INFRASTRUCTURE PLAN FOR IOWA'S FUTURE ECONOMY

A Strategic Direction

May 2010

IOWA DEPARTMENT OF ECONOMIC DEVELOPMENT

BY STATE PUBLIC POLICY GROUP, INC.

April 30, 2010

Bret Mills
Director
Iowa Department of Economic Development
200 East Grand Avenue
Des Moines, IA 50309

Dear Mr. Mills:

On behalf of the Infrastructure Planning Task Force, I am pleased to deliver the *Infrastructure Plan for Iowa's Future Economy: A Strategic Direction*. A product of ten months of work by more than 125 Iowans, the Plan sets forth bold steps for all Iowans to ensure that their children and grandchildren can live and prosper in this great state.

The 28-member Task Force and five Sector Committees stand by their assessments of Iowa's infrastructure and the critical need for coordinated planning and wise investments so that Iowa can maintain quality of life and compete in the global economy. Without significant infrastructure investment and careful decision making, the future looks dim for Iowa's economy and our competitiveness.

As you receive the Infrastructure Plan, the Task Force urges you to recognize and act upon the messages contained within these pages. Key infrastructure sectors – buildings and vertical infrastructure, energy, natural resources, telecommunications, and transportation – no longer can be considered separately, and Iowa's investments must leverage integrated sector impacts on our future.

In a brief section at the end of this Plan, the Task Force indicates its strong commitment to action and offers to continue their efforts to ensure momentum is not lost. The members welcome your interest in convening the group soon for ongoing, clearly-focused activities.

Finally, while state government plays an important role in the implementation of this plan, the recommendations and strategies have application for the private, nonprofit, and public sectors at all levels across the state. Stakeholders from an array of experiences and perspectives joined to review information and develop this plan; they expect that the impact of their work will be seen in the years and decades to come and are ready to support these changes.

Thank you and the Iowa Department of Economic Development for your support throughout the process and your consideration of the recommendations within this plan.

Sincerely,

Thomas W. Hart
Chair, Infrastructure Planning Task Force

CC Emily Hajek, Rebuild Iowa Office
David Miller, Iowa Homeland Security and Emergency Management

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INFRASTRUCTURE PLANNING TASK FORCE MEMBERS

Thomas W. Hart, Task Force Chair, Infrastructure Manager, Iowa Department of Economic Development, Des Moines

Rob Berntsen, Chair, Iowa Utilities Board, Des Moines

Elisabeth Buck, Director, Iowa Workforce Development, Des Moines

Joseph Cassis, Deputy Director, Iowa Communications Network, Des Moines

Wayne Chizek, Director, Geographic Information Services, Marshall County, Marshalltown

Dean Crist, Vice President of Regulation, MidAmerican Energy, Des Moines

Steve Fleagle, Chief Information Officer, The University of Iowa, Iowa City

Jeff Geerts, Special Projects Manager, Iowa Department of Economic Development, Des Moines

Chuck Gipp, Director, Division of Soil Conservation, Iowa Department of Agriculture and Land Stewardship, Des Moines

Bud Grant, Associate Professor, St. Ambrose University, Davenport

Emily Hajek, Chief of Staff, Rebuild Iowa Office, Des Moines

Paul Hanley, Director of Transportation Policy Research, The University of Iowa, Iowa City

Alexander King, Director, Ames Laboratory, US Department of Energy, Ames

Sheri Kyras, Director of Transit, CyRide, Ames

Mary Lawyer, Director of Business Development, Conlon Construction, Dubuque

Rich Leopold, Director, Iowa Department of Natural Resources, Des Moines

David Miller, Administrator, Iowa Homeland Security and Emergency Management, Johnston

Mike Miller, President and Chief Executive Officer, RACOM, Marshalltown

Bret Mills, Director, Iowa Department of Economic Development, Des Moines

Todd Misel, Communications Officer, Iowa Department of Public Safety - State Patrol, Des Moines

Jon Murphy, Director, Iowa Office of State-Federal Relations, Des Moines

Joe O'Hern, Executive Director, Iowa Finance Authority, Des Moines

Don Petersen, Director of Government Relations, Iowa Farm Bureau Federation, West Des Moines

Jim Prosser, City Manager, City of Cedar Rapids, Cedar Rapids

Nancy Richardson, Director, Iowa Department of Transportation, Ames

Daniel Sabin, President, Iowa Northern Railway Company, Cedar Rapids

Gerry Schnepf, Executive Director, Keep Iowa Beautiful, Des Moines

Roya Stanley, Director, Iowa Office of Energy Independence, Des Moines

The 28-member Task Force was assembled from the 125 members of the five Sector Committees. Task Force members were included based on ensuring a balance of public and private sector members, individuals representing key interest groups, academic and research specialists, stakeholders, department experts, and others active in the Sector Committee deliberations. The respective state department leaders of each Sector Committee were included. In addition, those who served on the Task Force displayed a penchant for broad-based thinking, problem solving, and a strong interest in addressing the infrastructure issues of the future.

ACKNOWLEDGEMENTS

Opportunities are rare for a diverse group to undertake a statewide, comprehensive, and visionary planning process without external constraints or requirements for compliance with a specific program. The members of the Infrastructure Planning Task Force are grateful that Iowa will benefit from the independent work of the many stakeholders throughout the infrastructure Sector Committee process and the plan development by the Task Force.

Iowa Department of Economic Development (IDED) provided the support and project direction for this initiative. The Task Force expresses its thanks to Project Manager Thom Hart and to IDED Director Bret Mills for their leadership.

Funding for this planning initiative was made available through a grant from the US Department of Commerce, Economic Development Administration. The Task Force expresses its appreciation to this important funder for their support of the work.

Members of the Sector Committees devoted their expertise, precious time, and resources to this initiative. To each, special thanks are offered. The Task Force also recognizes the state agency leaders who served as committee chairs and participated in the Sector Chairs Group providing additional support, insight, and guidance.

Staff and colleagues of the Task Force and Sector Committee members served the planning process well with their expertise, diligence, and commitment.

The Task Force also expresses its appreciation to those interested Iowans across the state who participated in the outreach meetings, contributing additional ideas and a practical perspective on the challenges and opportunities for Iowa's future economy.

Finally, appreciation is expressed to the SPPG staff for their coordination and facilitation of this complex planning initiative.

PREFACE

Iowa's infrastructure is at a crossroads. A stalwart collection of Iowans dared to consider Iowa's future economy, the way ahead for future generations, and what infrastructure will be required – and what will not be required – for Iowa to excel. The findings are full of opportunity and challenge. *The Infrastructure Plan for Iowa's Future Economy: A Strategic Direction* tells the story and points the way to a strong economy and quality of life for our children and our children's children.

This plan is different from most in that the motivation for its development came not from a requirement to comply or achieve a particular milestone, but, rather, from a recognition that infrastructure, in order to ensure a globally-competitive future economy, must transform from that of past generations.

It is not news that all infrastructure – from our rich soil to our bridges – is a challenge to maintain. Prior to the natural disasters of 2008 and the national economic crisis, Iowa was tested in its capacity to sustain not only the infrastructure, but to anticipate future needs. It is imperative that wise investments and planning guide Iowa's infrastructure development.

This plan reflects Iowa's collective assessment of its infrastructure– buildings, energy, natural resources, telecommunications, and transportation – as, literally, interdependent building blocks of our future. Over the months of planning, more than 200 Iowans participated as part of committees, a task force, or in community meetings. The plan is for all of Iowa, reflected in private, nonprofit, and public interests and involvement throughout the process. Iowa's success depends on all of Iowa, in all sectors and interests, to engage in its implementation.

The Infrastructure Plan for Iowa's Future Economy: A Strategic Direction sets a clear and bold direction for all stakeholders, making it clear all have a responsibility and an opportunity to contribute to Iowa's success.

EXECUTIVE SUMMARY

Iowans are rightfully proud of their state as an agriculture, business, and education leader. People are loyal, take care of one another, work to do the right thing, and want a bright future for their children and grandchildren. These are Iowa values.

Time is marching on, however. Iowa is facing new challenges in maintaining those values and Iowa's quality of life. Nowhere is this more evident than in the state's infrastructure. Buildings and other structures, energy, natural resources, telecommunications, and transportation are the foundation of our state and make possible the quality of life and economic strength on which Iowans build their lives and their work.

Even before the events of 2008, Iowa's infrastructure was shortchanged in repair, maintenance, improvements, and new development. The destruction from the tornadoes, storms, and floods of the spring and summer of 2008 and the national economic crisis later in the year resulted in a formidable challenge for Iowa's infrastructure. In early 2008, Governor Chet Culver asked Iowa Department of Economic Development to conduct a planning process for Iowa's infrastructure to ensure the economy of the future would be strong. Then came the natural and national economic disasters, making strategic thinking, planning, and initiatives more important than ever. Those collective challenges brought together more than 200 Iowans engaged in review and plan development activities focused on the five infrastructure sectors as they related to economic strength. The findings of these Iowans from across the state and all walks of life were stark, with a sense of urgency.

Iowa's infrastructure is unaffordable and unsustainable within the current systems. Much of the existing infrastructure costs too much to maintain. Demand for new infrastructure is high with no good way to pay for either its construction or ongoing costs, and, too often, it is developed in isolation from other partners or other infrastructure sectors.

Iowa's challenges can also bring opportunity. As a smaller state with a good balance of urban and rural areas and a population not afraid of hard work, Iowa's infrastructure problems can be addressed more easily than those in some other states. The current conditions of and future needs for infrastructure give Iowans license to plan strategically and incorporate the interdependence of infrastructure sectors through the steps they take.

Those involved in this planning process and who developed this *Infrastructure Plan for Iowa's Future Economy: A Strategic Direction* are committed to seeing the plan through to implementation and beyond. They believe the challenges are so important for Iowa that Iowans cannot afford to ignore the difficult work ahead.

THE CHALLENGES

This plan makes 25 recommendations that, taken together, will take Iowa's infrastructure to the next level, ensure quality of life, and allow the economy to be globally competitive. It requires two fundamental changes in Iowans' practices: cooperative planning and integration of infrastructure sectors.

Planning certainly occurs now in the private sector, interest and trade associations, and in the public sector at all levels. In the new Iowa approach, planning and infrastructure development must include partners, whether public, nonprofit, or private. Plans and decisions should be data driven and demonstrate an array of stakeholders that have worked through issues to create a collaborative plan. Infrastructure also needs to be socially, environmentally, and economically sustainable. Infrastructure planning and development must contribute to the quality of life and support a competitive economy.

The second fundamental change expands the view of infrastructure planning and development beyond a single sector, such as buildings. Instead of thinking only of constructing a new office building or school, transportation, telecommunications, and energy must be part of

the discussion. Natural resources – water, air, and soil – must also be considered as natural infrastructure that is impacted by all other sectors. How are all sectors affected and how would a new building impact those sectors? This approach assumes that "more" is not necessarily better.

New approaches to planning and decision making for Iowa's infrastructure will only be adopted and expected if all Iowans understand and demand these changes. The key is for the public, special interests, the private sector, and governments to see the infrastructure challenge, experience how it affects their lives and work, and become actively involved in developing the solutions. That shared vision will drive the transformation to affordable and sustainable infrastructure.

The strength of the economy is closely tied to Iowa's capacity and ability to be flexible, anticipate, and respond to opportunity. Infrastructure is critical to the economic future of Iowa. Without the right buildings, energy options, advanced connectivity, means of transport, and healthy natural resources to rely upon, the economy, simply, cannot succeed in the future. It is imperative that the state take decisive action to assure economic competiveness and health.

Throughout the planning for infrastructure to support Iowa's economy of the future, the planning groups kept in mind the following elements the state must meet in order to create and sustain a strong economy:

- Smart planning and growth principles
- A diversified economy that ensures a strong agricultural sector
- A skilled workforce for quality jobs
- Environmental stewardship
- Iowa-based energy solutions
- An economy that is globally competitive
- A population that chooses to live and work in Iowa
- Realistic funding for new and maintenance of new and existing infrastructure

In a very plain and overarching view of infrastructure, the state faces challenges that, when taken together, place Iowa at a crossroads.

- Iowans do not typically plan adequately for infrastructure, and if they do, they often plan independently of potential partners and without consistent criteria.
- Funding options are typically not tied to planning or other data-driven criteria, nor is it common for funding options to actively promote cross-sector initiatives.
- Planning for new infrastructure often includes only the first costs, and if costs over the life cycle of the infrastructure are not included in planning, the infrastructure becomes unsustainable over time.
- Demand for certain critical infrastructure is changing and rapidly increasing.
- Iowa's soil, water, and air are fundamental infrastructure for Iowa's economy and are currently at risk.
- Iowans expect more and better infrastructure when and where they want it, though they do not, typically, know about or take into consideration the costs.

THE DATA

The current situation is plain, and these examples of demographic and sector data help put the challenges of our infrastructure in context. From Iowa Department of Economic Development's Consolidated Plan:

- Iowa's total population grew by just 2.6 percent from April 1, 2000 to July 1, 2008, compared to 8 percent nationally.

- Only 25 of Iowa's 99 counties have posted population growth between 2000 and 2008.
- 719 of 950 Iowa municipalities, or 76 percent, had population losses.
- Demographic projections indicate that Iowa's population growth will continue to be concentrated in its nine metropolitan areas, while the state's rural areas will continue to lose population. Micropolitan areas, or regional trade centers with populations between 10,000 and 50,000, will likely remain stable but will not experience growth.
- From 2000 to 2008, Iowa experienced the following population changes related to age cohorts: residents under the age of 20 declined by 2.9 percent; residents ages 25 to 44 declined by 6.9 percent; and residents ages 45 to 64 increased by 20.6 percent.

From other sources, data about each sector shows the issues are broad and serious.

- It was reported in 2007 that 29 percent of Iowa's housing units were built in 1939 or earlier. Almost half of the state's stock of rural non-metro places were built before 1940.
- A 2007 Environmental Protection Agency (EPA) *Drinking Water Needs Survey and Assessment for Iowa* estimated more than $6 billion in infrastructure needs through 2026 for expanding, replacing, and rehabilitating systems to provide safe drinking water.
- The 2004 EPA *Clean Watershed Needs Survey and Assessment* reported nearly $1 billion in needs for Iowa waste water systems over the next 20 years. Many of these projects will be necessary to comply with the Federal Clean Water Act.
- To support business as usual today, Iowa's energy needs would be 12.6 percent higher in the year 2025. (Office of Energy Independence - OEI)
- Iowa is currently #1 in the US in wind generation output as a percentage of all electricity generation, with 17-20% of all electricity generated in Iowa coming from wind.
- Iowa produces the largest amount of ethanol of any state (one-fourth of the nation's ethanol supply) and is ranked ninth in ethanol consumption. (US Department of Energy)
- Iowa ranks 2nd in wind energy production (existing capacity) and 10th in potential capacity. (American Wind Energy Association)
- Iowa has among the nation's highest percentage of land in cultivation and ranks 49th in the nation in the percentage of land in public ownership. (Public Land Ownership by State Report, Natural Resources Council of Maine)
- Between 1989 and 2009, Iowa has increased the amount of corn produced by 68 percent on 9 percent more acres. In 1989, 12.25 million acres (1.45 billion bushels) were harvested with an average yield of 118 bushels per acre. In 2009, 13.4 million acres of corn (2.44 billion bushels) were harvested with an average yield of 182 bushels per acre. (Iowa Farm Bureau Federation)
- The Midwest is losing soil ten times faster than it can be replaced. (The National Academy of Sciences)
- There are 541 impaired bodies of water in Iowa that do not meet the state's clean water standards. (IDNR)
- One of the clearest trends in the United States observational record is an increasing frequency and intensity of heavy precipitation events. Over the last century there was a 50 percent increase in the frequency of days with precipitation over 101.6 mm (four inches) in the upper Midwestern US; this trend is statistically significant. (US Climate Change Science Program)
- About 8 percent of Iowa is part of a floodplain – areas of land that either have been or could be inundated by floodwaters.

EXECUTIVE SUMMARY

- According to the Sustainable Natural Resource Funding Study mandated in HF 2792 by the Iowa General Assembly in 2006, Iowa ranks 49th of 50 states for agriculture and natural resource funding.
- Average download speed is often used to compare connectivity. The United States was 28th among nations in download speeds in 2009. (Speed Matters, a project of the Communications Workers of America; www.speedmatters.org)
- Iowa ranked 35th among the 50 states in average download speeds in 2009. (Speed Matters)
- The United States ranked 15th behind other nations in broadband adoption. (Speed Matters)
- Motivation to provide improved telecommunications service in rural areas is low because the business model is not sustainable, they are small markets, with light population density, and significant cost to build the infrastructure to these areas with no guarantee of an ongoing customer commitment. (Telecommunications Sector Report, 2010)
- Iowa has over 114,000 miles of highway, with 31 billion vehicle miles of travel in calendar year (CY) 2008.
- While the Iowa Department of Transportation (DOT) has jurisdiction over approximately 8 percent of the total road mileage in the state, those roads carry 61 percent of all travel and 84 percent of all large truck travel.
- Secondary roads are vital to Iowa's agricultural economy. In 2007, Iowa's farmers produced over $20.4 billion in grains and livestock. With almost 90,000 miles of secondary roads in the state, each mile of secondary road supports approximately $225,000 worth of commodities every year. (Iowa Farm Bureau Federation)
- Iowa ranks 13th in the nation in miles of road; 5th in the number of bridges; 23rd in land area; and 30th in population.
- Nationally, Iowa ranks 30th in number of deficient bridges; 34th in rural interstate pavement condition; 43rd in urban interstate pavement condition; and, 43rd in rural arterial pavement condition.
- Iowa has approximately 4,000 miles of rail that haul 52.3 million tons of freight originating in Iowa; 43.7 million tons that terminates in Iowa; and, 237 million tons that move through Iowa.
- Iowa has 1,500 miles of recreational trails.
- Iowa has 500 miles of navigable rivers that carried 15.1 million tons of commodities in 2007.
- Based on March 2010 revenue estimates, the highway construction funding shortfall for Fiscal Year (FY) 2012 is $174 million.
- For public transportation to be a larger contributor to meeting the state's energy independence goals would require an additional investment of $350 million per year, which includes the $125 million per year additional investment required to meet the needs of Iowa's transportation disadvantaged.

These are but a few examples of the current status of the infrastructure upon which our quality of life, global competitiveness, and economy depend. Taken into consideration along with the real-life experiences of communities and families across the state, these data underscore the demand for a transformation of how infrastructure investments are determined and funded in order to make the infrastructure we need more affordable, efficient, and contribute to our future economy.

THE RECOMMENDATIONS

Iowa must move forward immediately to address the urgent need to shaping Iowa's future economy. The Task Force's four overarching recommendations speak to the need for maintaining the momentum of this planning initiative and the current focus on infrastructure brought about by the disasters and economic challenges. The Task Force does not seek to create additional bureaucracy in state government, but feels strongly that a continuing statewide emphasis must be appropriately placed on these issues.

EXECUTIVE SUMMARY

The Infrastructure Planning Task Force, in addition to its four overarching recommendations, adopted the complete body of recommendations developed by the five Sector Committees. It is important to realize that these recommendations are not exhaustive; they are not intended to reach into every issue in every sector. Rather, these recommendations point the direction to a new approach to Iowa's infrastructure challenges and opportunities. The following 25 recommendations, when implemented, will set Iowa on the course to a strong future economy with a critical foundation of affordable and sustainable infrastructure.

Infrastructure Planning Task Force Recommendations

1. In recognition of the urgent challenges facing Iowa's future infrastructure, immediately reconvene interested members of this Infrastructure Planning Task Force to begin implementing the work recommended by the Task Force in the planning initiative.
2. Establish a statewide planning structure with responsibility to ensure ongoing local and state level, private, nonprofit, academic, public, and citizen involvement in coordinated, integrated infrastructure planning, without a new structure adding to state government bureaucracy.
3. Implement all of the recommendations of each Infrastructure Sector Committee, with consideration for economies of scale and interdependency of the five sectors: buildings and vertical infrastructure, energy, natural resources, telecommunications, and transportation.
4. Engage the public in developing a vision for Iowa's future that includes an understanding of infrastructure requirements to achieve the vision.

Buildings and Vertical Infrastructure Sector Recommendations

1. Establish a framework and principles to guide infrastructure planning, investments, and oversight.
    a. Ensure stakeholder, community, and regional leadership and collaboration.
    b. Make development decisions predictable, equitable, and cost effective.
    c. Promote clean energy production and increase energy efficiency.
    d. Increase diversity of job and business opportunities.
    e. Concentrate development within communities and mix land uses.
    f. Improve housing opportunities and choices.
    g. Foster distinctive, attractive communities with a strong sense of place, identity, and marketability.
    h. Protect, preserve and wisely utilize natural resources and agricultural lands.
    i. Incorporate green building and infrastructure design that is structurally sound, durable, healthy, and safe.
    j. Provide for a variety of transportation choices and maximize walkability and mobility.
    k. Demonstrate financial sustainability for maintenance and operation.
2. Provide information and technical support for stakeholders on the elements of sustainable infrastructure.
3. Ensure that funding and regulatory structures support infrastructure priorities.
4. Encourage evidence-based decisions using data that can be analyzed regionally.

Energy Sector Recommendations

1. Establish a system to support an energy literate population in Iowa through education and information on implementing solutions to meet energy goals.
2. Establish a business climate and stable government investment structure that responsibly supports energy technology research, development, demonstration, and deployment. This structure would include policy and financial incentives to support all phases of development from early stage commercialization to the marketplace.

a. Policy and financial incentives in these areas should reflect both environmental and cultural factors.
b. This will require easy access, influence, and capitalization of federal opportunities and polices that benefit the state and nation.
c. Lead the global economy through lower energy costs and innovation in renewable energy technology.

3. Build a recognition that Iowa's primary resources (soil, water, wind, and an educated, motivated workforce) provide value-added opportunities throughout the state, and that capitalization requires consideration for the state's diverse communities and sustainability.
4. Balance infrastructure policy decisions with the need for stability, flexibility, and agility, while appropriately valuing current infrastructure.
5. Develop coordinated outreach in energy efficiency across sectors, establishing Iowa as a leader in best practices.

Natural Resources Sector Recommendations

1. Increase organic carbon levels in soil.
2. Manage watersheds and water resources to sustain quality and quantity necessary to meet community, business and ecological uses.
3. Manage watersheds and floodplains to reduce the impacts of flooding.
4. Implement practices to ensure Iowa's air will meet new federal public health and welfare standards.
5. Require that the impact on ecosystems be determined and considered in infrastructure planning and development.
6. Create opportunities to increase the use, enjoyment, and appreciation of Iowa's natural and cultural heritage.

Telecommunications Sector Recommendations

1. Create connectivity for all through a common, unified backbone that supports the public interest, is a public-private partnership that includes mutual benefits, and is built by consortiums.
2. Establish state policy that represents the public interest, pursues and advocates the mission/vision for telecommunications, and establishes financial plans to implement the policy.
    a. Establish state policy for "criteria" or goals for connectivity to the curb of every premise (fiber or equivalent transport technology), such as globally-competitive speed, universal access, and cost.
    b. Establish state policy for "criteria" or goals for consumer adoption.
    c. Establish a mechanism to recommend policies, processes, and programs and to coordinate the common, statewide system, including a review of tax and regulatory policy for telecommunications and related industries and of investment policy.
    d. Determine the state entity to implement the policy.
3. Establish a state consumer protection policy incorporating performance metrics for the purpose of telecommunications services and determine the state entity to implement the policy.

Transportation Sector Recommendations

1. Assess the current transportation system and shortfalls, and develop affordable methods to prioritize, improve, and achieve accessible transportation for people, goods, and services.
2. Determine transportation infrastructure funding levels, new funding and financing mechanisms, revenue generation methods and prioritization for investments, distribution methods, and priorities for project funding.
3. Engage and educate stakeholders, users, and citizens regarding transportation infrastructure funding and financing mechanisms, sustainable project priorities, investment decision-making, and policies and procedures.

TAKING CHARGE OF IOWA'S FUTURE ECONOMY

Additional information and detail about each of these recommendations and rationale for their inclusion is included in the complete plan. The Infrastructure Planning Task Force took the work of the Sector Committees a step further by recommending immediate activities to accompany each recommendation. The complete work of each Sector Committee is also incorporated into the *Infrastructure Plan for Iowa's Future Economy: A Strategic Direction*, with the exception of the supporting documents section.

The people of Iowa – the citizens, community leaders, business and industry sector, educators, issue advocates, and elected officials at all levels – all across the state must take charge of Iowa's future economy and help create the atmosphere for transforming the state's infrastructure.

The challenges are not simple, nor are the solutions. However, it is clear that the cost and consequences are greater if the state – the people, together – do not claim ownership of the future.

Those engaged for the past ten months in this planning initiative stand firmly committed to act upon the recommendations developed through careful consideration and difficult deliberations. The Infrastructure Planning Task Force, in this document, requests that members be reconvened very soon to move from planning into public engagement and implementation of these recommendations. Iowa can no longer afford the status quo.

INTRODUCTION

Iowa, like many states, is challenged to balance available resources with the demand for infrastructure development, maintenance, and improvement. This *Infrastructure Plan for Iowa's Future Economy: A Strategic Direction* looks in new ways at which infrastructure is necessary, which is not necessary, and how infrastructure is interdependent across sectors. Even while examining each sector separately, it is clear that in the future, sectors cannot be considered in isolation from others.

Infrastructure supports our economic activity, and strategic investments in infrastructure are required for a strong and globally-competitive future. Not only is the right infrastructure necessary for competitive economic positioning, but Iowans also influence their quality of life through the choices they make about their infrastructure. This is not news, but planning in new ways that considers all of Iowa and connects infrastructure sectors will fundamentally change the opportunities and how infrastructure investments are made and sustained.

In his Condition of the State address in January 2008, Governor Chet Culver recognized the challenges and opportunities when he called for a long-range, comprehensive infrastructure plan that "must address every facet of our 21st century infrastructure, to ensure that we continue to grow our economy and support the jobs of the future." The need was clear then, in the winter of 2008. Then came the spring and summer, bringing the tornadoes, storms, and floods of 2008. In the fall it was clear the national economy was facing a crisis that further tested our capacity to support our infrastructure. Even as we begin to recover, if ever there was a need for a strategic direction to ensure Iowa's strong future economy, it is now.

The time is right, but the window of opportunity will not remain open for long.

There is great opportunity for Iowans, but only if we can meet the challenges of our infrastructure. This plan focuses on five key infrastructure sectors – buildings and vertical infrastructure, energy, natural resources, telecommunications, and transportation. Each impacts and is impacted by the others, and the challenges include recognizing and incorporating those impacts as well as leveraging the value and priorities among sectors.

This plan, then, is for all Iowans. While there are key roles for state government, this is not a state government plan. Rather, it is a living document with application for Iowans across the state. Private sector, nonprofit sector, interest groups and associations, and local government will see how they fit – and what responsibilities they may embrace – in working collectively to implement the recommendations developed by and for Iowans with real experience in the sectors.

The responsibility for conducting a planning process that actively engaged more than 200 Iowa stakeholders was given to Iowa Department of Economic Development (IDED). The ten-month process drew from an independent set of sector experts and interested stakeholders convened to conduct difficult deliberations leading to this Plan. The opportunity to benefit from the *Infrastructure Plan for Iowa's Future Economy: A Strategic Direction* is open to all.

IOWA'S INFRASTRUCTURE NOW AND IN THE FUTURE

Bold action is required to position Iowa to compete in the economy of the next generation. At the same time, Iowans continue to expect a high quality of life no matter where they live in the state. Certainly, there is a cost related to these actions. However, the cost of *NOT* taking action is greater. Simply stated, Iowa's infrastructure needs a lot of attention. The status quo means Iowa will continue to lose ground to other states and to countries around the globe.

What is the current status of Iowa's infrastructure, in general? What are the problems that need solutions? In a very plain and overarching view of infrastructure, Iowa faces issues that, when taken together, place Iowa at a crossroads.

- Iowans do not typically plan adequately for infrastructure, and if they do, they often plan independently of potential partners and without consistent criteria.
- Funding options are typically not tied to planning or other data-driven criteria, nor is it common for funding options to actively promote cross-sector initiatives.
- Planning for new infrastructure often includes only the first costs, and if costs over the life cycle of the infrastructure are not included in planning, the infrastructure becomes unsustainable over time.
- Demand for certain critical infrastructure is changing and rapidly increasing.
- Iowa's soil, water, and air are fundamental infrastructure for Iowa's economy and are currently at risk.
- Iowans expect more and better infrastructure when and where they want it, though they do not typically know about or take into consideration the costs.

Iowa's leaders and residents want the state to grow and prosper in the future, making Iowa a place where people enjoy living and working, have quality of life, and have options for recreation, health, and education. It takes a strong economy to attract and retain people, industry, business, and cultural amenities. From leaders – whether private, nonprofit, or public sector – intentional focus and commitment to infrastructure is required to create our viable future as a state. Infrastructure makes a bright future possible, but it must be the right infrastructure, with planning and decisions based on data and considered in context of multi-sector benefits and achieving strategic priorities.

As a state, Iowa became focused on infrastructure recently because of the events of the past two years. The severe damage to parts of the state from the tornadoes, storms, and floods required recovery efforts to repair and rebuild some infrastructure already needing attention, as well as other infrastructure that only required work because of the disaster damage. The national recession and accompanying American Recovery and Reinvestment Act (ARRA) is infusing funds as well, much of which is targeted on infrastructure. Finally, Iowa's I-JOBS program also secures improvements in infrastructure based on demonstrated need.

These short-term infusions of funds have allowed Iowa to repair, replace, and in, some cases, improve infrastructure that was an existing priority for one reason or another. For a time, the term "shovel-ready" was on the lips of all public officials as they diligently worked to secure precious resources to address issues they knew were of immediate need. With the waning of those funds directed to short-term projects, infrastructure opportunities will shift as well.

Time is of the essence. Iowans must recognize the future in the faces of the next generations, act to change current unsustainable practices, and prepare to support a thriving future economy, workforce, and quality of life for Iowans. Some might think this Plan "cries wolf," but those individuals who served in this effort to explore Iowa's current status to project the demands of a healthy future economy see a looming crisis for Iowa's infrastructure.

IOWA'S INFRASTRUCTURE NOW AND IN THE FUTURE

Without transforming how Iowans address infrastructure expectations and requirements, the economy of this state will suffer from this point forward. The unexpected influx of funding from disaster and economic programs has had benefits well beyond funding for projects. Iowans have begun to promote joint planning, review past practices, and carefully consider the investments for the future. Many of those initial efforts, however, have not been sustained.

Now, this strategic planning process focused on Iowa's economy boosts the expectations at all levels for making more careful and wise decisions in the future. The circumstances of the past two years are forcing Iowa to shift to strategic, data-driven decisions and have provided the momentum to continue the early progress. Simply, Iowa must use a strategic approach for selecting its infrastructure priorities and adopt criteria by which it will determine and fund those integrated infrastructure projects.

ESSENTIAL ELEMENTS OF THE FUTURE ECONOMY

Based on experience, expertise, and a healthy dose of practicality, essential elements of a future economy make it clear that this Plan raises the bar. Focused on the future, this plan sets these eight elements as expectations for an Iowa of 2020 and beyond.

- Smart planning and growth principles
- A diversified economy that ensures a strong agricultural sector
- A skilled workforce for quality jobs
- Environmental stewardship
- Iowa-based energy solutions
- An economy that is globally competitive
- A population that chooses to live and work in Iowa
- Realistic funding for new and maintenance of new and existing infrastructure

IOWA DEMOGRAPHICS

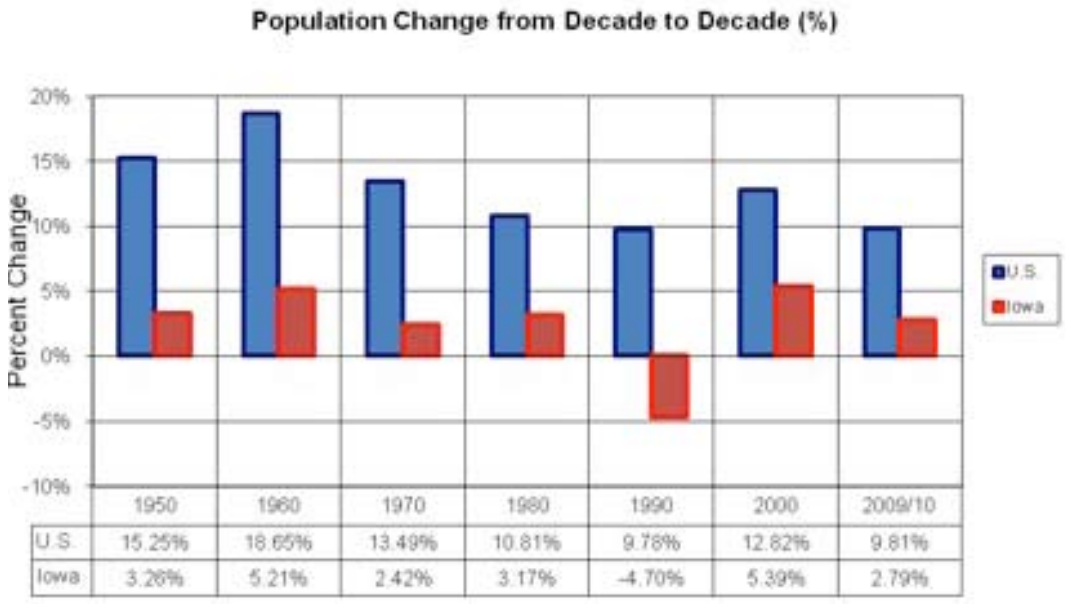
The demographics of the state clearly play a role in how infrastructure investment is approached for future economic vitality and quality of life for a population that chooses to live and work in the state. From the state Consolidated Plan, developed by Iowa Department of Economic Development, demographics illustrate the changes in population and impacts on areas of the state.

- Iowa's total population grew by just 2.6 percent from April 1, 2000, to July 1, 2008, compared to 8 percent nationally.
- Demographic projections indicate that Iowa's population growth will continue to be concentrated in Iowa's nine metropolitan areas, while the state's rural areas will continue to lose population. Micropolitan areas, or regional trade centers with populations between 10,000 and 50,000, will likely remain stable but will not experience growth.
- Only 25 of Iowa's 99 counties have posted population growth between 2000 and 2008.
- 719 of 950 Iowa municipalities, or 76 percent, had population losses.
- Declining Iowa communities shed 54,148 persons this decade, and growing communities added 128,767 persons.
- From 2000 to 2008, Iowa experienced the following population changes related to racial and ethnic groups: White residents declined by 0.2 percent; Black residents increased by 26.9 percent; Asian residents increased by 41.1 percent; and Hispanic and Latino residents increased by 52 percent.
- From 2000 to 2008, Iowa experienced the following population changes related to age cohorts: residents under the age of 20 declined by 2.9 percent; residents ages 25 to 44 declined by 6.9 percent; and residents ages 45 to 64 increased by 20.6 percent.

According to Iowa State University researchers, the impact of these demographics is significant for the state and communities:

- Industry and job losses have been significant in the micropolitan areas.
- Manufacturing will still be important, but job numbers will be down – the most efficient and productive will endure; the inefficient will disappear.
- Tax capacity in nonmetropolitan communities is rapidly eroding.
- Business, personal care, education, and health services will lead in demand for jobs.

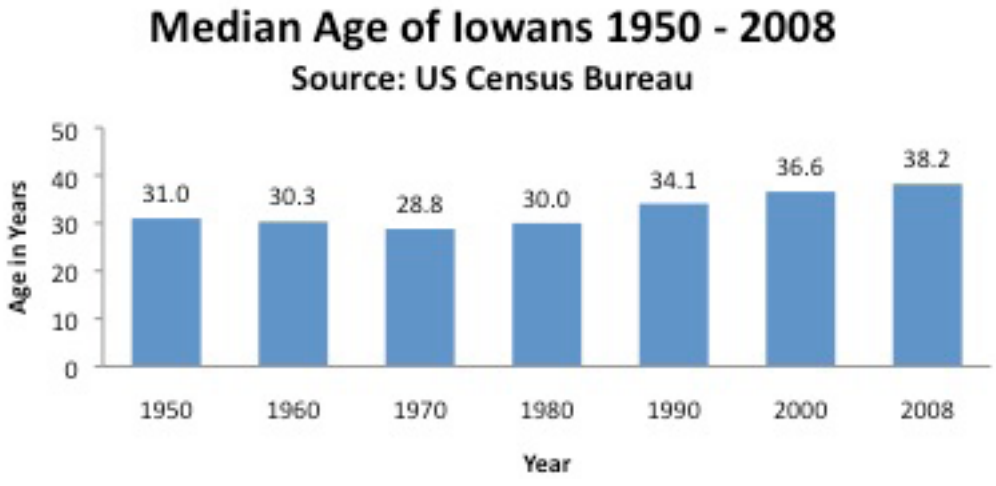
While these data provide perspective over the past 10 years, it is important to recognize that Iowa's population growth has historically lagged behind that of other states and the US as a whole. The following chart illustrates the percent of growth in Iowa's population as compared to that of the United States each decade since 1950. Iowa lost population during the decade of the farm crisis in the 1980s, and regained population in the decade following.



	1950	1960	1970	1980	1990	2000	2009/10
U.S.	15.25%	18.65%	13.49%	10.81%	9.78%	12.82%	9.81%
Iowa	3.26%	5.21%	2.42%	3.17%	-4.70%	5.39%	2.79%

Source: US Census Bureau

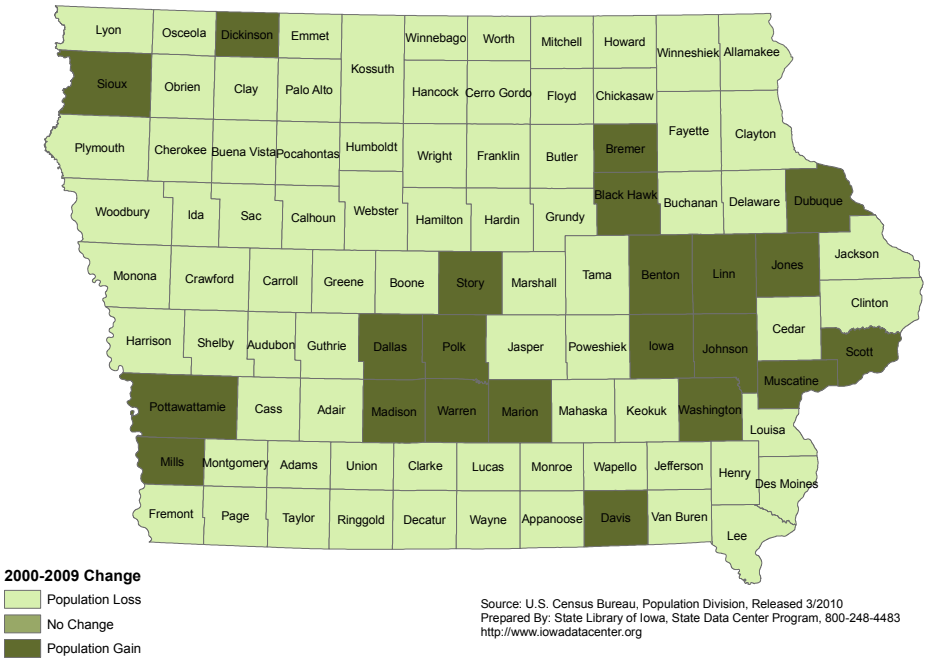
The median age of Iowans has been increasing steadily since the 1970s. The following data illustrate the median age in years from 1950 through 2008, the last date for which data are available. Again, the largest jump in median age occurred during the 1980s farm crisis when many working-age Iowans left the state, some to return in the next decade.



