

Economic Development and Energy Careers – Working Group Meeting #2

April 5, 2016; 10:00 am – 12:00 pm

Meeting Summary

I. Meeting Objectives

- To **dive deeper** into the conversation and continue to **develop current challenges and areas of opportunity** and organize them by topic area.
- To **share expertise** around topic areas and frame the issues associated with that topic.
- To **gather more information** and facts on issues and opportunities.

II. Summary of Key Comments

The following topic areas were discussed as they relate to Economic Development and Energy Careers. The summary captures issues brought forward by working group members.

Attracting and Retaining Business

- There is a commitment to grow Iowa's bio-based energy cluster – this approach could be applied to other bio-based products (plastics, fertilizers, etc.). This could include:
 - o Cultivation Corridor
 - o Bio-refineries for corn and starches
- The Bio-chemical tax credit just passed – this precludes anything for fuel. We have to divide that industry based on fuels VS. chemicals
- We should plan by looking at the broad economic development ecosystem – this includes all the incentives that can drive entrepreneurship into commercialization. Including:
 - o Innovation, R+D
 - o Policies
 - o Capital, incubator space
 - o Educated workforce
 - o Educated citizens – via K12, public education, and fostering a culture that embraces this kind of economic growth
- Many of these pieces exist in the bio-ag area, how do we use existing development to attract additional investment?
- Iowa is projected to be a leading biomass provider by 2030. The feedstock bio-cluster with ISU has already begun to attract investment to Iowa
 - o The bio-cluster is an example of mapping the best location, research university partners, demonstrating return on investment, and showing economic impact (in GDP growth) as a result of having all the pieces in place to invest in home-grown energy.
- Goal is to attract capital to create new industries in Iowa – need to prove-out the models and fill gaps

- Policy support is also needed to create and grow new industries. Data is needed to prove new policies are good for the state
- Predictability and consistency are important for businesses – if energy prices and policies change frequently, this can create challenges
 - o Companies may be willing to invest, but need infrastructure investment first (for example, pipelines)
 - o How to finance/raise capital to invest in Iowa?

Energy Affordability and Equity for Individuals

- Low-Income Housing Energy Assistance Program (LIHEAP) currently established – The state spends \$55mil/year – funds are for low-income residents, most often in old, inefficient homes
 - o Funds are to help pay energy bills – can this instead be invested in energy efficiency in order to lower bills, thus lowering need?
 - o It's an inefficient use of funds to keep spending on utility bills for leaky homes every year
 - o Funds go directly to heat providers for utility costs, so LIHEAP doesn't know how many therms or kWh their paying for
 - o There is a moratorium on shutting heat off for unpaid bills during heating months – if a homeowner starts out behind in the fall, then they're in an even worse position at the end of the heating season when they have to pay again
 - Some residents are in temporary duress, but for those in a more chronic state, the moratorium can worsen their situation.
 - o A goal should be to carve out more of these funds to go toward energy efficiency and energy education
- There is also a Weatherization Assistance Program – could use cost/home served as a benchmark for how much it would take to address efficiency
- The plan should work to make energy accessible to those that need assistance the most
- Most energy-related incentives require some upfront capital – this creates a barrier for people without access to capital – these are also the people living in homes that likely require most investment
 - o Residential customers pay highest per-unit price for energy – homes that consume the most, pay the most
 - What types of policies, incentives, or financing mechanisms can be put in place to help those that don't have access to capital make energy efficiency investments on their homes?
 - Many can't take advantage of tax credits or rebate programs because they still require a co-pay or tax liability – Need to think more creatively
 - PACE could be helpful – but it's only available for people that own property
 - On-bill financing has been implemented by some utilities, but not statewide

Reducing Energy Costs for Businesses

- Some companies are demanding renewable energy availability when deciding where to locate
 - o For example – Data centers
 - There is more information about this sector and how they consume energy – Schneider electric resource
 - Attraction of data centers as a new industry in Iowa is a job creation opportunity
 - Iowa is currently not targeting data centers as they are high energy users. Focused more on agriculture and bio-economies that are more connected to state's resources
 - Many data centers have come to Iowa so far because of the cost of energy, reliability, and percent of renewable energy generation
- More and more companies are creating sustainability or energy goals
- Mid-American is promoting efficiency to commercial customers through:
 - o Free energy audits for companies
 - o Rebates to encourage new customers to purchase efficient equipment
 - o Assisting large commercial accounts with programs such as building-optimization
- Do these utility programs play a role in attracting business? i.e. Facebook, Google
- Money saved by companies through energy efficiency can be spent within communities
 - o This message needs to reach households and small businesses
 - o A local delivery system for efficiency and renewable programs can magnify and accelerate adoption of utility programs, leading to exponential momentum
 - o This is also related to affordability and equity – it helps keep dollars local and homes more financially sustainable
 - o Efficiency and renewables go hand-in-hand – should promote efficiency programs first, in addition to renewables
 - Example with Distributed Generation – Farmer's Electric Co-op reached 2.5kWh solar penetration per customer. If they scaled this program up over a decade, they could reach 7.5 gigawatts of distributed solar (close to wind accomplishments). This would mean a \$15billion investment in the state, keep \$1billion of energy sales within the state, and create jobs
 - Need to leverage smart, targeted, efficiency and demand response while helping utilities cope with increased renewables
- One obstacle is that business facilities are often inefficient. Capital can often be cost-prohibitive as upgrades to these facilities can have a 10-20 year payback
 - o Need to measure when it is worth it to keep maintaining old facilities VS. building new
- Businesses that focus on efficiency and renewables are more competitive. However getting utility programs and information to them can be a challenge
 - o Need other outreach channels to reach Iowa businesses (and households)
- Grid efficiency is an important piece of the puzzle – we need data on transmission and delivery energy loss
- We need to keep mid-low income customers in mind when promoting efficiency programs – added costs for grid modernization and efficiency incentives can impact rates
- Duck-curve challenge

