

Program Proposal for Economical Energy Development and Consumption:

A Green Village

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Energy Initiative Project: Executive Summary

The United States has grown considerably and its appetite for resources has grown in parallel. Today, we face an enormous challenge ahead as the effects and dangers of global warming, security becomes more fragile, and wealth is being transferred around the world (Pickens, 2008; Yergin, 2008). The next biggest challenge for the country is to seek a good strategy for handling the impending needs of the American energy appetite as well as those from around the world and make those inviting to business strategies (Wirth & Podesta, 2003; Enkvist, Naucner & Oppenheim, 2008).

Another Silicon Valley

David Sokol, CEO of MidAmerican Energy Company, (2008) suggested to Congress that the United States needs a massive project and initiative to change our energy policy and consumption on the scale of the Apollo Moon Project. That project involved thousands of business with a task to develop and to invent technologies that have influence the country beyond the primary goal of sending someone to the moon. Additionally, the Economist (June 19, 2008) describes the potential for “Another Silicon Valley” that focuses upon energy technology.

If we work with that idea, we find a correlation with what Thomas Edison did for the light bulb when his team built an effective light bulb design but more about ultimately providing the support infrastructure around the light bulb (such as switches, wires, sockets, plugs, and electrical delivery systems). By considering the state (and the country as a whole) in a few years to many years from today, we identify target energy objectives, and then, we can strategically analyze what we need to do today to get to our energy objectives.

What we do today can be beneficial, profitable and healthy for Americans today and tomorrow, but we must be willing to invest in our future for these things to happen. The vision that we set forth and the investment that we commit may be risky to short term needs like looming deficits (Hansen, Feb 2008), but the properly managed and directed investment will provide rewards similar to the challenge that the moon mission did. In likeness to such a vision, the bountiful technologies that we gained from the moon mission more than paid for the investment, and if we focus upon target milestones, we can exceed simply meeting the goals and mission of the project. As well, the project can provide the economic growth well within the target parameters of time and cost.

We have to be willing to challenge average Americans and businesses to achieve the vision and goals set forth. The undeniable benefit will be to pass on more opportunities and efficient processes to our posterity rather than a depleted environment with consumed resources. There is an economic and moral cost to gluttonous energy consumption, and there are economic benefits to a “green” policy for today and tomorrow (Birol, 2007).

IIEC: The Four Parts

The four parts of this entire project focuses upon IIEC: Innovation, Education, Efficiency and Conservation. The first part identifies innovation and invention to build or to improve energy efficient technologies in terms of the consumption, the production and the transmission. The second part focuses upon education where curriculum development, similar to Hudson’s ideas (2003), can steer toward scientific and intellectual achievement for resourceful use of energy and the environment. Efficiency will guide people towards building efficient designs and processes that attempt to reduce waste in every way possible with an ultimate goal of

0% waste production. Conservation parallels efficiency efforts where the project focus is upon using only that which is necessary to consume.

Sustainable energy policy is possible in good companies that build efficient processes (efficient production) and consumers that understand the affects of their consumption (educated consumers). As well, good policy sets forth benchmarks, tactical timelines, goals and strategies for achieving cost-effective solutions for stakeholders that encourages technology development in order to achieve the overall goals. Since this is an encompassing proposal we can not expect that one company can do this alone, nor can one city, but the state of Iowa can be the catalyst and the example that fosters mutual benefit for consumers, government, industry and the future of the whole country.

Giving Back to the Future as an Opportunity

We must realize that consumption can not control our destiny because those in our posterity need to be able to function in life as well. Theodore Roosevelt thought that the resources and environment are mutually shared responsibilities and must be maintained if our future generations are to have wealth in their years and truly enjoy democracy (Filler, n.d.). As well, from our American Indian cultures, we must realize that we should take only what we are willing give back.

Proverbially, we cannot “idly put our heads in the sand” and pretend that nothing happens, wait for issues to resolve themselves, wait for better technology to be created, or get stuck in nuisance discussions about energy efficiency as suggested by (Stein, 2008). Doing so, we would simply miss the opportunity to do something for our community, our nation and ultimately our world. This will be the bold vision to encourage science, innovation and perhaps the “next silicon valley” because one company or the government cannot work alone.