IOWA'S INFRASTRUCTURE NOW AND IN THE FUTURE

Trends in population shifts show that over the last sixty years, Iowans have continued their moves from more rural areas to more populated counties. This movement has increased as a result of the recession and loss of jobs that impacted rural and micropolitan areas more than urban areas. The following map shows which counties gained population and which lost population over the past decade.

Iowa Counties by Population Gain or Loss: 2000-2009



Source: U.S. Census Bureau, Population Division, Released 3/2010
Prepared By: State Library of Iowa, State Data Center Program, 800-248-4483
http://www.iowadatacenter.org

SECTOR ASSESSMENT AND DATA

Each infrastructure sector has strengths and challenges within its existing infrastructure as well as challenges in meeting emerging needs and changing demands of future generations. The status of each sector creates a strong case for an integrated approach to future infrastructure investments. It is valuable to highlight examples of the overlap and integration of sectors as further evidence of the opportunities for Iowa's future economy.

Integration of sectors can be seen in private and public initiatives of many types across the state. It is these innovations that must become commonplace and part of all infrastructure planning and development in the public and private arenas. For example, The University of Iowa's (UI) Power Plant Oat Hull Project involves a partnership with Quaker Oats in Cedar Rapids to find and use a unique biomass fuel. Oat hulls are a byproduct of Quaker Oats' process of making cereal. The UI Power Plant uses this source of fuel to generate power, replacing energy that would otherwise have been generated from burning coal.

This good example of recycling byproducts illustrates crossover between infrastructure sectors and private and public education interests. Retrofits of downtown housing and commercial structures in Dubuque, Des Moines, and elsewhere are similar examples of building on existing infrastructure in ways that make it sustainable for future generations. Smaller communities also can come together to undertake integrated infrastructure development. West Union is focusing on sustainable urban design and developing best practices for green infrastructure.

In each of these examples, a set of much-needed champions and advocates for infrastructure emerge and engage others. With successful innovative infrastructure planning, data-driven decision making, and quality implementation, advocates for the new approach to infrastructure will achieve a stronger voice.

Buildings and Vertical Infrastructure

Residential, commercial, industrial, public, and nonprofit buildings and facilities that serve a public need, as well as supporting physical systems are included in the scope of the buildings and vertical infrastructure sector. Examples of supporting physical systems are sewer, water, gas, and electrical systems. Within this category, Iowa's infrastructure needs are so great that the state can no longer approach buildings and vertical infrastructure decisions and investments in the status quo manner. The reality is that Iowa cannot afford or sustain its current infrastructure. Current demographics and projections indicate that the state has too much infrastructure to reasonably maintain, which also limits the ability to invest in infrastructure improvements for the future.

Iowa is further challenged to address the scope of these infrastructure needs, recognizing that current planning and investments are not coordinated at state, regional, or local levels, and there is no mechanism to encourage or support such coordination. Often infrastructure decisions are made with short-term interests in mind, but bring significant long-term operating costs for those structures, as well as costs of other public utilities such as gas, electric, water, and sewer. Additionally, the current approach to financing infrastructure is fragmented and encourages behaviors and patterns in development that are unsustainable and against collective long-term interests. The approach for distributing resources is often reactive, and resources tend to be distributed as evenly as possible to create a sense of fairness rather than allocating resources according to strategic priorities.

Some facts related to buildings and vertical infrastructure illustrate the current situation and provide insights into the future.

- In 2009, the Iowa Department of Economic Development produced a report as an early product of this planning initiative. *Preliminary Assessment of Public Infrastructure Needs* outlined state and local "ready-to-go" public building and vertical infrastructure projects. More than 3,500 local projects with an estimated cost of $10 billion were self-reported by cities, counties, K-12 public schools, community colleges, and Councils of Government. State projects were tallied separately from the $10 billion local projects. The assessment did not seek information about major, long-term projects or plans or about private infrastructure needs.
- It was reported in 2007 that 29 percent of Iowa's housing units were built in 1939 or earlier, compared with 14.5 percent for the US. A 2003 housing study states that almost half of the state's stock of rural, non-metro places were built before 1940.
- Iowa lags the nation strongly in the percentage of housing built since the 1980s.
- The Iowa Finance Authority's 2007 *Housing Study* cited long-term challenges to upgrading the quality of existing older homes, and because housing prices grew faster than family incomes in the first half of the decade, new and low- to moderate-income Iowans will continue to struggle to afford safe, quality housing.

- Affordable, accessible housing options for older Iowans and persons with disabilities are currently limited, with needs becoming more difficult to meet as Iowa's population ages.
- A 2007 Environmental Protection Agency (EPA) *Drinking Water Needs Survey and Assessment* for Iowa estimated more than $6 billion in infrastructure needs through 2026 for expanding, replacing, and rehabilitating systems to provide safe drinking water.
- The 2004 EPA *Clean Watershed Needs Survey and Assessment* reported nearly $1 billion in needs for Iowa waste water systems over the next 20 years. Many of these projects will be necessary to comply with the Federal Clean Water Act.

Energy

The scope of the energy sector is considered to include components of the production, transmission, transport, distribution, storage, and usage systems that provide for efficiency, opportunities to increase affordability, safety, environmental and human health, reliability, and availability for the state to become energy independent and position Iowa as a supplier of energy and energy technologies to support economic development.

Iowa can gain an economic advantage in the energy sector if the state can produce and use energy in a variety of forms and deliver them to other states. Infrastructure priorities are still evolving and depend upon regulation, practice, management structures, and scientific innovation. Expansion of wind, solar, and biofuels energy has great potential, though each will require significant and different infrastructure investments. The state's strengths are in its current energy infrastructure that includes technology and innovation at the academic and business levels, a commitment to natural resources, a strong agricultural economy, and well-maintained roads. Infrastructure challenges include robust transmission and transport systems because of Iowa's opportunities for wind export and the state's dependence on imported energy.

- Electricity consumption is growing at 2.1 percent per year, placing Iowa 30th in growth of electricity consumption. (US Department of Energy)
- Transportation and residential are the 2nd largest energy-consuming parts of Iowa's economy, behind industry. (US Department of Energy)
- According to a 2009 Gallup/USA *Today* poll, 68 percent of Americans say they have taken steps in the past year to improve the energy efficiency of their homes.
- In March 2010, the Iowa Office of Energy Independence's (OEI) State of Iowa Energy Efficiency Appliance Rebate Program obligated the entire funding allocation – $2,775,150 – within one business day of opening the program, due to a high level of interest from the public. (OEI)
- Energy efficiency is shown to increase productivity and reduce environmental impact, stress on overtaxed infrastructure, and dependence on foreign fuels. (OEI)
- Iowa is one of the leading states in per-capita spending on energy efficiency and load management, according to a nationwide analysis by the Consortium for Energy Efficiency. In 2007 Iowa's investor-owned utilities budgeted $94.8 million for energy efficiency and load management – a per capita level of $31.73. In per capita spending, Iowa ranks third nationally behind Vermont and California. (Energy Efficiency in Iowa's Electric and Natural Gas Sectors, Iowa Utilities Board, 2009)
- Fuel sources for electric power generation in Iowa include coal (76 percent), natural gas (4.1 percent), petroleum (0.3 percent), nuclear (10 percent), hydroelectric (1.5 percent), and renewable sources (8 percent). (US Department of Energy)
- Iowa continues to rely heavily on imported energy; more than 93 percent of primary energy sources come from out of state. (US Department of Energy)
- Clean technology accounts for 15 percent of private capital investments in the US. (TechCrunch)

IOWA'S INFRASTRUCTURE NOW AND IN THE FUTURE

- Iowa is ranked 14th in electricity production from non-hydroelectric renewable energy. (US Department of Energy)
- Transmission investment crucial to the continued development of Iowa's renewable industry, including wind generation, will be made. … Reduced congestion and a more robust transmission system will stimulate the wholesale market, which should bring prices down (or mitigate increases) for all electricity users." (SPU 2007-0011, Iowa Utilities Board)
- Iowa produces the largest amount of ethanol of any state (one-fourth of the nation's ethanol supply) and is ranked 9th in ethanol consumption. (US Department of Energy)
- Iowa ranks 2nd in wind energy production (existing capacity) and 10th in potential capacity. (American Wind Energy Association)
- An estimated 17-20 percent of all electricity generated in Iowa comes from wind, as of January 2010. This output is generated in Iowa, but may be consumed outside of the state. This reflects the expected annual performance of all wind generation installed in Iowa to date, not historic performance. (Iowa Utilities Board Staff)
- It is estimated that Iowa is currently first in the country in wind generation output as a percentage of all electricity generation in the state. (Iowa Utilities Board Staff)
- The three fastest-growing energy sectors are wind, solar, and biofuels. (PlanetGreen)
- Although the Midwest has lost more than 1.2 million manufacturing jobs since 2000, recent studies suggest that new energy industries can create 1.2 million jobs over the next decade, with as much as a third of those in high wage, skilled manufacturing and construction jobs. (Iowa Workforce Development)
- Disruptive technologies (innovations that improve a product or service in ways that the market does not expect and often displace or marginalize existing usage) are expected to increase in availability.
- Energy consumption is expected to increase by 60 percent worldwide between 2002 and 2030, but renewable energy will continue to count for 14 percent of all energy used. (OEI)
- To support business as usual today, Iowa's energy needs would be 12.6 percent higher in the year 2025. (OEI)
- Iowa ranks 12th in total energy consumption per capita. (US Department of Energy)
- Iowa's energy expenses for principal sources in 2007 were $14.3 billion. (OEI)
- Reduced energy costs attract desirable industries. For example, Osage, Iowa, gains $2.23, in economic development for every $1 spent on energy efficiency. (OEI)
- Changes in energy consumption and performance could affect current building needs, codes, and tax structures for roads.

Natural Resources

Natural resources encompass Iowa's raw materials such as soil, water, and air, but also include physical infrastructure such as parks, trails and lakes; plants, wildlife and livestock; as well as public attitudes and practices such as conservation, land use or even driving habits. The scope of this sector, then, focuses on soil, water, air, ecosystems, and culture related to Iowa's natural resources.

The quality of natural resources is frequently impacted by their interaction with one or more of the other sectors. Industry, including agriculture, heavily impacts the state's soil, water, and air. It has been suggested that these natural resources are a barometer of how well the state is planning and implementing other infrastructure sector practices and projects. Without careful consideration of impacts on natural resources, other activities of Iowans at work and play can place those resources at risk. This sector relies a great deal on private interests to wisely use and safeguard our natural resources, even though the public may think of natural resources in a more narrow, recreational way. As an agriculture-based economy, Iowa's economic future is tied to the quality and well-being of the natural resources infrastructure.

- About 98 percent of the state's 36 million acres is privately owned – leaving just two percent open for public use. That means decisions made on private lands have a large impact on the quality of our water, wildlife, retention of top soil, recreational opportunities, and more. (Iowa Department of Natural Resources, (IDNR))
- Iowa has among the nation's highest percentage of land in cultivation and ranks 49th in the nation in the percentage of land in public ownership. (*Public Land Ownership by State Report*, Natural Resources Council of Maine)
- In 1985, farmers planted 878,000 acres of small grains like oats, wheat and rye, and forage crops like alfalfa and clover. These small grains provide habitat for wildlife and keep soil from washing off into streams and lakes. In 2007, that number dropped to just 95,000 acres – a loss of 89 percent. At the same time, the number of farms in Iowa has declined 20 percent, while the average farm size continues to grow. (IDNR)
- Between 1989 and 2009, Iowa has increased the amount of corn produced by 68 percent on 9 percent more acres. In 1989, 12.25 million acres (1.45 billion bushels) were harvested with an average yield of 118 bushels per acre. In 2009, 13.4 million acres of corn (2.44 billion bushels) were harvested with an average yield of 182 bushels per acre. (Iowa Farm Bureau Federation)

- The Midwest is losing soil ten times faster than it can be replaced. (The National Academy of Sciences)
- Since the conversion of land from wetlands and prairies to row crop agriculture and grazing, Iowa's soil has lost up to 50 percent of its organic matter. (Dr. Rick Cruse, Iowa State University, College of Agriculture and Life Sciences)
- Increased organic matter helps the soil act like a sponge allowing it to absorb and retain more water. Soil with increased organic matter develops a lower bulk density that has more pore space which captures rain and snowmelt so that runoff never begins. (IDNR)
- There are 541 impaired bodies of water in Iowa that do not meet the state's clean water standards. (IDNR)
- The 2004 *Clean Watersheds Needs Survey and Assessment* reported that the cost of Iowa's need for publicly-owned water treatment is more than $950 million. This figure represents documented needs for up to a 20-year period. The Environmental Protection Agency (EPA) defined a need as a project, with associated costs, that addresses a water quality or public health problem.
- The 2007 EPA *Drinking Water Needs Survey and Assessment* reported that Iowa's need is more than $6.1 billion. This estimate represents infrastructure projects necessary from January 1, 2007, through December 31, 2026, for water systems to continue to provide safe drinking water to the public.
- One of the clearest trends in the United States observational record is an increasing frequency and intensity of heavy precipitation events. Over the last century there was a 50 percent increase in the frequency of days with precipitation over 101.6 mm (four inches) in the upper Midwestern US; this trend is statistically significant." (US Climate Change Science Program)
- Most of the riskiest areas in Iowa lie in or near a floodplain, particularly along larger rivers. About 8 percent of Iowa is part of a floodplain – areas of land that either have been or could be inundated by floodwaters. In 2008, several Iowa towns experienced extreme flooding when levees were overtopped or breached. Statistics show that if a home or business lies in the 100-year floodplain, the chance of being damaged by a flood is seven times greater than the chance of being damaged by a fire. (IDNR)
- Iowa has had multiple presidential disaster declarations due to flooding in 7 of the last 10 years. On average, each of those declarations involved more than 26 counties. (IDNR)
- Watershed size varies widely, but there are approximately 1,400 watersheds in Iowa that are the size (25-40,000 acres) in which watershed improvement projects can be successful. (IDNR)
- The EPA estimates 23 toxic chemicals are in high enough concentration in Iowa's air to pose excessive health risks from long-term, low-level exposure. The EPA attributes some health concerns in Iowa to breathing these chemicals for many years. Despite toxic chemical reductions being a major goal in the 1990 Clean Air Act, Iowa is one of 14 states without an air toxics control program. Currently Iowa's air is monitored for six common pollutants (sulfur and nitrogen oxides, carbon monoxide, particulates, and ozone smog), and limited monitoring in five urban areas for toxic chemicals has just begun.
- Impacts of development that has affected ecosystem are common. One impact is the loss of riverine wetlands where the river can reconnect with its floodplain in times of high flood flows. Another impact is the loss of prairie pot-hole wetlands where drainage has destroyed the terrestrial habitat and drainage water carries high levels of nitrate causing downstream problems such as drinking water problems for water utilities and hypoxia in the Gulf of Mexico. (IDNR)

- According to the *Sustainable Natural Resource Funding Study* mandated in HF 2792 by the Iowa General Assembly in 2006, Iowa ranks 49th of 50 states for agriculture and natural resource funding.
- Outdoor recreation opportunities are important to Iowans as evidenced by more than 25 million visits made annually to Iowa state parks and lakes. County park visits are estimated to be at a comparable level of about 23 million visitor groups. (*The Economic Value of Iowa's Natural Resources*, Daniel Otto, Iowa State University, Department of Economics)
- Recreation opportunities and natural resources are important to retaining and attracting skilled workers in the state. Quality of life factors are increasingly important considerations in the competition for recruiting and retaining entrepreneurs and skilled workers. National and regional studies, which include Iowa, have consistently identified quality natural resources as an important factor in rates of economical growth. (*The Economic Value of Iowa's Natural Resources*, Daniel Otto, Iowa State University, Department of Economics)

Telecommunications

Infrastructure to provide information for all needs for everyone, at any time, anywhere encompasses the scope of the telecommunications sector. Reliance of Iowans on connectivity and telecommunications services is often invisible even as demand grows rapidly. The term "telecommunications" belies the vast changes that have occurred in recent decades and that will continue at an increasing pace and scope in future years. The ability of Iowa's telecommunications infrastructure to fulfill the demand for information for all needs, anytime, anywhere, for anyone, will increasingly define Iowa's competitive success. In other words, what Iowa needs to grow and sustain its population, jobs, and economy is a world-class telecommunications system. This becomes more evident as information transport requirements have shifted from voice to a focus on data and ever-evolving technology.

Connectivity and instant access to information is becoming the standard expectation for people around the world. Businesses cannot compete without adequate capacity and speed. Demand for connectivity is increasing as new personal and commercial uses of technology and connectivity are found every day. The first generation of digital natives – young people who were born into use of computers and have never known a world without the technology – will further impact the demand and development of affordable, accessible, and very high speed connectivity.

- Average download speed is often used to compare connectivity. The United States was 28th among nations in download speeds in 2009. (Speed Matters, a project of the Communications Workers of America; www.speedmatters.org)
- Iowa ranked 35th among the 50 states in average download speeds in 2009. (Speed Matters)
- The United States ranked 15th behind other nations in broadband adoption. (Speed Matters)
- Connectivity in Iowa varies widely, with key factors being capacity, speed, access, and cost.
- Connectivity (using fiber or equivalent transport technology) must provide the greatest potential for capacity, speed, and access at a reasonable cost for a unified backbone network. Wireless will, certainly, continue to play a role in the ubiquitous network, but most likely, and considering the knowledge of available technology, the infrastructure will require a foundation consisting of some type of a wire in the ground. (Telecommunications Sector Report, 2010)

IOWA'S INFRASTRUCTURE NOW AND IN THE FUTURE

- Iowa has a great deal of telecommunications infrastructure that is independently-owned and operated.
- Existing infrastructure consists of traditional wireline, fiber-optics, cable, and wireless.
- Electronic services such as Google Voice and Vonage that provide features similar to traditional telephone service, but are based on Internet Protocol, are also expanding the applications opportunities for consumers.
- Separate private and public investments in telecommunications infrastructure are significant and costly to maintain.
- Iowa has more middle-mile fiber-optic cable than any state in the nation.
- Network challenges now, and for the future, lie in the last mile infrastructure.
- Iowa has a large number of telephone companies, increasing the difficulty in achieving broad participation and support for creating a globally-competitive network for access by Iowa's business, education, government, and public.
- The historically voice-focused industry in Iowa consists of:
    - Large telecommunications providers (Qwest, Iowa Telecom, Frontier, and, recently, Mediacom),
    - 154 historical rural telephone companies (incumbent local exchange carriers – ILECs),
    - More than 100 additional competitive telephone companies receiving certification after September 30, 1992 (competitive local exchange carriers – CLECs),
    - 15 municipalities providing telecommunications services, and
    - The state-owned Iowa Communications Network (ICN) developed with a focus on educational video needs and is authorized to provide telecommunications services to state and federal government, hospitals, and libraries.
- Motivation to provide service in rural areas is low because the business model is not sustainable, they are small markets, with light population density, and significant cost to build the infrastructure to these areas with no guarantee of an ongoing customer commitment. (Telecommunications Sector Report, 2010)
- Existing federal and state policy create significant financial support for ILECs in their current operations.
- *The Draft National Broadband Plan* released in mid-March 2010 proposes, among many changes, shifting the rural subsidies from voice to broadband.
- The April 2010 court ruling limiting the Federal Communication Commission's (FCC) ability to regulate Internet providers further complicates and confuses the path to solutions.

Transportation

The scope of the transportation sector is the safe, efficient, and coordinated movement of people and goods by all modes for all purposes. An overarching goal for the sector is to develop a transportation infrastructure system for Iowa that is the right system, in the right place, and with the right services to support the basic needs of the economy. Iowa has a large and complex transportation system and funding mechanism that is challenged to maintain the right transportation infrastructure for the 21st century. Data show there are not enough resources to maintain the current transportation infrastructure. Supporting Iowa's economy in the future will require difficult decisions to determine the appropriate transportation modes necessary to ensure quality of life and commerce.

Planning for transportation is an example of the benefits of careful planning based on criteria and priorities that could be used in any one or more sectors. In the TIME-21 effort begun in 2002, Iowa Department of Transportation began to address the very significant need to maintain and improve public roadways and have adequate resources to do so. The result was planning and priority setting that: 1) identified long-range public roadway needs; 2) recognized that those needs are so huge that it is necessary to focus on critical infrastructure needs that support the economy; 3) identified those critical needs; 4) resulted in legislation that provides some of the critical funding need, but required those new funds be distributed based on where those needs exist, and required that they be spent on those needs.

In light of a shifting population and a more diversified economy, deciding where Iowa's future transportation system is built and maintained is critical. As Iowa's economy progresses, the transportation services available in 2010 may not be the same as those needed in the future.

- Iowa has over 114,000 miles of highway, with 31 billion vehicle miles of travel in calendar year (CY) 2008.
- While the Iowa Department of Transportation (DOT) has jurisdiction over approximately 8 percent of the total road mileage in the state, those roads carry 61 percent of all travel and 84 percent of all large truck travel.
- Secondary roads are vital to Iowa's agricultural economy. In 2007, Iowa's farmers produced over $20.4 billion in grains and livestock. With almost 90,000 miles of secondary roads in the state, each mile of secondary road supports approximately $225,000 worth of commodities every year. (Iowa Farm Bureau Federation)
- Iowa ranks 13th in the nation in miles of road; 5th in the number of bridges; 23rd in land area; and 30th in population.

IOWA'S INFRASTRUCTURE NOW AND IN THE FUTURE

- Nationally, Iowa ranks 30th in number of deficient bridges; 34th in rural interstate pavement condition; 43rd in urban interstate pavement condition; and, 43rd in rural arterial pavement condition. (Annual Report on the performance of State Highway Systems, Reason Foundation, December 2009)
- Iowa has approximately 4,000 miles of rail that haul 52.3 million tons of freight originating in Iowa; 43.7 million tons that terminates in Iowa; and, 237 million tons that move through Iowa.
- Iowa freight railroads directly contribute $276 million a year to the economy in wages and benefits to the 4,038 employees who live in Iowa. In addition, 8,970 retired railroad workers and family members live in Iowa. (2007)
- Railroads operating in Iowa routinely invest about 25 – 30 percent of their revenues earned in Iowa in maintaining and improving the track system.
- In 2008, Iowa railroads spent an estimated $188 million on maintenance and $247 million on upgrades.
- Iowa has 1,500 miles of recreational trails.
- Iowa has 500 miles of navigable rivers that carried 15.1 million tons of commodities in 2007. River transportation, particularly on the Mississippi River is a vital and extremely efficient form of transportation and there are significant needs with the lock and dam system. However, the responsibility for the locks and dams lies with the federal government and the state of Iowa involvement is primarily at the policy level balancing the needs to support transportation and respect the river's vital natural resources.
- Iowa has 111 public airports (8 providing commercial service) that support 1.4 million aircraft operations and 2.5 million boardings annually.
- Iowa has 35 public transit systems, which cover the entire state and provide over 25 million rides annually.
- To meet the public transportation needs of Iowa's transportation disadvantaged would require an additional investment of $125 million per year. (Iowa Passenger Transportation Funding Study submitted to the Iowa General Assembly, December 15, 2008)
- For public transportation to be a larger contributor to meeting the state's energy independence goals would require an additional investment of $350 million per year, which includes the $125 million per year additional investment required to meet the needs of Iowa's transportation disadvantaged.
- From CY 2004 to 2008, highway construction costs in Iowa increased 67 percent. (TIME 21 Funding Analysis submitted to the Iowa General Assembly, December 31, 2008)
- Based on March 2010 revenue estimates, the highway construction funding shortfall for FY 2012 is $174 million. (TIME 21 Funding Analysis submitted to the Iowa General Assembly, December 31, 2008)
- To meet the needs of Iowa's aviation system would require an average annual increase in funding of approximately $27 million over the next 20 years.
- To meet the freight rail needs of Iowa's system would require an average annual increase in funding of approximately $19 million per year over the next 20 years.
- To implement passenger rail service from Chicago to Dubuque and Chicago to Iowa City will require a total investment in Iowa of $117 million.
- To meet the needs of Iowa's trail system would require an average annual increase in funding of approximately $25 million over the next 20 years.
- A motor fuel and diesel tax was enacted in 1925 at 2¢ per gallon. The current fuel tax rates are 19¢ per gallon for gasohol, 21¢ per gallon for gasoline and 22.5¢ per gallon for diesel. The last increase was in 1989.

- In 1949, the Road Use Tax Fund was established providing for a distribution formula.
- Legislation was enacted in 2005 to adopt a formula to distribute county Road Use Tax Funds based on factors to include population, mileage, lineal feet of bridges, and traffic levels as they occur.
- When the federal gas tax is added to the Iowa gas tax, the total 40.4¢ per gallon ranks 33rd nationally and was below the national average of 47.4¢ per gallon. (American Petroleum Institute January 2010 analysis of fuel tax rates by state)
- An analysis of existing and potential transportation revenue sources was included in an Iowa Department of Transportation report submitted to the Iowa General Assembly in December 2008. The report is available at: www.iowadot.gov/time21/index.htm.
- Eighty-one percent of the $115.4 billion worth of commodities delivered annually from sites in Iowa is transported by trucks on the state's highways. An additional 5 percent is delivered by parcel, US Postal Service or courier, which use multiple modes including highways. (The Associated General Contractors of America)
- Vehicle travel on Iowa's highways increased by 35 percent from 1990 to 2005. Iowa's population grew by seven percent between 1990 and 2005. Vehicle travel on America's highways increased by 39 percent from 1990 to 2005, while new road mileage increased by only four percent. The nation's population grew by 19 percent during that period. (The Associated General Contractors of America)
- There are 39 miles of road for every 1,000 people in Iowa. This is three times the national average per capita infrastructure burden of 13 miles of road for every 1,000 people. (Iowa Department of Transportation)
- Driving on roads in need of repair costs Iowa motorists $749 million a year in extra vehicle repairs and operating costs – $368 per motorist. (The Associated General Contractors of America)

Typical Construction Costs

Interstate (urban construction including structures)	$53.3 million per mile
4-lane Interstate (rural)	
New	$14.5 million per mile
Reconstruction	$ 5.3 million per mile
4-lane interchange (rural)	$ 8.6 million
4-lane bypass (grading, paving and structures)	$14.5 million per mile
4-lane Expressway (rural)	
New	$11.0 million per mile
Add two lanes to existing two lanes	$ 5.8 million per mile
Resurfacing	$ 1.5 million per mile
2-lane highway (rural)	
New	$ 4.2 million per mile
Reconstruction	$ 2.6 million per mile
Commercial runway (reconstruction of 7000 foot runway)	$10.5 million *
General aviation runway	
Reconstruction of 5,500 foot runway	$ 5.4 million *
Reconstruction of 4,200 foot runway	$ 3.0 million *

Transit Bus	
Heavy duty (40' bus)	$384,000
Medium duty	$166,000
Light duty	$82,000
Construction of mainline track	$2 million *
Construction of mainline track (with Right of Way and development costs included)	$5 million
Construction of urban industrial spur	$1 million per mile *
Trail (new construction)	$250,000 per mile *

** These costs do not include Right of Way and development costs.*

SECTOR CONNECTIONS

These five sectors that are the subject of this strategic planning process intersect and interact with one another intentionally and unintentionally. Many times the integration benefits multiple sectors, and in future infrastructure initiatives, increased multi-sector benefits need to be actively sought. At other times, sectors intersect in ways that highlight divergent interests, and those, too, need to be identified and addressed.

In planning strategically for the economy of the future, integration of infrastructure sectors is a fundamental expectation, should be intentionally developed, and solutions found to challenges.

The review and discussion of infrastructure to support a strong economy revealed that the current planning and funding mechanisms often do not assure or allow flexibility needed to optimize infrastructure sector integration. An accompanying challenge is that those private and public sector organizations developing the projects may lack the capacity or commitment to creatively work through perceived and actual barriers to sector integration.

For sustainable infrastructure from this point forward, it is imperative that consideration of the relationship to, impact on, and impact of other sectors be part of a project's planning and implementation.

There are scores, if not hundreds, of common areas in which sector crossover occurs and creates opportunities to enhance our economy and more wisely leverage Iowa's infrastructure investments. Sector integration is illustrated here in two scenarios. In these scenarios, new and traditional practices, impacts of infrastructure all around us, and interdependency of sectors are illustrated.

AUTUMN HARVEST

Take, for instance, a common autumn scenario in Iowa, one of harvest that is central to our agricultural economy. Harvest calls upon infrastructure in all the sectors included in this planning initiative, showcases model practices that can be expanded upon, as well as calls attention to current practices that could be improved.

It is a crisp, fall day following a day of rainy weather. Fortunately, the fields are dry enough that he can resume the corn harvest. The farm owner is operating the combine and monitoring the yields using the combine's computerized system. Later, he will send the information to his office computer and match it up with previously-gathered GIS data on seed variety, moisture, and soil quality.

As the combine fills with the wet corn, the cobs and stalks are re-deposited on the ground. The farm owner rides along, periodically touching base with the trucker and other harvest help on their cell phones. He begins to think that he should spend some time during the winter running the numbers to see whether he should invest in equipment to gather the corn stover to be sold as biomass to the ethanol plant 35 miles away from the home place. It would be great to support that new plant after such tough financial times. It's built near the source of raw materials, and he thinks it will help agriculture and the neighboring communities survive in the long run.

There's a lot to consider in balancing a potential new revenue source with his 45-year commitment to maintaining the century farm's world-class topsoil. Soil quality and controlling runoff has always been important – it's just tragic to see that good, black Iowa dirt washing off toward the Mississippi River, he thinks. This winter he'll just have to run the numbers and figure out what's best for his land.

SECTOR CONNECTIONS

He bumps across the harvested rows toward the semi parked in the end rows near the driveway. This should be the last dump of the bin before the trailer is full and can head to town. It's been a bumper crop this year, and his storage bins at home are already full. Natural gas prices were up this year, but because it was a pretty dry year he only had to dry the corn down 3.5 percent to store it. Now that his bins are full, the rest of the crop will be taken to the elevator in town just 12 miles away.

It's too bad the gravel road is still so soft from the rains last week and from yesterday. The ruts haven't had a chance to dry out and get smoothed over. It is hard on those gravel roads to drive the loaded semis to the blacktop 3 miles south. The farmer figures he'll be hearing the Board of Supervisors complain about the costs of the maintainer again, but, after all, having good farm-to-market roads is part of being an Iowan.

It's not lost on this farmer the irony of his use of petroleum-based diesel fuel, gasoline, and natural gas to fuel his farm operation while, at the same time, contemplating investing in a biofuels effort. He is weighing the relative importance of preserving his prized natural resources – the soil and water – against the potential risks to them by taking away the biomass that protects the ground in order to help manufacture biofuels that could reduce his dependence on those petroleum products he uses daily. What a complicated dilemma!

Meanwhile, the semi driver arrives at the elevator in town, and she pulls into line to weigh full and then unload. The bumper crop is showing at the local elevator, too. These folks have been running this facility for two decades now, and they've done a pretty good job of maintaining the infrastructure, but it's always been a challenge to store grain when yields are high. They're already piling corn on the ground. Inside, the farmers are talking with the elevator men about how long they think it will be until grain cars are available to haul corn. It shouldn't be too many days, they thought, and know they are fortunate to have built the elevator so close to the busy rail line, making it reasonably easy to get those cars to ship grain to market before it sits on the ground too long.

The driver weighs, unloads, and weighs tare before heading back to the farm to do it all over again.

The farm owner is hoping for a good week of weather with no equipment breakdowns so he can take Friday night off to go the Homecoming game at the local high school where his grandson plays center on the football team. He's a good kid, and so are his sisters and the cousins. The farmer stops to think about how these days he thinks about them a lot, and knows that it's true what they always say, even though it sounds corny. It is all about the children, and their children – his grandchildren.

METRO LIVING

Her parents were worried, but she wasn't. They live in a small town and would worry no matter what she decided to do. She wanted to live where it was easy, near fun things to do, and she could have an upscale place, even though she was on a pretty tight budget. Hey, she worked hard all day, and wanted a place to call her own. She picked a retrofitted warehouse as her new home, and she loves it.

In one of her university courses she learned about the life cycle of cities and the trends to move farther and farther away from the "old parts" of a city. "Infill development" may be the term for her new neighborhood, but to her it is just a great place to live. Whoever figured out this set-up was smart. Before she decided to move into this area of the city she did a bit of research.

It seems a few of the city's "movers and shakers" decided they couldn't let the city's central district fall into disrepair and become an urban desert – with blocks of empty, unused space. They talked up the idea and gradually built up enough interest to have some serious talks and get some people involved with the know-how and resources to make it happen. She learned it wasn't an easy process and they didn't always agree, but they stuck together and worked it out, keeping their shared vision as their guide.

Oh, and there were problems. Sewers in older parts of the city are always a challenge. Working out availability of high-speed connections without costing an arm and a leg. Getting the retail and small businesses to commit to a risky venture. Zoning and building codes. All that red tape. But it sounds as if the businesses and the governments wanted it to work, so it did.

And it was worth it for her and for the city. Among other things, the warehouse was renovated with apartments that would fit all types and ages of people – young, older and retired, those with disabilities, even families. And pets, lots of pets. Utility bills were low because of the good windows and how the place was designed. The neighborhood was planned to include a system so everyone has free high-speed connectivity – and it is fast and reliable – no matter where anyone lives or works.

After years of driving nine miles to get to work, it's sure a treat to walk just four blocks to her job as a graphic designer for one of the firms in town. Maybe that's why she likes the downtown mixed-use development – it's creative and interesting and makes the most of the landscape and surroundings. They have even put in some public art. She figures that's the influence of some of the "pillars of the community" who have been very visible and helped promote this development.

The people who got together to plan this new downtown neighborhood thought of everything. There are trails and a park within six blocks, and it's a great place to ride her bike. They even did some landscaping using the natural flow of the land and using some kind of permeable pavement so the water doesn't just run off and pollute and flood the creek. She can walk anywhere easily and safely. Coffee shops are great gathering places, and are always full of people studying, working, or just updating their Facebook pages. The public library is near the park, and the success of the new development helped the city decide to keep the library downtown. There's a grocery store, drug store, and restaurants and bars as part of the neighborhood. She can even get her car fixed at a local service station – and they actually know her name.

But she's found she doesn't use her car as much now. She can walk to work, but if it's cold or rainy, the bus is easier and cheaper than finding and paying for parking. Plus it saves gas.

Someday, if she gets married and decides to have a couple of kids, she wonders if this would still be a good place to live. Time will tell, but right now she thinks so. There are parks, there's a school nearby, and, most of all, the neighborhood seems to look ahead, not back. There's a pride in the accomplishments and a commitment to continue improvements. This is the place to be, and more people are starting to see the advantages in this kind of neighborhood.

She wonders why there aren't more neighborhoods built where organizers have thought ahead and planned like this. There should be!

INFRASTRUCTURE RECOMMENDATIONS FOR IOWA'S FUTURE ECONOMY

The primary message of this plan is this: Iowa's infrastructure, like that of other states, is facing a looming crisis, placing the state's future economy at risk. The time has come to intervene and set infrastructure on an affordable, sustainable course. There is no time to waste.

The recommendations included in this *Infrastructure Plan for Iowa's Future Economy: A Strategic Direction* are not for the timid. Viewing five major infrastructure sectors as critical parts of a whole allows Iowa's private, nonprofit, and public sectors to benefit from their interdependence and create a more resilient infrastructure – and economy. It requires commitment to shifting from business as usual to a new pattern of integration in planning, decision making, funding, and implementation.

Iowa's challenge can also be its opportunity. The significant need for repair and improvement in each sector allows private and public sector planners to encompass more strategic goals than implementing a simple fix to otherwise strong infrastructure. As is frequently the case, Iowa's size, location, and mix of urban and rural communities means the state is not as severely impacted as large states or those with large urban areas. Iowa's infrastructure issues can be solved.

There can be no turning back without settling for less than the present conditions, however. The Infrastructure Planning Task Force, in consensus decisions, developed a set of recommendations when, taken as a whole, creates a new direction for generations to come.

In this plan, the Infrastructure Planning Task Force issues four overarching recommendations to set the immediate direction for Iowa's economic strength. In addition, the Task Force adopts all of the recommendations presented by the five Sector Committees for inclusion as critical to the strategic direction for Iowa. Economic competitiveness and quality of life are each clearly dependent on the integrated approach to infrastructure of the future emphasized in this plan. There is a strong element of private sector engagement implied, and required, for successful implementation of Iowa's strategic direction and these recommendations for integrated infrastructure efforts.

The Task Force emphasizes the urgent action necessary in its four recommendations. They speak to the importance of maintaining the attention and momentum generated by this planning initiative and the focused efforts toward infrastructure repair arising from the disaster and economic downturn. The priority given these four recommendations by the Task Force serves as an indicator of the opportunities that may be available as a result of the momentum, as well as the degree of need for immediate action.

In its recommendations, the Task Force faces the reality of the power of the people of Iowa, citizens and interested stakeholders alike. Momentum from the planning process needs to carry on uninterrupted to ensure broader awareness of stakeholders and the public of Iowa's strategic infrastructure priorities. Likewise, the Task Force is pleased that an Iowa Smart Planning Task Force was created by the Iowa General Assembly in the 2010 session. Recommendations of the Infrastructure Planning Task Force and process can and should be included early in the considerations of establishing the new Smart Planning group, to assure the value of the months of work are leveraged for the future.

This is not to diminish the importance and value to Iowa's economic competitiveness and quality of life of the 21 recommendations developed by the five Sector Committees. These recommendations place a level of focus on priority needs of each sector in the context of a future economy where infrastructure sectors necessarily intersect. Without implementation of these recommendations, together with the priority recommendations of the Task force, the work is barely begun.

INFRASTRUCTURE RECOMMENDATIONS FOR IOWA'S FUTURE ECONOMY

It is important to recognize that some of the recommendations brought forward from the Sector Committees align with others, and some recommendations have application for all of the infrastructure sectors – buildings and vertical infrastructure, energy, natural resources, telecommunications, and transportation. In implementation, the recommendations must be viewed as a whole in order for optimal benefit for Iowans and the economy.

In addition, the Infrastructure Planning Task Force adds immediate activities to each of the recommendations to help get implementation underway. It is also important to realize that neither the recommendations nor the suggested immediate activities are comprehensive or inclusive of all specific infrastructure issues in the state, but they point the direction to the new approach.

If people doubt the serious nature of these statements, they probably skipped reading the previous section containing descriptions of the current status and projecting the challenges for the future. That background serves the reader well as the following 25 infrastructure recommendations are considered.

INFRASTRUCTURE PLANNING TASK FORCE RECOMMENDATIONS

1. In recognition of the urgent challenges facing Iowa's future infrastructure, immediately reconvene interested members of this Infrastructure Planning Task Force to begin implementing the work recommended by the Task Force in the planning initiative.

Immediate Activities

- Reconvene the Infrastructure Planning Task Force to place more detail on the recommendations and action steps and to engage stakeholders in support of the Plan.
- Identify a means to maintain the private-public engagement in implementation for the longer term.
- Support the work of the newly-created Iowa Smart Planning Task Force and serve as a bridge until the time that group convenes.

2. Establish a statewide planning structure with responsibility to ensure ongoing local and state level, private, nonprofit, academic, public, and citizen involvement in coordinated, integrated infrastructure planning, without a new structure adding to state government bureaucracy.

Immediate Activities

- Encourage state agencies to compare and align planning processes for infrastructure investments.
- Analyze lessons learned from recent natural disasters to design and implement ongoing local and state level, private, nonprofit, academic, public, and citizen involvement in coordinated, integrated infrastructure planning.
- Implement criteria for infrastructure funding based on smart planning and economic growth principles.
- Support the work of the Iowa Smart Planning Task Force and encourage inclusion of all of these stakeholders, particularly the private sector, in ongoing, integrated, infrastructure planning.