Career-Path Education and Training Needs

- Community colleges are working with businesses to understand short-term training needs. Almost every region has an economic development organization which partners closely with community colleges.
- Indian Hills Community College has a program that was started because one of their faculty members was from the energy sector and spearheaded the initiative.
 - o Community Colleges need to start the process of developing new programs early (usually 4-5 years in advance to develop and get them accredited)
 - Hopefully the energy plan can serve as a guide to show what's coming in the future
- K12 is an important piece in addition to the community colleges.
 - o Many K12 schools are offering externships for teachers to get into an industry – they learn about a particular sector and then bring learnings back into the classroom
 - We could do this for the energy industry
 - o Career-on-wheels is another K12 current initiative – One school brought in Mid-American for kids to learn about what they do
- We should work with STEM initiatives
- There is a shortage of contractors to do energy work, particularly home efficiency upgrades – this is a big challenge in rural communities
- Buildings trades programs at high schools are decreasing
- Developing new educational programs takes time and resources
 - o Indian Hill Community College took a big risk when they started their renewables programs.
 - Solar training program is going well, but they had to suspend their bio-energy program. It is starting back up soon
- Community colleges alone can't keep up with job demand

Providing Public Education

- The Iowa Energy Center is a place for reliable, objective information. Resources are from university, government, and lab sources; not from advocacy or interest groups
 - o It is funded by rate-payers
- The Farm Bureau has good outreach channels. Their public education commercials are effective
 - o Could the energy sector do something similar?
 - o We need an organization that can vet the information and keep it relevant and neutral
- We need to both gather information, and also make it digestible. Are there resources available for marketing material development?
- "Energy District" model is a concept where state and utility programs have a strong local presence in each community
 - o USDA Soil and Water Conservation Districts is another similar model of deep local community engagement
- IEDA has a successful City Energy Management program that provides technical services to help cities promote energy efficiency including audits, upgrade projects, and energy action plans
 - o Can this be replicated for small businesses?
- Specific technical assistance is crucial. Residents and businesses need to know what they need to do, how, who to work with, how to pay for it, etc. – every piece of the process

- Public education is a great avenue for sharing success stories, learning from existing programs and replicating them
- There needs to be a distinction between credible information and “noise” from the media when promoting energy opportunities
- First, we should answer the questions: What do we want to educate the public on? How do we measure success?
 - o We want to educate the public about all energy efficiency opportunities
 - o It would help to have universal applicability of utility and energy programs. For example, it is difficult to promote efficiency programs widely when eligibility and program details change across each utility territory.
- A proposed school program was voted down by constituency because of lack of quality information about the benefits of efficiency and renewables from trusted sources
- Many people don't know about efforts that are already underway. Many residents don't know about the Iowa Energy Center or existing Community College programs
 - o People don't know where to go for information

Research and Development

- Opportunity for agriculture sector to use natural gas in ammonia fertilizer, which is currently a large economic import
 - o Universities are starting to do R+D to look at creating ammonia fertilizers using local sources of energy – need to increase these types of initiatives
- Transportation fuel is another opportunity for development of alternative sources
- More research is needed on recycling nutrients in order to keep them out of watershed and create a closed-loop system
- Research around crops that need less fertilizer would be beneficial.
- More research dollars should be spent directly on greenhouse gas emissions, watershed impacts, and other environmental issues that are currently thought of as externalities.
- Research is largely dependent on grant dollars. If the state is the direct beneficiary of new developments, then the state should make investments to expand
- Need more funds for lab resources, testing, and research around advanced energy crops and nutrient recycling

Financing and Capital Needs

- Iowa needs more local investment in wind and solar projects. Tax credits help, but it would be beneficial to explore possibilities of loan options as well
- We should encourage more private investment in university initiatives
- Technical expertise is needed for businesses to take on adoption of new technologies and potential investment opportunities
 - o For example: Recycling plastics and PVP are business opportunities, but need more information
- It would be a game-changer to make energy investments as easy as investing in mutual funds
 - o For example: For someone to invest in a local wind or solar development, it is not currently clear what makes a project financially feasible for individuals to invest in
 - o A goal of this plan should be to help break through the barriers to investment
 - If the state makes the statement of intention, then finances can fall in place

- Financial industry needs to be secure in decision-making for investments to be made in new technologies
 - o Energy programs are complicated (tax credits, etc.), which creates a barrier to investment
 - o Projects need to be made secure. One possibility is through incentive programs
 - o If you want to invest in a large project, you have to go through a lengthy process
- Examples of local investment opportunities and barriers when it comes to tax issues (will be posted on basecamp)

