Energy Efficiency-Based Economic Development: Policies and Opportunities

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ABSTRACT

Economic development is a critical issue and tool for local political and economic leaders. At the same time, the effectiveness of traditional development tools have become diluted as increasing numbers of groups have expanded their efforts to attract new facilities, employers, and investment capital to their communities or to retain the existing firms. Despite the increase in competition for development opportunities, most communities continue to rely on the traditional development policies. While these policies can remain effective and essential to building diversified development portfolios, most community, economic, and political leaders have failed to incorporate one of their most significant and potentially potent economic development tools – energy and energy efficiency policies.

The paper discusses the opportunities for the creation of new local development-based energy efficiency policies. It also discusses the manners in which local energy efficiency-based development policies differ from 'traditional' energy efficiency programs in terms of scale, scope, and focus. It documents that energy efficiency policies do meet the job creation, income creation, and tax base improvement requirements to be considered development policies. It also includes a hypothetical comparison between traditional manufacturing and energy efficiency-based development policies. The analysis concludes with a discussion of some of the possible methods that communities could employ to implement energy efficiency-based local economic development.

Introduction

One only needs to turn on the television or peruse the newspaper headlines to realize that this country is facing a period of nearly unparalleled economic crisis. The financial market is mired in crisis, the stock market has experienced significant losses, companies have announced significant layoffs and "record energy prices [have] affect[ed] the cost of everything from baked goods to baby diapers."[1] In times like these, many of the economic policy discussions focus on creating and sustaining "economic development." Economic development "can be defined as efforts that seek to improve the economic well-being and quality of life for a community by creating and/or retaining jobs and supporting or growing incomes and the tax base."[2] Yet, as the world economic community has rapidly grown and become increasingly interconnected, traditional development concepts, like relying on one large established employer to support the community, therefore, are rapidly becoming ineffective. Local leaders and economic development organizations must turn to new options to foster growth and development in their communities.

As discussed above, economic development has rapidly become a critical issue for local political and economic leaders. Simultaneously, the effectiveness of traditional development tools is becoming diluted by the increasing number of groups and municipalities competing for

[1] Transcript: "Fuel Costs, Job Losses Batter U.S. Economy" from *Online Newshour*; Source Public Broadcasting Service, 4 pgs. Available at: www.pbs.org/newshour/bb/business/jan-june08/economy_06-09.html.
[2] Economic development definition available from Reference.com at www.reference.com.

development opportunities. This has required communities to expand or intensify their efforts to attract new facilities, employers and/or investment capital to their communities or to retain the existing ones already there.[3] Yet most communities continue to rely on the traditional development policies.[4] While these policies remain an essential component of diversified development portfolios, most local leaders have missed an opportunity to incorporate one of their most significant and potentially potent tools – energy and energy efficiency policies – into their development policies.

According to the United States Department of Energy, "the economic and employment impacts associated with the purchase of energy represent a potent area of opportunity for local governments."[5] In addition, many business leaders have begun to recognize the potency of energy policies for growth and development. For example, Allen Walsh, president of the Alamo Cement Company said in an open letter to other leaders in his industry that, "energy efficiency is the most cost-effective source of energy today. Savings are pure profit and go directly to enhance a company's bottom line."[6]

Finally, the Association for the Conservation of Energy, in their discussion paper, "Employment Impacts of Energy Efficiency Investment," has noted that the "environmental benefits from programmes promoting energy efficiency are already well known and documented. Employment generation is another aspect of sustainable development that is the positive side effect of many of these programmes."[7] Despite these opportunities, many communities have yet to embrace energy and efficiency policies as tools in their economic development arsenal. This is often because they either lack the expertise to implement the programs[8] or fail to grasp the impacts that energy and efficiency policies can have on local economic development.[9] The remainder of this analysis will look at what economic development is and how the changing energy picture has made energy and efficiency policies powerful tools for leaders looking for innovative ways to drive development in their communities.

What Is Economic Development?