INFRASTRUCTURE RECOMMENDATIONS FOR IOWA'S FUTURE ECONOMY

3. Implement all of the recommendations of each Infrastructure Sector Committee, with consideration for economies of scale and interdependency of sectors.
    a. Buildings and Vertical Infrastructure
    b. Energy
    c. Natural Resources
    d. Telecommunications
    e. Transportation

Immediate Activities

- Map and align the Sector Recommendations for implementation.
- Measure and report the success of the Sector Recommendations and Immediate Activities.
- Promote the Plan and implementation of all recommendations to the Iowa Smart Planning Task Force.

4. Engage the public in developing a vision for Iowa's future that includes an understanding of infrastructure requirements to achieve the vision.

Immediate Activities

- Establish a private-nonprofit-public partnership to support statewide engagement and development of support for interdependent and resilient infrastructure.
- Create a statewide awareness and promotional initiative to expand the support for immediate action in critical areas.

BUILDINGS AND VERTICAL INFRASTRUCTURE SECTOR RECOMMENDATIONS

1. Establish a framework and principles to guide infrastructure planning, investments, and oversight.
    a. Ensure stakeholder, community, and regional leadership and collaboration.
    b. Make development decisions predictable, equitable, and cost effective.
    c. Promote clean energy production and increase energy efficiency.
    d. Increase diversity of job and business opportunities.
    e. Concentrate development within communities and mix land uses.
    f. Improve housing opportunities and choices.
    g. Foster distinctive, attractive communities with a strong sense of place, identity, and marketability.
    h. Protect, preserve, and wisely utilize natural resources and agricultural lands.
    i. Incorporate green building and infrastructure design that is structurally sound, durable, healthy, and safe.
    j. Provide for a variety of transportation choices, and maximize walkability and mobility.
    k. Demonstrate financial sustainability for maintenance and operation.

Immediate Activities

- Identify and demonstrate successes of initiatives that use the framework and principles.
- Secure commitment of key organizations to adopt and promote use of the framework and principles.

INFRASTRUCTURE RECOMMENDATIONS FOR IOWA'S FUTURE ECONOMY

2. Provide information and technical support for stakeholders on the elements of sustainable infrastructure.

   Immediate Activities

   - Create materials, workshops, on-line resources, training, and other assistance to support stakeholders in developing proposals that implement elements of sustainable infrastructure.
   - Conduct practical workshops for local consortiums about how to develop and negotiate infrastructure proposals.

3. Ensure that funding and regulatory structures support infrastructure priorities.

   Immediate Activities

   - Create a demand for funding of infrastructure initiatives that are consistent with addressing Iowa's infrastructure crisis.
   - Conduct an assessment to identify existing funding and regulatory structures that can be flexibly used to address Iowa's strategic infrastructure needs.

4. Encourage evidence-based decisions using data that can be analyzed regionally.

   Immediate Activities

   - Develop the statewide database of relevant data that can be accessed locally.
   - Develop and provide technical assistance to local consortiums regarding access, analysis, and use of data in funding applications.

ENERGY SECTOR RECOMMENDATIONS

1. Establish a system to support an energy-literate population in Iowa through education and information on implementing solutions to meet energy goals.

   Immediate Activities

   - Establish a private-nonprofit-public partnership to support statewide engagement and development of support for interdependent and resilient infrastructure.
   - Create an awareness and promotional initiative to expand the support for immediate action in critical areas.

2. Establish a business climate and stable government investment structure that responsibly supports energy technology research, development, demonstration, and deployment. This structure would include policy and financial incentives to support all phases of development from early stage commercialization to the marketplace.
   a. Policy and financial incentives in these areas should reflect both environmental and cultural factors.
   b. This will require easy access, influence, and capitalization of federal opportunities and polices that benefit the state and nation.
   c. Lead the global economy through lower energy costs and innovation in renewable energy technology.

   Immediate Activities

   - Review and evaluate energy technology research to determine the most critical priorities for integrated infrastructure development.

INFRASTRUCTURE RECOMMENDATIONS FOR IOWA'S FUTURE ECONOMY

- Conduct an assessment to identify existing funding and regulatory structures that can be flexibly used to address Iowa's strategic infrastructure needs.

3. Build a recognition that Iowa's primary resources (soil, water, wind, and an educated, motivated workforce) provide value-added opportunities throughout the state, and that capitalization requires consideration for the state's diverse communities and sustainability.

Immediate Activities

- Conduct an assessment to determine the level at which Iowa's primary resources are adequate to meet Iowa's energy and other needs.
- Assess how the infrastructure currently in place is supporting our Iowa-grown energy.

4. Balance infrastructure policy decisions with the need for stability, flexibility, and agility, while appropriately valuing current infrastructure.

Immediate Activities

- Establish priorities for small-scale investments in new energy technology to ensure the ability to make quick adjustments as change occurs.
- Create a direct connection between energy research and industry to focus on strategic investments and risk mitigation.

5. Develop coordinated outreach in energy efficiency across sectors, establishing Iowa as a leader in best practices.

Immediate Activities

- Identify and demonstrate successes of energy efficiency initiatives in all sectors.
- Secure commitment of key organizations at all levels to adopt and promote energy efficiency practices.

NATURAL RESOURCES SECTOR RECOMMENDATIONS

1. Increase organic carbon levels in soil.

Immediate Activities

- Utilize sustainable agricultural practices such as no-till farming, use of cover crops, crop rotation, filter strips, restoring wetlands, and enrolling acres in the federal Conservation Reserve Program (CRP) to increase organic carbon levels in Iowa's cultivated lands.
- Utilize sustainable urban planning practices such as creating green spaces, enhancing the tree canopy, smart growth principles, and storm water management best practices to increase organic carbon levels in Iowa's urban areas.

2. Manage watersheds and water resources to sustain quality and quantity of water necessary to meet community, business, and ecological uses.

Immediate Activities

- Implement practices to ensure all bodies of water in Iowa meet federal water quality standards.
- Coordinate watersheds on a federal, regional, and local basis to ensure water resources are evaluated and managed to provide sustainable yields.

INFRASTRUCTURE RECOMMENDATIONS FOR IOWA'S FUTURE ECONOMY

3. Manage watersheds and floodplains to reduce the impacts of flooding.

   Immediate Activities

   - Develop individual watershed priorities and manage watershed components to reduce the impacts of flooding.
   - Develop urban storm water practices that coordinate with drainage district and watershed improvement plans.

4. Implement practices to ensure Iowa's air will meet new federal public health and welfare standards.

   Immediate Activities

   - Determine the effects on air quality and air capacity when making infrastructure and industry development decisions.
   - Utilize Iowa-based energy sources that do not negatively impact the quality of Iowa's air.

5. Require that the impact on ecosystems be determined and considered in infrastructure planning and development.

   Immediate Activities

   - Develop a process for determining the impact on ecosystems for state or locally funded infrastructure developments.
   - Develop a process for determining the impact on ecosystems for privately-funded developments.

6. Create opportunities to increase the use, enjoyment, and appreciation of Iowa's natural and cultural heritage.

   Immediate Activities

   - Enhance our existing park and public outdoor infrastructure.
   - Increase the quality and quantity of Iowa's tree canopy.

TELECOMMUNICATIONS SECTOR RECOMMENDATIONS

1. Create connectivity for all through a common, unified backbone that supports the public interest, is a public-private partnership that includes mutual benefits, and is built by consortiums.

   Immediate Activities

   - Educate the public, stakeholders, and policymakers about the increasing demand for connectivity and the need for a common network.
   - Engage the private sector in convening initial discussions to build a unified backbone.

2. Establish state policy that represents the public interest, pursues and advocates the mission/vision for telecommunications, and establishes financial plans to implement the policy.

   a. Establish state policy for "criteria" or goals for connectivity to the curb of every premise (fiber or equivalent transport technology), such as globally-competitive speed, universal access, and cost.

   b. Establish state policy for "criteria" or goals for consumer adoption.

c. Establish a mechanism to recommend policies, processes, and programs and to coordinate the common, statewide system, including a review of tax and regulatory policy for telecommunications and related industries and of investment policy.

d. Determine the state entity to implement the policy.

Immediate Activities

- Educate the public, stakeholders, and policymakers about the increasing demand for connectivity, the need for a common network, and the policy necessary to support its success.
- Review and report on other states' and federal policies that may be applicable in Iowa's proposed network structure.

3. Establish a state consumer protection policy incorporating performance metrics for the purpose of telecommunications services and determine the state entity to implement the policy.

Immediate Activities

- Identify the parameters of a consumer protection policy and state entity role.
- Establish performance criteria and means to track and make performance information available to the public.

TRANSPORTATION SECTOR RECOMMENDATIONS

1. Assess the current transportation system and shortfalls, and develop affordable methods to prioritize, improve, and achieve accessible transportation for people, goods, and services.

Immediate Activities

- Evaluate and compile existing transportation system plans and data to develop priorities to address the transportation funding crisis.

2. Determine transportation infrastructure funding levels, new funding and financing mechanisms, revenue generation methods and prioritization for investments, distribution methods, and priorities for project funding.

Immediate Activities

- Determine strategic priorities for transportation infrastructure based on consideration of impacts on and from telecommunications, buildings and vertical infrastructure, energy, and natural resources sectors.
- Investigate and implement new alternative funding mechanisms to support transportation.

3. Engage and educate stakeholders, users, and citizens regarding transportation infrastructure funding and financing mechanisms, sustainable project priorities, investment decision-making, and policies and procedures.

Immediate Activities

- Establish a private-nonprofit-public partnership to support statewide engagement and development of support for interdependent and resilient infrastructure.
- Create an awareness and promotional initiative to expand the support for immediate action in critical areas.

SECTOR REPORTS & RECOMMENDATIONS

Planning for infrastructure to support a globally-competitive Iowa began with the work of the 125 knowledgeable people involved in the five Sector Committees. Each Committee developed a sector-specific report containing issue background, identification of key issues, and recommendations relevant to the demands of the future. Using the *Essential Elements of Iowa's Future Economy*, the sectors also considered the necessary integration of sectors to leverage overall benefits to the state.

A primary recommendation of the *Infrastructure Plan for Iowa's Future Economy: A Strategic Direction* is to implement all of the recommendations from each sector. While those recommendations are listed in the previous section of this plan, the context and issues are presented here to accompany the recommendations. Please note that all supporting documents are not included, but are available at www.iowalifechanging.com/infrastructure.

These five documents, submitted individually as stand-alone reports and recommendations, include data, explanations of the relevance of the issues and the sectors to the future economy, and the relationship of sectors. Notably, each sector, independently, arrived at key common themes:

- Integration of sectors is fundamental to a sustainable future economy.
- Consistent and coordinated planning is a lynchpin of careful and wise investment in infrastructure.
- The status quo is not sustainable or affordable, and urgent action is necessary.

This is one of the most complex and difficult challenges Iowa will face, and it is one of the most longstanding. Though it will take some time, these recommendations set the state in the direction of success.

Infrastructure
STRATEGY
For Iowa's Future Economy

Buildings and Vertical Infrastructure Sector

REPORT & RECOMMENDATIONS

February 2010

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Sector Committee Members

Bret Mills, Iowa Department of Economic Development, Des Moines – Committee Co-Chair

Joe O'Hern, Iowa Finance Authority Des Moines – Committee Co-Chair

Thomas W. Hart, Iowa Department of Economic Development, Des Moines – Project Director

Nadia Anderson, Iowa State University, College of Design, Ames

Charles Connerly, University of Iowa, Urban and Regional Planning, Iowa City

Michael Coveyou, Iowa Department of Public Safety, Des Moines

Jeff Geerts, Iowa Department of Economic Development, Des Moines

Bill Good, Des Moines Public Schools, Des Moines

Lynnae Hentzen, Center on Sustainable Communities, West Des Moines

Rick Hunsaker, Region XII Council of Governments, Carroll

Robert E. Josten, Dorsey Law Firm Des Moines

Brian Kaskie, University of Iowa, College of Public Health, Iowa City

Doug LaBounty, Community Housing Initiatives, Inc., Spencer

Mary Lawyer, Conlon Construction, Dubuque

David Lyons, The Iowa Institute, Des Moines

Timothy Oswald, Piper Jaffray, Des Moines

Jim Prosser, City of Cedar Rapids, Cedar Rapids

Terri Rosonke, Iowa Finance Authority, Des Moines

Introduction

Iowans have high expectations for a strong economy, good jobs, and a future of opportunity. Setbacks came in 2008 with the summer disasters, followed by the national recession and significant impacts on Iowa's infrastructure. Even while addressing those challenges through the influx of federal and state short-term funding for jobs, infrastructure, disaster recovery, and other broad needs, Iowans must also give significant consideration of the vision for the future economy and the infrastructure it will demand. Interested Iowans statewide will find in this report a set of recommendations and a strategic direction for the buildings and vertical infrastructure sector.

Buildings and vertical infrastructure were the subject of deliberations over a four-month period by a diverse array of Iowans who contributed their expertise, experience, and perspectives on the future economy and the infrastructure that will be required to meet those needs. Because the report was developed by stakeholders from across the state, it reflects and has future application to diverse stakeholders including the private sector, issue-based groups, nonprofit organizations, academia, and local and state government.

This report does not stand alone, however. As part of a comprehensive and coordinated statewide planning initiative, the recommendations and insights on the buildings and vertical infrastructure sector will be considered by a Task Force, along with similar reports on infrastructure needs for the future economy in energy, natural resources, telecommunications, and transportation. The ideas and recommendations contained in the five reports and the coordinated plan reflect the involvement and engagement of more than 200 Iowans over a span of nine months. From those deliberations, a strategy for Iowa's future economy was developed on behalf of and for all stakeholders. It is the hope of the Buildings and Vertical Infrastructure Sector Committee that policymakers, community leaders, business and industry, and others find ways to implement or support the recommendations of this sector report and those of the coordinated Infrastructure Strategy for Iowa's Future Economy.

Executive Summary

Iowa's buildings and vertical infrastructure are integral to the quality of life and economic health of the state. In considering elements of the sector that cut across public, private, residential, and other areas, the Buildings and Vertical Infrastructure Sector Committee discussed issues that impact people and communities, such as development patterns, building types, disaster mitigation, and living in concert with Iowa's natural resources. The Buildings and Vertical Infrastructure Sector Committee defined the scope of the sector as **"residential, commercial, industrial, public, and nonprofit buildings and facilities that serve a public need, as well as supporting physical systems**".

The timing of this integrated long-term planning effort was optimal to think in a manner that is both realistic and visionary about Iowa's buildings and vertical infrastructure. The Committee recognized that despite the recent infusion of state and federal resources, Iowa's infrastructure needs remain so great that the state as a whole can no longer approach infrastructure decisions and investments in the status quo manner. The reality is that Iowa cannot afford or sustain its current infrastructure, let alone build new infrastructure required for future economic competitiveness.

To establish Iowa's infrastructure priorities for 2020 and beyond, the following issues were identified as priorities to be addressed relating to both new and existing buildings and vertical infrastructure.

- **Iowa's current infrastructure is not economically, socially, and environmentally sustainable or affordable.**
- **Infrastructure planning and investments are neither coordinated nor strategic.**
- **Infrastructure financing is not influenced by and is disconnected from broader, regional, long-term interests.**

To address these issues, the Buildings and Vertical Infrastructure Sector Committee has made the following four recommendations to ensure that Iowa's infrastructure works to support the state's economic viability, competitiveness, sustainability, and quality of life now and in the future. The recommendations developed in response to priority issues should be considered as a whole, with each viewed as critical by the Committee to ensure a strong future economy for Iowa.

1. **Establish a framework and principles to guide infrastructure planning, investments, and oversight.**
   a. Ensure stakeholder, community, and regional leadership and collaboration.
   b. Make development decisions predictable, equitable, and cost effective.
   c. Promote clean energy production and increase energy efficiency.
   d. Increase diversity of job and business opportunities.

e. Concentrate development within communities and mix land uses.
f. Improve housing opportunities and choices.
g. Foster distinctive, attractive communities with a strong sense of place, identity, and marketability.
h. Protect, preserve and wisely utilize natural resources and agricultural lands.
i. Incorporate green building and infrastructure design that is structurally sound, durable, healthy, and safe.
j. Provide for a variety of transportation choices and maximize walkability and mobility.
k. Demonstrate financial sustainability for maintenance and operation.

2. **Provide information and technical support for stakeholders on the elements of sustainable infrastructure.**

3. **Ensure that funding and regulatory structures support infrastructure priorities.**

4. **Encourage evidence-based decisions using data that can be analyzed regionally.**

These issues and recommendations are further described in the following report, along with the context for planning, elements of Iowa's future economy, and a description of the process that resulted in these recommendations. The work of the Buildings and Vertical Infrastructure Sector Committee, along with the Transportation, Telecommunications, Natural Resources, and Energy Sector Committees, will be forwarded to a Task Force with combined membership for integration and development of an infrastructure strategy for Iowa's future economy.

Iowa's Future Economy

There is no crystal ball to predict exactly what Iowa's economy will be like in 2020 and beyond, but there are indicators and, certainly, steps that can be taken to shape the economy as Iowa recovers from the dual challenges of the 2008 disasters and the national recession. The Infrastructure Strategy for Iowa's Future Economy initiative was designed to work from a common understanding of Iowa's current economy and forecast of economic factors to establish some strategic direction for the state. Essential elements of the future economy were identified from this information and from the deliberations of the participants in the process. This section highlights the foundational premises of the Sector Committees and Sector Chairs Group that guided their work.

Essential Elements of the Future Economy
Iowa's economy of the future can benefit from and faces challenges because of the disasters and the recession. Iowans have vowed to come back from adversity stronger than ever. The future holds opportunity for innovative and strategic thinking, which tend to be a departure from day-to-day challenges to our infrastructure. In early discussions, each Sector Committee and the Chairs Group worked to identify how Iowa's economy can build upon current short-term investments to become stronger and more globally competitive.

Eight essential elements of the future economy were identified by the Sector Committees and the Sector Chairs Group. The essential elements were used by the Sector Committees to guide and measure their work and their recommendations against the vision for Iowa's economic future.

The Essential Elements of Iowa's Future Economy are:

- Smart growth
- A diversified economy that ensures a strong agricultural sector
- A skilled workforce for quality jobs
- Environmental stewardship
- Iowa-based energy solutions
- An economy that is globally competitive
- A population that chooses to live and work in Iowa
- Realistic funding for new and maintenance of infrastructure

Iowa's Current Economy and its Impacts
In the current environment in Iowa in 2010, a number of trends are affecting the state's economy. The following factors are taken from data provided to the Committees by researchers at Iowa State University's Department of Economics. First, the population of Iowa is shifting from rural to urban areas. Two other factors include the aging population and the baby boomer generation nearing retirement age. There has been an increase in the outmigration of young workers to other states, and population growth in Iowa has been due to increases in immigrant and minority populations in the state.

Because of the economic recession and the scaling back or closing of significant numbers of manufacturers across the state, non-metropolitan Iowa is losing both jobs and Iowans between ages of 25 and 44, which also has an echo effect of population loss in the under-20 category, reflecting children of those 25-44 year-olds. Iowa's unemployment rate, which has typically remained relatively low, may start to have a structural upward shift. The rural housing stock is deteriorating, and economic vitality is concentrated in relatively few areas. Additionally, tax capacity in non-metropolitan communities is rapidly eroding, due to population shifts and loss of manufacturing employers. However, rural energy opportunities, such as biofuels and wind, are evolving.

Iowa in 10 Years

ISU researchers predict that in ten years, Iowa will see the results of current trends in population, namely, that there will be fewer people in non-metropolitan areas, more investment and growth in metropolitan areas, and the continued outmigration of young and working-age people. Regional trade centers, called micropolitan communities (populations of 10,000 – 50,000), will be mostly stable, but not growing. The sectors that will lead in job demand will be business, personal care, education, and health services. Although some downplay the role of energy production in rural resettlement, the Sector Committees identify the energy industry's crucial role in the future economy of Iowa as a significant contributor to the overall rural economy and its potential to be a mitigating factor in further rural depopulation. It is also predicted that manufacturing will still be important, but the number of jobs will have decreased, and the manufacturing businesses that remain will be those with the most efficient and productive processes.

It is clear that action taken to shape Iowa's future economy will be key determinants in the success of the state. As technology develops, energy and telecommunications infrastructure will be critical to the state's competition in a global economy. Additionally, transportation, buildings, and vertical infrastructure will remain fundamental for moving and storing goods and services and supporting Iowa's workforce. Finally, natural resources will be essential to the state's continued economic success within the agricultural, industrial, and business sectors. All sectors are integrated and mutually dependent. The work of the planning initiative is to harness the opportunities of these critical sectors. When people come to live and work in Iowa, it will be because of Iowans' anticipation of the coordinated natural resources, transportation, buildings and vertical infrastructure, energy, and telecommunications infrastructure to support a robust economy.

The Issues

Iowa's buildings and vertical infrastructure are integral to the quality of life and economic health of the state. In considering elements of the sector that cut across public, private, residential, and other areas, the Buildings and Vertical Infrastructure Sector Committee discussed issues that impact people and communities, such as development patterns, building types, fuel sources, disaster mitigation, and living in concert with Iowa's natural resources. For the purposes of this planning process, the Buildings and Vertical Infrastructure Sector Committee focused on looking 40 to 50 years ahead and determining steps for the next 10 years to address the sector's most paramount issues.

The Buildings and Vertical Infrastructure Sector Committee defined the scope of the sector as **"residential, commercial, industrial, public, and nonprofit buildings and facilities that serve a public need, as well as supporting physical systems"**. This definition includes both public and private infrastructure, recognizing the role of each in a strong future economy. The committee also identified private nonprofit and other organizations as a critical element of the sector, as they provide vital community services such as day care, long-term care, acute care, disability services, and other charitable services. Supporting physical systems are the built systems that support buildings and facilities, such as sewer, water, gas, electrical, and others.

To establish Iowa's infrastructure priorities for 2020 and beyond, the following issues were identified as priorities to be addressed relating to both new and existing buildings and vertical infrastructure.

- **Iowa's current infrastructure is not economically, socially, and environmentally sustainable or affordable.**

The Buildings and Vertical Infrastructure Sector Committee acknowledged that the timing of this integrated long-term planning effort was optimal to think in a manner that is both realistic and visionary about Iowa's buildings and vertical infrastructure. This discussion occurred in the context of the current economic recession that has limited public and private budgets, while at the same time directing investments toward ready priority projects using American Recovery and Reinvestment Act Funds, state IJOBS investments, and 2008 disaster recovery funds. The Committee recognized that despite this infusion of resources, Iowa's infrastructure needs remain so great that the state as a whole can no longer approach infrastructure decisions and investments in the status quo manner. The reality is that Iowa cannot afford or sustain its current infrastructure, let alone continue to build new infrastructure that will require long-term maintenance.

Iowa's current demographics and projections for the next ten years led the Committee to conclude that the state has too much infrastructure to reasonably maintain, further limiting the ability to invest in infrastructure improvements for the future. Demographic projections indicate

that population growth will continue to be concentrated in Iowa's nine metropolitan areas, while the state's rural areas will continue to lose population. Micropolitan areas, or regional trade centers, will likely remain stable but will not experience growth.

From an economic, social, and environmental standpoint, the Committee highlighted several examples that illustrate challenges to sustaining current infrastructure. In 2009, the Iowa Department of Economic Development produced a report, Preliminary Assessment of Public Infrastructure Needs, outlining state and local "ready to go" public infrastructure projects. More than 3,500 local projects with an estimated cost of $10 billion were reported by cities, counties, K-12 schools, community colleges, and Councils of Government. The assessment did not seek information about major, long-term projects or plans.

Quality, safe, affordable housing is critical to Iowa's economic health and quality of life, yet the Iowa Finance Authority's 2007 Housing Study cited long-term challenges to upgrading the quality of existing older homes, and because housing prices grew faster than family incomes in the first half of the decade, new and low- to moderate-income Iowans will struggle to afford safe, quality housing. Affordable, accessible housing options for older Iowans and persons with disabilities are currently limited, with needs becoming more difficult to meet as Iowa's population ages.

Iowa also has a large aging public roadway system comprised of more than 114,000 miles for a national ranking of 13th in miles of roadway, but only 30th in population. The Iowa Department of Transportation (DOT) describes the public roadway system as deteriorating at a rapid rate due to age and severe weather. 2008 DOT figures estimate average annual total roadway needs of $3.48 billion, $2.26 billion of which are critical needs.

Water and wastewater systems are another example of infrastructure that will require significant investment across the state to provide clean drinking water and ensure the overall quality of Iowa's water resources and the health of its citizens. A 2007 Environmental Protection Agency (EPA) Drinking Water Needs Survey and Assessment for Iowa estimated more than $6 billion in infrastructure needs through 2026 for expanding, replacing, and rehabilitating systems to provide safe drinking water. In addition, a 2004 EPA Clean Watershed Needs Survey and Assessment reported nearly $1 billion in needs for Iowa waste water systems over the next 20 years. Many of these projects will be necessary to comply with the Federal Clean Water Act.

Infrastructure for telecommunications in Iowa is lagging nationally and is in need of investment to ensure the state's economic competiveness. Iowa currently ranks 35th among states for download speed, and the U.S. ranks 15th among nations. Costs for buildings and vertical infrastructure have an undeniable link to the economy and are inextricably linked with other sectors. The costs of these projects can dramatically affect the financial stability of Iowa communities and the affordability of services for citizens.

- **Infrastructure planning and investments are neither coordinated nor strategic.**

Currently, Iowa has no mechanism to encourage comprehensive planning at the state, regional or local levels. Without encouragement and support for planning, the state and communities are not able to make strategic or coordinated infrastructure investments. Communities may not have the resources, expertise, time, or even fully recognize the need or value of long-term planning.

Within an environment of scarce financial resources and pressing short-term infrastructure and other needs, communities are just trying to get by. Many short-term infrastructure decisions bring significant long-term operating costs for those structures, as well as costs of other public utilities such as gas, electric, water, and sewer. The recent and future situation means local governments, including schools, look at their costs as a year-to-year investment, and they cannot afford to be visionary or look long-term. Without plans, it is not possible to appropriately weigh the costs, necessary life span of investments, and other factors in making infrastructure decisions.

The Committee recognized a need to change how we look at buildings and vertical infrastructure, changing from the current place-based services perspective. Instead, discussion of infrastructure should prioritize those efforts that can sustain a socially, environmentally, and economically healthy future. Investment in infrastructure may look at providing the necessary services, as well as determining whether buildings are needed or if the current situation or lifestyle might allow their placement differently than in the past.

Consideration should also be given to planned future uses of infrastructure so that designs accommodate those potential future uses. For example, today's new school building might be designed for a predicted future use as a community center or senior assisted living center or vice versa. Another approach is to design in mixed-uses from the start to support the long-term maintenance and operations needs. Instead of constructing a new school or renovating a school just as a school, the community should consider whether the building can serve multiple purposes — health clinic, daycare, fitness center, community center, assisted living, city hall, social services, etc. Simply put, the form of the infrastructure should follow the desired function. The challenge in this statement noted by the Committee is the need to fully explore and identify the necessary, desired, and potential functions of buildings. Technology and changing demographics present opportunities to redefine Iowan's expectations for infrastructure and access to services.

The Committee also noted the lack of strategy and coordination in infrastructure planning and investments as a result of limited efforts on the part of many entities to work on a regional basis or through natural partnerships. This type of coordination could result in plans and projects that would achieve unique results, create efficiencies, and position parts of the state for future economic success.

Recognizing the reality of current and projected metropolitan growth, the Committee expressed concern over continued development in metropolitan areas in greenfields rather than making strategic investments to revitalize and develop infill strategies for existing neighborhoods. This

practice is problematic for a variety of reasons, including the development of working agricultural lands and need for new infrastructure. Greenfield development consisting of housing, commercial, industrial and other buildings necessitates and creates demand for all types of other infrastructure including roads, schools, utilities, recreational facilities, retail stores and many others. This infrastructure is often developed with the theory that new tax revenues will support the infrastructure, but in reality, it becomes an addition to infrastructure that cannot be maintained over the long-term.

- **Infrastructure financing is not influenced by and is disconnected from broader, regional, long-term interests.**

The Committee noted the challenge of addressing infrastructure needs when the current approach to financing infrastructure is fragmented. Current financing incentivizes behaviors and patterns in infrastructure development that the Committee has identified as unsustainable and against collective long-term interests. Funding for infrastructure projects comes from a variety of federal, state, local, and private sources. For example, a number of state government agencies have resources dedicated for infrastructure projects such as housing, transportation, water systems, community development, economic development, and energy efficiency, to name a few. These agencies need opportunities and encouragement to align financing priorities and program guidelines in a strategic direction to achieve broader, long-term infrastructure goals. The challenge these agencies face to coordinate and align is exacerbated by a lack of coordination and flexibility at the federal level, but the Committee believes such an approach is possible and should be demonstrated to other entities by the state.

Another challenge related to the current mechanisms for infrastructure financing is that the approach for distributing resources is reactive, and resources tend to be distributed as evenly as possibly to create a sense of fairness. There is a need for the state to be proactive, creating priorities that can then determine how resources are distributed. In the interest of working toward broader, long-term infrastructure priorities, the Committee suggests that not all projects should be considered equal, given the significant need and demand for infrastructure improvements previously noted.

Competition to access financing for infrastructure projects or attract businesses creates additional challenges toward working in the interest of regional and long-term benefits. Many communities and entities that seek funding have not developed long-term or regional plans that articulate the shared benefits and positive impacts of partnerships and strategic infrastructure decisions, whereby those with common interests compete for scarce funding. Examples include competition among geographically connected cities to locate new businesses despite obvious benefits to all entities should the business choose to locate in the region. Instead, the Committee would urge the development of a regional strategy to recruit new businesses with long-term interests of foremost importance.

School consolidation provides another example of competition where regional long-term strategies would wisely be developed. A rural school may seek to bond for new construction or improvements to existing infrastructure despite recognition that consolidation with a neighboring district is inevitable due to declining enrollments. The Committee acknowledged that these schools may be positioning themselves to be the home of a new consolidated district in the future, but the issue of maintaining infrastructure remains.

The Committee recognized the tremendous investment that federal stimulus resources have provided for infrastructure projects, but at the same time acknowledged the process as a learning opportunity for the future. The approach of the stimulus was to get resources distributed quickly to projects that were “ready to go” to help spur the economy and create jobs. This approach, of course, resulted in funding for projects, though worthwhile by current measures, regardless of regional or long-term strategy. The Committee suggested that this opportunity to reflect on the process should result in the development of priorities that could guide the direction of resources for the future.

Recommendations

The Buildings and Vertical Infrastructure Sector Committee has put forward the following four recommendations to ensure that Iowa's infrastructure works to support the state's economic viability, competitiveness, sustainability, and quality of life now and in the future. The recommendations developed in response to priority issues should be considered as a whole, with each viewed as critical by the Committee to ensure a strong future economy for Iowa. As part of discussions, the Buildings and Vertical Infrastructure Sector Committee emphasized the importance of future economic development, disaster recovery, and the application of the recommendations across planning sectors of Transportation, Telecommunications, Natural Resources, and Energy. These considerations, as well as explanations from discussion, are outlined below.

1. **Establish a framework and principles to guide infrastructure planning, investments, and oversight.**

   The Committee believes that a solution to ensure that infrastructure is sustainable, affordable, coordinated, and in the collective interest of stakeholders is for all stakeholders – state, regional, local, and private – to be operating from the same general set of principles that will move the state as a whole in a strategic direction. This can be accomplished by establishing a framework that would consist of principles to guide infrastructure planning, investments, and oversight. The Committee has developed the following eleven principles that would serve as this framework. These principles were adapted from the Principles for Smart Growth from the National Smart Growth Network, proposed Smart Growth Principles from the Rebuild Iowa Office, and Sustainable Development Principles from the Commonwealth of Massachusetts.

   a. Ensure stakeholder, community, and regional leadership and collaboration.
   b. Make development decisions predictable, equitable, and cost effective.
   c. Promote clean energy production and increase energy efficiency.
   d. Increase diversity of job and business opportunities.
   e. Concentrate development within communities and mix land uses.
   f. Improve housing opportunities and choices.
   g. Foster distinctive, attractive communities with a strong sense of place, identity, and marketability.
   h. Protect, preserve, and wisely utilize natural resources and agricultural lands.
   i. Incorporate green building and infrastructure design that is structurally sound, durable, healthy, and safe.
   j. Provide for a variety of transportation choices and maximize walkability and mobility.
   k. Demonstrate financial sustainability for maintenance and operation.

The intent of these principles would be to set broad guidance that could be used across sectors, levels of government, and by other public and private stakeholders. It is the intention of the Committee that such principles be adopted and utilized consistently across state agencies that set priorities for and direct resources to infrastructure projects. Additionally, these principles should be used to provide consistency in program and funding guidelines to address the issue of fragmentation. Other levels of government and entities can use such a framework to establish infrastructure priorities and guide their respective infrastructure decisions, investments, and oversight as well.

This recommendation aligns with new initiatives and proposals by others in Iowa including the Rebuild Iowa Office (RIO) and the Iowa Department of Economic Development (IDED). Legislation containing RIO's Smart Planning Proposal is currently being considered by the state legislature. The RIO proposal encourages planning as a means for communities to establish a future vision and locally-designated standards to attract economic development, protect and preserve the community's resources, and encourage a strong community identity. IDED has established the Iowa Green Streets Criteria to promote public health, energy efficiency, water conservation, smart locations, operational savings, and sustainable building practices. The Green Streets Criteria apply to the IDED Housing Fund, the Community Development Block Grant Program Community Facilities and Services Fund, and Main Street Iowa Challenge Grant projects.

2. **Provide information and technical support for stakeholders on the elements of sustainable infrastructure.**

Building on the previous recommendation, the Committee recommends that stakeholders – both the infrastructure developers and users – should be provided information on the enormity of the infrastructure issues faced by the state, the costs associated with maintenance and meeting public expectations, and the importance of moving forward with a more sustainable approach to infrastructure.

Information and technical support is also needed for stakeholders on use and implementation of the recommended infrastructure framework to ensure broad application and ownership statewide. Likewise, entities that adopt the framework should provide information and technical support for those seeking funding. The Committee recognized that with recommendations such as the infrastructure priorities framework, communities and entities will have vastly different capacity, resources, and expertise to apply this for their own use or compete for limited funding. The Committee discussed opportunities to build partnerships with and utilize the expertise of professional organizations, colleges, and universities, as well as state government to share information and provide technical support.

The Committee also believes that information must be shared with the public to create a real understanding of current infrastructure needs, the true costs to meet those needs, as well as the importance of making strategic infrastructure investments that position the state, regional, and local areas for sustainability and future economic success.

This recommendation would also have broad application for implementation in other infrastructure sectors facing similar challenges to convey the current situation, the overall need to set priorities, and how a sustainable approach to infrastructure supports a strong future economy.

3. **Ensure that funding and regulatory structures support infrastructure priorities.**

The Committee recommends a concerted effort on the part of the state to align and coordinate funding and regulation in support of the recommended infrastructure priorities. Where possible, this would include grant program guidelines, loan funds, state law, discretionary infrastructure funding, development incentives and regulations, among others. The Committee encourages cross sector state leadership to identify areas and make recommendations for such alignment, including a comprehensive review of current practices, incentives, and all other funding mechanisms. The result might be streamlined, blended, or increased flexibility to support infrastructure priorities.

Consistency and alignment among funding and regulatory structures is also important from the perspective of the Committee to increase compliance and provide greater ease of oversight. The Committee expressed concern about oversight and compliance with building codes and water regulations in particular, and acknowledged the complexity of some of these state regulations. With greater alignment in the future, measures to ensure appropriate accountability, compliance, and oversight will also see improvement.

This recommendation provides an opportunity to positively influence behavior in a direction that ensures Iowa's economic viability, competitiveness, sustainability, and quality of life now and in the future.

4. **Encourage evidence-based decisions using data that can be analyzed regionally.**

Throughout discussions on issues and recommendations, the Committee came back to the need to make infrastructure decisions and investments based on data. The Committee emphasized that the primary reasons for a regional focus are avoiding duplication, as well as recognizing that many infrastructure issues are related to transportation, natural resources, economic development, housing, and health, all of which have a regional dimension.

The Committee suggests that a core set of data be defined at the state level; data would then be assembled through a combination of state, regional, and local efforts. The

Committee recommends that this data be a driver for the allocation of resources under any new dedicated infrastructure funding stream, and would influence the allocation of resources from existing infrastructure funding streams. Regional data would be used as project rationale by entities seeking to complete infrastructure projects. The Committee determined that the term “region” should be based on the type of project and be determined by local stakeholders. The data used would serve as context and supporting evidence in project applications to the state level.

Defining and assembling such data would also have broader benefits to the state and local areas. The Committee used the 2008 disasters as an example where such data and knowledge of community and regional assets would have been beneficial in response and recovery.

This recommendation would ensure that infrastructure funding is influenced by broad, regional, and long-term interests. Similar to other recommendations, this would have application across sectors related to defining and assembling data, as well as requiring regional data in application processes.

Infrastructure Planning Process

Across Iowa, economic strength and competitiveness depends, in part, on our state's infrastructure. In his 2008 Condition of the State address, Governor Chet Culver highlighted the need for a statewide infrastructure plan to ensure all of Iowa is ready for the economy of the future. At that time Iowans could not have foreseen the tragic disasters of 2008 or the seriousness of the economic recession, but their impacts underscored the need for integrated and strategic priorities for Iowa's infrastructure in future years.

Those challenges resulted in a short-term infusion of more than $6 billion for Iowa over a three-year period through the American Recovery and Reinvestment Act (ARRA), I-JOBS, and federal disaster recovery funds. These funds are being spent effectively and as expeditiously as possible on clear priorities for disaster recovery, jobs creation, economic recovery, and other infrastructure and non-infrastructure priorities for the near term.

Iowa also must be poised for the longer-term through strategic and visionary planning for the economy of the future. Iowa needs to continue to make investments in infrastructure, seeking value and success while competing in an international economy. The planning process builds on the significant impact of past and current initiatives, opportunities, issues, and challenges.

Iowa Department of Economic Development (IDED) was charged with developing a plan for Iowa. Funding for the planning initiative was provided by the U.S. Department of Commerce, Economic Development Administration as part of the disaster recovery grant to the State of Iowa. Under a competitive Request for Proposals process, State Public Policy Group, Inc. (SPPG) was awarded a contract for managing, facilitating, and developing the issues-focused plan under the direction of IDED and project director Thomas W. Hart.

The planning activities span August 2008 through April 2010, when the statewide plan for infrastructure to support Iowa's future economy will be completed. The process for developing the infrastructure strategy was designed to challenge and encourage Iowans to suggest strategies that link infrastructure sectors and position Iowa to shape and fully participate in the economy of the future. With guidance from state leaders in the five sectors of focus, stakeholders with a diversity of perspectives and experiences from across Iowa were engaged in the activities to develop an issue-focused plan with relevance to the public, private, and nonprofit sectors throughout the state.

Five sectors of focus were determined by IDED: Buildings and Vertical Infrastructure, Energy, Natural Resources, Telecommunications, and Transportation.