Rural Economic Development

- Opportunity for innovative renewable energy installations on under-utilized spaces as opposed to large farmland space
 - o Need capital and enabling technologies to make it work
- There is an opportunity for distributed job creation along with distributed energy generation across the state
- Value of Solar approach would help define and agree upon the value that can then open doors to new projects
 - o The industry is getting close to establishing a standard scale and universal definition
 - o AgSolar is starting to measure land use value for Agriculture VS. Solar for farmers – Can this resource be shared more widely?
 - o A land profitability map would be beneficial
 - o Need to consider water quality and other external factors in valuation
- There is some economic analysis of digesters which shows that wastewater infrastructure creates a bottleneck in productivity
- An “all of the above” approach (similar to statements related to the Clean Power Plan) can also be applied to land use types – We should consider both urban and rural applications and think creatively about use of technologies
 - o Community Solar provides a unique opportunity
 - o Meter technology investments are important in leading to load management and demand shaving
 - o Utilities can play a role in promoting and regulating renewable technologies
- There is push-back from farmers on leasing land for renewables. Sometimes selling the land is better economically for the farmers than leasing it for renewable installations.
 - o What happens when the renewable installations need to be repaired or replaced over the long-term? This creates uncertainty for farmers leasing land.
 - o There is a livelihood issue for farmers. Some are willing to sell, others are not.
 - o Important to also consider solar technologies that can be building-mounted, even in rural communities, so as to preserve farmland
 - o One-off VS. Large-scale projects can vary drastically. Economies of scale should be taken into account.

Energy Trade Imbalance

- Efficiency is extremely important. Need to promote process efficiency at every level
 - o For example: Automation can help to reduce energy use in HVAC systems, etc.
 - o Efficiency should be encouraged before generation
 - o We know how to invest in efficiency as the payback is clear. This can help to prevent imbalance

- Efficiency should also be considered when it comes to processes such as fertilizer usage
- A distributed assessment of trade imbalance by county or utility territory would be valuable
 - o More collaboration is needed at the local government level because local municipalities care about local economies
 - o Need to make sure jobs and benefits spread across communities

III. Comments and Questions Received from the Public

- Would it be possible to put together a chart similar to Lawrence Livermore's energy flow chart? <https://flowcharts.llnl.gov/>
- Mentioned losing industry because of lack of NG. Iowa sends the majority of NG flowing into Iowa through to Illinois. We should have plenty of NG.
- Distributed energy: Is anyone looking at micro and small-hydro possibilities? Should be a few MW in each county.
- STEM --> I prefer STEAM education, include arts & agriculture alongside technology projects.
- Trade Imbalance: petroleum could be reduced or eliminated by synthetic fuel. Not ready now but in 12 to 15 years it should be feasible & cheap.

Energy Efficiency and Conservation – Working Group Meeting #2

April 5, 2016; 1:00 pm – 3:00 pm

Meeting Summary

I. Meeting Objectives

- To **dive deeper** into the conversation and continue to **develop current challenges and areas of opportunity** and organize them by topic area.
- To **share expertise** around topic areas and frame the issues associated with that topic.
- To **gather more information** and facts on issues and opportunities.

II. Summary of Key Comments

The following topic areas were discussed as they related to Energy Efficiency and Conservation. The summary captures issues brought forward by working group members.

Building Codes

- Iowa's current energy code is the IECC 2012 and the state is currently working on adopting the 2015 version.
- Iowa is on the leading edge of considering and adopting new codes.
- The IECC 2015 code is outcome-focused and will be great for supporting building efficiency.
- The IECC 2015 is easier from a training and enforcement perspective.
- Simpler codes are better as codes are inherently complicated.
- Some states have auto-update provisions for energy codes which may be an opportunity in Iowa.
 - o Consider the amount of time needed for cities and contractors to learn and understand new codes.
 - o If city councils are unaware of codes now they will remain unaware under an auto-update framework.
 - o An auto-update framework could help contractors understand current standards.
- Education on codes and code enforcement is critical.
- Training and enforcement continues to be an issue regardless of the code in place.
 - o Staffing and resources are limited
 - o Some communities have memorandums of understanding around training and compliance.
 - o Community leaders cannot be responsible to stay on top of guidelines – staff and inspectors must be trained.
- Statewide codes are different than community-based decisions.
 - o Iowa traditionally favors local control.
 - o Local codes should be at or better than state codes.
- Do we know how many Iowa communities are actually following and enforcing the current code?

- How do we encourage adoption of more energy-efficient practices and technologies through use of existing buildings codes?
- How do we consider grandfathering issues?

Building Energy Usage

- Being involved early in the design process is one of the best ways to promote high-performance building design.
 - o Some utility new construction programs apply this approach.
 - o Model energy usage at the design stage to make better decisions.
- Building energy usage is more than just energy efficiency but involves optimizing all of a building's attributes including energy efficiency, overall lifecycle, and occupant productivity and comfort.
- Procurement methods focus on first cost but should consider an operational assessment.
- Benchmarking is particularly powerful when you have a portfolio of buildings and you need to determine which buildings to make improvements in.
- Benchmarking buildings should be expanded and some organizations (e.g., schools) are currently doing this.
 - o Tracking building energy usage is critical to strategic, statewide planning efforts.
 - o Benchmarking needs to be further promoted and possibly incentivized.
 - o Benchmarking enforcement may create burdens.
- Benchmarking efforts are often not fully embraced.
 - o An opt-in system would gather those entities that are interested.
 - o It is difficult for building owners/operators to keep up with benchmarking data collection and entry.
- How have other cities and states moved from voluntary to mandatory benchmarking?