EIP Part 1: Innovation – Innovative Energy Efficient Developments “A Green Village”

2008 brought flood damage to numerous communities in Iowa like Cedar Rapids and now they have the arduous task of rebuilding (Cedar Rapids Gazette, 2008). As catastrophic as the destruction is, we should use this opportunity to revise building codes and to encourage technology that will improve the energy efficiency of housing developments. The development can be mutually beneficially to displaced residents, businesses and the government. The proposed project here intends to challenge Iowa business to develop technology and to work together in a coordinated effort to build (or rebuild) residential developments with energy efficiency goals. This project will be part of a government mission to encourage, stimulate and develop technology in coordination with Iowa business and industry.

The proposal here is to develop a “green village” where previous developments have been destroyed by flooding (or to build the green development as a new subsections) for displaced citizens of flooded cities. The village project will aim to provide for the residents affected by the massive floods, to stimulate technology innovation, and to encourage economic development that is needed in the recession. Additionally, the developments may be showcased as models of economic development in coordination with energy efficiency goals.

This project is envisioned similar in scope and presentation to the San Diego project studied by Coburn and Farhar (2008). That project studied upper class residential developments with near-zero to zero energy consumption housing. This proposed project will exceed simply building new homes for upper-income earners. The progress targets and percentage reduction in consumption will be measured against 2008 values. Thus, the project focuses upon developing efficiency for the masses using economies of scale to lower costs while curbing consumption.

Agency Oversight

This project will be housed as an agency oversight board as part of the Iowa Department of Economic Development (IDED) and coincides with the department's Iowa Power Fund and Governor Culver's executive orders (Culver, 2006). As well, IDED may examine the existing Iowa Power Fund and Vision Iowa to determine if those boards and funds may be reformulated with the tasks to fund and manage this project. In order to encourage solidarity in efforts, the agency will require representation from governments of the communities where the initial projects are envisioned to be built (like Cedar Rapids, Coralville, Des Moines or Parkersburg). The project intends to focus upon a five-year initial plan, and based upon the success, the village program will be re-evaluated for process impacts, future projects and development as part of an on-going effort by the state to encourage research and development for residential use.

The Envisioned Project Specifics:

The green village will consist of a development of single to multiple family dwellings (like apartments, row-houses or condos) that feature technologies that significantly exceed efficiency standards. These developments will either replace destroyed developments or may be built as new subsections to the localities that govern them. The envisioned target prices of homes will be under the median prices of homes in the Des Moines and Cedar Rapids (125,000 and 139,500 respectively according to Yahoo Real Estate) metro markets in order to make them attractive and affordable for middle income earners. For the flooded areas, target prices will be lower than the average home resale value prior to the 2008 floods. This will help to focus upon affordability, disaster recovery and economies of scale development.

The pilot village project will study consumption trends based upon existing 2008 homes with families compared to the consumption levels in the new development with a target objective of 25-50% reduction over four years. Specifically, the project will examine the affect of

neighborhood association conservation upon individual “carbon footprint” including vehicles. Residents will be contracted as part of condo-neighborhood associations with specific expectations of waste and consumption discipline. As well, Iowa may offer conservation incentives to residents of existing neighborhood associations (as well to be studied). The study will examine trends of data to determine effectiveness and potentials from utilities.

Utilities, size and consumption

The project envisions developments will use wind turbine (or other clean energy) driven electricity, use cutting-edge, effective energy conservation, and to encourage the innovation of new technologies (like better solar conductors) to make the dwellings more efficient (Coburn and Farhar, 2008; Guzek, 2008). Thus, the size of the project will depend upon the capacity of a wind turbine to power a set of average household power levels (in 2007). Proposed reductions and conservations should produce net energy to be sold back to the utility company.