Leadership of the project was provided by a Sector Chairs Group comprised of state agency directors representing each sector. Sector Chairs met regularly throughout the planning process

to ensure consistency in the work of each Sector Committee and to address overarching issues. The following individuals served on the Sector Chairs group, working closely with IDED and SPPG:

- Thomas W. Hart, Iowa Department of Economic Development, Project Director, Sector Chairs Group Chair, and Task Force Chair
- Joseph Cassis, Iowa Communications Network, Telecommunications Sector Committee Co-Chair
- Steve Flagle, The University of Iowa, Telecommunications Sector Committee Co-Chair
- Richard Leopold, Iowa Department of Natural Resources, Natural Resources Sector Committee Chair
- Bret Mills, Iowa Department of Economic Development, Buildings and Vertical Infrastructure Sector Committee Co-Chair
- Joe O'Hern, Iowa Finance Authority, Buildings and Vertical Infrastructure Sector Committee Co-Chair
- Nancy Richardson, Iowa Department of Transportation, Transportation Sector Committee Chair
- Roya Stanley, Iowa Office of Energy Independence, Energy Sector Committee Chair

Additional individuals with special expertise related to the planning initiative participated on the Sector Chairs Group and the Task Force:

- Elisabeth Buck, Iowa Workforce Development
- Emily Hajek, Rebuild Iowa Office
- David Miller, Iowa Homeland Security and Emergency Management Division
- Jon Murphy, Iowa Office of the Governor

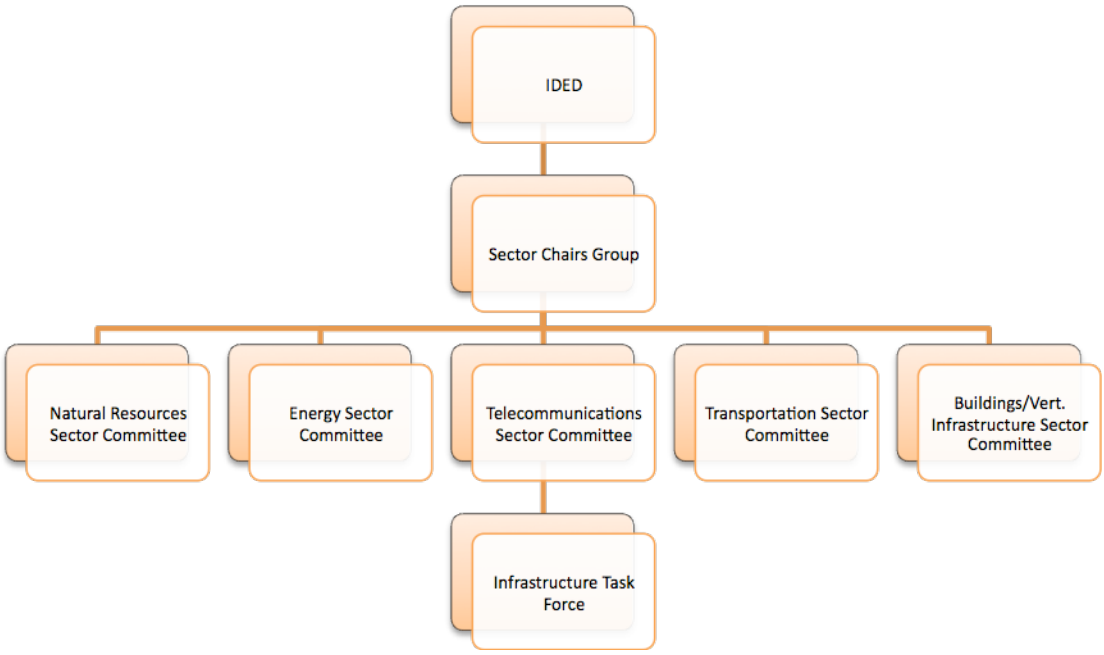
Each Sector Committee met four times in day-long deliberations between November 2009 and February 2010. Sector Committee membership was comprised of private, academic, issue-based, and public representatives providing a diversity of perspectives and strategic vision. Each committee was chaired by the respective member(s) of the Sector Chairs Group. Each of the five Sector Committees was responsible for defining the sector for purposes of this initiative, identifying issues, and developing recommendations based on research, experience, and information reviewed by each committee. Sector Committees were also charged with considering each sector's interaction and integration with the other sectors. Sector Committees were guided by the Essential Elements of Iowa's Future Economy and the common understanding of Iowa's economic situation and forecast described earlier in this report. The findings of each sector were detailed in five separate Sector Committee Reports.

Six community forums were held in Johnston, Coralville, Ottumwa, Dubuque, and Sioux City, with an ICN session conducted at 10 sites statewide. ICN sites were in Atlantic, Carroll, Clinton, Council Bluffs, Creston, Dubuque, Fairfield, Mason City, Storm Lake, and Urbandale. The forum in Dubuque was canceled due to winter weather, but rescheduled as an ICN forum. These community forums were structured to elicit public input regarding the initial issues and ideas

developed by the Sector Committees, and to inform the process going forward. Comments and suggestions from stakeholders proved very informational and beneficial to the overall process. The input from these community forums was integrated into each Sector Committee Report and Recommendations. Sector Committee reports were completed by March 1, 2010, and forwarded to the Task Force.

The Infrastructure Planning Task Force is charged with developing the statewide strategic plan, outlining priorities to achieve a strong and competitive economy. The Task Force, chaired by project director Thom Hart, includes all members of the Sector Chairs Group and several individuals from each Sector Committee and will meet three times during March and April. The plan and recommendations of the Infrastructure Task Force will be presented to IDED in May 2010.

Below is a graphic depiction of the relationship of all components of the process for developing the Infrastructure Strategy for Iowa's Future Economy.



The Infrastructure Strategy for Iowa's Future Economy will outline the Task Force's consensus direction for Iowa's buildings and vertical infrastructure, energy, natural resources, telecommunications, and transportation as sectors integrate with one another and as they impact the economic strength and competitive position for Iowa. This information should be of practical value to policymakers at all levels, state and local government agencies, the private sector, non-profit organizations, issue-based organizations, and the public.

The planning process created a clear understanding that Iowa's infrastructure as it exists and is funded today is neither sustainable nor affordable. The Infrastructure Strategy provides insights for all stakeholders as they shape their future.

Conclusion

Members of the Buildings and Vertical Infrastructure Committee have emphasized that Iowa's current infrastructure is not sustainable or affordable, requiring a new coordinated, strategic approach to infrastructure planning and investments. This approach will ensure Iowa's economic viability, competitiveness, sustainability, community vitality and quality of life for the future. As plans are developed during the Infrastructure Strategy Task Force process, the importance of coordinated planning and the identification of shared priorities between sectors should be foremost on the agenda. Only through this coordinated, comprehensive approach can Iowa's challenges be addressed for the overall goal of Iowa's growth, prosperity, and recovery.

Supporting Documents

Meeting Notes

- November 17, 2009
- December 15, 2009
- January 19, 2010
- February 16, 2010

Presentations and Handouts

- Housing as Infrastructure: Issues of Sustainability, Nadia Anderson, Iowa State University, College of Design
- The Iowa State Building Code and Its Application, Michael Coveyou, Iowa Department of Public Safety
- Scorecards and Smart Growth, Jeff Geerts, Iowa Department of Economic Development
- Sustainable Dubuque, David Lyons, The Iowa Institute

Infrastructure
STRATEGY
For Iowa's Future Economy

Energy Sector

REPORT & RECOMMENDATIONS

February 2010

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Acknowledgements

The Energy Sector Committee recognizes that the work of the Committee was improved by the information, opinions, and discussions provided at all four meetings. The opportunity to understand and vet new technologies and trends in energy could not have been possible without time and information provided by issue experts. These individuals included Kevin Dodson, Director of Environmental Programs, Compliance and Permits, MidAmerican Energy Company, for his presentation on Utility-Grade and Residential Solar Applications and Solar and Battery Technology Advances; William J. Fehrman, President and CEO, MidAmerican Energy Company, for his presentation on Current Nuclear Generation Technology; and Gary Spitznogle, Manager of IGCC and CO2 Capture and Storage Engineering, American Electric Power Company, for his presentation on Advanced Coal Technology.

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Energy Sector Committee Members

Roya Stanley, Sector Committee Chair, Iowa Office of Energy Independence, Des Moines

Thom Hart, Iowa Department of Economic Development, Des Moines

Andrew Anderson, Faegre & Benson Law Firm, Des Moines

Mick Barry, Greenstar North America, Des Moines

Rob Berntsen, Iowa Utilities Board, Des Moines

Dr. P. Barry Butler, The University of Iowa College of Engineering, Iowa City

Dean Crist, MidAmerican Energy, Des Moines

Regi Goodale, Iowa Association of Electric Cooperatives, Des Moines

Supervisor Jane Halliburton, Story County Board of Supervisors, Nevada

Peter Hemken, Dupont Company, Johnston

Dr. Patricia Keir, Eastern Iowa Community College, Davenport

Dr. Alexander King, U.S. Department of Energy, Ames

Bob Loyd, Clipper WindPower, Cedar Rapids

Dr. Alan Meyer, East Marshall Schools, Gilman

Stephen Newell, IBM, Springfield, Illinois

Lucy Norton, Iowa Renewable Fuels Association, Johnston

George VanDamme, Deere and Company, Moline, Illinois

Les Wilson, The Energy Group, Des Moines

Introduction

Iowans have high expectations for a strong economy, good jobs, and a future of opportunity. Setbacks came in 2008 with the summer disasters, followed by the national recession and significant impacts on Iowa's infrastructure. Even while addressing those challenges through the influx of federal and state short-term funding for jobs, infrastructure, disaster recovery, and other broad needs, Iowans must also consider the vision for the future economy and the infrastructure it will demand. Interested Iowans statewide will find in this report a set of recommendations and a strategic direction for the energy sector.

Energy was the subject of deliberations over a four-month period by a diverse array of Iowans who contributed their expertise, experience, and perspectives on the future economy and the energy infrastructure that will be required to meet future needs. Because stakeholders from across the state developed the report, it reflects and has future application to diverse stakeholders, including the private sector, issue-based groups, nonprofit organizations, academia, and local and state government.

As attention at both the national and state levels has turned to the promise of new energy policies and associated smart planning and growth principles, the energy sector in Iowa has risen to new heights. Smart planning decisions need to consider the growing needs of the state's business and industry, as well as the protection of farmland and the Iowa economy. Iowans have recognized that in order to remain competitive on the national and international levels, an energy industry must continue to be developed that utilizes the state's unique and rich natural resources. Additionally, Iowa's energy use is increasing, highlighting the issue that more efficient generation, transport, and use will be necessary to sustain a high quality of life for Iowans and expand opportunities for economic recovery and vitality.

The Energy Sector Committee worked to create a list of priority issues and corresponding recommendations that genuinely support Iowans and future generations. Energy is an important part of an Iowa solution to create a robust economy and maintain the state's economic vibrancy through effective, efficient, and strategic use of the state's unique resources. These resources can lead to the development of new technologies that have potential for state, national, and international application. This report does not stand alone, however. As part of a comprehensive and coordinated statewide planning initiative, the recommendations and insights on the energy sector will be considered by a Task Force, along with similar reports on infrastructure needs for the future economy in buildings and vertical infrastructure, natural resources, telecommunications, and transportation. The ideas and recommendations contained in the five reports and the coordinated plan from the Task Force reflect the involvement and engagement of more than 200 Iowans over a span of nine months. From those deliberations, a strategy for Iowa's future economy was developed on behalf of and for all stakeholders. It is the hope of the Energy Sector Committee that policymakers, community leaders, business and industry, and others find ways to implement or support the recommendations of this sector report and those of the coordinated Infrastructure Strategy for Iowa's Future Economy.

Executive Summary

Iowa's investment in energy through transportation, electricity, natural gas, propane, and other energy sources, has created jobs, new businesses, and other benefits for the environment and agricultural sector of the state's economy. To continue trends and expand, the Energy Sector Committee recognized the importance of comprehensive planning to spur innovation in the full energy life cycle. Infrastructure needs were noted to be different depending upon regulation, practice, management structures, and scientific innovation; however, several priorities were shared between energy segments. The Sector Committee identified an important crossroads between the infrastructure needs for expansion of wind, solar, and biofuels technology. These priorities included planning for and mitigating disaster, reducing the state's energy consumption, and increasing production to utilize Iowa's unique renewable resources including wind, soil, and water. The Committee also recognized the need to spur growth and investment in Iowa energy sources to support the state's economic opportunities and make a commitment to long-term climate change solutions.

There will be an economic advantage to developing the ability to adapt to a new energy future if the state can produce and utilize a variety of fuels and capitalize on the opportunity to deliver to other states. Additionally, Iowa must focus on knowing what other states are producing and utilizing in order to make the greatest impact. The committee agreed that the state of Iowa enjoys strengths in its current energy infrastructure that include technology and innovation at the academic and business levels, a commitment to natural resources, a strong agricultural economy, and well-maintained roads. The group also identified current weaknesses, including dependence on imported energy and stressed a continued need for robust transmission and transport systems. Additionally, they recognized that the system must be coordinated in order to respond quickly to changes in technology and that Iowa must build a system of public understanding and demand for clean, low or no carbon Iowa-based energy solutions.

The Energy Sector Committee defined their scope as the "components of the production, transmission, transport, distribution, storage, and usage systems that provide for efficiency, opportunities to increase affordability, safety, environmental and human health, reliability, and availability for the state to become energy independent and position Iowa as a supplier of energy and energy technologies to support economic development."

The issues identified by the Energy Sector Committee included the following:

- Energy production and usage patterns are continually evolving, and while certain aspects of the energy future remain unclear, some trends are already known.
- There is a need for infrastructure enhancements and a readily available, trained, and educated workforce to support the energy future.
- Iowa has a substantial existing infrastructure that needs to be considered.
- A diverse and flexible energy infrastructure is needed to support harvest, storage, transportation, conversion, access to sustainable raw materials and natural resources, and distribution.
- Leveraging rail, wires, pipelines, and rivers is critical to maximize the transmission and transport of energy.
- Customer behavior has a large impact on energy use and efficiency.

The Energy Sector Committee made five recommendations to address the priority issue areas:

- There should be a system to support an energy literate population in Iowa through education and information on implementing solutions to meet energy goals.
- There should be a business climate and stable government investment structure that responsibly supports energy technology research, development, demonstration, and deployment. This structure would include policy and financial incentives to support all phases of development from early stage commercialization to the marketplace.
    - Policy and financial incentives in these areas should reflect both environmental and cultural factors.
    - This will require easy access, influence, and capitalization of federal opportunities and polices that benefit the state and nation.
    - Iowa should be a leader in the global economy through lower energy costs and innovation.
- There should be recognition that Iowa's primary resources (soil, water, wind, and an educated, motivated workforce) provide value-added opportunities throughout the state, and that capitalization requires consideration for the state's diverse communities and sustainability.
- There should be recognition that infrastructure policy decisions must balance need for stability, flexibility, and agility, while appropriately valuing current infrastructure.
- There should be coordinated outreach in energy efficiency across sectors, establishing Iowa as a leader in best practices.

Although the energy future is evolving, it is clear that Iowa will need an environment that offers a variety of energy options, adaptability to changing innovations, and, ultimately, priority areas on which to concentrate resources and planning. Cooperation and collaboration is necessary through public-private partnerships, both to establish a shared vision and to ensure adequate investment. In Iowa, lower energy costs and innovation have a positive impact on the economy. Having a climate that supports energy research, development, demonstration, and deployment from early stage commercialization to the marketplace brings business to Iowa and cultivates ideas within existing businesses. Iowa can continue to lead in energy by creating a system that promotes and values the energy industry, recognizes existing natural resources and developments, and builds a culture of energy responsibility and education. Iowa's existing infrastructure plays an important role in ushering in success of these new possibilities. Some structures and systems may need to be re-thought or updated, but through prioritization, the state can move forward in a way that can help ensure smart planning and growth.

Iowa's Future Economy

There is no crystal ball to predict exactly what Iowa's economy will be like in 2020 and beyond, but there are indicators and steps that can be taken to shape the economy as Iowa recovers from the dual challenges of the 2008 disasters and the national recession. The Infrastructure Strategy for Iowa's Future Economy initiative was designed to work from a common understanding of Iowa's current economy and forecast of economic factors in order to establish strategic direction for the state. Essential elements of the future economy were identified from this information and from the deliberations of the participants in the process. This section highlights the foundational premises of the Sector Committees and Sector Chairs Group that guided their work.

Essential Elements of the Future Economy
Iowa's economy has faced challenges due to the disasters and the recession; conversely, Iowa's economy can benefit from the opportunities presented as the state recovers from these challenges. This will require a commitment to innovative and strategic thinking now, which tend to be a departure from day-to-day challenges to infrastructure. In early discussions, each Sector Committee and the Sector Chairs Group worked to identify how Iowa's economy can build upon current short term investments to grow stronger and enhance global competitiveness.

Eight essential elements of the future economy were identified by the Sector Committees and the Sector Chairs Group. The essential elements were used by the Sector Committees to guide and measure their work and their recommendations against the vision for Iowa's economic future.

The Essential Elements of Iowa's Future Economy are:

- Smart growth
- A diversified economy that ensures a strong agricultural sector
- A skilled workforce for quality jobs
- Environmental stewardship
- Iowa-based energy solutions
- An economy that is globally competitive
- A population that chooses to live and work in Iowa
- Realistic funding for new and maintenance of infrastructure

Iowa's Current Economy and its Impacts
In the current environment in Iowa, a number of trends are affecting the state's economy. The following factors are taken from data provided to the Sector Committees by researchers at Iowa State University's Department of Economics. First, the population of Iowa is shifting from rural to urban areas. Two other factors include the aging population and the baby boomer generation nearing retirement age. There has been an increase in the outmigration of youth workers to other states, and most population growth in Iowa has been due to increases in immigrant and minority residents in the state.

Because of the economic recession and the scaling back or closing of significant numbers of manufacturers across the state, non-metropolitan Iowa is losing both jobs and population between ages of 25 and 44. This has an echo effect of population loss in the under-20 category, reflecting children of 25-44 year-olds. Iowa's unemployment rate, which has typically remained relatively low, may start to have a structural upward shift. The rural housing stock is

deteriorating, and economic vitality is concentrated in relatively few areas. Additionally, tax capacity in non-metropolitan communities is rapidly eroding due to population shifts and loss of manufacturing employers. However, rural energy opportunities, such as biofuels and wind, are evolving.

Iowa in 10 Years

ISU researchers predict that in ten years, Iowa will see the results of current trends in population, namely, that there will be fewer people in non-metropolitan areas, more investment and growth in metropolitan areas, and continued outmigration of young and working-age people. Regional trade centers, called micropolitan communities (populations of 10,000 – 50,000 people), will be mostly stable, but not growing. The sectors that will lead in job demand will be business, personal care, education, and health services. Although some downplay the role of energy production in rural resettlement, the Sector Committees identify the energy industry's crucial role in the future economy of Iowa as a significant contributor to the overall rural economy and its potential to mitigate factor in further rural depopulation. It is also predicted that manufacturing will still be important, but the number of jobs will have decreased. The manufacturing businesses that remain will be those with the most efficient and productive processes.

The Issues

The Energy Sector Committee defined their sector as “components of the production, transmission, transport, distribution, storage, and usage systems that provide for efficiency, opportunities to increase affordability, safety, environmental and human health, reliability, and availability for the state to become energy independent and position Iowa as a supplier of energy and energy technologies to support economic development.” The Sector Committee members especially noted that success and innovation can only be seen in an environment that supports and invests in new ideas and technologies for systems that produce, transport, and use energy. The Commitee also recognized the incredible pace of the energy industry and the need to be responsive to innovations, policy, and practices in Iowa and around the world.

To secure a successful energy future in 2020 and beyond for Iowa, the following issues were identified as priorities to be addressed..

Energy production and usage patterns are continually evolving, and while certain aspects of the energy future remain unclear, some trends are already known.

The Energy Sector Committee concluded early in the process that cost and the way energy is produced, distributed, or used will not be the same in 2020. Science is moving faster than ever before, and each breakthrough will require adapted infrastructure. The Sector Committee agreed that as new technology is developed, there is little to no existing infrastructure to switch from one type of energy source to another. This lack of connectivity is also important when considering the current intermittency of renewable fuels, such as wind, solar and biomass, that are dependent upon non-controllable environmental factors for production. As referenced in the Office of Energy Independence Comprehensive Plan and attributed to the Iowa Climate Change Advisory Council report, biomass is defined as “biological material that can be used as a fuel or for industrial production.” Adequate backup and storage systems must be a part of the infrastructure discussion to ensure a robust menu of energy production options for Iowa.

Scientists predict that the energy future will be a mixed use of oil, natural gas, solar, wind, nuclear, coal, hydroelectric, and other energy sources. Energy production has been cited as slightly easier to predict than usage and will include coal, due to its low monetary cost, and natural gas, due to its supply and reliability. Wind opportunities are predicted to grow, and the biofuels industry is also expected to have a strong future as the scientific community innovates to replace the petroleum molecule with bio-materials for a range of products beyond energy, such as consumer goods. It is also predicted that demand for electricity will increase. Vehicles will likely experience changes in energy usage, although the methods are not yet certain. Vehicles may be powered by electricity, hydrogen, biofuels, natural gas, or other innovations. Committee members also recognized that there is sufficient natural gas to provide for the state’s needs for the next decade without serious challenges, except concerning the distribution network.

All sectors of the economy are impacted by scientific and technological advances that affect natural resources, transportation, telecommunications, and vertical infrastructure. Growth in other industries has an effect on usage patterns and demand, especially with regard to telecommunications through cellular phone towers, new server farms, and other business

needs. The group agreed that as energy technology changes, it will impact the need to construct and retrofit buildings that adapt to new energy sources, depending on the best technology in the future. The Sector Committee also recognized the issue of the need to balance development of energy infrastructure with concerns about health and competition with other states involved in energy production.

There is a need for infrastructure enhancements and a readily available, trained, and educated workforce to support the energy future.

In order to sustain growth of Iowa-based energy sources, the state must have an intellectual infrastructure that provides the base necessary to support transformation in the overall economy and the institution of new technologies into the system related to energy innovation. This includes a skilled and adaptable workforce, research and development, early stage commercialization, and access to technology through broadband. The workforce infrastructure is present, but is not at full capacity due to a need for a vision, coordination, and information. Further, the energy workforce is aging, and with that, institutional knowledge is leaving the industry while the state suffers from a lack of instructors to teach new energy professionals. This uptick in technology in Iowa attracts students from other states, which is presenting an opportunity to begin to build a critical mass of human infrastructure.

There has been a notable response from community colleges and educational institutions to create programs around energy developments, and there is a well-developed research capacity at Iowa's Regents Universities. Many cite barriers to building this new workforce as a low current demand for these positions. As the energy industry grows, needs change faster than programs can be created, accredited, and adjusted. The provision of new educational opportunities is not lacking but will need to grow through incentives and partnerships in order to meet future demand. Opportunities for education and research were recognized in the area of energy innovations. The Committee noted that the state should focus on attracting funding for additional research and coordinate workforce, education systems, and industry. Making investments in any infrastructure project poses risks, but the group agreed that state-led investments could mitigate risks, create shared visioning, and pave the way for new public-private partnerships in Iowa-based energy source development.

Iowa has a substantial existing infrastructure that needs to be considered.

Iowa has already taken steps to improve the state's energy future and has experienced some early success. For example, Iowa supplies 25 percent of the nation's renewable fuels, providing more ethanol to the nation than any other state, and comes in second in the nation in wind energy supply to the country. The Sector Committee members recognized that much of the current infrastructure is aging and as the state increases its production and potential export capacity, existing transport infrastructure will continue to be stressed at a time when needs for all existing infrastructure are growing. As the state has invested significantly in areas supported by a small population statewide, existing structures will play an important role in consideration of future projects. Existing structures and technologies will need to be retrofitted to save costs and maximize opportunities to re-use the infrastructure that is already in place. The Sector Committee agreed that wire, rail, transmission structures, and roads are the highest priority portions of the current infrastructure that need to be strategically maintained. Not supplying adequate transport and technology support threatens core facilities located in rural areas. This

poses the greatest threat to innovation and agility in maximizing future opportunities for energy export and independence.

The Committee recognized that Iowa's farm-to-market commodity system is a model for the Energy Sector, and the state's road maintenance practices provide easy transport for some energy products. The state's rail capacity was viewed by the Committee as a barrier for growth in biomass collection and recycling. Concerns were explored regarding loss and age of the state's rail system, including the need for greater efficiency in rail transport, lack of staging area capacity, and shortage of available rail cars. The Sector Committee acknowledged that the current transport system for energy does not have the capacity to support innovation, such as investments in cost-effective smart grid technology or Advanced Metering Infrastructure (AMI) systems that could affect energy consumption and conservation practices.

The Energy Sector Committee recognized the need to identify Iowa's limitations in relation to energy infrastructure. For instance, the state's capacity for hydroelectric power is limited due to the topography of Iowa's rivers. Also, Iowa's geologic makeup is not ideal for the porous qualities of rock layers involved in carbon capture. It is helpful to recognize these limitations in order to determine the energy sources that are ideal for the state. Also, the Committee noted that infrastructure should be seen as an investment in the industry and in Iowa's future energy independence. Energy industries have taken the lead on creating efficiencies in production to mitigate carbon outputs in advance of anticipated increases in production volume.

Along with the need to assess existing infrastructure, the group stressed strategic changes in energy processes that may provide new, more efficient, and environmentally friendly ways to use it. Currently, the biofuels industry needs more rail capacity to support the increased number of products that will need to be transported in the short-term. If less coal was used, there would be more rail capacity for biomass, which has a much smaller carbon footprint. Many noted that the public sector and private industry may have concerns about expense when mitigating the carbon footprint, but alternative energy sources, such as biofuels and recycling, create efficiencies and reduce carbon output. Larger connections concerning environmental impacts of energy production, transport, and usage will need to be continually monitored as they affect other states, as well as Iowa.

A diverse and flexible energy infrastructure is needed to support harvest, storage, transportation, conversion, access to sustainable raw materials and natural resources, and distribution.

The Energy Sector Committee recognized that the current energy infrastructure is not keeping up with supporting technology. Availability of sustainable raw materials and natural resources was cited by the Committee as a concern, as there has been a perception of competition between food and fuel. Impacts on the availability and quality of water used by the energy production process could produce concerns for natural resource management. As the biofuels industry continues to grow, access to biomass, conversion plant capacity, and distribution systems are slowing growth. The Committee also noted concerns for the state related to crop production and external regulation by other states and the federal government due to fertilizer runoff.

The Energy Sector Committee discussed that diversification of infrastructure investments would be the most appropriate way to ensure success in the changing market. As an example, the

group noted that current technology suggests the option to switch some coal plants to gas, but the system infrastructure may not be adequate to make the switch possible. If utilized, this would lower the state's carbon footprint and add additional capacity for natural gas distribution, a primary form of energy for the state at this time. It was also recognized that new energy sources will require storage capacity that Iowa does not have. The Committee agreed that Iowa's current business climate may not do enough to stimulate the new energy economy. As evidence, the Committee cited the production of products that are ready for consumption and would maximize Iowa's potential for agricultural success, but the move toward the creation of alternative products has not reached its full potential.

There is also a lack of infrastructure to make it easy for the public to change the way that they use energy. People do not understand how to access information to make decisions about energy efficient technologies for appliances and in building new structures. Other sectors that play a strong role in transport, information sharing, and systems must be integrated into the plan for diversification of energy. As natural resources are utilized for energy production, the demand must be balanced with sustainable practices, such as leaving some biomass on the ground to prevent runoff even though it could be used to supply fuel.

Being the first to market provides great advantage for the state. The agility of the energy industry to take advantage of innovations is challenged by an aging transportation infrastructure and a culture of non-innovation, due to increased fear of cost of those building new structures. In order to remain agile and take advantage of the latest technological advances, all residents will need access to broadband technology, or potential uses will go un-implemented in parts of the state where rich natural resources are located.

Leveraging rail, railroads, wires, pipelines, and rivers is critical to maximize the transmission and transport of energy.

Overall, Iowa is a net importer of energy when taking into consideration natural gas, electricity, and coal. Many cite issues with the current capacity of transportation and exporting mechanisms as missed opportunities for growth in Iowa's economy. The energy sector utilizes all current forms of transport systems available today. The Sector Committee recognized that the comprehensive transportation and distribution system for energy in the state is not conducive to exporting energy. This is a missed opportunity for growth and recovery in Iowa's future economy. Focuses on pavement, under-use of rivers, and increasing stress to the current grid structure were all cited as major infrastructure concerns.

The Sector Committee stressed that unlike other areas of the economy, growth in Iowa-based energy sources will require a strong rural development component to meet workforce needs in wind and biofuels production and distribution centers. To transport these energy sources and begin to export more energy from the state, it will be important to keep existing transport infrastructure systems operational and make investments in new technology to meet future demand. It was agreed that prioritization for funding is the key, along with strategic planning. Some expensive items, such as buying rights of way, can be used for more than one mode of transport or distribution, as long as planning is included. Also, the group addressed transmission specifically as it relates to planned growth in electric usage over time.

Opportunities for leveraging technology and the availability of rail, wire, pipeline, and river infrastructure are challenged by required technology investments and maintenance from the

transportation, natural resources, and telecommunications sectors. The Sector Committee recognized that increases in production of Iowa-based energy would translate into increased transportation needs and associated costs for investments and upkeep. Also, as energy sources are developed around the state, Iowans will increasingly expand the number of vehicle miles traveled. Concerning natural resources, many processes for energy production require water. Currently, Iowa's telecommunications system cannot support the necessary capacity for expanded electricity coverage to meet needs, as well as provide rural residents with opportunities to live and work remotely. Members of the Energy Sector Committee noted that portions of the energy transportation and distribution system in the state are constrained due to lack of capacity in certain areas, which further stifles growth into new arenas. The current energy infrastructure is not designed to handle additional loads and emerging needs for storage, distribution, and demand technologies.

Customer behavior has a large impact on energy use and efficiency.

Members of the Sector Committee recognize that customers expect reliable, safe, affordable, and environmentally responsible energy. As consumers in Iowa demand even more technology for their employment, entertainment, and daily living needs, energy usage continues to rise. In order for the state to remain globally competitive and to rebuild from the natural disasters of the summer of 2008 in a more efficient way, consumers play a large role in personal and business infrastructure, behavior choices, and investments made. The group noted that the largest barriers to behavior change are cost and motivation.

Although millions of dollars have been invested in energy efficiency programming, electricity usage in the state continues to increase. The Sector Committee reflected that there is often pressure faced by public entities to have a return on investment for energy systems; however, many new technologies that are available, such as solar, may not see a substantial return on investment for 20 years. The challenging connection to individual energy usage and climate change is also a priority for consideration, as environmental protection and bolstering the economy can appear at odds when considering the short-term return on investment. The need to remain globally competitive with emerging economies such as China and India indicates that investments in clean technology are also a priority.

Sector Committee members noted a challenge in changing consumer behavior while balancing the implications of usage and energy efficiency with quality of life. It was agreed that currently, not enough financial incentives are available, and many are not aware of opportunities for learning about and financing these types of improvements. Opportunities to find ways to change consumer behavior include making energy efficiency a less expensive and more convenient option. As an example, the rising cost of oil may increase the demand for hybrid vehicles. Conversely, making energy saving measures increasingly convenient and influencing consumer demand may also produce changes in consumer behavior and energy use. For instance, if businesses changed their operational structure and began utilizing telecommuting hubs, the number of vehicle miles traveled would decrease as people work closer to home.

Current demand for energy and any changes in consumer behavior are dependent upon the existing and growing transportation, telecommunications, vertical, and natural resource infrastructure systems. Each could be affected by consumer usage changes and changes in demand. If Iowans decrease their vehicle miles traveled or change to a different fuel source for vehicles, the distribution capacity and road use tax funds availability and prioritization structure

may be affected. Buildings and vertical infrastructure issues may arise concerning zoning and space for the way that buildings and vehicles access energy. The Sector Committee also recognized that the telecommunications system in the state will need to be updated to assist with changes in trends and usage of energy throughout the state. Concerns about land use and sprawl, in addition to limiting carbon output through new technology, will also be important considerations for Iowa's natural resources.

Recommendations

The Energy Sector Committee has put forward five recommendations to address the issues that Iowa faces in energy production, transport, storage, distribution, and usage. The recommendations overlap, as the issues are intertwined. As part of discussions, the Energy Sector Committee emphasized the importance of future economic development, disaster recovery, and the impact to and from the energy sector, with regard to the Transportation, Telecommunications, Natural Resources, and Buildings and Vertical Infrastructure Sectors. These considerations, as well as explanations from discussion, are outlined below.

There should be a system to support an energy literate population in Iowa through education and information on implementing solutions to meet energy goals.

This recommendation addresses the following issues:

- Energy production and usage patterns are continually evolving, and while certain aspects of the energy future remain unclear, some trends are already known.
- There is a need for infrastructure enhancements and a readily available, trained, and educated workforce to support the energy future.
- Customer behavior has a large impact on energy use and efficiency.

Since consumers will ultimately drive demand, it is imperative that they know and understand energy information. As they become more comfortable with these concepts, people will start to expect to have greater control over their energy use and costs, especially considering the advent and further development of smart grid and Advanced Metering Infrastructure (AMI) technologies. Through the creation of an energy literate population, consumers will be empowered to make energy decisions and begin to demand cleaner, more sustainable practices in the industry. This can be accomplished by providing education, systems to incent best practices, and to support transitions in the implementation of new energy technologies into homes and businesses around the state.

The Energy Sector Committee's discussion centered on the need to educate and inform the public. With the recognition that there is money to be made when consumers are educated about energy efficiency, in that vendors and home builders will be more likely to be utilized to replace inefficient appliances and home features, consumers ultimately benefit. For instance, the current consumer may be more likely to buy a less expensive, inefficient appliance because of upfront costs, without considering the life-cycle costs associated with inefficiencies. The Committee also recognized that common building codes that support energy efficiency and proper enforcement would add to success in creating a coordinated system of support and education. When organizations are motivated to provide customers with the information they need to make informed decisions, it is of benefit to society as a whole. Usage can drive change when people fully understand what energy means.

An energy literate population takes advantage of opportunities for energy efficiency, which decreases costs to businesses and families through decreased waste. This, in conjunction with the use of renewable energy, increases energy independence. Additionally, an energy literate population may start demanding that energy production and transport develop in a way that allows utilization of diverse energy sources, financial investment strategies, and new

technologies in their communities. A full information structure allows disaster rebuilding efforts and hazard mitigation to be forward thinking and intentional, in order to maximize the opportunity to rebuild in a way that incorporates energy considerations. It is important to create a culture of seeking new opportunities with youth and children, both in their own usage and future workforce opportunities. Educating students or children and youth in science and math has the potential to make Iowa's workforce more adaptable for the energy future.

The ability to utilize information and technology in rural locations enhances Iowa's agricultural and biofuels opportunities. With farmers' need to engage with the world as international business people, broadband access will be crucial to the farmer's ability to access information for their subsequent success. In some areas, access to broadband is currently unavailable due to profitability concerns on the part of broadband providers. However, rural connectivity will be crucial to the success of the Iowa economy and its dependence on agriculture. With new technologies constantly evolving, such as those that assist in fertilizer application, there will be implications for the production and transport of biofuels. Additionally, the technologies used to assist in targeted chemical application will undoubtedly have implications for natural resources, such as less runoff and use of fewer chemicals.

There should be a business climate and stable government investment structure that responsibly supports energy technology research, development, demonstration, and deployment. This structure would include policy and financial incentives to support all phases of development from early stage commercialization to the marketplace.

- Policy and financial incentives in these areas should reflect both environmental and cultural factors.
- This will require easy access, influence, and capitalization of federal opportunities and polices that benefit the state and nation.
- Iowa should be a leader in the global economy through lower energy costs and innovation.

This recommendation addresses the following issues:

- Energy production and usage patterns are continually evolving, and while certain aspects of the energy future remain unclear, some trends are already known.
- There is a need for infrastructure enhancements and a readily available, trained, and educated workforce to support the energy future.
- Iowa has a substantial existing infrastructure that needs to be considered.
- A diverse and flexible energy infrastructure is needed to support, harvest, storage, transportation, conversion, access to sustainable raw materials and natural resources, and distribution.
- Leveraging rail, wires, pipelines, and rivers is critical to maximize the transport and transmission of energy.

A changed business climate and corresponding infrastructure would allow new opportunities for Iowa, including the ability to invite innovation. Stability in policy decisions through common and strategic visioning is a priority among the business community, so the infrastructure investments they have made are applicable for the long haul within the context of regulatory certainty. There is a need to create a business and policy environment that supports a robust, diversified transport system to serve Iowans' overall needs as well as the export of energy. One Committee member recognized that research and development is often put into silos by technology. For example, at the Department of Energy, the solar, biomass, and wind programs are separate

from one another. This can create a challenge in making policy. When there are so many areas of innovation and research, it is hard to know where to invest and what to support as a state. This recommendation encourages public-private partnership, which could net a very strong economy. It also mitigates the risk involved for business in making investments and trying to anticipate which energy sources will be favored. Incorporating a system-wide process for planning and cooperation in investment will ensure that private and public partners have a common vision and understanding of the energy infrastructure needs for the future. Additionally, Iowa will continue to attract and grow business and investment opportunities by keeping energy costs competitive with other states. Although the Sector Committee recognizes that innovation will require investment, it is anticipated that energy infrastructure investments will be made strategically so that upfront costs can be recovered.

There is a need to provide balance for responsible practices with regard to the environmental implications of the energy sector as well. Iowa's economy depends heavily on the availability of sustainable natural resources, and it will be essential to consider this factor. One need is the infrastructure to support harvest, storage, transportation, conversion, and access to biomass, along with distribution. Land use patterns have involved abandonment of areas, and building out means more roads and greater distance traveled, which contributes to quality of life concerns. Striking a balance between development and allowing use of agricultural land will contribute to the success of the bioeconomy. Farm to market roads will continue to be needed for increased agricultural outputs that also fuel the energy sector. In addition, as telecommunications systems age and are continually stressed, cyber security of energy is a concern.

The Sector Committee noted the need to create a business climate to produce products that are ready for consumption to maximize Iowa's economic potential. Policy and incentives were suggested to be supportive of new, Iowa-based, clean energy opportunities that are in development or growth periods, such as wind transmission. Additionally, the cultural and quality of life elements of the energy future should be considered in order to attract and retain Iowans.

There should be recognition that Iowa's primary resources (soil, water, wind, and an educated, motivated workforce) provide value-added opportunities throughout the state, and that capitalization requires consideration for the state's diverse communities and sustainability.

This recommendation addresses the following issues:

- Energy production and usage patterns are continually evolving, and while certain aspects of the energy future remain unclear, some trends are already known.
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- Iowa has a substantial existing infrastructure that needs to be considered.
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- Leveraging rail, wires, pipeline, and rivers is critical to maximize the transport of energy.

For purposes of this report, value-added opportunities are those that provide opportunities for collaboration and utilization of existing and expanding technology and resources. For instance, technology has allowed Iowa to maintain the number of farmed acres while increasing yields, and this has been advantageous to the state's economy.

It is crucial to have the infrastructure to support these opportunities and the economic results they provide for the state. The Iowa economy depends heavily on natural resources that produce energy, directly and indirectly. Soil, water, and wind provide resources through which Iowa can become increasingly energy independent and an exporter of energy. Additionally, when considering sustainability and the ability to harness energy potential, opportunities to recycle materials will be critical. Recognition of the value-added opportunities that Iowa's resources provide will enable the state to continue to make smart investments. One such example is the system for farm to market roads that enables the goods produced in rural Iowa to reach the rest of the state, national, and international markets.

The potential economic impacts of having access to natural resources of high quality are great. With this access, Iowa can attract new energy investments. Having a workforce that is already trained or has access to quality training opportunities through innovative programs in community colleges and Iowa's regents institutions will be a key selling point to businesses looking to relocate to Iowa. Energy jobs provide well-paying work opportunities that match Iowa's strong work ethic and skilled workforce.

Supporting strong rural infrastructure enables the success of the entire state. For instance, ensuring that telecommunications systems are in place for the Iowa economy to be connected to the global economy will be essential. It will be important to make certain that existing buildings and other facilities are retrofitted and new buildings and facilities are built to support growth, including their sewer, water, and other systems. Finally, when thinking about the impacts on disaster recovery, there is a need to protect natural resources and mitigate future damage to them. By utilizing biofuels, the state will be able to take full advantage of the life cycle of its natural resources.

There should be a recognition that infrastructure policy decisions must provide balance for the needs for stability, flexibility, and agility, while appropriately valuing current infrastructure.