Energy Programs

- Centralized planning and implementation of energy programs could allow for consistency throughout Iowa.
 - o Perhaps apply to certain customer types.
- There is a centralized energy program planning process in the state as it relates to how utilities connect with stakeholders.
 - o The Iowa administrative code is a centralized guide for planning.
 - o This is a robust and collaborative process.
 - o Utilities have different customer needs and the current structure allows utilities to design and manage programs that best meet those needs.
- The statewide potential study will inform future utility plans.
- Municipal utilities and cooperatives could coordinate with other utilities to expand programs and leverage economies of scale.
 - o Some utilities currently have joint offerings
- New programs that leverage new technologies are a future opportunity.
- Need to focus on Iowa's low income population.
 - o Tools to reduce energy costs are helpful but hard to implement.
 - o Additional education and outreach efforts would be helpful.
 - o Home weatherization continues to represent a large opportunity for energy savings.
- The balance of funding between commercial/industrial offerings and residential offerings is a challenge.
 - o Commercial/industrial programs provide more savings per dollar

- Low income residents cannot implement all measures that would be beneficial due to upfront costs.
- A list of current efficiency program offerings that are shared across utility territories will be shared for the group to review.

Energy Affordability and Equity

- A state energy plan could go beyond federal eligibility requirements for various programs.
 - o Weatherization programs have a long-term impact but are costly.
- Equity should be considered in terms of energy program design.
- Schools and other tax-payer supported institutions need affordable program opportunities.
- Municipal utilities do not participate in state programs.
- Municipal utilities need resources for infrastructure and maintenance and are not often focused on energy efficiency and conservation.

Financing and Capital Needs

- Savings from energy efficiency is not always enough motivation and financing should be targeted to those who cannot do energy efficiency without incentives or capital.
- PACE and performance contracting are potential opportunities for the state to consider, particularly for customers who can afford upfront costs, but won't make upgrades without additional incentive.
- Approximately 25% of policies address financial barriers but only five address upfront financing and capital, and those have limitations.
- Low interest rates have reduced participation in utility financing and performance-based program mechanisms.
- There are a number of legal and regulatory barriers for public entities including Dillon's Rule, which is the theory of state preeminence over local government.
- Public and non-profit entities cannot take advantage of tax credits.

Grid Modernization

- The more that a customer knows about their energy usage the greater the likelihood that a customer will make changes.
- Smart grid and smart meters can provide new opportunities for energy efficiency efforts.
- Smart meters could be detrimental to low-income families and disconnection for failure to pay
- Training and enforcement continues to be an issue regardless of the code in place.
- Who should invest in and own modern grid infrastructure?
- How are issues of cost going to be resolved?
- Do we know how many Iowa communities are actually following and enforcing the current code?

Energy Policies

- The working group decided to discuss this topic on Basecamp.
- Example energy plans should be posted for working group member review.

III. Comments and Questions Received from the Public

- Part of efficiency is proper lighting... using less light to intentionally light only areas that need lighting. <http://darksky.org/resources/research/>
- Should policies & recommendations be revisited every 5 years by Lieutenant Governor? First time around likely won't be perfect.

Transportation and Infrastructure – Working Group Meeting #2

April 7, 2016; 10:00 am – 12:00 pm

Meeting Summary

I. Meeting Objectives

- To **dive deeper** into the conversation and continue to **develop current challenges and areas of opportunity** and organize them by topic area.
- To **share expertise** around topic areas and frame the issues associated with that topic.
- To **gather more information** and facts on issues and opportunities.

II. Summary of Key Comments

The following topic areas were discussed as they relate to Transportation and Infrastructure. The summary captures issues brought forward by working group members.

Alternative Fuels

- Natural gas and propane require different delivery infrastructure.
- Ethanol and biodiesel are home-grown and should continue to be supported.
- Growing infrastructure for renewable fuels is critical.
- Compressed natural gas (CNG) is an emerging technology and could have potential - particularly for local governments and their fleets.
- A program to help incentivize private sector infrastructure for alternative fuels may be appropriate.
- There are multiple examples from programs across the country that incentivize private sector to bring alternative fuels – OK, PA, CA, NY.
- Important to plan for electric vehicles (EVs) and be in line with national trends – however, alternative fuel is more Iowa-specific and the state can be a national leader on this.
- It's important to consider alternatives for locomotive fuel. B5 blend can be used transfer containers in nonattainment areas – better than the SO₂ from diesel
 - o NREL study on B20 says this will work, but warranties are still being modified
- We need to be mindful of who, how, and where when it comes to funding for infrastructure
- It may not be the role of government to create mass fueling stations for the public.
- It is important to figure out how the state pays for infrastructure (roads, bridges etc.) if we use non-traditional fuels and the state loses the tax revenue. Important to make sure users of roads contribute their usage fee.
- There are many vehicles that can run on alternative fuels, but they need to be available to the public.
- There are many vehicles that have the capacity to run on a higher blend of ethanol (higher than 10%), but there isn't capacity at the retailer level to dispense fuel with a higher portion of ethanol. Having the infrastructure at the pump is critical.
- Where is the demand for alternative fuels going to be?