To understand the role that energy and efficiency policies can play in economic development, we must first understand what economic development means to its practitioners. Economic development is about maintaining or increasing employment, income, and tax receipts for a community. Energy and efficiency policies make effective economic development tools because they can allow municipalities and development planners to directly address each of these concerns. By helping companies to address the projected increase in energy costs, efficiency policies can assist communities retain or capture jobs that would have otherwise fled to lower cost communities within the country or export those jobs to lower energy cost countries. By keeping energy expenditures in the local community, and employing local industries to implement them, energy efficiency policies address the income drain and wealth transfers

[3] For example, the Michigan Development Board has run economic development commercials in bordering states like Wisconsin and Ohio.
[4] These policies include job creation credits, tax breaks for moving to the community, and/or low interest loans for plants and equipment, to name a few.
[5] The Job Connection, p. 1.
[6] Allen Walsh, Open Letter to Other Cement Producers, 7 November 2005, pg. 1.
[7] "Employment Impacts of Energy Efficiency Investment – Discussion Paper, p. 1.
[8] University of Arkansas, Division of Agriculture, "Economic Multipliers," p. 1.
[9] The Job Connection, p. 1

associated with energy spending, which move income permanently out of the community. Through job creation/retention and income growth, efficiency-based development policies assist in growing of the tax base for communities.

How Would an Energy Efficiency Local Development Policy Operate?

Local economic development programs that fund energy efficiency programs can aid economic development by fostering an environment in which investments in energy efficiency can thrive. One component of efficiency-based development policies would be education and technical assistance. These programs will assist in teaching companies and individuals in the community that the benefit associated with investing in energy efficiency can deliver significantly more to their companies and/or homes, and will more than exceed the additional first costs associated with the energy efficient equipment. Another component of local efficiency-based development policies would be to provide communities access to the experts in the fields of efficiency that otherwise would not be readily available to them. This expert access will further assist customers in identifying, developing, and capitalizing on developing energy efficiency opportunities. Local efficiency-based development programs will also deliver validation and verification services. These services will document to businesses, consumers, and the government the actual energy savings being delivered to the community and assist the community in overcoming any qualms about the reliability of the energy savings promises being offered by energy efficiency providers. Finally, by providing incentives and financial assistance, development-based energy efficiency programs can assist those customers who would like to pursue energy efficiency upgrades, but due to current capital requirements are unable to do so. By helping local businesses manage and reduce their energy consumption and costs, development-based energy efficiency programs assist local companies to compete, thrive, and flourish.

Energy Efficiency Local Development Policies vs. 'Traditional' Energy Efficiency Policies

On the surface, it could be argued that energy efficiency-based local development is essentially no different than 'traditional' energy efficiency programs. This is true in many ways. The mechanisms which would be employed in an energy efficiency local development program would borrow heavily from those developed for 'traditional' energy efficiency programs. The differences between energy efficiency local development policies and 'traditional' energy efficiency programs are questions on scale, scope and focus, rather than the mechanisms of the implementation. It is in these differences in approach, however, that distinguish energy efficiency local development policies from 'traditional' energy efficiency programs.

1. ***Scale:*** The first chief difference between energy efficiency local development policies and 'traditional' energy efficiency programs is a question of scale. Although similar in the implementation mechanisms of education, training, incentives and validation, energy efficiency local development policies differ significantly from 'traditional' energy efficiency programs on the scale in which these mechanisms are implemented. Although some municipal utilities do offer energy efficiency programs, the vast majority of 'traditional' energy efficiency programs in the United States are focused at the state or utility level. Energy efficiency local development policies are designed to be

implemented at the local level. This difference in scale is significant. 'Traditional' programs spread the value of their programs across a significantly large geographical base, which in turn blunts their effectiveness as economic development tools. Energy efficiency local development policies, on the other hand, draw on the mechanisms created in the implementation of these larger scale programs and focus their impact on the needs of the local community.

2. ***Scope:*** The second chief manner in which 'traditional' energy efficiency programs and energy efficiency-based local development policies differ is in the matter of scope. 'Traditional' energy efficiency programs have a disproportionate focus on how the reductions in energy consumption are delivered. In particular, 'traditional' programs are more focused on the amounts and types of energy efficiency equipment that are purchased under the program. For example, under the 'traditional' energy efficiency structure developed by the Texas Board of Public Utilities, illumination reductions are capped at 65% of economic incentives that other energy efficiency technologies would receive for identical energy savings. Energy efficiency-based local development policies on the other hand, are focused on specific goals of assisting local companies with controlling/reducing their energy costs. Under this scope, where 'traditional' energy efficiency policies are generally focused on technology acquisition, energy efficiency-based local development is focused on resource acquisition. The energy efficiency local development policies are going to promote which technologies will deliver the greatest energy savings to local companies with the least cost to the community, thus ensuring that the appropriate mix of technologies is implemented.