This recommendation addresses the following issues:

- Energy production and usage patterns are continually evolving, and while certain aspects of the energy future remain unclear, some trends are already known.
- Iowa has a substantial existing infrastructure that needs to be considered.
- Leveraging rail, wires, pipeline, and rivers is critical to maximize the transport of energy

Policy decisions have to be well thought-out and responsible when energy infrastructure is developed and implemented. With the energy future, it will be essential to invest in common denominators to make innovation successful. For instance, there may be a need to serve electric vehicles if that is a direction taken by the auto industry and the public. In this case, investment may need to be made in building an electricity infrastructure along roads, perhaps building on existing infrastructure at gas stations and rest stops. Additionally, buying rights of way can be coordinated with other investments, as long as planning is included in the process. Other examples of common denominators include utilization of home heating systems that can take advantage of multiple energy sources, biofuels, recycling, and retrofitted pipelines. In order to keep existing built infrastructure viable, there is a need to find new ways to fund infrastructure that consider sustainability. There is also a need to recognize the opportunities for investment on a small scale to test energy solutions.

One approach that the Energy Sector Committee identified as critical to maximizing energy transport and transmission is leveraging rail, wire, pipeline, and rivers. The transport of people and goods, such as through the use of roads, sometimes coincides with energy transport, and sometimes they do not work as well together, or opportunities for their shared usage are missed. It will be critical to take stock of current infrastructure and keep the elements in place that serve the state's economic success. As the Energy Sector Committee noted, all elements of the current infrastructure will be critical to a diverse energy sector. The group discussed the potential to put a moratorium on divesting of rights of way as a means to encourage multi-modal transport. There was also discussion of the development of regional processing centers, such as biorefineries and mini-mills, in order to be centrally located to serve the end user or to optimize the transport of raw biomass materials.

The committee recognized the need for both stability and flexibility when making infrastructure policy decisions. There is a need for stability to enable businesses to anticipate laws and regulations and react accordingly. Also, there is a need for adaptability within decision making to consider new technology and innovation. Similarly, group members noted the importance of balancing the need to prioritize with the need to invite and understand the market. When considering the value of current infrastructure, it should also be noted whether current infrastructure can be maintained based on funding sources.

There is a need to recognize the implications that this recommendation has on disaster recovery, economic development, and the other sectors. Disaster recovery provides an opportunity to adapt to changing infrastructure and technology needs. The need for stability for businesses to be able to react to and anticipate needs is crucial to their success in the Iowa economy. If the rules and regulations are always changing, business finds it difficult to navigate profitably. Additionally, it will take an adaptable infrastructure to increase the economy around the state so Iowa can be on the forefront of new developments.

Within the transportation system, there is a need to appropriately value current infrastructure, as well as consider the capacity to retrofit buildings and other vertical infrastructure. Additionally, the investments made in the telecommunications backbone should be utilized to create opportunities for future needs.

There should be coordinated outreach in energy efficiency across sectors, establishing Iowa as a leader in best practices.

The final recommendation addresses the following issues:

- There is a need for infrastructure enhancements and a readily available, trained, and educated workforce to support the energy future.
- Customer behavior has a large impact on energy use and efficiency.

This recommendation incorporates two primary areas of emphasis – personal and business energy usage. Promotion of energy efficiency best practices brings awareness to businesses, consumers, and vendors. Ideally, it also allows people and businesses to save money on their energy bills, which has huge implications for a sector such as advanced manufacturing. Information on the return on investment is necessary for people to make informed decisions. Competition can also provide a healthy environment for behavior change. For instance, in

Massachusetts, utilities publish neighbors' energy usage on consumers' bills, and this effort has affected the motivation to implement energy efficient practices positively.

Iowa has the opportunity to model energy best practices with funding by encouraging communities to build buildings that are more efficient. The Vision Iowa Fund adopted an energy efficiency best practice, and in communities these investments have been an example to educate others in the benefits of green buildings, serving as a way to raise additional money, and helping communities to think about energy efficiency. Similarly, Iowa can serve as a national leader in energy efficiency best practices. Iowa is a perfect state to serve as a leader in energy because of its rich natural resources, the work ethic of its citizens, and the state's strong history of investment in the energy development process from research to early stage commercialization.

Iowa's electric and natural gas utilities have made considerable investments and have implemented planning to improve energy efficiency through home energy audits and other resources. By leveraging this investment and planning, in addition to other avenues to improve energy efficiency, Iowa will be successful in utilizing solutions that can serve as a national model and as a tool for building public will. For example, through community college programs in HVAC (Heating, Ventilating, and Air Conditioning), the state has an opportunity to utilize communication to prospective customers about energy efficient appliances, in addition to countless other possibilities. By improving insulation and windows, it can decrease the need for large heating and cooling systems, and making future technicians and contractors aware of this issue is imperative. Purchasing decisions affect the amount of energy used and commodities, and the goal is to help guide those decisions. Additional promotion of national initiatives, such as the Energy Star program, and coordination with utilities' efforts to increase efficiency will be helpful as consumers become increasingly familiar with opportunities for energy efficiency.

When considering the impact on the economy, disaster recovery, and other sectors, positioning Iowa as a leader in energy efficiency helps businesses and consumers save money, brings Iowa to the forefront of the national discussion, and promotes ideas and innovations in the state, which will ultimately attract businesses. Disaster recovery creates opportunities to put energy efficiency into practice during the rebuilding process. Smart grid technology may enable consumers to conserve natural resources through informed decisions about the use of energy. With improvements to infrastructure, less water will be wasted in distribution. In order to enable the use of these technologies, telecommunications and access to broadband will be a crucial factor.

Lastly, the Energy Sector Committee also recognized the need to increase compliance with current building code standards. Iowa has the most extreme climate differences in humidity and temperature of any state in the country, which places unique demands on buildings. If energy efficiency is possible in Iowa, it can be duplicated in states with less extreme weather.

Infrastructure Planning Process

Across Iowa, economic strength and competitiveness depends, in part, on our state's infrastructure. In his 2008 Condition of the State address, Governor Chet Culver highlighted the need for a statewide infrastructure plan to ensure all of Iowa is ready for the economy of the future. At that time, Iowans could not have foreseen the tragic disasters of 2008 or the seriousness of the economic recession, but their impacts underscored the need for integrated and strategic priorities for Iowa's infrastructure in future years.

Those challenges resulted in a short-term infusion of more than $6 billion for Iowa over a three-year period through the American Recovery and Reinvestment Act (ARRA), I-JOBS, and federal disaster recovery funds. These funds are being spent effectively and as expeditiously as possible on clear priorities for disaster recovery, jobs creation, economic recovery, and other infrastructure and non-infrastructure priorities for the near term.

Iowa also must be poised for the longer-term through strategic and visionary planning for the economy of the future. Iowa needs to continue to make investments in infrastructure, seeking value and success competing in an international economy. The planning process builds on the significant impact of past and current initiatives, opportunities, issues, and challenges.

Iowa Department of Economic Development (IDED) was charged with developing a plan for Iowa. Funding for the planning initiative was provided by the United States Department of Commerce, Economic Development Administration as part of the disaster recovery grant to the State of Iowa. Under a competitive Request for Proposals process, State Public Policy Group, Inc. (SPPG) was awarded a contract for managing, facilitating, and developing the issues-focused plan under the direction of IDED and project director Thomas W. Hart.

The planning activities span August 2008 through April 2010, when the statewide plan for infrastructure to support Iowa's future economy will be completed. The process for developing the infrastructure strategy was designed to challenge and encourage Iowans to suggest approaches that link infrastructure sectors and position Iowa to shape and fully participate in the economy of the future. With guidance from state leaders in the five sectors of focus, stakeholders with a diversity of perspectives and experiences from across Iowa were engaged in the activities to develop an issue-focused plan with relevance to the public, private, and nonprofit sectors throughout the state.

Five sectors of focus were determined by IDED: Buildings and Vertical Infrastructure, Energy, Natural Resources, Telecommunications, and Transportation.

Leadership of the project was provided by a Sector Chairs Group, which was comprised of state agency directors representing each sector. Sector Chairs met regularly throughout the planning process to ensure consistency in the work of each Sector Committee and to address overarching issues. The following individuals serve on the Sector Chairs group working closely with IDED and SPPG:

- Thomas W. Hart, Iowa Department of Economic Development, Project Director, Sector Chairs Group Chair, and Task Force Chair

- Joseph Cassis, Iowa Communications Network, Telecommunications Sector Committee Co-Chair
- Steve Fleagle, The University of Iowa, Telecommunications Sector Committee Co-Chair
- Richard Leopold, Iowa Department of Natural Resources, Natural Resources Sector Committee Chair
- Bret Mills, Iowa Department of Economic Development, Buildings and Vertical Infrastructure Sector Committee Co-Chair
- Joe O'Hern, Iowa Finance Authority, Buildings and Vertical Infrastructure Sector Committee Co-Chair
- Nancy J. Richardson, Iowa Department of Transportation, Transportation Sector Committee Chair
- Roya Stanley, Iowa Office of Energy Independence, Energy Sector Committee Chair

Additional individuals with special expertise related to the planning initiative participated on the Sector Chairs Group and the Task Force:

- Elisabeth Buck, Iowa Workforce Development
- Emily Hajek, Rebuild Iowa Office
- David Miller, Iowa Homeland Security and Emergency Management Division
- Jon Murphy, Iowa Office of the Governor

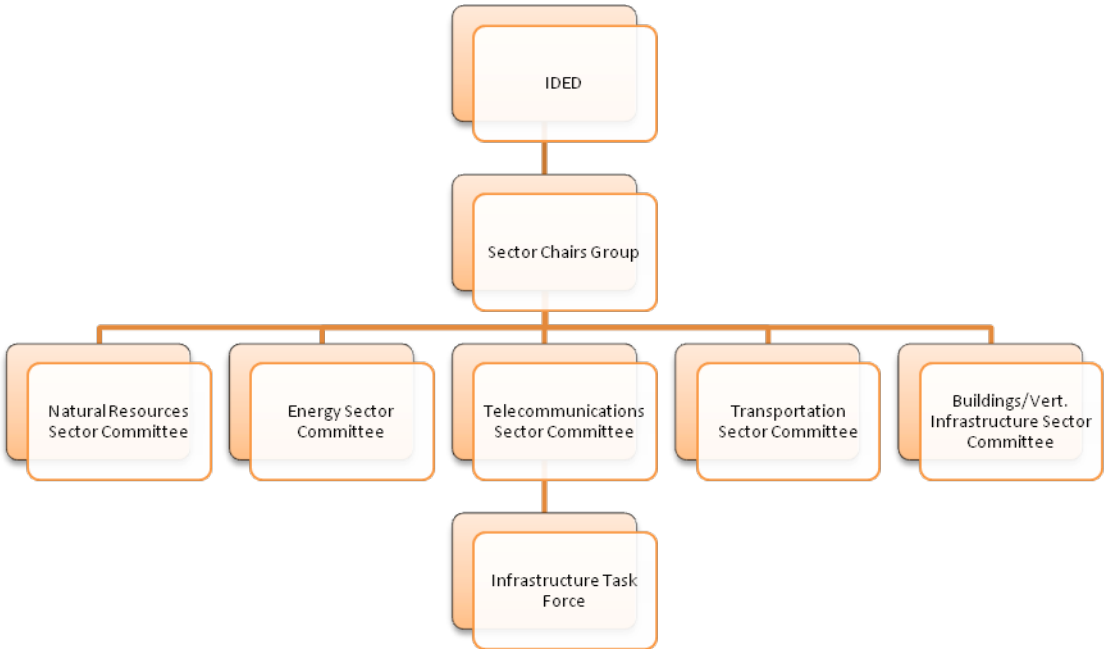
Each Sector Committee met four times in day-long deliberations between November 2009 and February 2010. Sector Committee membership was comprised of private, academic, issue-based, and public representatives providing a diversity of perspectives and strategic vision. Each committee was chaired by the respective member(s) of the Sector Chairs Group. Each of the five Sector Committees was responsible for defining the sector for purposes of this initiative, identifying issues, and developing recommendations based on research, experience, and information reviewed by each committee. Sector Committees were also charged with considering each sector's interaction and integration with the other sectors. Sector Committees were guided by the Essential Elements of Iowa's Future Economy and the common understanding of Iowa's economic situation and forecast described earlier in this report. The findings of each sector were detailed in five separate Sector Committee Reports.

Six community forums were held in Johnston, Coralville, Ottumwa, Dubuque, and Sioux City, with an ICN session conducted at 10 sites statewide. ICN sites were in Atlantic, Carroll, Clinton, Council Bluffs, Creston, Dubuque, Fairfield, Mason City, Storm Lake, and Urbandale. The forum in Dubuque was canceled due to winter weather, but it was rescheduled as an ICN forum. These community forums were structured to elicit public input regarding the initial issues and ideas developed by the Sector Committees and to inform the process going forward. Comments and suggestions from stakeholders proved very informational and beneficial to the overall process. The input from these community forums was integrated into each Sector Committee Report and Recommendations. Sector Committee reports were completed by March 1, 2010, and forwarded to the Task Force.

The Infrastructure Planning Task Force is charged with developing the statewide strategic plan and outlining priorities to achieve a strong and competitive economy. The Task Force, chaired by project director Thom Hart, includes all members of the Sector Chairs Group and several

individuals from each Sector Committee and will meet three times during March and April. The plan and recommendations of the Infrastructure Task Force will be presented to IDED in May 2010.

Below is a graphic depiction of the relationship of all components of the process for developing the Infrastructure Strategy for Iowa's Future Economy.



The Infrastructure Strategy for Iowa's Future Economy will outline the Task Force's consensus direction for Iowa's buildings and vertical infrastructure, energy, natural resources, telecommunications, and transportation as sectors integrate with one another and as they impact the economic strength and competitive position for Iowa. This information should be of practical value to policymakers at all levels, state and local government agencies, the private sector, non-profit organizations, issue-based organizations, and the public.

The planning process created a clear understanding that Iowa's infrastructure as it exists and is funded today is neither sustainable nor affordable. The Infrastructure Strategy provides insights for all stakeholders as they shape their future.

Conclusion

Members of the Energy Sector Committee have noted the need for agility, diversification, and prioritization for infrastructure needs. The Committee was charged with taking a hard look at how the sector is currently operating, what can be improved, and how Iowa may fall short of meeting goals regarding infrastructure. Iowa's energy future stands to be very bright, and reaching that success will require the appropriate strategic investments in infrastructure. As plans are developed during the Infrastructure Strategy Task Force process, the importance of coordinated planning between sectors should be noted. Efforts in coordinated planning should be followed by coordination in implementation. Sectors must work together to identify priorities to ensure growth and success for each and avoid delay of innovation and opportunities. Only through this coordinated, comprehensive approach can energy innovations and opportunities be realized in the overall goal of Iowa's growth, prosperity, and recovery.

Supporting Documents

Meeting Notes

- November 17, 2009
- December 17, 2009
- January 21, 2010
- February 24, 2010

Presentations to the Energy Sector Committee

- Utility-Grade and Residential Solar Applications and Solar and Battery Technology Advances
- Current Nuclear Generation Technology
- Advanced Coal Technology

Infrastructure
STRATEGY
For Iowa's Future Economy

Natural Resources Sector

REPORT & RECOMMENDATIONS

February 2010

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Acknowledgements

The Natural Resources Sector Committee acknowledges the work and contributions of each committee member through sharing of expertise, opinions, information, and discussions over the course of four meetings. The Committee would also like to thank Richard Leopold, Director of the Iowa Department of Natural Resources for his leadership as Committee Chair.

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Thanks are also due to the many stakeholders around the state and to the members of the other four Sector Committees who lent their ideas, comments, and expertise to the work of the Natural Resources Sector Committee.

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Planning process facilitation, staffing, and management were provided by State Public Policy Group, Inc. – SPPG of Des Moines. www.sppg.com

Sector Committee Members

Richard Leopold, Iowa Department of Natural Resources, Des Moines (Chair)

Thomas W. Hart, Iowa Department of Economic Development, Des Moines (Project Director)

Mark Ackelson, Iowa Natural Heritage Foundation, Des Moines

Lori Beary, Iowa Finance Authority, Des Moines

Don Brazelton, Iowa Association of County Conservation Boards, Ankeny

Dee F. Bruemmer, Scott County, Davenport

Tom Buman, Agren, Inc., Carroll

Liz Christiansen, The University of Iowa, Office of Sustainability, Iowa City

Chuck Corell, Iowa Department of Natural Resources, Des Moines

Bill Ehm, Iowa Department of Natural Resources, Des Moines

Chuck Gipp, Iowa Department of Agriculture and Land Stewardship, Des Moines

Bud Grant, Saint Ambrose University, Davenport

Bill Menner, USDA Rural Development, Des Moines

Matt O'Connor, Iowa Pheasants Forever, Hopkinton

Ted Payseur, Veenstra & Kimm Incorporated, West Des Moines

Don Peterson, Iowa Farm Bureau, West Des Moines

Dan Rasmussen, Iowa Chapter Land Improvement Contractors, Independence

Marian Riggs Gelb, Iowa Environmental Council, Des Moines

Gerry Schnepf, Keep Iowa Beautiful, Des Moines

Sherry Timmins, Iowa Department of Economic Development, Des Moines

Introduction

Iowans have high expectations for a strong economy, good jobs, and a future of opportunity. Setbacks came in 2008 with the summer disasters followed by the national recession and significant impacts on Iowa's infrastructure. Even while addressing those challenges through the influx of federal and state short-term funding for jobs, infrastructure, disaster recovery, and other broad needs, Iowans must also give significant consideration of the vision for the future economy and the infrastructure it will demand. Interested Iowans statewide will find in this report a set of recommendations and a strategic direction for the Natural Resources sector.

Natural resources was the subject of deliberations over a four-month period by a diverse array of Iowans who contributed their expertise, experience, and perspectives on the future economy and the natural resources infrastructure that will be required to meet those needs. Because the report was developed by stakeholders from across the state, it reflects and has future application to diverse stakeholders including the private sector, issue-based groups, nonprofit organizations, academia, and local and state government.

Natural resources create the foundation to support Iowa's infrastructure and economies. Iowa's natural resources such as soil, water, and air, all have limited capacities and must be strategically managed to support communities and businesses alike. In addition, natural resources infrastructure such as trails, parks, rivers, and lakes are integral to creating an environment that will attract and retain a vibrant and diverse workforce in our state. The consensus work of the Natural Resources Sector Committee directly addresses how the demands of our future economy can be balanced with the limited supply and capacity of our natural resources infrastructure.

This report does not stand alone, however. As part of a comprehensive and coordinated statewide planning initiative, the recommendations and insights on the Natural Resources sector will be considered by a Task Force, along with similar reports on infrastructure needs for the future economy in buildings and vertical infrastructure, energy, telecommunications, and transportation. The ideas and recommendations contained in the five reports and the coordinated plan reflect the involvement and engagement of more than 200 Iowans over a span of nine months. From those deliberations, a strategy for Iowa's future economy was developed on behalf of and for all stakeholders. It is the hope of the Natural Resources Sector Committee that policymakers, community leaders, business and industry, and others find ways to implement or support the recommendations of this sector report and those of the coordinated Infrastructure Strategy for Iowa's Future Economy.

Executive Summary

Iowa's natural resource infrastructure is integral to the quality of life and economic health of the state. In considering elements of the sector that cut across the four other sector groups (building and vertical infrastructure, energy, telecommunications, and transportation) issues identified by the Natural Resource Committee define critical considerations that must be addressed in making infrastructure and economic development decisions.

The Natural Resource Sector Committee defined the sector based on five integral components of natural resources infrastructure:

- Soil
- Water
- Air
- Ecosystems
- Culture

Each component was evaluated in terms of supply, demand and the impact that community and business needs place on each resource. The following priority issues were identified under each component of natural resources infrastructure:

Soil

- Iowa must enhance the long-term productive capacity and retention of top soil to ensure the viability of Iowa's economy and agricultural industries.
- Water infiltration and the absorptive capacity of soil must be increased to improve the ability to hold water, reduce the effects of flooding and decrease the levels of sediments, nutrients and bacteria in our water systems.

Water

- Iowa must evaluate and manage its water resources for sustainable yield.
- Iowa must promote and implement source water protection for public water supplies.
- Iowa must maintain viable wastewater infrastructure to protect the public's health and comply with federal water quality standards.
- Iowa must assess, prioritize, and coordinate watershed plans to protect public health and meet federal water quality standards.
- Urban storm water management practices must be developed to address local flooding and water quality issues.

Air

- Iowa must be prepared to meet current and future federal air quality standards to protect the public's health.

Ecosystems

- Iowa must consider the impact on ecosystems when making land use planning, infrastructure, and development decisions.

Culture

- Iowa must make the state more attractive to a vibrant and diverse population.
- Iowa must create connections between the public and outdoor activities to help increase the funding, care and volunteering necessary to protect our public areas.

To address these issues, the Natural Resource Sector Committee has made the following six recommendations to ensure that Iowa's infrastructure works to support the state's economic viability, competitiveness, sustainability, and quality of life now and in the future. The recommendations were developed in response to priority issues and should be considered as a whole, with each viewed as critical by the Committee to ensure a strong future economy for Iowa.

1. Increase organic carbon levels in soil.

2. Manage watersheds and water resources to sustain quality and quantity necessary to meet community, business and ecological uses.

3. Manage watersheds and floodplains to reduce the impacts of flooding.

4. Implement practices to ensure Iowa's air will meet new federal public health and welfare standards.

5. Require that the impact on ecosystems be determined and considered in infrastructure planning and development.

6. Create opportunities to increase the use, enjoyment, and appreciation of Iowa's natural and cultural heritage.

These issues and recommendations are further described in the following report, along with the context for planning, elements of Iowa's future economy, and a description of the process that resulted in these recommendations. The work of the Natural Resources Sector Committee, along with the Building and Vertical Infrastructure, Energy, Telecommunications, and Transportation Sector Committees, will be forwarded to a Task Force with combined membership for integration and development of an infrastructure strategy for Iowa's future economy.

Iowa's Future Economy

There is no crystal ball to predict exactly what Iowa's economy will be like in 2020 and beyond, but there are indicators and, certainly, steps that can be taken to shape the economy as Iowa recovers from the dual challenges of the 2008 disasters and the national recession. The Infrastructure Strategy for Iowa's Future Economy initiative was designed to work from a common understanding of Iowa's current economy and forecast of economic factors in order to establish some strategic direction for the state. Essential elements of the future economy were identified from this information and from the deliberations of the participants in the process. This section highlights the foundational premises of the Sector Committees and Sector Chairs Group that guided their work.

Essential Elements of the Future Economy

Iowa's economy of the future can benefit from and faces challenges because of the disasters and the recession. Iowans have vowed to come back from adversity stronger than ever. The future holds opportunity for innovative and strategic thinking, which tend to be a departure from day-to-day challenges of our infrastructure. In early discussions, each Sector Committee and the Sector Chairs Group worked to identify how Iowa's economy can build upon current short term investments to grow stronger and more globally competitive.

Eight essential elements of the future economy were identified by the Sector Committees and the Sector Chairs Group. The essential elements were used by the Sector Committees to guide and measure their work and recommendations against the vision for Iowa's economic future.

The Essential Elements of Iowa's Future Economy are:

- Smart growth
- A diversified economy that ensures a strong agricultural sector
- A skilled workforce for quality jobs
- Environmental stewardship
- Iowa-based energy solutions
- An economy that is globally competitive
- A population that chooses to live and work in Iowa
- Realistic funding for new and maintenance of infrastructure

Iowa's Current Economy and its Impacts

In the current environment of Iowa in 2010, a number of trends are affecting the state's economy. The following factors are taken from data provided to the Committees by David Swenson, a Research Scientist with Iowa State University's Department of Economics. First, the population of Iowa is shifting from rural to urban areas. Two other factors include the aging population and the baby boomer generation nearing retirement age. There has been an increase in the outmigration of young workers to other states, and population growth in Iowa has been due to increases in immigrant and minority populations in the state.

Due to the economic recession and the scaling back or closing of significant numbers of manufacturers across the state, non-metropolitan Iowa is losing both jobs and Iowans between ages of 25 and 44, which also has an echo effect of population loss in the under-20 category, reflecting children of those 25-44 year-olds. Iowa's unemployment rate, which has typically

remained relatively low, may start to have a structural upward shift. The rural housing stock is deteriorating, and economic vitality is concentrated in a relatively few areas. Additionally, tax capacity in non-metropolitan communities is rapidly eroding, due to population shifts and loss of manufacturing employers. However, rural energy opportunities such as biofuels and wind, are evolving.

Iowa in 10 Years

Swenson predicts that in ten years, Iowa will see the results of current trends in population, namely, that there will be fewer people in non-metropolitan areas, more investment and growth in metropolitan areas, and the continued outmigration of young and working-age people. He notes that regional trade centers, called micropolitan communities (populations of 10,000 – 50,000), will be mostly stable, but not growing. The sectors that will lead in job demand will be business, personal care, education, and health services. Although Swenson downplays the role of energy production in rural resettlement, the Sector Committees identify the energy industry's crucial role in the future economy of Iowa as a significant contributor to the overall rural economy and its potential to be a mitigating factor in further rural depopulation. Swenson predicts that manufacturing will still be important, but the number of jobs will have decreased, and the manufacturing businesses that remain will be those with the most efficient and productive processes.

It is clear that action taken to shape Iowa's future economy will be key determinants in the success of the state. As technology develops, energy and telecommunications infrastructure will be critical to the state's competition in a global economy. Additionally, transportation, buildings, and vertical infrastructure will remain fundamental for moving and storing goods and services and supporting Iowa's workforce. Finally, natural resources will be essential to the state's continued economic success within the agricultural, industrial, and business sectors. All sectors are integrated and mutually dependent. The work of the planning initiative is to harness the opportunities of these critical sectors. When people come to live and work in Iowa, it will be because of Iowans' anticipation of the coordinated natural resources, transportation, buildings and vertical infrastructure, energy, and telecommunications infrastructure to support a robust economy.

The Issues

Sector Scope and Definition

Natural Resource infrastructure is incredibly broad and challenged the sector committee in defining the scope of the term. Committee members indicated that natural resources encompass Iowa's raw materials such as soil, water and air, but also includes physical infrastructure such as parks, trails and lakes; plants, wildlife and livestock; as well as public attitudes and practices such as conservation, land use or even driving habits. Following considerable discussion, committee members determined that the most appropriate manner to approach natural resource infrastructure is to define the term based on the following five components:

- Soil
- Water
- Air
- Ecosystems
- Culture

Soil

Agriculture is a large part of Iowa's economy. According to a study conducted by Dan Otto of Iowa State University Extension, agriculture represents approximately 27% of Iowa's overall economy. Further, Iowa has among the nation's highest percentage of land in cultivation and ranks 49th in the nation in the percentage of land in public ownership, according to the Natural Resources Council of Maine's report, *Public Land Ownership by State*. Given these facts, land use decisions in the state are largely driven by private land owners engaged in agriculture. Soil, as a natural resource and a vital part of the state's infrastructure was discussed at length. Issues considered under the category of soil include soil quality, such as water filtration, levels of organic matter, soil structure and carbon sequestration. Additional soil issues include soil and crop productivity, water and wind erosion, farming practices, and chemical management. Iowa's reliance on a strong agricultural economy, floodplain management, land use, and urban sprawl were also critical to the discussion on soil as it relates to Iowa's infrastructure and economies.

The Natural Resources Sector Committee identified the following priority issues related to soil:

- Iowa must enhance the long-term productive capacity and retention of top soil to ensure the viability of Iowa's economy and agricultural industries.

In addition to the production of food, emerging industries such as the production of some Iowa-based fuels (corn ethanol, cellulosic ethanol, biodiesel, etc.) also rely heavily on the long-term productive capacity of Iowa's rich soils. Efforts should be made to ensure the long term productive capacity of Iowa's soil is enhanced.

- Water infiltration and the absorptive capacity of soil must be increased to improve the ability to hold water, reduce the effects of flooding and decrease the levels of sediments, nutrients and bacteria in our water systems.

Dr. Rick Cruse of Iowa State University reports that Iowa's soil has lost up to 50% of its organic matter. According to Cruse, much of Iowa's crop soil has low organic matter, low infiltration and is susceptible to erosion. Increasing the absorptive capacity of soil would improve the ability to hold water where it falls, reducing soil loss and the effects of small to moderate sized floods in both rural and urban areas. In addition, clean water is vital to the health and wellbeing of our ecosystems. Clean drinking water and clean rivers and lakes are both necessities to our health and are quality of life issues that ensure Iowa remains an attractive option for vibrant and diversified populations . Further, the health of Iowa's ecosystems is largely reliant on having sources of clean water. Improving the ability of water infiltration in soil can help decrease levels of sediments, nutrients and bacteria – the three mains categories of water pollution.

Water

Water infrastructure was defined by the sector committee to include issues of water quality and water quantity. Water quality included discussion on source water protection, drinking water quality, point and non-point pollution, federal clean water standards, watershed management and addressing the state's impaired waters. In addition, the state of waste water infrastructure in Iowa's communities was also considered. The discussions on water quantity included issues of adequate and excessive amounts of water. Issues including surface water erosion, controlling the flow of water, land use policy, agricultural practices and coordination of watershed plans were all considered. In addition, there was significant discussion on the water quantity needs of Iowa's communities and businesses including farming, energy, manufacturing and other vital industries in the state.

The Natural Resources Sector Committee indentified the following priority issues related to water:

- Iowa must evaluate and manage its water resources for sustainable yield.

The climate and geography in Iowa are unique in that adequate annual rainfall amounts and access to adequate water supplies to support Iowa's industries are rarely an issue. However demand for adequate water supplies could change due to industry needs, climate changes, demand for water in other parts of the country or other unforeseen changes. As a state we must not take our water resources for granted. Water resources needed to support people and industries in the state must be evaluated and managed to ensure sustainable yields can be achieved now and in the future. Sustainable yields as defined by the natural resources sector is the condition attained when the quantity and quality of available water resources are sufficient to meet current and future community, economic, and ecosystem needs. It represents a long-term balance between resource conditions (supply) and beneficial uses (demand).

- Iowa must promote and implement source water protection for public water supplies.

Clean drinking water and clean rivers and lakes are essential to our health and are quality of life issues that ensure Iowa remains an attractive option for college graduates and working professionals. Further, the health of Iowa's ecosystems is largely reliant on having sources of clean water. Protecting water at its source from the ground, streams, rivers, springs or lakes in a watershed is vital to maintaining clean public water supplies.

- Iowa must maintain viable wastewater infrastructure to protect the public's health and comply with federal water quality standards.

As a state, much work is needed to ensure bodies of water in Iowa meet federal water quality standards. A critical step to reaching federal compliance is maintaining a viable wastewater infrastructure. Many communities across the state lack the economic resources necessary to bring their local wastewater infrastructure into compliance. Communities must make decisions to invest in local wastewater infrastructure to protect the health and wellbeing of the public and to ensure compliance with federal regulations.

- Iowa must assess, prioritize, and coordinate watershed plans to protect public health and meet federal water quality standards.

Needs and priorities must be assessed and developed for Iowa's watersheds. Coordination between watershed improvement plans and local water drainage districts will be necessary in order to bring Iowa's bodies of water within current and future federal water quality standards. Iowa has over 3,300 water drainage districts. Currently drainage districts are not federally regulated, however this change will likely be realized in the future. Improved coordination between local water drainage districts and regional and state efforts to improve watersheds is needed.

- Urban storm water management practices must be developed to address local flooding and water quality issues.

Coordinating urban storm water management with drainage district decisions and watershed improvement plans would further enhance efforts to address local flooding and water quality issues. Urban storm water management, including the adoption of alternative storm water management best practices must be a priority.

Air

Issues considered by the sector committee during discussions on air focused on issues of quality and capacity. Discussions on air quality included issues such as new changes to federal clean air standards, regional haze, non-attainment (exceeding allowable pollution standards), local and regional air pollution contributors and climate change. Public attitudes and practices such as driving habits, urban sprawl and energy use were also discussed. The carrying capacity of air as it relates to Iowa's agricultural and industrial needs was also a key point of discussion.

The Natural Resources Sector Committee indentified the following priority issue related to air:

- Iowa must be prepared to meet current and future federal air quality standards to protect the public's health.

Federal air quality standards are changing rapidly. Nitrogen dioxide, sulfur dioxide, ozone, lead, and carbon monoxide standards are currently being re-evaluated. As federal standards become more stringent, the state will be forced to act quickly. Parts of the state may exceed allowable pollution standards, known as non-attainment. Once non-attainment has been reached, state and local governments must develop and implement a plan on how areas will attain and maintain federal clean air standards. Implementation of a plan to address non-attainment could adversely affect state and local economies if business, industry, and consumer practices are

forced to change immediately. As a state, Iowa must be proactive to ensure non-attainment is not reached. Energy planning, industrial growth, plant location, and supply chain logistics all play a critical role in improving the quality of Iowa's air. Further, smart growth practices and transportation planning in our communities also have a large effect on the quality of air. Coordination between business and industry developments, infrastructure investments and consumer activities will be required to ensure the health and wellbeing of Iowans are protected.

Ecosystems

The sector committee defined ecosystems by function, structure, and human impact. Issues considered as a function of ecosystems include climate, geography, topography, flora, and fauna that provide ecological services to one another. Issues considered as structures within an ecosystem include genetic diversity and the balance within and among species adjusting to ecological conditions in the state. The discussion of human impact on ecosystems encompassed environmental services, comprehensive land use planning, water quality, air quality, smart growth, agricultural practices, and the effects Iowa's vital industries such as agriculture, manufacturing, and energy have on Iowa's ecosystems.

The Natural Resources Sector Committee indentified the following priority issue related to ecosystems:

- Iowa must consider the impact on ecosystems when making land use planning, infrastructure, and development decisions.

Iowa's ecosystems are at risk. Many factors including cost, access to energy, transportation routes, sewer and water infrastructure, and many others are considered when making development and infrastructure decisions. However, one critical factor is often over looked – what is the impact on ecosystems as a result of the proposed development? A process for identifying the impact on ecosystems for state funded infrastructure developments, or local and privately funded urban, industrial, and agricultural developments should be created.

Culture

The sector committee's discussion on culture included issues such as public attitudes on energy conservation, recycling, lands restoration, and other practices that impact our natural resources. Discussion on culture also encompassed cultural traditions in Iowa such as farming, hunting, and an appreciation for the outdoors. Quality of life issues such as the availability of trails, parks, public areas, clean lakes and rivers, and clean air were also a focus of the discussion.

The Natural Resources Sector Committee indentified the following priority issues related to culture:

- Iowa must make the state more attractive to a vibrant and diverse population.

Access to trails, parks, public lands, and other outdoor areas help provide a high quality of life. In addition resources such as clean air, water, lakes and rivers also help to create an attractive environment to retain and attract professionals. Demographics and populations in Iowa are shifting. The population of Iowans over the age of 60 is increasing and many in the baby boomer generation are nearing retirement. Iowa is also experiencing an outmigration of young workers who will be raising our future generations. Further, Iowa is working hard to position itself as a

home for emerging industries with high paying jobs. As a state, Iowans must do all that is possible to enhance the beauty of our communities and outdoor areas. In addition, clean resources such as clean air, water, lakes and rivers will also help create a wonderful home to retain and attract a vibrant and diverse population.

- Iowa must create connections between the public and outdoor activities to help increase the funding, care and volunteering necessary to protect our public areas.

Iowa's heritage is connected strongly to the outdoors from agriculture to hunting, fishing, biking and other outdoor activities. Further, our trails, parks and public lands are a wonderful attraction for residents and tourists around the world. Unfortunately federal, state, and local funding for our public outdoor attractions is woefully inadequate. According to the Sustainable Natural Resource Funding Study mandated in HF 2792 by the Iowa General Assembly in 2006, Iowa ranks 49th of 50 for agriculture and natural resource funding. More opportunities are needed to connect residents and tourists with Iowa's natural and cultural heritage to help increase the funding, care, and volunteering necessary to protect our public areas.

Relationships to Other Sectors

Natural Resources are integrated into the interests and work of the other sectors involved in this planning effort. In many ways, the priority issues identified by the Natural Resource Committee define critical considerations that must be addressed to make infrastructure development decisions. All of our natural resources are limited in quantity and capacity and must be managed to protect the public's health. Soil has a limited productive capacity to support agriculture. Soil also has a limited absorptive capacity to control surface water runoff. In addition there are limitations in the ability of soil to infiltrate surface water. As a result, the issues the Sector Committee identified regarding soil, address strategies to maximize capacities of soil that will support the sustainable production of crops, reduce the effects of local flooding, and improve the quality of source water. Clean water is also a limited resource. Infrastructure investments, urban planning, business and industry needs, and other economic decisions will have an impact on the demand for a limited resource. Sector Committee issues focus on responsibly managing our water resources and working to improve the quality of water in Iowa. Responsible management also includes strategies to control excess amounts of a resource. The Sector also identified issues and recommendations to reduce the effects of flooding, which in turn protects our state's infrastructure systems. Like soil and water, air also has limited capacities that must be managed to protect the public's health and ensure the viability of Iowa's businesses and industries. Issues identified by the Sector related to air address appropriately managing the capacity of air, ensuring federal public health standards are not exceeded, and businesses and industries are able to operate sustainably.

Issues related to ecosystems recognize that all land use planning, infrastructure, and development decisions have an impact on ecosystems. Impacts on ecosystems are not necessarily negative or positive, but must be measured and addressed to ensure balance within an ecosystem is maintained. Culture is also vital to the future of Iowa's economies. Issues identified by the Sector related to culture address strategies to embrace Iowa's outdoor heritage and promote a quality of life that is attractive to a vibrant and diverse workforce. High growth industries will only be developed in Iowa if a healthy and active lifestyle also can be supported.

Recommendations

The Natural Resource Sector Committee has put forward the following six recommendations to ensure that Iowa's infrastructure works to support the state's economic viability, competitiveness, sustainability, and quality of life now and in the future. The recommendations developed in response to priority issues should be considered as a whole, with each viewed as critical by the Committee to ensure a strong future economy for Iowa. As part of discussions, the Natural Resources Sector Committee emphasized the importance of future economic development, disaster recovery, and the application of the recommendations across planning sectors of Buildings and Vertical Infrastructure, Energy, Telecommunications and Transportation. These considerations, as well as context and explanations identified by Natural Resource Sector members are outlined below.

1. Increase organic carbon levels in soil.

2. Manage watersheds and water resources to sustain quality and quantity necessary to meet community, business and ecological uses.

3. Manage watersheds and floodplains to reduce the impacts of flooding.

4. Implement practices to ensure Iowa's air will meet new federal public health and welfare standards.

5. Require that the impact on ecosystems be determined and considered in infrastructure planning and development.

6. Create opportunities to increase the use, enjoyment, and appreciation of Iowa's natural and cultural heritage.

Context and Explanation of the Recommendations

Recommendation 1: Increase organic carbon levels in soil.

The Natural Resources Sector committee believes that increasing organic carbon levels in soil will address two key priority issues identified by the Sector Committee. Firsthand, increasing organic carbon levels will enhance the long-term productive capacity and retention of top soil. Secondly, increasing organic carbon levels in soil will improve the water infiltration and absorptive capacity of soil.

Agriculture remains a key component of Iowa's economy, representing approximately 27% of Iowa's overall economy, as reported by Dan Otto, Iowa State University Extension. In addition to the production of food, emerging industries such as the production of some Iowa-based fuels (corn ethanol, cellulosic ethanol, biodiesel) also rely heavily on the long-term productive capacity of Iowa's soils. Unfortunately much of Iowa's topsoil is lost each year due to water and wind erosion, affecting the productive capacity of soil and the quality of water in Iowa's lakes,

rivers and streams. Further, Dr. Rick Cruse of Iowa State University's Agronomy Department reports that Iowa's soil has lost as much as 50% of its organic matter. Soil with low levels of organic matter reduces infiltration capacity and is more susceptible to erosion further excelling the loss of topsoil. Increasing organic carbon levels in soil will increase infiltration and reduce erosion. If agriculture is going to remain a key component of Iowa's economy, sustainable practices to increase organic carbon levels must be utilized. Further, emerging industries such as the production of Iowa-based fuels will also require sustainable practices that increase organic carbon levels.