Alternative Fuel Vehicles

- Utilities should be part of the discussion.
- Private sector companies (particularly large companies with sustainability policies) seem interested in electric vehicles (EV).
- Electric vehicle technology will expand to more travel miles in the near future.
- There is a need to create policies that help recover the cost of installing charging stations.
- Charging stations are incentivized differently throughout the country – some with tax credits. There is a need to pay attention to the different types of incentives.
- More auto manufacturers are standardizing EV charging technology and therefore allowing the market to adopt at a faster pace.
- Up-take of personal EVs is still relatively small and the payback on installing charging stations is long.
- The technology for charging stations is moving very fast, and therefore stations become outdated relatively quickly.
- Critical to think about the stress on the electric grid if many users charge their vehicles at night at their homes.
- There is a study underway to forecast the potential growth of electric vehicles in Iowa – IEDA is undertaking this effort. Study will be complete by June 2016.
- More information on electric vehicles:
 - o How many registered EV's are in Iowa? 160 all-electric; 981 total including hybrid plug-in.
 - o What are the trends for electric vehicle growth? It has not grown much in the last few years, primarily because the price of gas has remained low.
 - o 76 charging stations in the state (multiple outlets each)
 - o A map of national locations will be posted on Basecamp.
- There are national discussions on how vehicles could operate on e30+ blends. What are the outcomes of these discussions?

Transportation Infrastructure Modernization

- We should consider rail and river for commodity transportation in addition to highways.
- The plan should use a lens of thinking about the most efficient use of Iowa's existing infrastructure
 - o Funding for connections between modes has been proposed
- Trucking efficiency standards from EPA and truck fuel economy are also important drivers
 - o Do current Iowa truck registrations take this into account?
 - o If not trucks aren't purchasing as much fuel, this will have an impact on the fair-share issue
- Policies are being revised related to interstate travel and tax reform
 - o User fees for transportation are general funds that go to transportation at the federal level. This could be an opportunity for state policy. Iowa may need to go beyond just using a gas-tax for infrastructure funding
 - o The planning process is an opportunity to look at big issues nationally and future impacts
 - o Using both miles traveled and weight to calculate fee structures would be the fairest system. This is how air quality and fuel standards are calculated at the federal level, which is what Iowa should support.
- Transport of energy through the state will also impact the infrastructure we choose to build and maintain

- We should utilize “positive train control” as a safety feature when transporting volatile fuel.
 - o This may be more expensive, but it’s likely necessary for both environmental and human safety
- We should understand the amount of ethanol currently being shipped in the state, and how it will increase in the future
- Iowa’s rail has to be flexible and ready for growth
 - o This is especially important as east and west coast states with low-carbon fuel standards are increasing demand of Iowa biofuels.
- Congestion problems on routes I80, 35, and 380 are a challenge. These roads may need to be widened in addition to finding ways of decreasing traffic.
 - o Are there ways Iowa can address congestion created by trucks? Some other states have truck-only lanes.
- Iowa needs to pay attention to maintaining existing infrastructure such as roads and bridges in addition to planning for expansion.
- An issue on rural roads is that there are a lot of valuable commodities being transported on “suspect” infrastructure. The fuel tax that was enacted last year helps, but it is not a silver bullet.
- Iowa Department of Transportation is currently finishing a study on transportation.
- There is also information on crude oil and other energy transport tracking and forecasting coming out soon.
- U.S. Environmental Protection Agency is releasing trucking efficiency standards for heavy-duty trucks soon. We should look at how this will intersect with the state.

Energy Infrastructure Modernization

- The new requirements from EPA will be more challenging for retailers as they need to maintain and likely expand.
 - o Current infrastructure does not support E15
 - o We should look at expansion from a policy standpoint based on what’s already successful
 - o We need to maintain program compatibility requirements of equipment
- The manufacturing industry is mainly focused on electricity and natural gas. When assessing fuel options, manufacturers’ first priority is reliability, and then cost. Need the most cost-effective, reliable options.
- Some in the riverfront industry have switched from coal to natural gas. We should consider how this feeds into availability of natural gas as more coal plants close.
- Iowa needs to make sure transmission infrastructure can support wind and additional renewables
- This group should get a deep understanding of distributed generation and how it impacts infrastructure
 - o Is there a way to help defer some infrastructure costs through cost-savings from DG? We should collect data to support this idea.
- Increasing DG also supports the need for infrastructure updates. The increase in EV’s and DG are signs that the nature of our systems are changing.
 - o Iowa also needs to build transmission upgrades when energy sources are retired. Those units still connect to the grid and need to be updated over time
 - o Iowa should plan to allow for retirements along with new generation and DG. Ultimately, we need a robust grid that can be flexible
 - The energy plan should not allow for siloes. We should be communicating at a regional level with MISO in order to plan together for future changes

- Planning should lead to efficiencies
- Transmission fees are growing because we need to plan and build for infrastructure needs. Improvements need to be efficient so that investment is cost-effective
- The Clean Line would help create a new supply chain. Other lines are already taking wind out of Iowa and Clean Line would continue this.
 - Demand for wind from other states has created a new transportation need as Iowa has become a wind exporter
 - Iowa should decide whether we want to build infrastructure to support exporting activities
- Issues related to nuclear and coal plant closings such as job loss and infrastructure impacts need to be addressed.
- Need to address transmission eminent domain issue, particularly when building for export
 - Investment for through-traffic needs to be coordinated with economic needs to access in the state
- There are also issues related to natural gas and crude oil traveling through Iowa (i.e. Dakota Access)
- Iowa should look at safety, reliability, and cost-recovery when building infrastructure. The plan should address how we fund infrastructure that will support the future. This involves not just replacement, but the need to support future and different needs. Iowa needs to find a funding mechanism that allows the state to stay competitive by having reliable, affordable energy regardless of the source. This competitive advantage against surrounding states is important for the plan to protect.
- There are new environmental requirements from U.S. EPA related to ethanol that will need to be met for infrastructure.