The project will examine the unit cost of energy for production including government subsidies and other tax incentives before and during the initial four years of the project. Energy delivery built to sustain needs for this village will require quantifying the sell-back as this can be considered cost savings for the development. As well, the cost of building the supporting energy transmission using solar, wind, or geothermal power will be studied to build more efficiency in the transmissions through government incentives like those in Ontario and Germany (Silverstein, 2008; Guzek, 2008). As well, the study does not have to be completed before developed technologies are able to be used elsewhere.

Home Building

Home builders will be challenged to build significantly energy conscious homes at affordable and marketable prices for middle to lower incomes. All included appliances will be

required to meet significant energy consumption standards where tax incentives and grant awards may be awarded to encourage development of these appliances.

Bidding process

The project would require a competitive bidding process aimed at economic development of Iowa-based companies to build the homes (like Hubbell), to finance (like MidAmerican Finance, Principal, Wells Fargo), and to build efficient solar or wind units (MidAmerican Energy and Alliant Energy). The government can offer mediation for displaced residents with existing loans on destroyed properties for new loans for the pilot village. Proposed grants, loans and incentives will be scrutinized for performance, plans, community benefit and will require independent oversight.

Target objectives / Expected outcomes

The envisioned target home values will be under the median prices of homes as previously stated. Developed technology will have to be able to be mass produced and studied how the improvements can be made to existing structures at low cost to property owners. In addition, objectives include

- Quantifiable reduction of carbon and acidic emissions with new developments as compared to 2008 levels
- Significantly raise use of renewable energy in proportion to non-renewable sources;
- Lower the unit cost to produce and to deliver renewable energy
- Reduce through conservation/ rations individual consumption of natural gas, electricity, gasoline, water, and waste by 25 to 50 %
- 60-75% reduction of dependency upon foreign resources within the developments.

- Challenge Iowa-based engineering and science institutions to build technologies that do not exist or to significantly improve those that do exist at cost effective means.
- Provide incentives and awards for innovations and inventions from local companies and individuals that further cost-effective delivery and efficient consumption of energy
- Provide a transition for existing dwellings, vehicles and consumer habits into energy efficient and environmentally respectful processes
- Raise awareness of Iowa as the catalyst of energy and environmental innovation (perhaps labeled as that energy “Silicon Valley”) through conferences and expositions.
- Develop a community that focuses upon being a producer of energy rather than of waste.
- Scrutinize public money as a commitment to responsible use of public funds

Stakeholders

A stakeholder is anyone who has an invested or legitimate interest in the outcome, the process, or the resources used to accomplish the mission of the project, and stakeholders may have differing viewpoints about a particular project that must be coordinated (Boutelle, 2004). The target of developments is to encourage innovation through rebuilding of the devastated communities, and the residents of those affected areas, residents of the new developments and managers of multi-dwelling units will have the ultimate stake in these projects.

The project will pilot in cities in Iowa as part of Vision Iowa and the Iowa Power Fund, and these programs already have many requests for funding. Those affected by diverted funding will be indirect stakeholders to this program. Iowa Green Communities programs, as well as state boards like Economic Development and Renewable Energy Infrastructure, may also provide insights and directions. Utility companies may provide statistics in addition to power

production, innovations, current energy management programs, curtailment packages, and energy delivery systems as part of mutual benefit programs. Homebuilders will be solicited for building innovative and affordable housing designs with specifically and targeted affordable prices. They, as well, can provide data for evaluation purposes such as building costs and property value enhancements.

State-funded universities, the Iowa Board of Regents, community colleges and private colleges will have a stake in award funding for scientific endeavors especially as institutional grants. The governments of the state, cities and counties, as well as government boards (e.g. Iowa Utilities Board and Iowa Environmental Council) will have to establish rules and to designate areas for development. Oversight of state funds for the project will be monitored by the Iowa Department of Economic Development and subsidiary boards.