Increasing organic carbon levels will also improve water infiltration of soil. Sediments, nutrients, and bacteria are the primary categories of water pollution. Improved water infiltration in soil will help to decrease levels of all three water pollutants. Clean drinking water and clean rivers, lakes and streams is both a necessity to public health, and the health of our ecosystems. In addition, clean water enhances the quality of life in Iowa, presenting our state as an attractive home for a productive workforce. Further, raising organic carbon levels will increase the absorptive capacity of soil and improve the ability to hold water where it falls. Increasing absorptive capacity of soil will reduce the loss of top soil and reduce the effects of small to moderate sized flooding in rural and urban areas.

In a heavily cultivated state where land use is largely determined by private land owners, it will be imperative that agricultural practices embrace efforts to increase organic carbon levels. No-till practices, use of cover crops, crop rotation, filter strips, restoring wetlands, and enrolling acres in the federal conservation reserve program (CRP) are all practices that will help increase organic carbon levels in soil. Utilizing green spaces, enhancing the tree canopy, utilizing smart growth principles, and storm water best management practices will help increase the organic carbon levels of soil in urban areas.

Recommendation 2: Manage watersheds and water resources to sustain quality and quantity necessary to meet community, business and ecological uses.

The demand for clean water is increasing across the nation. Iowa is blessed in that adequate water supplies to support Iowa's communities and industries are rarely an issue. However, the demand for adequate water supplies could change due to industry needs, climate change, regional demand across the county, or other unforeseen changes. Adequate water supply is rarely a consideration in the process of determining infrastructure and development decisions. Industries in Iowa such as the production of energy, agriculture, manufacturing and transportation all place demands on a limited supply of water. As the demand for water increases, water resources to support communities and industries in the state must be evaluated and managed to ensure sustainable yields can be achieved now and in the future. Federal, regional and local coordination of watersheds will be required to ensure a long-term balance between water resources (supply) and beneficial uses (demand).

There are many components to creating clean supplies of water in the state. Firsthand, it is important to acknowledge that federal water quality standards are changing. Not only will federal water quality standards continue to become more stringent, greater coordination will be required across watersheds and the components that make up a watershed such as tributaries, wetlands, drainage districts, floodplains, and wastewater infrastructure. Iowa must assess, prioritize, and coordinate watershed plans to meet changing federal water quality standards.

Creating clean water supplies starts with the promotion and implementation of source water protection practices. Protecting water at its source from the ground, streams, rivers, springs or lakes in a watershed is vital to maintaining clean public water supplies. In addition viable wastewater infrastructure must be maintained. Many communities across the state lack the economic resources necessary to bring their local wastewater infrastructure into compliance. It is often said that a system is only as strong as its weakest component. Inadequate wastewater infrastructure is a critical contributor to source water pollution. Communities must make decisions to invest in local wastewater infrastructure to protect the public's health and to ensure compliance with federal regulations.

Appropriate management of watersheds and water resources will ensure adequate clean water supplies are available to meet the needs of Iowa's communities, businesses and ecosystems. Clean drinking water and clean rivers and lakes are a necessity to the public's health and the quality of life available in Iowa's communities.

Recommendation 3: Manage watersheds and floodplains to reduce the impacts of flooding.

The prevalence of all sizes of floods (small, moderate, and large) has increased in Iowa and the Midwest. Land use decisions, agricultural practices, storm water management, the absorptive capacity of soil, snow and rain accumulation, and many other factors contribute to flooding. Although many causes of flooding cannot be managed, some can. As a state, Iowa must manage its watersheds and floodplains to reduce the impacts of flooding. Decisions on how to manage watersheds and their components such as drainage districts, flood plains, wastewater infrastructure, headwaters, surface runoff and many other integral parts of a watershed must be prioritized and managed to reduce the impacts of flooding. Urban planning to reduce the impacts of flooding must also be integrated into the management of watersheds and floodplains. Specifically, urban storm water management practices must be developed to address local flooding and water quality issues. Coordinating urban storm management with drainage district decisions and watershed improvement plans would further enhance efforts to address local flooding and would assist efforts to improve water quality. Although some flooding is inevitable, Iowa must manage its watersheds and floodplains to reduce the devastating physical, emotional, and economic impacts flooding leaves behind.

Recommendation 4: Implement practices to ensure Iowa's air will meet new federal public health and welfare standards.

Iowa must be prepared to meet current and future federal air quality standards. Currently, federal standards for nitrogen dioxide, sulfur dioxide, ozone, lead, and carbon monoxide are being re-evaluated. As federal standards change, the state will be forced to act quickly to ensure that non-attainment is not reached. If non-attainment is reached in Iowa, state and local governments will be required to develop and implement a plan on how areas will reach and maintain federal clean air standards. The effects of implementing non-attainment plans could be devastating to Iowa's economy and wellbeing. Foremost, non-attainment of federal clean air standards will put the public's health at risk. In addition, non-attainment could be devastating to the operations of Iowa's businesses and industries if immediate changes are required. Energy planning, industrial growth, plant location, farming practices, and supply chain logistics will all play a critical role in improving the quality of Iowa's air. Further, smart growth practices and transportation planning in our communities also have a large effect on the quality of air.

Coordination between business and industry developments, infrastructure investments and consumer activities will be required to ensure the health and wellbeing of Iowans is protected and compliance with federal air quality standards is achieved.

Recommendation 5: Require that the impact on ecosystems be determined and considered in infrastructure planning and development.

Ecosystem are made up of a complex relationship of life including living resources, humans, plants, animals, water, soil, and other microorganisms. Each part of an ecosystem is dependent on other species, yet plays a unique role as an integral and functional component in nature. In fact, ecosystems represent how the other areas of focus (soil, water, air and culture) impact and integrate with each other. Affecting even one component can result in the deterioration or proliferation of an entire ecosystem. Sector committee members recognized that Iowa's ecosystems are at risk. Every day development and infrastructure decisions are made based on a variety of factors including cost, access to energy, transportation routes, availability of raw materials, etc. Unfortunately the impact a decision will have on an ecosystem is often not considered. Iowa must consider the impact on ecosystems when making land use planning, infrastructure and development decisions. Simply reacting to the impact that a decision has had on an ecosystem is highly inadequate. The function of ecosystems could be disrupted, species could be lost and even the health of our communities could be put at risk. The cost to restore balance to an ecosystem could be incredibly expensive and in some cases, not feasible. A process for identifying the impact of ecosystems for state funded infrastructure developments, or local and privately funded urban, industrial and agricultural developments should be considered. The purpose of this recommendation is not intended to pit environmentalists against developers and businesses leaders. The purpose is to ensure that the balance of our ecosystems is maintained and the health and wellbeing of Iowans is protected.

Recommendation 6: Create opportunities to increase the use, enjoyment, and appreciation of Iowa's natural and cultural heritage.

Iowa must make the state more attractive to a vibrant and diverse population. Access to trails, parks, public lands, and other outdoor areas help provide an enhanced quality of life. Further, resources such as clean air and clean water also contribute to the health and wellbeing of our residents. Access to both must be increased to position Iowa as an attractive home to ever changing populations. It is well known that demographics and populations are shifting in the state. The population of Iowans over the age of 60 continues to increase and many baby boomers are nearing retirement. Simultaneously, Iowa is experiencing an outmigration of young workers as college graduates educated in Iowa, move to other areas of the country to develop careers and raise families. In addition, emerging industries in the state will require a vibrant and diverse workforce. Enhancing the beauty of Iowa's communities and outdoor areas will help to create an attractive home for current and prospective residents in addition to creating an appealing destination for visitors. Efforts such as enhancing our existing park infrastructure and increasing the quality and quantity of the tree canopy are essential to the high quality of life available in Iowa.

Federal, state, and local funding for Iowa's trails, parks, and public outdoor attractions is critically insufficient. If additional funding is not provided, the future of many state, county, and municipal parks is at risk. Efforts should be targeted to create connections between the public and outdoor activities to help increase the funding, care and volunteering necessary to protect

the state's public areas. As Iowans we must embrace our outdoor heritage and work to ensure our park and public outdoor infrastructure can be utilized for current and future generations.

Infrastructure Planning Process

Across Iowa, economic strength and competitiveness depends, in part, on our state's infrastructure. In his 2008 Condition of the State address, Governor Chet Culver highlighted the need for a statewide infrastructure plan to ensure all of Iowa is ready for the economy of the future. At that time Iowans could not have foreseen the tragic disasters of 2008 or the seriousness of the economic recession, but their impacts underscored the need for integrated and strategic priorities for Iowa's infrastructure in future years.

Those challenges resulted in a short-term infusion of more than $6 billion for Iowa over a three-year period through the American Recovery and Reinvestment Act (ARRA), I-JOBS, and federal disaster recovery funds. These funds are being spent effectively and as expeditiously as possible on clear priorities for disaster recovery, jobs creation, economic recovery, and other infrastructure and non-infrastructure priorities for the near term.

Iowa also must be poised for the longer-term through strategic and visionary planning for the economy of the future. Iowa needs to continue to make investments in infrastructure, seeking value and success competing in an international economy. The planning process builds on the significant impact of past and current initiatives, opportunities, issues, and challenges.

Iowa Department of Economic Development (IDED) was charged with developing a plan for Iowa. Funding for the planning initiative was provided by US Department of Commerce, Economic Development Administration as part of the disaster recovery grant to the State of Iowa. Under a competitive Request for Proposals process, State Public Policy Group, Inc. (SPPG) was awarded a contract for managing, facilitating, and developing the issues-focused plan under the direction of IDED and project director Thomas W. Hart.

The planning activities span August 2008 through April 2010 when the statewide plan for infrastructure to support Iowa's future economy will be completed. The process for developing the infrastructure strategy was designed to challenge and encourage Iowans to suggest strategies that link infrastructure sectors and position Iowa to shape and fully participate in the economy of the future. With guidance from state leaders in the five sectors of focus, stakeholders with a diversity of perspectives and experiences from across Iowa were engaged in the activities to develop an issue-focused plan with relevance to the public, private, and nonprofit sectors throughout the state.

Five sectors of focus were determined by IDED: Buildings and Vertical Infrastructure, Energy, Natural Resources, Telecommunications, and Transportation.

Leadership of the project was provided by a Sector Chairs Group comprised of state agency directors representing each sector. Sector Chairs met regularly throughout the planning process to ensure consistency in the work of each Sector Committee and to address overarching issues. The following individuals serve on the Sector Chairs group working closely with IDED and SPPG:

- Thomas W. Hart, Iowa Department of Economic Development, Project Director, Sector Chairs Group Chair, and Task Force Chair

- Joseph Cassis, Iowa Communications Network, Telecommunications Sector Committee Co-Chair
- Steve Flagle, The University of Iowa, Telecommunications Sector Committee Chair
- Richard Leopold, Iowa Department of Natural Resources, Natural Resources Sector Committee Chair
- Bret Mills, Iowa Department of Economic Development, Buildings and Vertical Infrastructure Sector Committee Co-Chair
- Joe O'Hern, Iowa Finance Authority, Buildings and Vertical Infrastructure Sector Committee Co-Chair
- Nancy Richardson, Iowa Department of Transportation, Transportation Sector Committee Chair
- Roya Stanley, Iowa Office of Energy Independence, Energy Sector Committee Chair

Additional individuals with special expertise related to the planning initiative participated on the Sector Chairs Group and the Task Force:

- Elisabeth Buck, Iowa Workforce Development
- Emily Hajek, Rebuild Iowa Office
- David Miller, Iowa Homeland Security and Emergency Management Division
- Jon Murphy, Iowa Office of the Governor

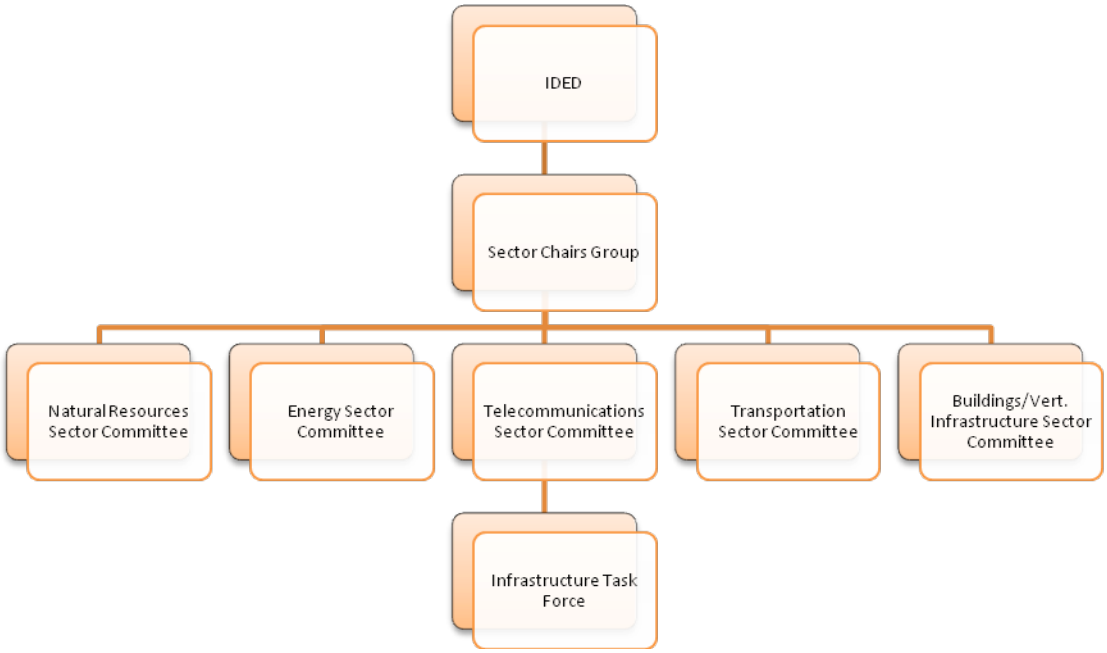
Each Sector Committee met four times in day-long deliberations between November 2009 and February 2010. Sector Committee membership was comprised of private, academic, issue-based, and public representatives providing a diversity of perspectives and strategic vision. Each committee was chaired by the respective member(s) of the Sector Chairs Group. Each of the five Sector Committees was responsible for defining the sector for purposes of this initiative, identifying issues, and developing recommendations based on research, experience, and information reviewed by each committee. Sector Committees were also charged with considering each sector's interaction and integration with the other sectors. Sector Committees were guided by the Essential Elements of Iowa's Future Economy and the common understanding of Iowa's economic situation and forecast described earlier in this report. The findings of each sector were detailed in five separate Sector Committee Reports.

Six community forums were held in Johnston, Coralville, Ottumwa, Dubuque, and Sioux City, with an ICN session conducted at 10 sites statewide. ICN sites were in Atlantic, Carroll, Clinton, Council Bluffs, Creston, Dubuque, Fairfield, Mason City, Storm Lake, and Urbandale. The forum in Dubuque was canceled due to winter weather, but rescheduled as an ICN site. These community forums were structured to elicit public input regarding the initial issues and ideas developed by the Sector Committees, and to inform the process going forward. Comments and suggestions from stakeholder proved very informational and beneficial to the overall process. The input from these community forums was integrated into each Sector Committee Report and Recommendations. Sector Committee reports were completed by March 1, 2010, and forwarded to the Task Force.

The Infrastructure Planning Task Force is charged with developing the statewide strategic plan, outlining priorities to achieve a strong and competitive economy. The Task Force, chaired by project director Thom Hart, includes all members of the Sector Chairs Group and several

individuals from each Sector Committee and will meet three times during March and April. The plan and recommendations of the Infrastructure Task Force will be presented to IDED in May 2010.

Below is a graphic depiction of the relationship of all components of the process for developing the Infrastructure Strategy for Iowa's Future Economy.



The Infrastructure Strategy for Iowa's Future Economy will outline the Task Force's consensus direction for Iowa's buildings and vertical infrastructure, energy, natural resources, telecommunications, and transportation as sectors integrate with one another and as they impact the economic strength and competitive position for Iowa. This information should be of practical value to policymakers at all levels, state and local government agencies, the private sector, non-profit organizations, issue-based organizations, and the public.

The planning process created a clear understanding that Iowa's infrastructure as it exists and is funded today is neither sustainable nor affordable. The Infrastructure Strategy provides insights for all stakeholders as they shape their future.

Conclusion

Members of the Natural Resources Committee have emphasized that the impact on ecosystems be determined and considered in infrastructure planning and development. Natural resources including soil, water, and air are limited quantity and must be managed sensibly to meet the long term needs of Iowa's communities, businesses and ecosystems. This approach will ensure Iowa's economic viability, competitiveness, sustainability, community vitality and quality of life for the future. As plans are developed during the Infrastructure Strategy Task Force process, the importance of coordinated planning and the identification of shared priorities between sectors should be foremost on the agenda. Only through this coordinated, comprehensive approach can Iowa's challenges be addressed for the overall goal of Iowa's growth, prosperity, and recovery.

Supporting Documents

Meeting Notes

- November 19, 2009
- December 14, 2010
- January 25, 2010
- February 25, 2010

Presentations and Handouts

- Carbon 101 Carbon Essentials, Dick Schultz and Rick Cruse, College of Ag & Life Sciences, Iowa State University
- Iowa's Economy in a Difficult Time, Dave Swenson, Economics, Iowa State University
- What is an Ecosystem? Father Bud Grant, Saint Ambrose University

Other Resources

- ARRA Report 2009, Iowa ARRA 1512 Reporting Team, http://www.iowa.gov/recovery/media/reportoctober.pdf
- Iowa Climate Change Advisory Council 2009, Public Interest Institute, http://www.limitedgovernment.org/publications/pubs/studies/ps093.pdf
- Iowa Watershed Task Force Report 2001, Iowa Watershed Task Force, http://www.rio.iowa.gov/wrcc/assets/flood_plain_prior_recommendations.pdf
- Iowa Watershed Quality Task Force of 2007, Watershed Quality Planning Task Force, http://www.iowadnr.gov/water/taskforce/files/wqptf_final_report.pdf
- Keep Iowa Beautiful Report 2006, Keep Iowa Clean and Beautiful Task Force, http://www.dps.state.ia.us/commis/pib/PDFS/KeepIowaCleanandBeautifulTaskForceReport_FINAL_9506.pdf
- State Wildlife Action Plan 2005, Iowa Department of Natural Resources Wildlife Bureau, http://www.iowadnr.gov/wildlife/diversity/files/iwap_part1.pdf
- Water Resources Advisory Council 2009, Water Resources Coordinating Council, http://www.rio.iowa.gov/wrcc/assets/Final_Subcommittee_Flood_Plain_Recommendations.pdf

Infrastructure
STRATEGY
For Iowa's Future Economy

Telecommunications Sector

REPORT & RECOMMENDATIONS

February 2010

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Acknowledgements

The Telecommunications Sector Committee is grateful for the opportunity to examine and deliberate the future of Iowa's connectivity. To others who supported the effort and contributed to the collective vision, we express our thanks.

Special appreciation is extended to John Gillispie, who worked to launch the Committee and provide insights and leadership prior to his departure from the Iowa Communications Network in January.

Several members and non-members of the Telecommunications Sector Committee shared their information and expertise through the activities of the Committee. Appreciation is extended to Mike Balch of the Iowa Utilities Board for his presentation on "Who Can Do What?" Committee members Heath Mallory, Michael Sadler, and Krista Tanner also deserve extra recognition for their work to increase the understanding of the issues for the benefit of the entire Committee.

Thanks are also due to the many stakeholders around the state and to the members of the other five Sector Committees who lent their ideas, comments, and expertise to our deliberations.

Without the funding support from the US Department of Commerce Economic Development Administration and the project management and leadership provided by Iowa Department of Economic Development, it is unlikely this effort for innovative planning would have occurred. The Sector Committee offers compliments to and hearty appreciation for the contributions of these agencies.

Planning process facilitation, staffing, and management were provided by State Public Policy Group, Inc. – SPPG of Des Moines. www.sppg.com

Sector Committee Members

Steve Fleagle, The University of Iowa, Iowa City – Chair

Joseph Cassis, Iowa Communications Network, Des Moines – Co-Chair

Thomas W. Hart, Iowa Department of Economic Development, Des Moines – Project Director

Cevin Anderson, HyVee, Inc., West Des Moines

Wayne Chizek, Marshall County, Marshalltown

Dean Cook, Eddyville-Blakesburg Community School District, Eddyville

Joe Crookham, Musco Lighting, Oskaloosa

Arletta Dawson, Heartland AEA 11, Johnston

Fred Eastman, Midwest Rural Telemedicine Consortium (MRTC), Des Moines

Mark Greenwood, North Iowa Area Community College, Mason City

Robert Houlihan, Cedar Falls Utilities, Cedar Falls

Nicholas Johnson, University of Iowa College of Law, Iowa City

Jay Lohmann, Iowa National Guard, Johnston

Heath Mallory, Western Iowa Telephone, Lawton

Mike Miller, RACOM, Marshalltown

Todd Misel, Iowa Department of Public Safety – State Patrol, Des Moines

Matt Morton, Buena Vista University, Storm Lake

Michael Sadler, Qwest Communications, Des Moines

Michael Shear, Pockets – Strategic Office Networks, Des Moines

Krista Tanner, Iowa Utilities Board, Des Moines

Tommy Thompson, Pleasant Hill

Introduction

Iowans have high expectations for a strong economy, good jobs, and a future of opportunity. Setbacks came in 2008 with the summer disasters followed by the national recession and significant impacts on Iowa's infrastructure. Even while addressing those challenges through the influx of federal and state short-term funding for jobs, infrastructure, disaster recovery, and other broad needs, Iowans must also give significant consideration of the vision for the future economy and the infrastructure it will demand. Interested Iowans statewide will find in this report a set of recommendations and a strategic direction for the Telecommunications sector.

Telecommunications was the subject of deliberations over a four-month period by a diverse array of Iowans who contributed their expertise, experience, and perspectives on the future economy and the telecommunications infrastructure that will be required to meet those needs. Because the report was developed by stakeholders from across the state, it reflects and has future application to diverse stakeholders including the private sector, issue-based groups, nonprofit organizations, academia, and local and state government.

Iowa's rich history of development of telephone service dates back to the late 1800s and early 1900s, with private and cooperative development of telephone service throughout the state. Moving more than a century forward to today's reliance on telecommunications creates an image of continued advances and implementation of technology, bringing with it even wider application and heavier use to support the way we want to live and work in a strong economy everywhere in the state.

All Iowans are reliant to a great degree on telecommunications, whether through the basic wired telephone or through the dependence on advanced forms of information exchange by our agriculture, retail, health care, law enforcement, education, manufacturing, transportation, utility, and countless other segments of our society and economy. That reliance is expanding rapidly and creating much greater demands on telecommunications. In Iowa, the Sector Committee identified the fundamental challenges and set forth solutions in the pages of this report.

This report does not stand alone, however. As part of a comprehensive and coordinated statewide planning initiative under guidance of Iowa Department of Economic Development, the recommendations and insights on the telecommunications sector will be considered by a Task Force, along with similar reports on infrastructure needs for the future economy in buildings and vertical infrastructure, energy, natural resources, and transportation. The ideas and recommendations contained in the five reports and the coordinated plan reflect the involvement and engagement of more than 200 Iowans over a span of nine months. From those deliberations, a strategy for Iowa's future economy was developed on behalf of and for all stakeholders. It is the hope of the Telecommunications Sector Committee that policymakers, community leaders, business and industry, and others find ways to implement or support the

recommendations of this sector report and those of the coordinated Infrastructure Strategy for Iowa's Future Economy.

Executive Summary

Among the most critical needs for Iowa to grow and sustain its population, jobs, and economy is a world-class telecommunications system. Demand and use of telecommunications continue to expand in applications and technologies we could never have imagined just a few years ago. Business and industry, health care, education, government, citizens, and scores of others remind us of the sector's potential and the expectations of Iowans for connectivity. Iowa prides itself on its educated, well-informed populace. In today's world, that means access to the worldwide web and other on-line information resources. However, Iowa's telecommunications infrastructure is already insufficient, and much work remains to be ready for the future.

In its charge to review the issues and develop recommendations for a strong future economy, the Telecommunications Sector Committee clearly viewed telecommunications as fundamentally linked with the other four sectors engaged in this overall strategic initiative – buildings and vertical infrastructure, energy, natural resources, and transportation. In considering how to address telecommunications in the context of the other sectors, the current infrastructure investments, the impacts of the disasters, and the economic recession, the Committee embraced the essential elements of the future economy developed to guide the planning effort: smart planning and growth principles, a diversified economy that ensures a strong agricultural sector, a skilled workforce for quality jobs, environmental stewardship, Iowa-based energy solutions, an economy that is globally competitive, a population that chooses to live and work in Iowa, and realistic funding for new and maintenance of infrastructure.

The impact and involvement of connectivity and telecommunications services are often invisible to Iowans. Think of filling and purchasing a prescription medication, buying a home, operating a business, or sending an email to a family member. Iowans are beginning to expect the connectivity they need, whether or not they know they are using telecommunications.

Telecommunications Definition and Issues

Telecommunications was defined by the Committee as *infrastructure to provide information for all needs for everyone, at any time, anywhere.*

The Committee, in its series of intense and long discussions, identified two issues requiring immediate attention in order for Iowans and Iowa's economy to compete within the United States and globally. These two challenges are inextricably linked. Solutions for both issues are required in order to solve the fundamental problems with Iowa's connectivity.

- The telecommunications infrastructure is fragmented and does not meet the current or future needs of Iowans in capacity, access, and cost.
- Telecommunications policy is fragmented and is a barrier to developing the physical infrastructure required to be globally competitive.

Iowa is not keeping up with other states and the world. Those who have information and knowledge create opportunity and growth. The rest of the world is beginning to operate in a ubiquitous environment, one in which people move from place to place with seamless connectivity at a capacity that allows efficient performance of information transfer. The systems are technology agnostic, meaning that regardless of what tool one uses (cell phone, mainframe, laptop, etc.) it interfaces with the infrastructure with no thought required from the user. Iowa's network is neither ubiquitous nor technology agnostic. Iowa has nearly 300 telecommunications providers operating in the state, many with their own independent infrastructure. Duplicate infrastructure, not to be confused with redundancy required for reliability, is not uncommon in many communities. Redundancy is more difficult to achieve with the fragmented infrastructure.

Compared with other nations, the United States (US) ranks 28th in average download speeds in 2009, at 5.1 megabits per second (mbps), and Iowa ranks 35th among states at 4.5 mbps. This compares with the top two ranked nations, South Korea at 20.4 mbps and Japan at 15.8 mbps.

Policy governing telecommunications is not only fragmented as well, but there has been less regulation and oversight in recent years, leaving consumers confused and the state's telecommunications sector without needed structure.

Telecommunications Sector Recommendations

The Sector Committee presents the following three recommendations for urgent action on the part of the state and the many stakeholders involved. The group emphasized that it will require initial awareness and education of the public and all other stakeholders to the level of need and urgency for Iowa. The Committee also recognized that the greatest hurdle in implementation is successfully bringing the key stakeholders to agreement that they are willing to work together to develop the telecommunications infrastructure. Two critical Committee members from the private sector telecommunications industry, Qwest and Western Iowa Telephone, demonstrated their perspectives and participated fully in the forthright discussions. However, their business models and policy priorities prevented the private telecommunications companies from supporting elements of the recommendations, including the common backbone and any increased oversight. Yet, each appreciated the need for these discussions now and in the future for the benefit of all Iowans.

1. The infrastructure needs to be a common, unified backbone that supports the public interest, is a public-private partnership that includes mutual benefits, and is built by consortiums.

2. Establish state policy that represents the public interest, pursues and advocates the mission/vision for telecommunications, and establishes financial plans to implement the policy.
    a. Establish state policy for "criteria" or goals for connectivity to the curb of every premise (fiber or equivalent transport technology), such as globally-competitive speed, universal access, and cost.
    b. Establish state policy for "criteria" or goals for consumer adoption.

c. Establish a mechanism to recommend policies, processes, and programs and to coordinate the common, statewide system, including a review of tax and regulatory policy for telecommunications and related industries and of investment policy.
d. Determine the state entity to implement the policy.

3. Establish a state consumer protection policy incorporating performance metrics for the purpose of telecommunications services and determine the state entity to implement the policy.

The Committee's vision for a technology agnostic and ubiquitous fiber-optic network to the curb of every premise is not only possible, but imperative for the future economy, jobs, and well-being of Iowans. In this vision, the state plays a role in setting policy and standards for access and technology. The private sector, including existing providers, participates in private consortiums to build, operate, maintain, and upgrade the state's world-class connectivity.

Iowa's Future Economy

There is no crystal ball to predict exactly what Iowa's economy will be like in 2020 and beyond, but there are indicators and, certainly, steps that can be taken to shape the economy as Iowa recovers from the dual challenges of the 2008 disasters and the national recession. The Infrastructure Strategy for Iowa's Future Economy initiative was designed to work from a common understanding of Iowa's current economy and forecast of economic factors in order to establish some strategic direction for the state. Essential elements of the future economy were identified from this information and from the deliberations of the participants in the process. This section highlights the foundational premises of the Sector Committees and Sector Chairs Group that guided their work.

Essential Elements of the Future Economy

Iowa's economy of the future can benefit from and faces challenges because of the disasters and the recession. Iowans have vowed to come back from adversity stronger than ever. The future holds opportunity for innovative and strategic thinking, which tend to be a departure from day-to-day challenges to our infrastructure. In early discussions, each Sector Committee and the Chairs Group worked to identify how Iowa's economy can build upon current short term investments grow to stronger and more globally competitive.

Eight essential elements of the future economy were identified by the Sector Committees and the Sector Chairs Group. The essential elements were used by the Sector Committees to guide and measure their work and their recommendations against the vision for Iowa's economic future.

The Essential Elements of Iowa's Future Economy are:

- Smart planning and growth principles
- A diversified economy that ensures a strong agricultural sector
- A skilled workforce for quality jobs
- Environmental stewardship
- Iowa-based energy solutions
- An economy that is globally competitive
- A population that chooses to live and work in Iowa
- Realistic funding for new and maintenance of infrastructure

Iowa's Current Economy and its Impacts

In the current environment in Iowa in 2010, a number of trends are affecting the state's economy. The following factors are taken from data provided to the Committees by researchers at Iowa State University's Department of Economics. First, the population of Iowa is shifting from rural to urban areas. Other factors include the aging population and the baby boomer generation nearing retirement age. There has also been an increase in the outmigration of youth workers to

other states, and population growth in Iowa has been due to increases in immigrant and minority populations in the state.

Because of the economic recession and the scaling back or closing of significant numbers of manufacturers across the state, non-metropolitan Iowa is losing both jobs and Iowans between ages of 25 and 44, which also has an echo effect of population loss in the under-20 category, reflecting loss of the children of those 25-44 year-olds. Iowa's unemployment rate, which has typically remained relatively low, may start to have a structural upward shift. The rural housing stock is deteriorating, and economic vitality is concentrated in a relatively few areas. Additionally, tax capacity in non-metropolitan communities is rapidly eroding, due to population shifts and loss of manufacturing employers. However, rural energy opportunities, such as biofuels and wind, are evolving.

Iowa in 10 Years

ISU researchers predict that in ten years, Iowa will see the results of current trends in population, namely, that there will be fewer people in non-metropolitan areas, more investment and growth in metropolitan areas, and the continued outmigration of young and working-age people. Regional trade centers, called micropolitan communities (populations of 10,000 – 50,000), will be mostly stable, but not growing. The sectors that will lead in job demand will be business, personal care, education, and health services. Although some downplay the role of energy production in rural resettlement, the Sector Committees identify the energy industry's crucial role in the future economy of Iowa as a significant contributor to the overall rural economy and its potential to be a mitigating factor in further rural depopulation. It is also predicted that manufacturing will still be important, but the number of jobs will have decreased, and the manufacturing businesses that remain will be those with the most efficient and productive processes.

It is clear that action taken to shape Iowa's future economy will be key determinants in the success of the state. As technology develops, energy and telecommunications infrastructure will be critical to the state's competition in a global economy. Additionally, transportation, buildings, and vertical infrastructure will remain fundamental for moving and storing goods and services and supporting Iowa's workforce. Finally, natural resources will be essential to the state's continued economic success within the agricultural, industrial, and business sectors. All sectors are integrated and mutually dependent. The work of the planning initiative is to harness the opportunities of these critical sectors. When people come to live and work in Iowa, it will be because of Iowans' anticipation of the coordinated natural resources, transportation, buildings and vertical infrastructure, energy, and telecommunications infrastructure to support a robust economy.

The Issues

Picture this: firefighters from multiple towns fighting a large fire, a sales associate selling a sweater at a local store, a student researching a topic using the Internet, a new cloud computing business starting up in Iowa, a patient wearing a portable heart monitor at home, airplanes landing at a regional airport, a couple watching a movie on cable TV or downloaded from Netflix, grandparents keeping in touch with distant grandchildren over webcam, travelers checking road reports before driving Iowa's highways, teens texting and posting to their Facebook pages, and the list goes on endlessly.

These are but a few ways telecommunications has exponentially grown and changed to touch our lives nearly constantly. Much of the time we rely on advanced forms of exchanging information and data without realizing it. The Telecommunications Sector Committee of the Infrastructure Strategy for the Future Economy initiative recognized the expansive and increasing demand for information transfer and the accompanying opportunities. In focusing its work, the Committee developed its definition of telecommunications.

Definition of Telecommunications
Infrastructure to provide information for all needs for everyone, at any time, anywhere.

In considering the world and Iowa's economy in ten or twenty years, it is clear to the Telecommunications Sector Committee that the demand for access to high capacity connectivity will continue to grow at a faster pace than we have seen in past years. The question is whether Iowa's current infrastructure can serve that need; the consensus is that it cannot. It is crucial for Iowans' economy, lives, and work that the infrastructure not only meets the minimum needs of today, but be capable of handling the ever-growing, and still unknown, utilization of telecommunications technology and services.

Make no mistake; this is a very complex issue with physical, policy, and behavioral elements. Solutions will require change within those elements and implementing a vision of the future that steps away from the systems that no longer work in today's and tomorrow's world.

Telecommunications Issues
The Committee, in its series of intense and long discussions, identified two issues requiring attention in order for Iowans and Iowa's economy to compete within the United States and globally. These two challenges are inextricably linked. Solutions for both issues are required in order to solve the fundamental problems with Iowa's connectivity.

- The telecommunications infrastructure is fragmented and does not meet the current or future needs of Iowans in capacity, access, and cost.
- Telecommunications policy is fragmented and is a barrier to developing the physical infrastructure required to be globally competitive.

Context and Explanation of Telecommunications Infrastructure

Telecommunications in Iowa is at a tipping point, and the state will either take a leap into global competitiveness or will fall farther behind. Telecommunications is a significant driver of the economy and of jobs that accompany a healthy economy.

The world is becoming technology agnostic, where it makes no difference which tool one uses (such as a laptop, a cell phone, or a credit card machine) or where one happens to be, the connectivity is there supporting it. In fact, many countries are already operating in this manner, and the US is far behind, meaning our competitiveness continues to drop. The fundamental requirement is a robust information transport network. In today's world, that is a fiber-optic network.

Iowa's fragmented connectivity is a sharp contrast to the Japanese technology agnosticism. The Telecommunications Sector Committee was provided this description early in its work.

> *Technology is permitting a shift toward an "ubiquitous" environment. In Japan for an example, mobile devices hop from network to network seamlessly. While at home, one would plug into a Fiber-To-The-Home (FTTH) network or a high-speed personal wireless system (802.11n) and as this person moves outdoors, the connection moves onto the 4G cellular network. After arriving at the office, the person's communications automatically connects to the corporate high-speed network. This ubiquity fundamentally puts the consumer in constant communications at the best possible configuration. It will change how people work and live. For Japan, the providers are not the same. Regulation forced the networks to open selection (pick your equipment and providers) and then the providers value add by making it seamless to move across all the networks.*

The description of the Japanese infrastructure is stark in comparison to Iowa, where the telecommunications infrastructure is neither connected nor seamless. The Sector Committee was thoughtful in its approach to the infrastructure issue and sought to identify and understand the current situation so that constructive recommendations could be developed.

In short, the current system reflects Iowa's history and values. Local control is a fundamental premise of public and private entities alike. When the telephone came into use in the late 1800s, enterprising Iowans brought service to homes and businesses across the state. The entrepreneurial spirit resulted in scores of telephone companies serving the needs of communities of all sizes and rural areas of the state. Since that time, voice service has become only one service necessary for a competitive future in an expanding information age.

The legacy of telecommunications' early years in Iowa is a current array of several large telecommunications providers (Qwest, Iowa Telecom, Frontier, and, recently, Mediacom), 154 historical rural telephone companies (incumbent local exchange carriers – ILECs), more than 100 additional competitive telephone companies receiving certification after September 30, 1992 (competitive local exchange carriers – CLECs), and 15 municipalities providing

telecommunications services. In addition, in the early 1990s, the Iowa General Assembly and Governor approved and signed legislation creating a fiber-optic network, the Iowa Communications Network (ICN), designated to providing full-motion video access to every kindergarten through university level educational system in the state.

Even though each telecommunications provider has its own independent infrastructure, all providers are interconnected for the reciprocal exchange of traffic. All major providers connect at points of presence or central offices. Small carriers connect at meet points. In recent years, wireless providers have signed interconnection agreements with all wireline providers, and, recently, Mediacom has begun the same process for interconnection. Some providers have come together in networks to provide certain infrastructure and services. The ICN contracts with private providers for last mile infrastructure, as required by law. Fragmentation is evident when one realizes that, even though Iowa has ample infrastructure, it is not connected in a common network and access to the infrastructure is limited and operates under different authorities and regulations. Many pieces exist, but no open access to a statewide fiber network exists in the state.

Service to difficult-to-reach and rural areas is a challenge worldwide; Iowa is no exception in certain markets. Some rural providers are installing fiber-to-the-home or providing broadband services throughout the exchange. The economics of the private sector model, understandably, creates a challenge. Motivation to provide service in rural areas is low because of the small market, light population density, cost to build the infrastructure, with no guarantee of an ongoing customer commitment. The ICN was designed, in part, to address that challenge for education. The need to communicate does not end at the borders of the state, so connectivity across state lines is also an issue.

With hundreds of providers, it is clear there is duplication of infrastructure. Some areas of the state have several types of telecommunications infrastructure side by side because of the duplicate or different technologies used by the respective providers. Traditional telephone, cable, fiber, and multiple wireless infrastructures are typically found in the same communities, serving the same customers with different services.

In an effort to achieve the connectivity necessary for competitive success and meet pressing needs, Iowa communities, companies, and consortiums turn to building their own networks. This has happened with school districts, community colleges, universities, cities, and private industry. Telecommunications providers, including the ICN, have been parties to independent solutions. The results, while addressing those individual needs, further fragment Iowa's system and create additional duplication.

Duplication of infrastructure should not be confused with redundancy. While it is critical for telecommunications to have contingencies for continued service should part of the system temporarily "go down," without duplicate infrastructure being connected to the whole of the network, it does not provide the redundancy needed statewide.

Existing infrastructure consists of traditional wireline, fiber-optic cable, cable, wireless, and electronic services such as Google Voice and Vonage that look like traditional telephone service, but are not the same technology. Private and public investments in infrastructure are significant and costly to maintain. Iowa has more middle-mile fiber-optic cable than any state in the nation. Network challenges now and for the future lie in the last mile infrastructure.

One of the greatest challenges is to determine agreement on the means to bring together all types of existing infrastructure when fiber, or an equivalent transport technology, is necessary to deliver the common connectivity the state requires.