Energy Storage

- In order to assess Iowa's complete energy picture for the future, we need to identify critical storage needs and locations in the state. We need reliable energy storage at the most urgent uses and infrastructure if an energy source runs out.
- When planning for electricity storage, especially in DG scenarios, we need to consider both the load demand and generation factors.
 - The order of magnitude of the gap in storage need vs. current capacity is very large. It may not be financially feasible to achieve completely.
- The demand-flexibility motivation is important (for example, solar with battery storage at dairy farms is a big opportunity)
- It is very expensive to store large quantities of energy. We need to understand the reasons for storage to determine what is worthwhile and ensure it is cost-effectiveness
 - The environmental consequences of leaks also need to be considered
- Ethanol plants are not located near rail lines. This creates an avoidable storage need.
- There is a propane study report coming out but is not yet finished. Is there any way to include in the planning process?

Energy Assurance

- Energy diversity would improve national security and decrease the need for storage.
- Natural disasters such as ice storms and flooding are a big issue and can cause major economic losses (dairy farmers, etc.)
- Will micro-grids work in Iowa as they're more meant for densely populated areas?

- Even micro-grids still need to be connected and supported by generation.
- The plan should help define what is most cost-effective. It may be more efficient to invest in a larger, robust system
- Local governments need a reliable communication system for natural disasters
 - Keeping infrastructure going during natural disasters is a priority
 - The plan should focus on communication, collaboration and coordination of local governments
- When there is a shortage of diesel, trucks need to be able to continue delivery beyond normally allowed hours. Policies for extreme situations that can help address urgent needs and respond to disasters would be beneficial
 - This would allow for cutting through red tape in urgent situations
- There is a workforce need for rural area line technicians. In the case of an emergency, is there an available workforce to help restore energy in rural areas?
- Most companies have security plans as security needs can change every day. There is a challenge of having security plans that are not available to the public. These need to be overseen and regulated by government

Education

- There needs to be more education around the state on the use of DG and EV's
- There are job opportunities around ethanol and other alternative energy that Iowans aren't aware of
- There is an education need around Iowan's understanding the benefits of export. There is currently a lot of confusion and more would likely support if there were more accurate information and better public awareness of benefits
- There is more education needed on biodiesel as there is still a lot of pushback
 - End-users have to be educated that biodiesel is suitable and standards are much higher than they were in the past
- The general public doesn't understand the level wind energy generation particularly in western Iowa and that Iowan's can't use all of it and can't store it, therefore there is a need to put it back on the grid
 - The public doesn't understand the benefits of the export market in general
- There is a public thinking that people currently pay for all transportation infrastructure needs. However this is not the case and more education about what things actually cost and how they are funded would be beneficial.
- DOT has innovative strategies for getting information out including use of technology, and gathering resident feedback (smart phones, etc.)
- A website or central location with facts about energy in Iowa compartmentalized by different sources would be very helpful. Particularly if it were focused on unbiased facts and not marketing
- Post 911, people are less inclined to share information

III. Comments and Questions Received from the Public

- I have concerns that fuels must have a good Energy Return on Investment (financial EROI or subsidy reliance) as well as excellent Energy Return On Energy Invested (physics of efficient resources EROEI). Many people outside of Iowa do not see ethanol as being efficient. Be mindful of emerging synthetic fuels which may be more efficient.
- On incentivizing Alternative Fuel Fleets: I know that NYC assisted taxi fleets with purchasing hybrids (often used in 12 hour shifts) These vehicles often drive > 150 miles each shift.
- Freight Movement: could expanding railways (to each county seat even) be efficient. There would be less heavy trucks wearing down the roads.
- My understanding is that the best grid-level storage is pumped hydro. While Iowa doesn't really have any large hydro, there are many small & micro-hydro possibilities. This would also be a great distributed energy source. As an example: <http://www.alternative-energy-news.info/micro-hydro-power-pros-and-cons/>
- Energy Assurance should include access to raw materials for energy production.... (coal supply, uninterrupted NG) Micro-grids would protect those areas that are not directly hit with natural disasters. Also nuclear energy only resupplies every 18-24 months - infrequent resupply makes it safe against running out of fuel.
- Additional ideas for facts on energy (laws of physics are the same within Iowa as well as outside!) can be found at University of Calgary's website: http://energyeducation.ca/encyclopedia/Main_Page

Iowa's Energy Resources – Working Group Meeting #2

April 7, 2016; 1:00 pm – 3:00 pm

Meeting Summary

I. Meeting Objectives

- To **dive deeper** into the conversation and continue to **develop current challenges and areas of opportunity** and organize them by topic area.
- To **share expertise** around topic areas and frame the issues associated with that topic.
- To **gather more information** and facts on issues and opportunities.