Logic model

This program will use the logic model (or the reasoning behind the program theory) as presented by the University of Wisconsin extension office (Taylor-Powell, n.d.) and recommendations from the Kellogg Foundation (1998). Taylor-Powell proposes general three-tiered models that examine inputs, outputs, and outcomes where logic models will vary based upon the interactions and complexity of the program design. The designer has to connect these basic parts and logic flows beyond the proverbial “miracle occurs” at this point (Taylor-Powell, n.d.: 13). The logic model (Figure 1) lays out what is needed to make the project develop and the expected outcomes. The initial projects will have to follow this logic model, and later projects will have to re-examine this model for applicability.

This project, research questions, and perceived successes are dependent upon willing participants, upon willingness of participants to report data, upon the financial ability of homeowners, upon energy prices, upon housing market pressures and upon builders to build near-zero energy consuming properties. As well, the project assumes there are “shovel-ready” projects and innovations that can be used to build the more efficient houses.

Logic Model (Template provided by the University of Wisconsin-Extension)
 Situation: Building Energy Efficient Developments (Green Villages) to Rebuild Devastated Iowa Communities

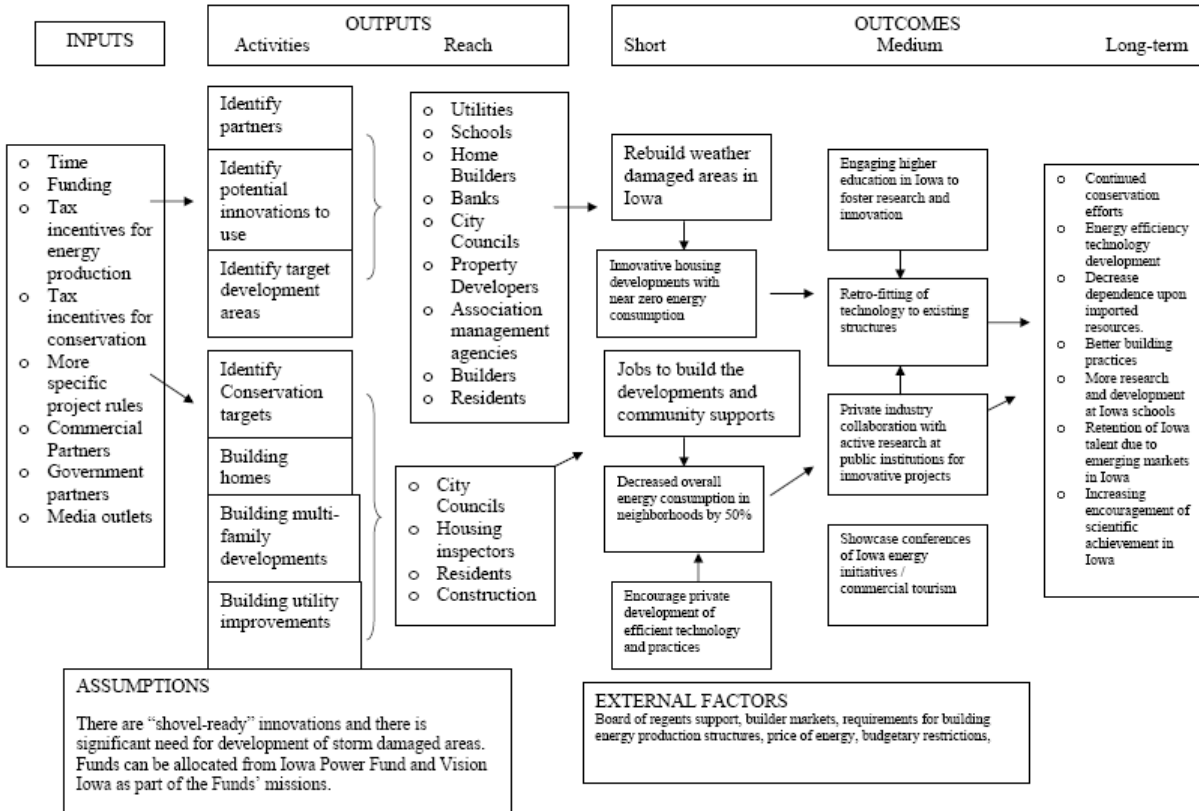


Figure 1: Logic Model

Research questions

To evaluate the project and the theory, some research questions will attempt to answer structure and performance needs as suggested by Rossi et al (2004) as well as Trochim and Donnelly (2008). According to Rossi et al (2004), good evaluation questions are in the form of the functions the project must perform, and thus, performance is the crucial test. Yet, we have to identify what is measurable performance. Each question has to establish criteria, note standards, quantify performance against a standard and then build an assessment from the data.