The focus must be on the future and making changes to Iowa's system now. Fiber-optics is recognized as the world standard for infrastructure capable of the connectivity necessary for global success.

The Glass Highway

The Telecommunications Sector Committee, in its recommendations later in this report, states that it is imperative and urgent to develop a fiber-optic or equivalent transport technology network to provide the connectivity Iowa must have to survive in the future Iowa and global economies. It was after much discussion of Iowa's telecommunications needs and the vision of the future, that the "glass highway" emerged as central to Iowa's future and the future of coming generations.

Iowa's history provides both opportunities and questions around how stakeholders might come to support creating this new network, but there is little doubt that a shared, unified backbone is the heart of telecommunications now and into the future.

The Sector Committee also was aware that for most Iowans, discussion of technology and telecommunications is like speaking another language. It is critical, though, to understand what is available, the context in which decisions must be made, and to have good information available about the technology most suited for the necessary connectivity. Then, informed and strategic decisions can be made.

Glass fiber can carry more data than any other medium known at this point, making a fiber-optic backbone the obvious choice for any new network. The "glass highway" has frequently been likened to the interstate highway network in explaining how it would be constructed and accessed. There was one federal interstate highway system built, and everyone has access to the use of this network of highways to get anywhere in the nation. The investor in the interstate system is the federal government, and users of the network of highways pay for its repair, maintenance, and expansion through fees and taxes based on use or payment to service providers who use it.

Service providers, such as Heartland Express, Hy-Vee, or FedEx do not need to build their own interstate highways in order to serve their customers. It would be absurd to think that each

provider would need its own roads to deliver goods and services and move people from place to place; yet we often find that telecommunications service providers, such as Qwest or Mediacom, must build their own infrastructure in order to sell their services to customers.

Some may argue that not everyone needs the super-fast access provided by fiber or an equivalent state-of-the-art transport technology. There are different views of telecommunications by Iowans ranging from those who use the basic telephone land line service and are happy with that to those whose business or personal needs for telecommunications have fast outgrown what the network can offer and are thwarted by the fragmentation of infrastructure and policy. Between those extremes are Iowans who do not recognize what telecommunications can do for them so they do not demand it, those who need and have some basic services and are satisfied, and some who still do not have access to connectivity.

Information and knowledge create opportunity and growth. The glass highway meets the diverse needs of all sectors of the economy and of Iowans as they rely more and more on information. On a day-to-day basis, Iowans rely on telecommunications, whether they know it or not, in financial transactions, public safety and emergency services, health care, education, government services and information, personal social interaction, business, industry, commerce, advocacy, and so much more. For many Iowans, entertainment is a rapidly-growing use of telecommunications infrastructure. Iowa's economy and lifestyles demand connectivity to meet their expectations and to compete globally.

Iowa's Competitive Standing

Many are surprised to discover just how far behind the rest of the world the United States and Iowa lag. Average download speed is often used to compare connectivity. The United States is 28th among nations in download speeds in 2009, according to Speed Matters, a project of the Communications Workers of America. Iowa ranks 35th among the 50 states. The United States ranks 15th behind other nations in broadband adoption.

Download Speeds and Rankings for 2009*

World Ranking	Country	Average Download Speed (megabits per second – mbps)
1	South Korea	20.4
2	Japan	15.8
5	Sweden	12.8
9	Netherlands	11.0
13	Germany	8.3
28	**United States**	5.1
	Iowa (35th among states)	4.5

Iowa Download Speeds*

Download Speed Range	% of Iowa
Less than 768 kbps	17%
768 kbps to 6 mbps	55%
6 to 10 mbps	19%
10 to 25 mbps	8%
Greater than 25 mbps	1%

*Source: US data from speedmatters.org test results. International data from speedtest.net.

The new definition of broadband established by the Federal Communications Commission is 768 kilobits per second (kbps). The Telecommunications Sector Committee does not believe that 768 kbps is an adequate goal for Iowa. Many uses of telecommunications demand significantly greater speeds. Committee members discussed download speeds of 3 mbps to upwards of 100 mbps as speeds necessary for Iowans to meet identified needs in business, education, and other functions. Other nations are starting to talk in terms of gigabits per second as well. By thinking in terms of a goal of 768 kbps for high-speed broadband, the Committee believes Iowa would immediately be placing itself in a non-competitive position.

Clearly, Iowa's telecommunications infrastructure is fragmented, and policy is not effectively supporting the infrastructure we have now, let alone that needed for the future.

Context and Explanation of Telecommunications Policy

Like the physical infrastructure, telecommunications policy is, in some cases, fragmented, outdated, or nonexistent as a result of the emergence of new telecommunications technologies and services and the shift in consumer demand from other technologies and services. Regulation, which traditionally had been reserved for monopoly services, has receded as telecommunications services have been deemed competitive. Thus, as telecommunications have become more complex and critical to the economy and the lives of Iowans, there has been a move toward less regulation. Many on the Telecommunications Sector Committee agreed that these developments have left the sector without a policy-setting body to turn to.

Regulation is confusing and challenging for many, even those involved in the sector, and sometimes creates real or perceived inequity among providers. The Committee noted that some older and outdated regulations make little practical sense in this century and serve as barriers to investment, profit, and service to Iowans. Included in the policy gap is that, in many instances, there is no single place for residents to turn to address issues they experience with the array of providers and services.

Wireless numbers now exceed land lines by about a three-to-two margin in Iowa. Licensing and regulation of wireless providers is under the authority of the Federal Communications Commission (FCC). Landline carriers are under the authority of the Iowa Utilities Board (IUB) for service quality and complaint resolution, but the IUB does not have retail rate-setting authority. Nomadic Voice over Internet Protocol (VoIP) carriers are considered interstate and are subject to some regulation by the Federal Communications Commission. There are other, newer

applications that use VoIP technology, such as Google Voice, that want to operate with even fewer regulatory constraints.

The revenue sources supporting the telecommunications industry vary within the industry itself. Traditional landline telephone companies receive customer revenues, access revenues for completing toll calls, and in most cases, some Universal Service Fund (USF) support. Access rates are under state or federal regulation, depending on whether a toll call crosses state lines. USF support is primarily regulated by the FCC. Access revenues and USF support may vary widely depending on whether a landline carrier is considered rural or urban. Wireless carriers receive customer revenues, but in most cases, little or no access revenues. Some wireless carriers receive USF support. Cable telephone companies receive customer revenues, access revenues, and may or may not receive USF support. VoIP carriers may only receive customer revenues.

As the number of wireline customers decreases, the revenue streams of the wireline telephone carriers are strained. Because wireline telephone companies have a large role in the deployment of broadband services, the challenge of providing affordable broadband services and maintaining infrastructure becomes apparent.

Potential changes in federal policy and regulation have created uncertainty for some in the state as they attempt to plan. For several years, the FCC has contemplated changes to access charges and USF support. Thus, significant changes to telecommunications carrier revenue streams could be forthcoming. In addition, the FCC is expected to announce the blueprint for a National Broadband Plan in mid-March 2010. Though these are significant initiatives, the Telecommunications Sector Committee urges that its recommendations proceed toward implementation with an eye to these initiatives and the flexibility to adapt as necessary.

In its discussions, the Sector Committee stresses the separation of the infrastructure itself from the services, or “applications,” that may be provided using the infrastructure. Policy, too, will need to consider this separation in a new system. With the imperative shift to a different, common infrastructure proposed by the Committee, current policies can be replaced with policy supportive of tomorrow’s telecommunications.

As policy is examined, several fundamental decisions are necessary around the three components of the infrastructure issue identified by this Telecommunications Sector Committee – access, capacity, and cost. The state should set policies that effectively support development of an effective telecommunications backbone.

This is the context in which the Telecommunications Sector Committee seeks imperative and rapid change to both the infrastructure and the policy supporting telecommunications in Iowa.

Costs and Benefits to the Economy

Fragmentation of telecommunications infrastructure and policy exact a daily toll on Iowans in all walks of life and sectors of the economy. Competitiveness is clearly compromised. The state's future, arguably, is at stake with the potential loss of Iowa's youth, workers, and businesses that have choices about where to live, work, raise a family, and support jobs and the economy.

In Committee discussions, it was suggested that some early exploration of the cost of building a new system to provide fiber-optics to the curb of every premise in Iowa was placed at an estimated $2.5 billion, though data were not sought and further research was not conducted by the Committee to verify this cost.

While that estimated cost may seem challenging to some, it was also suggested that the value of making this investment now greatly exceeds the cost. In fact, the case could be made that it would cost more to not make the change to the glass highway. Those projections of value and cost savings include:

- A 1.5 percent gain in Iowa's $180 billion economy for one year equals more than the cost of the system.
- Quality of life opportunities would be enhanced for the state of Iowa, its communities, and all living in or visiting the state.
- Cost of communication services for individuals could be reduced while providing greatly enhanced service.
- Smart energy management becomes practical to achieve.
- Industrial and agricultural business could achieve lower costs and have access to worldwide information and opportunity for innovation.
- Public services could save costs and improve services.
- Educational systems would be able to deliver greater value at reduced costs.
- Health care costs would decrease and services expand and improve.

Telecommunications Sector Committee members recognized that the subject matter is not as exciting or visible as some other infrastructure, but it is certainly equally critical for the future of the state. Iowa is now beginning to raise generations of "digital natives," children who have never known anything but technology and telecommunications at their fingertips to do everything from pay bills to play games. Three year-olds are able to use a computer and show their parents how to maneuver through the technology. Connectivity is a given with this generation.

The costs to Iowa by not moving forward to the glass highway, according to Committee members, include the demise of rural Iowa, loss of Iowa's youth and future workforce, failure to achieve global competitiveness, and failure to look out for future generations. It is about the economy, and it is about high speed broadband access for every Iowan to allow success.

Relationships to Other Sectors

Telecommunications is integrated into the interests and work of the other sectors involved in this planning effort. Some on the Committee referred to telecommunications as the glue that holds together many functions of many sectors. New uses for telecommunications are identified every year, and the demand for moving information is expanding rapidly. The future economy will be increasingly dependent on telecommunications in ways not imagined today.

In a literal sense, telecommunications infrastructure is what connects buildings and other vertical infrastructure to the outside world. In designing and siting infrastructure, attention to access to telecommunications is a consideration, as is building telecommunications into original construction. Telecommunications serves myriad functions in buildings, ranging from allowing and limiting access to structures to bringing people and information to the site instantly via telecommunications. Access to connectivity is a fundamental element in whether construction of a physical “place” is necessary at all, thereby supporting smart planning and growth principles.

Energy and telecommunications are mutually dependent. Telecommunications operations are dependent on reliable energy sources. Likewise, the smart grid and energy transport are heavily dependent on connectivity that is fast, high capacity, and accessible everywhere. Monitoring of water, gas, and electricity call upon telecommunications, and as this practice grows to serve individual home and business applications, demand for connectivity will increase. World-class connectivity can also reduce energy use by allowing telecommuting and alternative workplace configurations that will reduce the number of vehicle miles traveled.

On a systemic level, telecommunications has enabled natural resources to do more and do it better in monitoring and tracking information in water, air, solid waste, and other environmental factors. For example, water quality and air quality testing require connectivity, as does real time river and stream monitoring. Drinking water, wastewater, and storm water are all monitored with systems that transport data via telecommunications. Telecommunications also allow Iowans to visit wireless hot spots around the state, use Iowa Department of Natural Resources’ online reservation system, and access online licensing.

A wide array of common interests are found between transportation and telecommunications. Public safety relies very significantly on telecommunications and access to high speed connectivity. Road conditions, traffic flows, providing information and warnings to motorists, and automated weigh stations for commercial vehicles are examples of current transportation application of connectivity. Management of truck fleets and monitoring specific data of individual trucks is growing more common. Public policy in some communities now allows traffic ticketing using technology and connectivity to move information.

These are but a few examples of the integrated nature of the sectors involved in this planning initiative. The Telecommunications Sector Committee supports efforts that will ensure globally-competitive connectivity statewide and recognizes the benefits such change will also bring to the other sectors.

Recommendations

The recommendations presented in this section are not for the faint of heart. They are based on the future economy, creating globally competitive businesses in Iowa, and ensuring that Iowa's children and their children's children can choose to live, work, and enjoy Iowa. The recommendations require that the current image and structure of telecommunications be set aside, and that current state policy also be set aside. They also require that, to some level, stakeholders set aside their personal interests long enough to recognize and determine the benefits of implementing the vision for the citizens, the state, and for them. The vision for telecommunications is based on reality; Iowa simply must act, and act soon, to make real and lasting change for the sake of Iowa's economic survival.

Achieving the recommendations of the Telecommunications Sector Committee will require action on two critical elements. First, Iowans must understand and grasp the vision for this change in telecommunications for all. The public, business and industry, and the public sector must come together to support the vision and work collaboratively to move from discussion into construction.

Second, these changes are possible and affordable, particularly when compared to the greater long-term costs of not taking prompt and definitive action. Perhaps the greatest challenge is to move the key stakeholders to decide they will work together to solve a mutual problem in a way that will provide benefit to every partner. Once they have decided and committed to the vision, they will be able to work together through the details.

The Committee looked at the current telecommunications infrastructure and policy status, other nations' systems, and the aggregate demand for connectivity in future years. From that information and those deliberations, the Committee reached a significant level of agreement on the recommendations for Iowa.

Because diverse perspectives and honest discussion were encouraged at the meetings, differences were identified and aired. Yet, these recommendations are supported by all but two members of the group. That is not to say that every person who supported the recommendations agreed with every word. It is important to note that "the devil is in the details," and how the recommendations may be implemented will require much additional discussion.

The two Committee members who were unable to support substantive elements of the recommendations were from the private sector telecommunications industry. Qwest and Western Iowa Telephone members explained their positions, provided information to the group, and participated fully in the forthright discussions. However, their business models and policy priorities prevented these two private telecommunications companies from supporting elements of the recommendations. Of particular concern were elements of the recommendations that call for a common, unified backbone and any increase in oversight and government involvement.

Even with these significant concerns, each appreciated the need for these discussions now and in the future for the benefit of all Iowans.

One thing is very clear and underpins the success of any implementation – telecommunications infrastructure and supporting policy are inextricably linked.

Recommendations for the Telecommunications Sector

In Iowa, both the physical infrastructure and the policy supporting the infrastructure are needed for the state to enter the ranks of states and nations with competitive-level connectivity. Three recommendations should be implemented to achieve Iowa's world-class connectivity and bolster opportunities for economic, social, and individual success.

1. The infrastructure needs to be a common, unified backbone that supports the public interest, is a public-private partnership that includes mutual benefits, and is built by consortiums.
2. Establish state policy that represents the public interest, pursues and advocates the mission/vision for telecommunications, and establishes financial plans to implement the policy.
    a. Establish state policy for "criteria" or goals for connectivity to the curb of every premise (fiber or equivalent transport technology), such as globally-competitive speed, universal access, and cost.
    b. Establish state policy for "criteria" or goals for consumer adoption.
    c. Establish a mechanism to recommend policies, processes, and programs and to coordinate the common, statewide system, including a review of tax and regulatory policy for telecommunications and related industries and of investment policy.
    d. Determine the state entity to implement the policy.
3. Establish a state consumer protection policy incorporating performance metrics for the purpose of telecommunications services and determine the state entity to implement the policy.

Context and Explanation of the Recommendations

Recommendation 1: The infrastructure needs to be a common, unified backbone that supports the public interest, is a public-private partnership that includes mutual benefits, and is built by consortiums.

The implications of this short statement are complex. Many options and courses of action can be devised to implement this recommendation. The infrastructure is, simply, a connected network that reaches to the curb of every address and provides access to all Iowans to connect to a home, government building, community organization, business, industry or other premise. The Committee discussed many elements related to implementation and offers its insights. These elements included the concerns of private telecommunications providers.

The Committee discussed in detail how to emphasize the requirement that the network consist of the transport technology representing the greatest capacity, speed, convenience, and economic efficiencies available. In 2010, that technology is fiber-optic cable. Should a new technology innovation be developed to replace fiber before the network is developed, that technology should be the choice for the backbone. The Committee, seeking immediate efforts for implementation, does not anticipate a new technology in the near term that would replace fiber-optic cable.

First and foremost, there needs to be one network, the backbone of the statewide system. The backbone would be fiber-optic cable for the first, middle, and last miles of the system. While the network could be built new from the start, the Committee understands the value of the thousands of miles of fiber already in the ground. Implementation should include connecting existing infrastructure to create the backbone and building remaining segments as needed. This approach also recognizes the investment of those who built existing infrastructure and includes consideration of that investment within the statewide network.

The network would provide fiber to the curb of every premise in Iowa. This means that globally-competitive connectivity would be available to all Iowans. It would remain the responsibility of each person to connect from their business, home, office, or agency to the access point at the curb.

The resulting glass highway would allow open access to those who want to deliver services via the network for a cost. Customers would have greater choice of providers and services in this system because all services are flowing over the same network. For example, current telecommunications providers, education, business, government, health systems, and anyone else could use this common backbone to deliver their specific services. Likewise, consumers of those services would have access at their premise to the wide array of services provided at a cost to the consumer.

The Sector Committee, with exceptions previously noted, strongly believes that Iowa's future depends upon implementing the vision for this system. The Committee agreed that neither an "all public sector" solution or a "private sector only" solution would be best for Iowa. Rather, the network should be a public/private partnership. The responsibilities of the public sector would be to set policy for access and technology standards as described in the next recommendation.

The private sector responsibilities would be broad, encompassing building, maintaining, operating, upgrading, and financing the glass highway. This could be done by one or more private entities or by a consortium of private entities. The Committee envisions a consortium of private entities including existing telecommunications providers, "applications" providers (educational systems, health care systems, Internet services, and many more) wishing to sell their services via the network, and other interested parties.

Financing the telecommunications infrastructure would be completed by the consortium and structured to achieve its cost recovery within a period of years through fees to providers of services to each premise.

Various scenarios should be evaluated as part of the planning for implementation of this significant change in connectivity for all. State policymakers would also need to determine how the building of the common backbone will be undertaken. The state's role would need to be defined, including whether the state would issue a request for proposals to solicit competitive private sector approaches and costs to develop the network. The structure of contracts for ongoing operations, maintenance, and upgrades would be included in the planning to implement the recommendation.

Clearly, the physical infrastructure is closely tied to the policy decisions early in the initiative as well as the policy supporting the network's future. The next recommendation focuses on the element of state policy.

Recommendation 2: Establish state policy that represents the public interest, pursues and advocates the mission/vision for telecommunications, and establishes financial plans to implement the policy.

a. *Establish state policy for "criteria" or goals for connectivity to the curb of every premise (fiber or equivalent transport technology), such as globally-competitive speed, universal access, and cost.*
b. *Establish state policy for "criteria" or goals for consumer adoption.*
c. *Establish a mechanism to recommend policies, processes, and programs and to coordinate the common, statewide system, including a review of tax and regulatory policy for telecommunications and related industries and of investment policy.*
d. *Determine the state entity to implement the policy.*

A common, unified fiber-optic network will demand careful consideration of policy to address critical issues, and the Sector Committee sees the need for infrastructure, access, capacity, and cost policy. Representing the public interest must be the guiding principle.

Strong state leadership is necessary to bring together consortiums and drive the change. The Committee recognizes the significant opportunity for the state to develop practical, consistent, reasonable policy for telecommunications. It is expected the state will set the standards for access and technology.

Within these discussions, age-old policy questions in Iowa will be answered:

- Who builds the network, and who gets to use it?
- What does universal access mean in Iowa?
- What is the government's role?
- What is the private sector's role?
- How do the existing private and public telecommunications become partners with the infrastructure and continue to offer services once the backbone is built?

- How is building the backbone paid for and how are ongoing costs and improvements financed?
- Who decides all of these issues?

The Committee discussed and reached some level of agreement on many of these issues, recognizing fundamental differences, and reflected those thoughts in this report. The Sector Committee will appreciate and support the efforts of those in authority as they address Iowa's urgent need to develop policy and infrastructure for world-class connectivity and to implement the recommendations of this Committee.

Recommendation 3: Establish a state consumer protection policy incorporating performance metrics for the purpose of telecommunications services and determine the state entity to implement the policy.

The Telecommunications Sector Committee was troubled throughout its deliberations by the fact that there is no point of contact for consumer protection. Current issues arise because of the fragmentation of regulation and that there is no Iowa source of information or enforcement.

With implementation of the recommendations of the Committee, those issues should disappear within the new infrastructure and connectivity and the supporting public policy. However, consumers will have more choices of service providers, and with that comes a need for consumers to be able to do comparison shopping. By requiring performance metrics, consumers will have access to the data and information they need to make decisions based upon their individual needs. In addition to this, consortiums operating under the guidelines developed for implementation will have metrics applied to their operations to ensure quality and effective rollout of services.

Infrastructure Planning Process

Across Iowa, economic strength and competitiveness depends, in part, on our state's infrastructure. In his 2008 Condition of the State address, Governor Chet Culver highlighted the need for a statewide infrastructure plan to ensure all of Iowa is ready for the economy of the future. At that time Iowans could not have foreseen the tragic disasters of 2008 or the seriousness of the economic recession, but their impacts underscored the need for integrated and strategic priorities for Iowa's infrastructure in future years.

Those challenges resulted in a short-term infusion of more than $6 billion for Iowa over a three-year period through the American Recovery and Reinvestment Act (ARRA), I-JOBS, and federal disaster recovery funds. These funds are being spent effectively and as expeditiously as possible on clear priorities for disaster recovery, jobs creation, economic recovery, and other infrastructure and non-infrastructure priorities for the near term.

Iowa also must be poised for the longer-term through strategic and visionary planning for the economy of the future. Iowa needs to continue to make investments in infrastructure, seeking value and success competing in an international economy. The planning process builds on the significant impact of past and current initiatives, opportunities, issues, and challenges.

Iowa Department of Economic Development (IDED) was charged with developing a plan for Iowa. Funding for the planning initiative was provided by US Department of Commerce, Economic Development Administration as part of the disaster recovery grant to the State of Iowa. Under a competitive Request for Proposals process, State Public Policy Group, Inc. (SPPG) was awarded a contract for managing, facilitating, and developing the issues-focused plan under the direction of IDED and project director Thomas W. Hart.

The planning activities span August 2008 through April 2010 when the statewide plan for infrastructure to support Iowa's future economy will be completed. The process for developing the infrastructure strategy was designed to challenge and encourage Iowans to suggest strategies that link infrastructure sectors and position Iowa to shape and fully participate in the economy of the future. With guidance from state leaders in the five sectors of focus, stakeholders with a diversity of perspectives and experiences from across Iowa were engaged in the activities to develop an issue-focused plan with relevance to the public, private, and nonprofit sectors throughout the state.

Five sectors of focus were determined by IDED: Buildings and Vertical Infrastructure, Energy, Natural Resources, Telecommunications, and Transportation.

Leadership of the project was provided by a Sector Chairs Group comprised of state agency directors representing each sector. Sector Chairs met regularly throughout the planning process to ensure consistency in the work of each Sector Committee and to address overarching issues.

The following individuals serve on the Sector Chairs group working closely with IDED and SPPG:

- Thomas W. Hart, Iowa Department of Economic Development, Project Director, Sector Chairs Group Chair, and Task Force Chair
- Joseph Cassis, Iowa Communications Network, Telecommunications Sector Committee Co-Chair
- Steve Flagle, The University of Iowa, Telecommunications Sector Committee Chair
- Richard Leopold, Iowa Department of Natural Resources, Natural Resources Sector Committee Chair
- Bret Mills, Iowa Department of Economic Development, Buildings and Vertical Infrastructure Sector Committee Co-Chair
- Joe O'Hern, Iowa Finance Authority, Buildings and Vertical Infrastructure Sector Committee Co-Chair
- Nancy Richardson, Iowa Department of Transportation, Transportation Sector Committee Chair
- Roya Stanley, Iowa Office of Energy Independence, Energy Sector Committee Chair

Additional individuals with special expertise related to the planning initiative participated on the Sector Chairs Group and the Task Force:

- Elisabeth Buck, Iowa Workforce Development
- Emily Hajek, Rebuild Iowa Office
- David Miller, Iowa Homeland Security and Emergency Management Division
- Jon Murphy, Iowa Office of the Governor

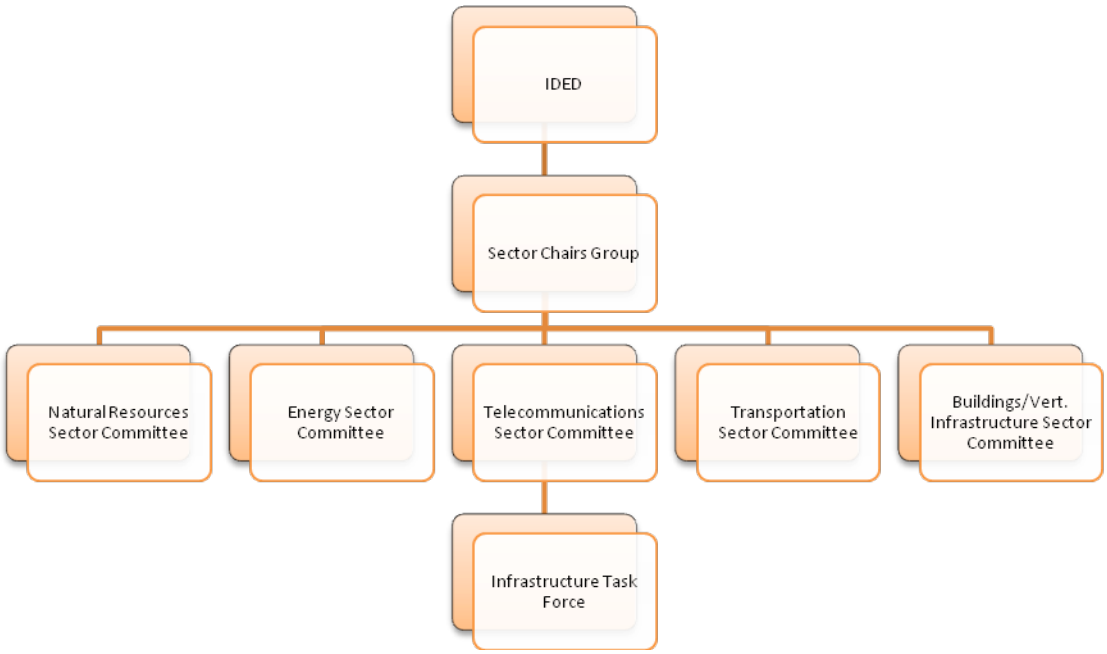
Each Sector Committee met four times in day-long deliberations between November 2009 and February 2010. Sector Committee membership was comprised of private, academic, issue-based, and public representatives providing a diversity of perspectives and strategic vision. Each committee was chaired by the respective member(s) of the Sector Chairs Group. Each of the five Sector Committees was responsible for defining the sector for purposes of this initiative, identifying issues, and developing recommendations based on research, experience, and information reviewed by each committee. Sector Committees were also charged with considering each sector's interaction and integration with the other sectors. Sector Committees were guided by the Essential Elements of Iowa's Future Economy and the common understanding of Iowa's economic situation and forecast described earlier in this report. The findings of each sector were detailed in five separate Sector Committee Reports.

Six community forums were held in Johnston, Coralville, Ottumwa, Dubuque, and Sioux City, with an ICN session conducted at 10 sites statewide. ICN sites were in Atlantic, Carroll, Clinton, Council Bluffs, Creston, Dubuque, Fairfield, Mason City, Storm Lake, and Urbandale. The forum in Dubuque was canceled due to winter weather, but rescheduled as an ICN site. These community forums were structured to elicit public input regarding the initial issues and ideas developed by the Sector Committees, and to inform the process going forward. Comments and

suggestions from stakeholder proved very informational and beneficial to the overall process. The input from these community forums was integrated into each Sector Committee Report and Recommendations. Sector Committee reports were completed by March 1, 2010, and forwarded to the Task Force.

The Infrastructure Planning Task Force is charged with developing the statewide strategic plan, outlining priorities to achieve a strong and competitive economy. The Task Force, chaired by project director Thom Hart, includes all members of the Sector Chairs Group and several individuals from each Sector Committee and will meet three times during March and April. The plan and recommendations of the Infrastructure Task Force will be presented to IDED in May 2010.

Below is a graphic depiction of the relationship of all components of the process for developing the Infrastructure Strategy for Iowa's Future Economy.



The Infrastructure Strategy for Iowa's Future Economy will outline the Task Force's consensus direction for Iowa's buildings and vertical infrastructure, energy, natural resources, telecommunications, and transportation as sectors integrate with one another and as they impact the economic strength and competitive position for Iowa. This information should be of practical value to policymakers at all levels, state and local government agencies, the private sector, non-profit organizations, issue-based organizations, and the public.

The planning process created a clear understanding that Iowa's infrastructure as it exists and is funded today is neither sustainable nor affordable. The Infrastructure Strategy provides insights for all stakeholders as they shape their future.

Conclusion

A unified fiber-optic backbone using common infrastructure is a critical need for the economy, jobs, and Iowans' lives. Perhaps not as visible or headline-grabbing as other infrastructure needs, connectivity is the future. Many simply do not pay attention because the direct impact has not yet touched them. Burdened by history and the complexity of the technology, telecommunications is sometimes set aside when the discussions get difficult. But, if Iowa wants to be globally competitive, change is imperative, and it is possible.

Telecommunications is a sector where integration with the other five sectors is clear, natural, and necessary. As infrastructure resources continue to be in short supply, the coordinated planning and strategic implementation serves as a means to bring mutual benefit to multiple sectors and ensure wise investment of scarce resources.

Iowa's world-class connectivity – to be built, operated, and maintained by private sector consortiums – will offer countless opportunities for other sectors to develop and deliver new services on the open access network. Education, workforce, manufacturing, health care, entertainment, public safety, and every other sector or interest stands to benefit from the changes brought by the recommendations of the Telecommunications Sector Committee for:

1. Development of a common, unified telecommunications infrastructure that supports the public interest.
2. Establishment of state policy that supports the infrastructure in access, capacity, and cost, as well as standards, technology, and financing.
3. Establishment of a state consumer protection policy.

With completion of this Report and Recommendations, the Telecommunications Sector Committee forwards it to the Infrastructure Planning Task Force for consideration, deliberation, and inclusion in the plan that will be developed by the Task Force and delivered to Iowa Department of Economic Development. The Sector Committee is confident that these bold and broad recommendations will contribute to a strong future for all Iowans, jobs, and the economy.

Supporting Documents

Meeting Notes

- December 1, 2009
- January 6, 2010
- January 26, 2010
- February 23, 2010

Presentations to the Committee

- Who Can Do What: Local Voice Landscape in Iowa
- Assessing High-Speed Internet: Access in the State of Iowa
- Experiences in Other States and Nations

Telecommunications Industry in the State of Iowa

Map of Fiber-Optic Cable in Iowa

Other Resources

- Iowa State Interoperable Communications System Board, www.isicsb.iowa.gov
- Johnson, Nicholas, "The Broadband Challenge: Consumer Protection in a Deregulated Digital Age," February 2010, http://www.nicholasjohnson.org/writing/BroadbandChallenge.doc
- *Next Generation Connectivity*, a report on behalf of the FCC http://www.fcc.gov/stage/pdf/Berkman_Center_Broadband_Study_13Oct09.pdf
- Speed Matters, a Communications Workers of America informational website http://speedmatters.org/content/resources/

Infrastructure STRATEGY
For Iowa's Future Economy

Transportation Sector

REPORT & RECOMMENDATIONS

February 2010

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Acknowledgements

A special thank you goes to all of the members of the Transportation Sector Committee for their volunteer time, expertise, and expense to participate in the discussion, the process, and in developing this report. It was notable that Sector Committee Members not only were engaged and provided valuable input, but each, while bringing their own experience and expertise, set aside self and special interests to work together in identifying issues and making recommendations.

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Sector Committee Members

Nancy J. Richardson, Iowa Department of Transportation, Ames (Chair)

Thomas W. Hart, Iowa Department of Economic Development, Des Moines (Project Director)

Stuart Anderson, Iowa Department of Transportation, Ames

Regenia Bailey, City of Iowa City, Iowa City

Patricia Boddy, Iowa Department of Natural Resources, Des Moines

Lyle Brehm, Tama County, Tama

Kevin Brubaker and Andrew Snow, Environmental Law and Policy Center, Chicago

Thomas Determann, Clinton Regional Development Corporation, Clinton

Debi Durham, Siouxland Chamber of Commerce, Sioux City

Murry Fitzer, Florilli Transportation, LLC, West Liberty

Robert Grierson, Dubuque Regional Airport, Dubuque

Christina Gruenhagen, Iowa Farm Bureau Federation, West Des Moines

Paul Hanley, University of Iowa Public Policy Center, Iowa City

Sheri Kyras, CyRide, Ames

Greg Reeder, City of Council Bluffs, Council Bluffs

Daniel Sabin, Iowa Northern Railway Company, Cedar Rapids

Duane Sand, Iowa Natural Heritage Foundation, Des Moines

Larry Sauer, Governor's Traffic Safety Bureau, Des Moines

Introduction

Iowans have high expectations for a strong economy, good jobs, and a future of opportunity. Setbacks came in 2008 with the summer disasters followed by the national recession. These events had significant impacts on Iowa's infrastructure. Even while addressing those challenges through the influx of federal and state short-term funding for jobs, infrastructure, disaster recovery, and other broad needs, Iowans must also give significant consideration of the vision for the future economy and the infrastructure it will demand. Interested Iowans statewide will find in this report a set of recommendations and a strategic direction specifically for the transportation sector.

Iowa's transportation system was the subject of deliberations over a four-month period by a diverse array of Iowans who contributed their expertise, experience, and perspectives on the future economy and the comprehensive transportation infrastructure that will be required to meet those future needs. Because the report was developed by stakeholders from across the state, it reflects points of view of diverse stakeholders including the private sector, issue-based groups, nonprofit organizations, academia, and local and state government.

Iowans depend on its transportation system for the movement of goods, access to employment and quality of life. The public roadways, railroads, airports, transit systems, trails, and rivers are critical to support Iowa's diverse economy. And, as agriculture yields increase and the manufacturing economy shifts and expands, there will be a continued emphasis on maintaining this system for our urban and rural communities.

In the early 1930s, it was determined that it was time to get travelers and farmers "out of the mud." The state and federal government graded and constructed gravel and hard-surface roadways that became the lynchpin of Iowa's growing agricultural economy. The state built upon its strong agriculture base and over the last 80 years the manufacturing sector has significantly expanded and diversified.

Iowa's transportation system consists of over 114,000 miles of highways, 4,000 miles of rail lines, 111 public airports, 35 public transit systems, over 1,500 miles of trails, and almost 500 miles of navigable rivers. There continues to be an expectation by Iowans that their roads, trails, airports, and streets are safe and well maintained. Farmers and rural communities rely on the road system to move their products to market, as well as to help sustain an economy in small towns where population is waning. Iowa's population has grown little over the last 100 years. Creating trails and outdoor recreation opportunities has been one strategy for recruiting younger people to the state. What is more, as Iowa's population is aging, it requires adaptation and changes in roadway design and signage, as well as access to services provided by public transit. Resolving the challenges of the transportation sector is very complicated.

This report does not stand alone, however. As part of a comprehensive and coordinated statewide planning initiative, the recommendations and insights on the Transportation Sector Committee will be considered by a Task Force, along with similar reports on infrastructure needs for the future economy in building and vertical infrastructure, energy, natural resources, and telecommunications. The ideas and recommendations contained in the five reports and the coordinated plan reflect the involvement and engagement of more than 200 Iowans over a span of nine months. From those deliberations, a strategy for Iowa's future economy was developed on behalf of and for all stakeholders. It is the hope of the Transportation Sector Committee that policymakers, community leaders, business and industry, and others find ways to implement or support the recommendations of this sector report and those of the coordinated Infrastructure Strategy for Iowa's Future Economy.

Executive Summary

The Transportation Sector Committee, with input from four community forums and ICN sessions at 10 sites, developed three primary recommendations that address system issues essential for meeting the needs of Iowa's future economy. Public safety remains a critical overarching issue for Iowa's transportation system. These issues and recommendations must be addressed if Iowa is to create a skilled workforce, create quality jobs, and maintain a quality of life and identity to be more livable and globally competitive.

Definition
Transportation is the safe, efficient, and coordinated movement of people and goods by all modes for all purposes.

Transportation Sector Committee Goal
To develop a transportation infrastructure system for Iowa that is the right system, in the right place, and with the right services to support the basic needs of the economy.

Priority Issues
To address the Committee Sector's Goal and to establish Iowa's transportation for 2020 and beyond, the following issues were identified.

Issue One
Iowa's transportation infrastructure is aging and expansive.

It is clear there is an economic impact resulting from infrastructure development. For example, for every $1 billion in highway investment, 27,800 jobs are supported for construction, with industry, and through induced employment. But Iowa's system is large and aging. Construction cost inflation, coupled with flattening revenues makes it very difficult to maintain acceptable condition ratings for roads and bridges. A 2006 study completed by the IDOT identified a $27.7 billion shortfall in funding to meet all of Iowa's needs through a 20-year period. And while Iowa's rail system is critical to Iowa's agricultural, energy, and manufacturing economy, Iowa lacks the rail capacity to meet future demands. Like other elements of the system (aviation, trails, and transit), funding is also severely inadequate.

Issue Two
The funding and financing of Iowa's transportation system extends well beyond problems with the current funding mechanism and funding shortfall. There have been few changes or alterations to a funding system created for the last half of the 20th century.

Iowa's transportation system is primarily funded through user taxes and fees. At the local level, supporting farm-to-market roads and community streets also may affect local property taxpayers. Little has changed in Iowa's infrastructure funding mechanisms over the last 60

years. Cars and trucks that travel on Iowa's streets provide a great deal of the revenue for funding Iowa's transportation system.

Issue Three
Iowans do not adequately understand the funding, the financing mechanisms, and constraints in providing high quality and safe public services. Educating the general public is important to further the development of the transportation system.

Iowans are generally satisfied with Iowa's infrastructure. For many years the state has built and maintained a massive infrastructure system. As Iowa looks to its economic future, it is essential to engage Iowans as an informed partner in addressing all of the state's infrastructure sector priorities and financing issues.

Recommendations
Recommendation One
Assess the current transportation system and shortfalls, and develop affordable methods to prioritize, improve, and achieve accessible transportation for people, goods, and services.

The reality for Iowa is that it can no longer sustain and grow its infrastructure at the current level. This requires that the state of Iowa as well as cities and counties, take a very hard look at the current situation and determine how best to move forward.

Recommendation Two
Determine transportation infrastructure funding levels, new funding and financing mechanisms, revenue generation methods and prioritization for investments, distribution methods, and priorities for project funding.

Iowa's city, county, and state government funding systems are stressed. Iowans have high expectations and are very pleased with their roads and streets. But there is an enormous funding shortage for transportation infrastructure in 2010. Supporting that system under the current funding mechanism is impossible if Iowa is to grow and expand its economy. It must change the way it makes decisions and find new ways to fund what is decided.

Recommendation Three
Engage and educate stakeholders, users, and citizens regarding transportation infrastructure funding and financing mechanisms, sustainable project priorities, investment decision-making, and policies and procedures.

Information should be provided to the public and key stakeholders on the enormity of the infrastructure issues faced by the state. The public education initiative needs to include the costs associated with maintenance, current funding mechanisms, and the importance of moving forward with a more sustainable approach to infrastructure.

Conclusion

Members of the Transportation Infrastructure Sector Committee have focused on the fact that Iowa's current infrastructure is not sustainable or affordable. To address the issues of Iowa's future economy will require a coordinated, integrated, and strategic planning process that takes into consideration all infrastructure sectors. This report is one of five sector reports to be considered by the Infrastructure Strategy Task Force.

For Iowa to be more competitive in the global economy, better coordinated planning and strategic investments must become a high priority. With these considerations, Iowa's quality of life will continue to improve and its population will grow and prosper.