II. Summary of Key Comments

The following topic areas were discussed as they relate to Iowa's Energy Resources. The summary captures issues brought forward by working group members.

Overall Planning Process

- In response to the initial research and policy inventory, we need to answer the questions, "What is this effort an answer to?" What is the "So what?"
- What kinds of recommendations and guidelines can the working groups give back to Iowa that will create economic benefit and manufacturing support, while considering environmental factors and other externalities?
- This process needs to take a regional lens. For example, Iowa has benefited from importing hydroelectric power within the region
- The plan also needs to focus on the economics of various sources (i.e., the "things we can get money for") regardless of whether that is through imports, exports, or both. Being a net-importer or net-exporter is not good or bad, it is just a fact to consider when planning for what's best for the state.
- The facilitators will make sure these comments and concerns are captured for the larger planning process.

Distributed Renewable Energy Generation

- The question of "should we be promoting DG in Iowa?" is unclear
 - o There should be a freedom of choice
 - o DG is a national trend that is growing
 - o Iowa should at least allow and not impede it. We can leave it up to economics and let the market determine whether it's viable.
- Iowa needs to allow for more than just intermittent generation. Some renewables can help with time-of-use rates and load sharing
- All renewable energy applications would require some DG. So if Iowa wants renewable energy, we need to allow for DG
- Overall, could we make it so that DG should neither be promoted nor prohibited?
 - o To do this, we'd need to determine if there are any current barriers that need to be removed

- The general assembly should be able to set a policy guide based on the costs (however this could lead to an equity issue)
 - Removing barriers is not that simple as municipal and co-op utilities have different circumstances (i.e. DG should not be funded through utility rates)
 - Neutrality on the issue doesn't work for environmental initiatives if we want to promote clean, renewable sources
 - Need to define what "neutral" means from a policy perspective
- Some states have passed laws making it clear that some utilities wanted to kill DG. Iowa needs to understand the costs such as infrastructure and then make a decision based on cost-effectiveness.
 - Nothing in the rate structure should be punitive or create undue costs
 - Policy shouldn't create barriers to renewable development
- The question of changing rate structures is very loaded for utilities. Municipal and co-op utilities and their decisions are approved by locally elected leaders. Therefore each community has different wants and needs from their utilities
 - Should it be left up to utilities to decide what's right for their constituencies?
 - Investor-owned utilities have the same policies across communities
 - If Iowa is going to promote DG, we would need a more level playing field for customers of all utility territories
 - Another limitation is created for municipal utilities that have wholesale purchase requirements
- There is a presumption that the state should expand DG because it "is the right thing to do". It would be more effective to look at it as a financial decision. Then the conversation becomes more about the details of implementation, as opposed to the politics
- A deep understanding of what is involved in the rates and prices is needed in order to make rate structure decisions
- Some rate structure studies have found a wide disparity of economics for a company to put in Combined Heat and Power based on energy pricing. This can cause a barrier to promoting CHP adoption because standby-rate fixed charges don't change even when energy use is decreased. Therefore energy savings doesn't necessarily lead to economic savings.
- Does Combined Heat and Power at manufacturing facilities count as DG?

Solar Energy

- Value of Solar (VOS) measures what the utility should pay to a customer for power generated by solar photovoltaic (PV) applications belonging to the customer – Should include both the utility's avoided costs as well as externalities avoided by not generating and delivering that amount of energy.
- When considering the solar on agricultural land, PV is often not as economical when compared to wind
- Technical potential does exist – Studies have shown that rooftop solar in Iowa could generate 36% of electricity demand
 - However there are risks associated with the grid's capacity to allow for that amount of distributed generation
- There is potential to utilize brownfields and other unused land for solar installations
- The threshold of creating a rate impact for utilities is about 2.5% renewable penetrations. Iowa is currently at about 1%

- We should use this time for data collection as renewable adoption grows, in order to prepare for future decisions when we reach that tipping point (i.e. we could do a VOS study when the state is approaching that point). Some VOS studies come out at or above retail value
- There is a need to properly value the grid and entire system, not just solar in isolation
- Solar is most valuable during peak times. Storage would add a lot of value.
- There is a need for land use regulations that accommodate and provide some structure for installations
- We have to be careful in Iowa when using system averages for demand as it hides some nuances due to wide variety of land uses, population density, etc.
- Iowa needs to create policies to address current needs for reliable, sustainable energy, as opposed to waiting until we reach a higher penetration later
- Many parts of the state don't have any current land use regulations. This lack of regulation creates a barrier beyond direct permitting issues.
 - Suggesting a change in regulation in order to allow for more solar installations misses half the problem, as comprehensive regulations should be developed first. For example, Minnesota is requiring large scale solar proposals to conduct drainage studies, add vegetation measures, etc. in the permitting process.
 - Project complexity changes depending on type, size and location of solar being installed
- Great Plains Institute has a model DG for Solar ordinance and permitting that can be shared