Trochim and Donnelly (2008) suggest that evaluation questions have to identify the problem and the scope being considered. Further, they suggest asking where the issue originates, seriousness and size of the issue. Then, we must consider how the program addresses this issue and how well is the delivery of the program (Trochim and Donnelly, 2008). The evaluation questions will answer characteristics of the program, and then, we can review the development of program theory with respect to specific “outcomes” and “efficiency” goals (Rossi et al, 2004, 77). This follows Taylor-Powell’s (n.d.) recommendation that you have to measure results to determine success.

The objective of the project is to establish the best ways that government can encourage innovation by examining the mix of tax incentives, research programs, grant awards or subsidies prior to and during the program as compared to patents submitted from Iowa based firms. The evaluation questions will need to determine levels of consumption by a set of population. The characteristics (e.g. income, age, commute distances, and what utility services they use) of that population will help to identify potential beneficial improvements. As well, are there available projects at utilities and education institutions that may provide energy efficiencies and what do they need to become implemented projects? For residential customers, we will ask what types of

construction enhancements improve energy efficiency and at what cost they can be implemented. How many pounds of garbage does a person produce in one month or one year? We also can determine how well community associations influence conservation? To what degree do community associations (like condo associations) affect an individual's conservation efforts? Can tax incentives encourage more conservation, construction enhancements and to what degree?

We can determine what level of collaboration yields the most effective government help to industry innovation by investigating the effect of standard regulations, new regulations for new developments, and tax policy. For this, we determine what is collaboration and the "levels" whether simple co-sponsorship, co-development, funding for research, or solo innovation.

Questions of fact are referenced from fact and evidence. They would determine the political and social environment of the program. For example, we should determine how much does a unit of energy cost by production source (natural gas, wind, coal, gasoline, nuclear). Which sources of energy does the state of Iowa have to import, if any? What are the current tax incentives in place that influence those prices and importation? After implementation of the program, we can examine what changes, if any, occurs in the matrix of energy prices.

EIP Part 1: Summary

The question becomes can government spur innovation and to what extent this can be done. The Village project focus will be to promote innovation in residential development, and will be an opportunity to showcase ingenuity. Thus, the overall goal and mission is to build affordable, efficient houses that encourage technology innovation for all structures.

These objectives will be revealed through the re-development of a site or building a new subsection that use improved technologies. These developments will encourage energy

efficiency in the new technology use as well as consumer consumption. Everything in the village from trash, housing construction, to lawn care will be challenged to follow a philosophy and a vision of resourcefulness (and be able to demonstrate that resourcefulness). The improved processed and technology will then influence the improved development of existing structures.

The formative evaluation of this proposed program will follow techniques and research designs issued by Rossi, Freeman and Lispey et al (2004) and Trochim (2007) to avoid unbiased reports, which are clear and useful for the public. The proposal is to present a bold vision and initiative for Iowa, its companies, and its consumers to take part in the energy policy while creating a strong future for the state. The project proposal and study aims to provide avenues and directions for lawmakers with developing an economic energy policy that is mutually beneficial for the industry, the consumer and the environment. The investment in this project will return technologies and opportunities for Iowa to build and to profit from energy efficiency. If energy is the next biggest hurdle for our country, let Iowa lead the way in developing technologies and innovative delivery methods.

The investment in this project will return technologies and opportunities for Iowa to build and to profit from energy efficiency technologies. There are many stakeholders for this project and the proposed funding will cause many to analyze the merits of the proposal here. Using the proposed logic model, we have a graphical layout of inputs, outputs and projected outcomes (near term and long term). Furthermore, this project will provide the opportunity to analyze consumer behavior and innovation with respect to government incentives and interventions.

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