Iowa's Future Economy

There is no crystal ball to predict exactly what Iowa's economy will be like in 2020 and beyond, but there are indicators and, certainly, steps that can be taken to shape the economy as Iowa recovers from the dual challenges of the 2008 disasters and the national recession. The Infrastructure Strategy for Iowa's Future Economy initiative was designed to work from a common understanding of Iowa's current economy and forecast of economic factors in order to establish some strategic direction for the state. Essential elements of the future economy were identified from this information and from the deliberations of the participants in the process. This section highlights the foundational premises of the Sector Committees and Sector Chairs Group that guided their work.

Essential Elements of the Future Economy

Iowa's economy of the future can benefit from and faces challenges because of the disasters and the recession. Iowans have vowed to come back from adversity stronger than ever. The future holds opportunity for innovative and strategic thinking, which tend to be a departure from day-to-day challenges to our infrastructure. In early discussions, each Sector Committee and the Chairs Group worked to identify how Iowa's economy can build upon current short term investments and grow to be stronger and more globally competitive.

Eight essential elements of the future economy were identified by the Sector Committees and the Sector Chairs Group. The essential elements were used by the Sector Committees to guide and measure their work and their recommendations against the vision for Iowa's economic future.

The Essential Elements of Iowa's Future Economy are:

- Smart planning and growth principles
- A diversified economy with a strong agricultural sector
- A skilled workforce for quality jobs
- Environmental stewardship
- Iowa-based energy solutions
- An economy that is globally competitive
- A population that chooses to live and work in Iowa
- Rapid access to markets and services
- Realistic funding for new and maintenance of infrastructure

Iowa's Current Economy and its Impacts

In the current environment in Iowa in 2010, a number of trends are affecting the state's economy. The following factors are taken from data provided to the Committees by researchers at Iowa State University's Department of Economics. First, the population of Iowa is shifting from rural to urban areas. Two other factors are the aging population and the baby boomer generation nearing retirement age. There has been an increase in the outmigration of youth

workers to other states, and population growth in Iowa has been due to increases in immigrant and minority populations in the state.

Because of the economic recession and the scaling back or closing of significant numbers of manufacturers across the state, non-metropolitan Iowa is losing both jobs and Iowans between ages of 25 and 44, which also has an echo effect of population loss in the under-20 category, reflecting children of those 25-44 year-olds. Iowa's unemployment rate, which has typically remained relatively low, may start to have a structural upward shift. The rural housing stock is deteriorating, and economic vitality is concentrated in a relatively few areas. Additionally, tax capacity in non-metropolitan communities is rapidly eroding due to population shifts and loss of manufacturing employers. However, rural energy opportunities, such as biofuels and wind, are evolving.

Iowa in 10 Years

ISU researchers predict that in ten years Iowa will see the results of current trends in population, namely that there will be fewer people in non-metropolitan areas, more investment and growth in metropolitan areas, and the continued outmigration of young and working-age people. Regional trade centers, called micropolitan communities (populations of 10,000 – 50,000), will be mostly stable, but not growing. The sectors that will lead in job demand will be business, personal care, education, and health services. Although some downplay the role of energy production in rural resettlement, the Sector Committees identify the energy industry's crucial role in the future economy of Iowa as a significant contributor to the overall rural economy and its potential to be a mitigating factor in further rural depopulation. It is also predicted that manufacturing will still be important, but the number of jobs will have decreased, and the manufacturing businesses that remain will be those with the most efficient and productive processes. The ability of those companies to rapidly access diverse markets and distant locations through a network of airports across the state will prove to be critical in the choice of those companies to locate within the borders of Iowa as opposed to neighboring states. Rapid access is illustrated by the growth and dependence on the priority air freight systems developed by Fed Ex and UPS.

It is clear that actions taken to shape Iowa's future economy will be key determinants in the success of the state. As technology develops, energy and telecommunications infrastructure will be critical to the state's competition in a global economy. Additionally, transportation, buildings, and vertical infrastructure will remain fundamental for moving and storing goods and services and supporting Iowa's workforce. Finally, natural resources will be essential to the state's continued economic success within the agricultural, industrial, and business sectors. All sectors are integrated and mutually dependent. The work of the planning initiative is to harness the opportunities of these critical sectors. When people come to live and work in Iowa, it will be because of Iowans' anticipation of the coordinated natural resources, transportation, buildings and vertical infrastructure, energy, and telecommunications infrastructure to support a robust economy.

The Issues

To begin the issue identification process, the Sector Committee first defined transportation and then, through subsequent discussion and public input, identified a goal for transportation and three priority issues, all of which are summarized below:

Definition
Transportation is the safe, efficient, and coordinated movement of people and goods by all modes for all purposes.

Goal
To develop a transportation infrastructure system for Iowa that is the right system, in the right place, and with the right services to support the basic needs of the economy.

Issues

- Iowa's transportation infrastructure is aging and expansive.
- The funding and financing of Iowa's transportation system extends well beyond problems with the current funding mechanism and funding shortfalls. There have been few changes or alterations to a funding system created for the last half of the 20th century.
- Iowans do not adequately understand the funding, the financing mechanisms, and constraints in providing high quality and safe public services. Educating the general public is important to further the development of the transportation system.

The remainder of this section provides a summary of the discussion that led to the issue identification along with additional detail on each issue.

Transportation Overview
The way Iowans live and work has changed considerably over the years. While agriculture, small business, manufacturing, and our service industry are core to our past and future economy, planning and fitting our infrastructure system into a new and changing economy requires a serious "step-back." As Iowa continues to address its transportation sector planning for the future economy, it requires greater consideration and integration with all other infrastructure categories, and a closer integration with Iowa's building and vertical infrastructure, energy, natural resources, and telecommunication sectors.

For the most part, Iowans have high expectations for Iowa's infrastructure. Roadways should be in good shape and safe. Iowa's water and air should be clean and safe, and high quality access to technology is an expectation. Iowans expect to see a light come on when they flip the light switch. There are basic and essential elements to ensure a quality of life for all Iowans who live and work in the state.

Iowans have long enjoyed a quality of life that meets their expectations. Over the last 100 years, Iowa has built a remarkable infrastructure in response to the expectations of Iowans. But over the last century, with agriculture, the state's population has grown little. With a lack of population gains, advancements in agricultural practices, an expanded service economy sector, and more diverse manufacturing, Iowa's economy is no longer grounded in small towns and farms. For Iowa, population shifts from rural to urban and suburban communities require adjustment and changes in Iowa's infrastructure system, as well as the understanding of Iowans.

Iowa's transportation sector encompasses six categories: highways, passenger and freight rail, aviation, public transit, navigable rivers, and trails. The Iowa Department of Transportation has a long and strong record of system planning for the construction, maintenance, and support of Iowa's transportation system. Local governments, the federal government, and the private sector also play significant roles in ensuring a safe and accessible multi-modal transportation system.

Iowa's transportation system is expansive. For example, Iowa's public roadway system consists of more than 114,000 miles of highway and approximately 25,000 bridges. Nationally, Iowa ranks 13th in miles of road and 5th in number of bridges to maintain and repair. At the same time, Iowa is 30th in the nation in population and 23rd in land area, meaning Iowans have a heavy roadway infrastructure burden whether measured on a per capita basis or per square mile of land area. This system is linked by farm-to-market roads that checkerboard Iowa's landscape. Like the entire US, Iowa once depended on freight and passenger rail to move people and product. Iowa currently has 4,000 miles of freight rail, down from a high of over 10,000 miles in 1915. Passenger rail service in Iowa is limited to two long-distance Amtrak routes; however, through national and state initiatives there is a unique opportunity to expand passenger rail service in the very near future with efforts underway to provide service from Chicago to Dubuque and Chicago to Iowa City.

Iowa has 35 public transit systems that serve every county through 12 large urban transit systems, seven small urban systems, and 16 rural systems. The access of transit service to all counties is unique in the country. The dichotomy is that the urban transit systems move people to work and jobs, while the rural systems primarily serve many older Iowans, make access to services possible and serve vital transportation needs of many rural communities.

Scenic trails for hiking and biking enthusiasts meander across the urban and rural countryside throughout the state. The more than 1,500 miles of trails provide recreation, but there is also an increase in those who use the trails to commute to work.

The great Mississippi and Missouri rivers, which are border the eastern and western boundaries of the state, are invaluable in transporting agricultural commodities and other products out of the state. The 500 miles of these navigable rivers are a key part of the Iowa transportation system and are essential to the state's economy. Within these same boundaries are 111 public airports serving cities, towns, and regions of the state. Eight of those airports also provide commercial

service. These airports are unique in that they serve both urban centers and rural outlying areas of the state by directly and rapidly connecting Iowa's economy to neighboring states and countries, bypassing the already overtaxed system of roads and bridges. The role played by airports in time of natural disaster or state or national emergency has most recently been seen in Haiti, and closer to home in the flooding in 1993 and 2008. Funding for the airports is a mixture of federal, and local funds, revenue is generated through federal and state fuel excise taxes, passenger facility charges, and registration fees.

Aviation represents a large portion of Iowa's economy. A 2009 study prepared by Wilbur Smith Associates reports that aviation contributes $5.4 billion to Iowa's economy, supporting an estimated 47,304 jobs and a payroll of $2.7 billion. Airports are not operated or financed by the State of Iowa; however, many airports receive grant funding for vertical infrastructure. This funding is small, but plays an important role in modernizing facilities.

Transportation Issues

There were extensive discussions of the Sector Committee and from participants in the statewide forums regarding the high value of Iowa's extensive transportation system. At the same time, however, it was recognized there are significant challenges and barriers to growing and sustaining a system that is appropriate for the 21st century.

Iowa's existing highway and roadway system is aging and requires significant maintenance and safety measures to meet the expectations of the public. Severe weather over the last several years has had a dramatic impact on Iowa's transportation infrastructure. Roads, bridges, railroads, trails, and public transit facilities have been damaged or destroyed by flooding and harsh weather. And, Iowa's highway infrastructure and trails have been incrementally damaged by the severe winters.

It is expected that regulation and public pressure regarding greenhouse gas emission from cars and trucks will significantly change how Iowa might address its current transportation funding system. Increased fuel prices are expected to result in more efficient automobiles and trucks, which will affect the current methods of funding, revenue generation, and planning and program requirements. That is expected to result in increased use of public transportation and other means of alternative travel. And despite greater attention to increased funding of Iowa's transportation system by policy makers, it has not received the necessary funding required to maintain its infrastructure.

Iowa's new and resurgent economy in bio-fuels and energy, as well as a continued increase in livestock and grain production could, result in additional impacts from oversize and overweight vehicles. This will likely increase stress on roads and an expected increase of highway maintenance costs.

Because more Iowans are moving from farms and rural communities to urban and regional centers, it will be necessary for the state to adjust its transportation system to ensure those

living in these communities continue to have safe and equitable access to services. Public transit and linking transportation modes together will become a higher priority if Iowa is to move forward with smart growth planning.

Priority Issues for Transportation
Issue One
Iowa's transportation infrastructure is aging and expansive.

It is clear there is an economic impact resulting from infrastructure development. For example, for every $1 billion in highway investment, 27,800 jobs are supported for construction, with industry, and through induced employment. But Iowa's system is large and aging. Construction cost inflation, coupled with flattening revenues, makes it very difficult to maintain acceptable condition ratings for roads and bridges. A 2006 study completed by the IDOT identified a $27.7 billion shortfall in funding to meet all of Iowa's needs through a 20-year period. And while Iowa's rail system is critical to Iowa's agricultural, energy, and manufacturing economy, Iowa lacks the rail capacity to meet future demands. Like other elements of the system (aviation, trails, and transit), funding is also severely inadequate.

Iowa has a number of other issues that must be taken into consideration in making infrastructure planning decisions for the future. There continue to be challenges in developing new sources of economic activity in nonmetropolitan areas. Maintaining and developing infrastructure without new development places additional tax burdens on existing residents and businesses. And, while there is an evolution of rural opportunities through a new energy economy, it does not provide for economic development and jobs for many communities because of where these industries grow and locate. Conversely, there is a deterioration of rural housing stock, and job opportunities are very limited in many rural areas of the state. Simply, over the last 25 years, Iowa's economic vitality has evolved in a select few areas of the state.

Iowa's population has grown very little in the last 100 years, and the current demographics and projections for the next ten years indicate a continuing shift of population from rural areas to urban, suburban, and Iowa's growing regional trade or commercial population centers. At the same time, Iowa's primary industry is agriculturally based, representing 27 percent of economic output. Farm-to-market roads and highways are essential to moving commodities and other products efficiently to the market. While population has declined, the economic value of farm products being transported on secondary and farm-to-market roads has increased to an average of about $225,000 per mile. It is expected that Iowa will also continue to expand and diversify its economy with a focus on energy, bio-technology, and advanced manufacturing. That will also require an infrastructure that is affordable, accessible, and capable of serving Iowa's new and emerging global economy.

There is a clear understanding that hard decisions will need to be made if Iowa is to succeed in the future global economy. It is essential that Iowa integrate its long-term planning to include all

infrastructure sectors. While Iowans should continue to expect good systems, accessibility, and good service, the reality is that building new infrastructure or sustaining the system at its current level is not a reality. The challenge will be how best to do that in a way that improves Iowa's future economy.

Integrated planning, coordination, and cooperation from many jurisdictions are essential in right-sizing a transportation infrastructure system that will give Iowans the quality of life they expect. And growing Iowa's future economy will require a significant transformation in thinking and making very difficult decisions.

Issue Two

The funding and financing of Iowa's transportation system extends well beyond problems with the current funding mechanism and funding shortfalls. There have been few changes or alterations to a funding system created for the last half of the 20th century.

The reality is that when focusing on the transportation infrastructure system, there are not enough resources provided by the current funding mechanisms to sustain it. Despite additional state-allocated TIME-21 funds and additional funding injected into the system through the 2008 disaster recovery, the American Recovery and Reinvestment Act of 2009, and state I-JOBS, the transportation infrastructure needs remain so great that the state can no longer approach infrastructure decisions and investments through a status quo approach.

Iowa's transportation system is primarily funded through user taxes and fees. At the local level, supporting farm-to-market roads and community streets also may affect local property taxpayers. Little has changed in Iowa's infrastructure funding mechanisms over the last 60 years. Cars and trucks that travel on Iowa's streets and roads provide a great deal of the revenue for funding Iowa's transportation system.

The investments needed to preserve, modernize, and enhance Iowa's transportation infrastructure are great. The historic and current revenue streams for all modes of transportation at all levels of government have seen little increase in rates of revenue generation. More recently, they have flattened even more. It also clear that some methods of revenue generation are not sustainable and over the long term, more innovative revenue generation must be put in place.

Fuel prices are expected to continue to rise. New technologies and more efficient engines mean cars and trucks are getting better miles per gallon which means fewer gas tax dollars. The transportation sector produces approximately 30 percent of the greenhouse gas emissions in the country, and it is expected that in the near future, there will be significant action at the federal level to control it. As we look to the future, we should expect changes in fuel prices, revenue generation, a change in revenue distribution, and other programming and planning requirements.

There has been a gradual shift to alternative transportation for some. Smart growth principles, which are being implemented in many public and private sector initiatives, emphasize reducing single occupant travel and increasing the use of bicycling, walking, public transit, and passenger rail.

The changes in technology and in behavior will require the state to change methods of funding Iowa's infrastructure system. It will mean taking into consideration other sector projects and coordinating closely with other governmental jurisdictions and the private sector. And certainly, there will be a great challenge in how to evaluate and make decisions in greatly changing economy.

Issue Three

Iowans do not adequately understand the funding, the financing mechanisms, and constraints in providing high quality and safe public services. Educating the general public is important to further the development of the transportation system.

Iowans are generally satisfied with Iowa's infrastructure. Yet there are indications of infrastructure stress with increasing numbers of embargoes on secondary roads which impact basic transportation needs of local residents and businesses. For many years the state has built and maintained a massive infrastructure system, one that exceeds most states in number of highway and road miles and bridges. There are very few states with transit systems that serve every county. It is important to note there are also 111 public airports across Iowa.

For the most part, Iowa's local and state governments have been able to keep up with maintaining such a large system, but each year costs increase, funding is inadequate, and maintenance slips back. Proposals for increasing user fees and taxes over a number of years have been rejected. In the current economic downturn, there is little political or public will to increase budgets through the current funding mechanisms.

Iowans love their cars, SUVs, and pick-ups, and their transportation habits will change little over the next few years. Iowans are a bit reticent to embrace public transportation, but it is vital for many Iowans. More will ride bicycles or walk for recreation and for transportation to their job. Iowans will primarily continue to travel by automobile. But as engines become more fuel efficient and there are alternative fuel sources for automobiles and trucks, revenues will diminish and even fewer funds will be available to maintain the system.

Like most, Iowans often find change difficult. But history has demonstrated that when Iowans learn and understand issues, they are willing to adjust and change with the times. Educating the public and key stakeholders is often suggested as a simple answer to address issues, but in this case it is an essential element to move forward to a future economy. The fact is that not enough has been done to inform and educate Iowa's public about the state's crumbling infrastructure and the funding mechanism presently in place, and why changes are required.

As Iowa looks to its economic future, it is essential to engage Iowans as informed partners in addressing all of the state's infrastructure sectors. Iowans want to know what they are paying for and why. If they support an initiative, project, fee or tax, or if they do not, they should understand the implications.

Recommendations

The Transportation Sector Committee, with input from four community forums and ICN sessions at 10 sites, developed three primary recommendations that address system issues essential for meeting the needs of Iowa's future economy. Public safety remains a critical overarching issue for Iowa's transportation system, and while highway fatalities have decreased over the years, safely remains the number one priority. Smart planning and growth principles were also identified as an overarching and critical issue. There was unanimity within the committee that more attention should be given to smart planning and growth principles if Iowa is to create a skilled workforce, create quality jobs, and maintain a quality of life and identity to be more livable and globally competitive.

Recommendations for Transportation:
Recommendation One
Assess the current transportation system and shortfalls, and develop affordable methods to prioritize, improve, and achieve accessible transportation for people, goods, and services.

The reality for Iowa is that it can no longer sustain and grow its infrastructure at the current level. This requires that the state of Iowa as well as cities and counties, take a very hard look at the current situation and determine how best to move forward. An initial assessment of the current situation is basic. Planning conducted by IDOT, other state agencies, regional/metropolitan planning organizations, and local governments can provide a start.

It is clear that resources cannot meet the current needs or expectations. Iowa has no mechanism to encourage comprehensive planning at the state, regional, and local levels. Planning for sustainability has taken a higher priority over the last five years. The Iowa Department of Economic Development (IDED) has adopted "smart growth" as a priority. IDOT has used smart growth principles in its planning.

Some Iowa communities have also adopted sustainable planning principles. Iowa's Councils of Governments have worked from a regional perspective, and the Rebuild Iowa Office has made smart planning principals a priority in the state's flood recovery work.

Smart planning and growth principles can guide local, regional, state government, and the private sector in future infrastructure planning. These principles provide a framework that will guide planning, investments, and oversight. Smart planning and growth principles would help set broad guidance to be used across infrastructure sectors, government entities, and other public and private stakeholders to direct resources to infrastructure projects and address issues of fragmentation.

Recommendation Two

Determine transportation infrastructure funding levels, new funding and financing mechanisms, revenue generation methods and prioritization for investments, distribution methods and priorities for project funding.

Iowa's city, county, and state government funding systems are stressed. Iowans have high expectations and are generally pleased with their roads and streets. They appreciate available public transit and the states quality recreational trail system. But the public also feels stressed, and most anguish, over any proposed increase in fees, use taxes, or property taxes. Sustaining current levels of transportation infrastructure services often conflicts with many other needs for Iowa's communities, businesses, and families. Resources are not available for everything.

A 2006 study completed by the IDOT identified a $27.7 billion shortfall in funding to meet all of Iowa's needs through a 20-year period. The funding shortfall for critical needs was estimated to be $4 billion, or $200 million per year, over that 20-year period. Since then, that amount has increased to $267 million per year as a result of inflation, severe weather impacts, and delays in securing the necessary funding.

The current system is outdated, and the demands and opportunities in all modes have shifted. Good roads are critical to an expanding agricultural economy that is increasing yields. Even though Iowa's freight railroads' contribution to the economy is growing, there is a lack of rail capacity to meet future demand and a lack of rail spurs to accommodate new and expanding businesses and industry. Public transit vehicles are old and deteriorating and the need for expanded services is significant just to meet the needs of Iowa's transportation disadvantaged. The trucking industry has evolved to address the just-in-time delivery demands of their customers, and access and investment in sufficient roads is essential.

There is an enormous funding shortage for transportation infrastructure in 2010. Iowans have high expectations and deserve a good transportation system. But supporting that system under the current funding mechanism is more than daunting; it is impossible. If Iowa is to grow and expand its economy, it must change the way it makes decisions and find new ways to fund what is decided.

Recommendation Three

Engage and educate stakeholders, users, and citizens regarding transportation infrastructure, funding and financing mechanisms, sustainable project priorities, investment decision-making, and policies and procedures.

Information should be provided to the public and key stakeholders on the enormity of the infrastructure issues faced by the state. The public education initiative needs to include the costs associated with maintenance, current funding mechanisms, and the importance of moving forward with a more sustainable approach to infrastructure.

Information and technical support is also needed on how priorities are developed in the current system and how Iowa's changing demographics may affect communities and entities that have vastly different capacities and resources. A part of the effort is to develop and communicate criteria that will impact funding, decision-making, and investment.

There needs to be a better analysis of "what's possible or what's necessary" as the state and Iowa's communities look to the future. For example, in order to increase efficiencies of Iowa's transportation system, it will be important to identify areas for increased partnerships and collaboration across jurisdictions, infrastructure sectors, modes, and state agencies. These collaborations may include expanded use of transportation corridors to meet other infrastructure needs, complete streets that accommodate vehicles, bicycles, transit vehicles, and pedestrians, or expanded use of shared governmental facilities.

A public engagement and education effort should make Iowans informed partners about the realities of the state's transportation infrastructure and work with them to address issues and priorities for Iowa's future economy.

Infrastructure Planning Process

Across Iowa, economic strength and competitiveness depends, in part, on our state's infrastructure. In his 2008 Condition of the State address, Governor Chet Culver highlighted the need for a statewide infrastructure plan to ensure all of Iowa is ready for the economy of the future. At that time Iowans could not have foreseen the tragic disasters of 2008 or the seriousness of the economic recession, but their impacts underscored the need for integrated and strategic priorities for Iowa's infrastructure in future years.

Those challenges resulted in a short-term infusion of more than $6 billion for Iowa over a three-year period through the American Recovery and Reinvestment Act of 2009 (ARRA), I-JOBS, and federal disaster recovery funds. These funds are being spent effectively and as expeditiously as possible on clear priorities for disaster recovery, jobs creation, economic recovery, and other infrastructure and non-infrastructure priorities for the near term.

Iowa also must be poised for the longer-term through strategic and visionary planning for the economy of the future. Iowa needs to continue to make investments in infrastructure, seeking value and success competing in an international economy. The planning process builds on the significant impact of past and current initiatives, opportunities, issues, and challenges.

Iowa Department of Economic Development (IDED) was charged with developing a plan for Iowa. Funding for the planning initiative was provided by US Department of Commerce, Economic Development Administration as part of the disaster recovery grant to the State of Iowa. Under a competitive Request for Proposals process, State Public Policy Group, Inc. (SPPG) was awarded a contract for managing, facilitating, and developing the issues-focused plan under the direction of IDED and project director Thomas W. Hart.

The planning activities span August 2008 through April 2010 when the statewide plan for infrastructure to support Iowa's future economy will be completed. The process for developing the infrastructure strategy was designed to challenge and encourage Iowans to suggest strategies that link infrastructure sectors and position Iowa to shape and fully participate in the economy of the future. With guidance from state leaders in the five sectors of focus, stakeholders with a diversity of perspectives and experiences from across Iowa were engaged in the activities to develop an issue-focused plan with relevance to the public, private, and nonprofit sectors throughout the state.

Five sectors of focus were determined by IDED: Buildings and Vertical Infrastructure, Energy, Natural Resources, Telecommunications, and Transportation.

Leadership of the project was provided by a Sector Chairs Group comprised of state agency directors representing each sector. Sector Chairs met regularly throughout the planning process to ensure consistency in the work of each Sector Committee and to address overarching issues.

The following individuals serve on the Sector Chairs group working closely with IDED and SPPG:

- Thomas W. Hart, Iowa Department of Economic Development, Project Director, Sector Chairs Group Chair, and Task Force Chair
- Joseph Cassis, Iowa Communications Network, Telecommunications Sector Committee Co-Chair
- Steve Flagle, The University of Iowa, Telecommunications Sector Committee Chair
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- Roya Stanley, Iowa Office of Energy Independence, Energy Sector Committee Chair

Additional individuals with special expertise related to the planning initiative participated on the Sector Chairs Group and the Task Force:

- Elisabeth Buck, Iowa Workforce Development
- Emily Hajek, Rebuild Iowa Office
- David Miller, Iowa Homeland Security and Emergency Management Division
- Jon Murphy, Iowa Office of the Governor

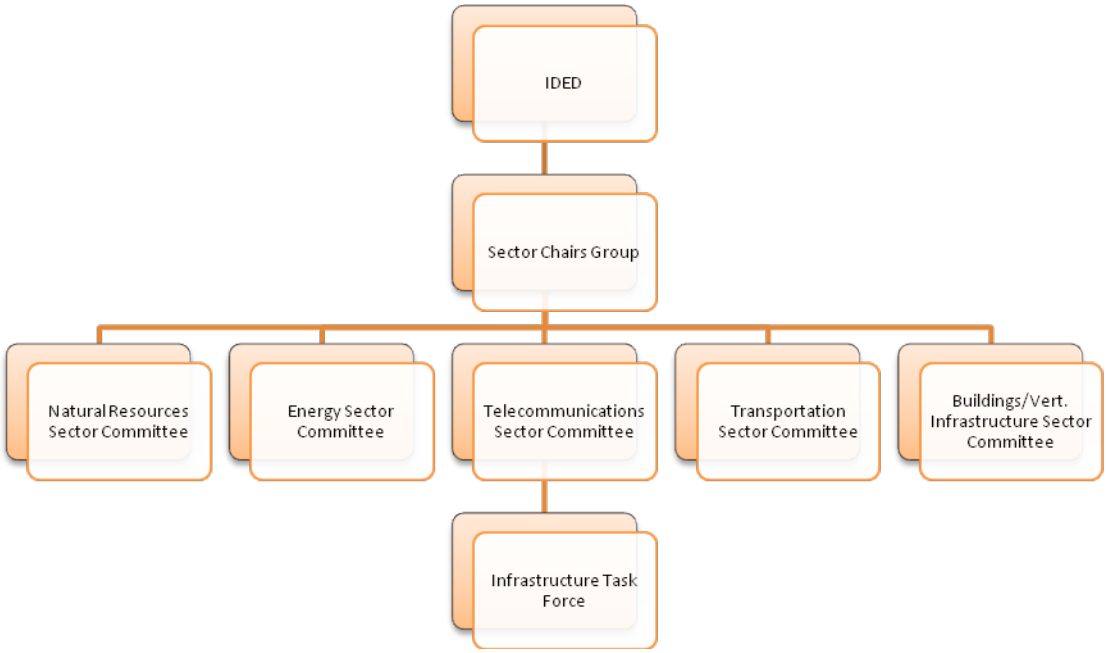
Each Sector Committee met four times in day-long deliberations between November 2009 and February 2010. Sector Committee membership was comprised of private, academic, issue-based, and public representatives providing a diversity of perspectives and strategic vision. Each committee was chaired by the respective member(s) of the Sector Chairs Group. Each of the five Sector Committees was responsible for defining the sector for purposes of this initiative, identifying issues, and developing recommendations based on research, experience, and information reviewed by each committee. Sector Committees were also charged with considering each sector's interaction and integration with the other sectors. Sector Committees were guided by the Essential Elements of Iowa's Future Economy and the common understanding of Iowa's economic situation and forecast described earlier in this report. The findings of each sector were detailed in five separate Sector Committee Reports.

Six community forums were held in Johnston, Coralville, Ottumwa, Dubuque, and Sioux City, with an ICN session conducted at 10 sites statewide. ICN sites were in Atlantic, Carroll, Clinton, Council Bluffs, Creston, Dubuque, Fairfield, Mason City, Storm Lake, and Urbandale. The forum in Dubuque was canceled due to winter weather, but rescheduled as an ICN site. These community forums were structured to elicit public input regarding the initial issues and ideas developed by the Sector Committees, and to inform the process going forward. Comments and suggestions from stakeholder proved very informational and beneficial to the overall process.

The input from these community forums was integrated into each Sector Committee Report and Recommendations. Sector Committee reports were completed by March 1, 2010, and forwarded to the Task Force.

The Infrastructure Planning Task Force is charged with developing the statewide strategic plan, outlining priorities to achieve a strong and competitive economy. The Task Force, chaired by project director Thom Hart, includes all members of the Sector Chairs Group and several individuals from each Sector Committee and will meet three times during March and April. The plan and recommendations of the Infrastructure Task Force will be presented to IDED in May 2010.

Below is a graphic depiction of the relationship of all components of the process for developing the Infrastructure Strategy for Iowa's Future Economy.



The Infrastructure Strategy for Iowa's Future Economy will outline the Task Force's consensus direction for Iowa's buildings and vertical infrastructure, energy, natural resources, telecommunications, and transportation as sectors integrate with one another and as they impact the economic strength and competitive position for Iowa. This information should be of practical value to policymakers at all levels, state and local government agencies, the private sector, non-profit organizations, issue-based organizations, and the public.

The planning process created a clear understanding that Iowa's infrastructure as it exists and is funded today is neither sustainable nor affordable. The Infrastructure Strategy provides insights for all stakeholders as they shape their future.

Conclusion

Members of the Transportation Infrastructure Sector Committee have focused on the fact that Iowa's current infrastructure is not sustainable or affordable. To address the issues of Iowa's future economy will require a coordinated, integrated, and strategic planning process that takes into consideration all infrastructure sectors. This report is one of five sector reports to be considered by the Infrastructure Strategy Task Force. Especially now, in these times of economic and disaster recover, shared priorities, smart growth planning, and targeted investments are critical elements for Iowa's future.

For Iowa to be more competitive in the global economy, better coordinated planning and strategic investments must become a high priority. With these considerations, Iowa's quality of life will continue to improve and its population will grow and prosper.

Supporting Documents

Transportation Committee Sector Meeting Notes

- November 24, 2009
- January 13, 2010
- January 19, 2010
- February 23, 2010

Presentations

- *Transportation Funding and Financing*, Stuart Anderson, Planning, Programming, and Modal Division Director, Iowa Department of Transportation
- *Transportation Infrastructure Presentation to the Transportation Sector Committee*, Omar Smadi, Ph.D., Institute for Transportation, Center for Transportation and Research, Iowa State University
- *Iowa's Economy in a Difficult Time*, David Swenson, Department of Economics, Iowa State University

Reports and Papers

- *Status of Iowa's Transportation System*, Stuart Anderson, Planning, Programming, and Modal Division Director, Iowa Department of Transportation
- *Trucking Industry & Economics Update*, Bob Costello, Chief Economist and Vice President, American Trucking Association

INFRASTRUCTURE PLANNING PROCESS

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Iowa also must be poised for the longer term through strategic and visionary planning for the economy of the future. Iowa needs to continue to make investments in infrastructure, seeking value and success competing in an international economy. The planning process builds on the significant impact of past and current initiatives, opportunities, issues, and challenges.

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The planning activities spanned August 2008 through May 2010, when the statewide plan for infrastructure to support Iowa's future economy was completed. The process for developing the infrastructure strategy was designed to challenge and encourage Iowans to suggest strategies that link infrastructure sectors and position Iowa to shape and fully participate in the economy of the future. With guidance from public and private leaders in the five sectors of focus, more than 200 stakeholders with a diversity of perspectives and experiences from across Iowa were engaged in the activities to develop an issue-focused plan with relevance to the private, public, and nonprofit sectors throughout the state.

Five sectors of focus were determined by IDED: buildings and vertical infrastructure, energy, natural resources, telecommunications, and transportation.

Leadership of the project was provided by a Sector Chairs Group comprised of state agency directors representing each sector. Sector Chairs met regularly throughout the planning process to ensure consistency in the work of each Sector Committee and to address overarching issues. The following individuals served on the Sector Chairs group working closely with IDED and SPPG:

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Each of the five Sector Committees was responsible for defining the infrastructure sector for purposes of this initiative, identifying issues, and developing recommendations based on research, experience, and information reviewed by each Committee. Sectors were also charged with considering each sector's interaction and integration with the other sectors. Sector Committees were guided by the Essential Elements of Iowa's Future Economy and the common understanding of Iowa's economic situation and forecast. The findings of each sector are detailed in the five separate Sector Committee Reports incorporated into this Plan.

Six community forums were scheduled in Johnston, Coralville, Ottumwa, Dubuque, and Sioux City, with an ICN session conducted at 10 sites statewide. ICN sites were in Atlantic, Carroll, Clinton, Council Bluffs, Creston, Dubuque, Fairfield, Mason City, Storm Lake, and Urbandale. The face-to-face forum in Dubuque was canceled due to winter weather, but rescheduled as an ICN site. These community forums were structured to elicit public input regarding the initial issues and ideas developed by the Sector Committees, and to inform the process going forward. Comments and suggestions from stakeholders proved very informational and beneficial to the overall process. The input from these community forums was integrated into each Sector Committee Report. Sector Committee Reports were completed by March 1, 2010, and forwarded to the Task Force.

The Infrastructure Planning Task Force was charged with developing the statewide strategic plan, outlining strategies to achieve a strong and competitive economy. The Task Force, chaired by project director Thom Hart, included all members of the Sector Chairs Group and several individuals from each Sector Committee and met three times during March and April. The plan and recommendations of the Infrastructure Task Force were presented to IDED in May 2010.

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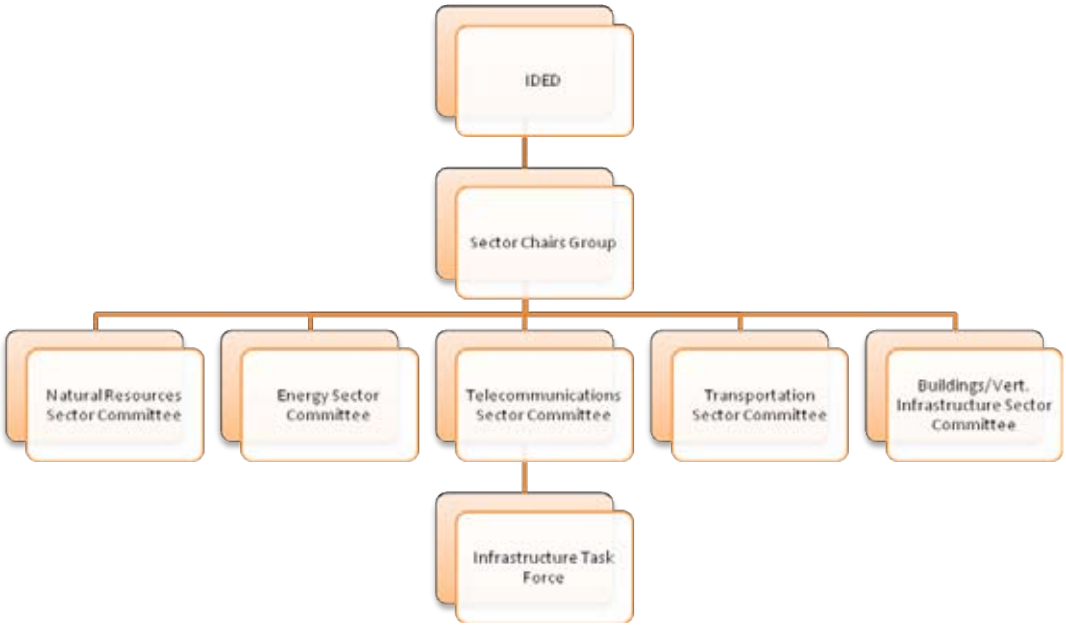

The *Infrastructure Plan for Iowa's Future Economy: A Strategic Direction* outlines the Task Force's consensus direction for Iowa's buildings and vertical infrastructure, energy, natural resources, telecommunications, and transportation as they integrate with one another and as they impact the economic strength and competitive position for Iowa. This information should be of practical value to policymakers at all levels, state and local government agencies, the private sector, nonprofit organizations, issue-based organizations, and the public.

The planning process created a clear understanding that Iowa's infrastructure as it exists and is funded today is neither sustainable nor affordable. The Infrastructure Plan provides insights for all stakeholders as they shape their future.

Process design, coordination, facilitation, writing, logistics, and other services were provided under contract by State Public Policy Group, Inc. www.sppg.com.

SUMMARY

Iowans have a tendency to believe that "everything will work out just fine," even if they worry a good bit about it in the meantime. That approach will no longer work for Iowa's infrastructure. For too long, we have created infrastructure that we wanted and needed, but have not also developed the means to take care of or replace that infrastructure. Our state and the world around us have changed dramatically in recent years, expanding the demand for more or new infrastructure of all types. Iowa can no longer keep up.

The time has come to take a new approach to buildings and vertical infrastructure, energy, natural resources, telecommunications, and transportation infrastructure. Private, nonprofit, and public interests must seek and support the interdependence of these sectors.

This plan has shown that Iowans cannot afford new infrastructure without planning with other partners and with other sectors. Iowans cannot afford to leave our funding mechanisms unchanged when they fund projects that are not needed but may not allow funding of some that are very important to our future.

These challenges for our future are among the most difficult and complicated that Iowa will face. Even though the challenges were made more critical with the natural disasters and national economic downturn, Iowa achieved some progress as a result of careful and effective use of infrastructure resources made available by state and federal governments. However, for the long term, it will take the participation of the private sector, interest and trade groups, and governments at all levels to transform how we think about and pay for infrastructure in all sectors. This plan has set a clear direction and offers some ideas for getting started.

Iowans will continue to believe that "everything will work out just fine," but also need to take swift action to make certain it does.

STEPPING FORWARD: TASK FORCE REQUEST TO CONTINUE

The Infrastructure Planning Task Force reached an easy consensus on member commitment to working together, and individually in their own stakeholder communities, to move forward immediately. The Task Force requests that there not be a lag in time, but for Iowa Department of Economic Development to give strong consideration to the urgent messages delivered by the Task Force in this Plan and reconvene the Task Force for specific purposes, which include:

- Continue to add detailed activities to each recommendation to spur and guide implementation.
- Continue to keep the issues in the forefront of Iowa's leaders and bridge efforts to the convening of the Iowa Smart Planning Task Force in the fall of 2010, where it is hoped that recommendations of this Plan will be taken up as appropriate.
- Contact and invite the many stakeholders who participated in the five Sector Committees to engage in ongoing support and implementation of the Plan.
- Begin to take the critical messages to the people of Iowa and all stakeholders who seek a strong quality of life and a competitive economy for Iowa.

Iowa is embarking on a new approach to infrastructure with the work on this Plan and the recognition that sectors are inextricably linked and interdependent. The Infrastructure Planning Task Force believes it is critical to maintain the thinking and momentum toward the convergence of infrastructure sectors and the opportunities for success in using infrastructure to drive our quality of life and world-class economic competition.

This Task Force of Iowans with expertise across the spectrum of infrastructure has volunteered dozens of hours and taken the risk of being bold. Now, these Iowans are again offering their service to continue the work, to ensure that swift action is taken to assure the bright future of the state.

Iowa Department of Economic Development (IDED) provided the support and project direction for this initiative. www.iowalifechanging.com

Funding for this planning initiative was made available through a grant from the US Department of Commerce, Economic Development Administration. www.eda.gov

Planning process design, facilitation, outreach, plan development, and project coordination was provided by SPPG – www.sppg.com