Utility-Scale Renewable Energy Generation

- Iowa's lack of RPS has caused problems in terms of long-term planning for MISO
 - Iowa didn't have anything to provide to MISO for planning assumptions
- Do we need to carve out at utility scale for biomass?
 - Biomass emits CO₂ when transporting material. Many biomass assessments don't account for those emissions
 - It is a useful fuel if it's not necessary to move long distances. Useful bio-char material can be pulled out on-site
 - If you utilize this material and don't transfer it anywhere, biomass can actually be carbon-negative
 - There may be some benefits at utility scale. Biomass complements Iowa agriculture nicely and is an opportunity to make use of utility-scale infrastructure in new ways
- Iowa needs policy to encourage technologies to scale
 - The state needs to decide if we're ready to specifically address reducing CO₂ emissions from existing coal plants
- Solar storage is crucial, particularly for rural uses
- There is both an incentivized and a mandated approach for utilities. Incentivized has the potential to build on what is already happening in the market. A policy like a state tax credit could incentivize utility renewable adoption
- Biofuel technology info will be posted on Basecamp

Energy Affordability and Equity

- There can be an equity issue through utility incentives for rooftop solar. Residents who can afford to install rooftop solar get incentives which can cause utility rates to increase, which in turn hit the low-moderate residents the hardest.

- Externality costs of energy need to be accounted for. One way to do this is to raise the price of energy in order to promote efficiency
- Wind costs have come down so much that they are competing with efficiency. There may be an opportunity to combine these affordable options.
- It is important to maintain diversity. Moving more to natural gas as coal plants close is good, but need to keep renewables as well.
- Net metering will need to be addressed
- Companies with sustainability commitments are buying wind power. Therefore Iowa's economy benefits by having a green energy portfolio
 - o This is a branding/marketing opportunity for the state
 - o However, we also need affordable energy in order to attract companies. Affordability could be coupled with social/PR drivers
 - o Need to consider job attraction
- When considering affordability for manufacturing, energy is one potential place for companies to create a competitive advantage
 - o Competitors in other locations can lower costs of labor, safety, environmental regulations, etc. Energy might be one place where Iowa manufacturers can pass savings along to customers and be protected against price volatility
- Need to address who pays for incentives if we want to encourage utilities to establish more large-scale renewables
- It is difficult to avoid passing costs to customers when the public funds projects or incentives
- People waste when they don't think something is expensive. Iowa needs to keep energy affordable, while not letting it be wasted

Energy Infrastructure Modernization

- Iowa should have an IRP
 - o This would allow utilities forecast rates, loads, etc.
 - o Can there be coordination between different utility groups on different IRP processes?
- Planning should be bigger than just generation. MISO and others plan for transmission, pipelines, and other infrastructure
- Utilities don't make changes or improvements without approval from MISO and others. This process works well now, RTO's could help streamline it further
- Do utilities cut back infrastructure budgets in order to keep rates down?
 - o No, the utilities do make substantial infrastructure investments from both distribution and generation budgets in order to maintain reliability
 - o Infrastructure decision-making is a long-term process that does have rate impacts
 - o When considering DG and other changes, the utility's primary goal is to connect consumers to power sources (this happens two-directionally and includes putting power back onto the grid)
- Post a description of IRPs on basecamp

Technology Research and Development

- There are opportunities for partnerships between industry and universities
 - o There may be changes needed at the university-level to work more closely with private sector

- The private sector should engage with economic development departments at universities, as well as regional economic development efforts throughout Iowa. There are examples of this already happening in new technology parks, etc.
- The Iowa Energy Center is a good resource for technology research
 - This resource is getting even better. It is currently a small pot of funding, but they are working on giving dollars to match and leverage with other funding sources for bigger projects

III. Comments and Questions Received from the Public

- I have concerns about distributed RE which must be load followed. Also I don't like net metering where full retail prices are paid to individuals for their RE. One energy source that should be looked at is micro-hydro which utilizes gravity (a constant influence). Europe seems to be ahead of the US on this. <http://www.restor-hydro.eu/en/>
- Rate payers are also tax payers. I would like to see how much subsidized energy sources actually cost on both sides of the equation. This would entail transparency in rate structures.
- California is starting to need to turn off solar at midday due to over-penetration. Another aspect of the ISO grid duck. <http://ww2.kqed.org/science/2016/04/04/what-will-california-do-with-too-much-solar/>
- Part of the recent move to RE is concerns about climate change; within that area I am more concerned with ocean acidification. Plankton is under stress - and creates 1/2 the oxygen we breathe! With that in mind, I believe that a "renewable portfolio" would be better named "clean energy portfolio". Though IMO RE, when tied to load-following fossil fuels, is not clean energy. Perhaps grey energy is a better term.
- Sequestration through biomass is generally for a single year or decade. We need sequestration timelines of thousands of years (geologic timescales!) to be effective. These shorter term biomass are nearly worthless for CO² reduction.
- I would much prefer nuclear replacing old coal plants than NG. NG is still dirty with CO₂ and CH₄ emissions. Nuclear AP100 or ESBWR until 2030 - likely some Gen4 options after 2030. Nuclear can load follow and is safer than nearly any other energy source (dept. of labor, WHO). Green portfolios are cleaner with nuclear, IMHO.
- Ontario, Quebec, Switzerland, Sweden, & France all have electrical emissions less than 200Lbs of CO² per MWh. Why should Iowa settle for ~1300? This is a quality of life concern - EPAs CPP sucks IMHO.
- State of Oregon is actively supporting NuScale (nuclear SMR) which should have a prototype within 10 years. Utah & Wash state utilities are also supportive. www.uamps.com/index.php/38-items/24-carbon-free-power-project