3. ***Focus:*** The final and most significant difference between energy efficiency local development policies and 'traditional' energy efficiency programs is essentially an outgrowth of the difference in scale and scope between them. The focus of energy efficiency local development policies is on the local community – in the form of using energy efficiency education, training, incentives and validation as mechanisms to create/retain jobs, increase income and increase the tax base. Most 'traditional' energy efficiency programs have very different focuses because of their larger scale or specific scopes. 'Traditional' energy efficiency programs seldom focus on any one local community, but rather on the larger state or utility needs. 'Traditional' programs often also focus on more nebulous program goals like market transformation, which can often conflict with the energy efficiency local development policy goal of maximizing local energy savings. Furthermore, when a utility or state employs a 'traditional' energy efficiency policy as a method to control load growth, those programs tend to focus on reducing the consumption of the largest consumers or broad customer classes.

Therefore, although energy efficiency local development policies may appear similar to 'traditional' energy efficiency policies - particularly in that they share common mechanisms of implementation – energy efficiency local development differs significantly from 'traditional' energy efficiency in its manners of implementation. Energy efficiency local development represents programs with a local scale and focused on reducing the energy consumption of local businesses as a mechanism to deliver economic development. 'Traditional' energy efficiency programs are large-scale programs that are not designed to maximize energy savings in any locale, and are often focused on larger more nebulous targets like market transformation or load growth control.

Why Energy Efficiency?

If we already have 'traditional' energy efficiency programs, why should we use any local development dollars on programs which may 'duplicate' the larger program in our area? First and foremost, there are still significant parts of the country where 'traditional' large scale efficiency programs have not taken hold or are still in their development/infancy stages. Furthermore, despite state-wide traditional economic development programs, like those designed to attract businesses to Michigan or Virginia for example, most local communities still implement their own additional traditional economic development programs to work in concert with existing state programs to attract jobs to their communities. Therefore, despite the existence of 'traditional' energy efficiency programs, locally focused and implemented energy efficiency policies can serve as economic development engines through their abilities to retain/create jobs, to increase incomes, and to expand the tax base. Energy expenditures are a significant cost for companies. For example, Bruce Stebbins, director of the Massachusetts regional office of the National Association of Manufacturers has suggested "energy prices will likely be the most critical challenge for manufacturing in the year[s] ahead."[10] As seen in Table 1, since 1997-2007, the increases in energy costs for gasoline, natural gas and oil have all grown significantly faster than the other costs faced by businesses, as measured by the Producer Price Index. Furthermore, electricity prices have grown essentially as fast as the Producer Price Index. This escalation in energy prices does seem to be at least somewhat out of step with most other business expenditures, rising significantly faster than most of the costs that a business faces (represented by the Producer Price Index).

Table I: Percentage Increases in U.S. Business and Energy Expenditures, 1987-2007

Fuel Type	Price Increase 1987-1997	Price Increase 1997-2007
Producer Price Index (PPI) [11]	24.1%	35.3%
Electricity[12]	7.5%	33.1%
Gasoline[13]	17.1%	241.5%
Natural Gas[14]	38.9%	175.4%
Oil[15]	36.9%	251.0%

The skyrocketing costs of energy have coincided with a period of unparalleled growth in global competition for most businesses. This increase in competition has placed significant downward pressures on the prices of end use goods. Many companies are facing rising production costs, which cannot be passed on to the customer in the form of high prices because

[10] N/A, "Soaring Energy Costs Fuel Speculation in Manufacturing," *BusinessWest*, 12 December 2005, 2pgs. Available at: http://findarticles.com/p/articles/mi_qu5286?is_200512/ai_n24310209/print?tag=artBody.

[11] PPI Data Source: Bureau of Labor Statistics, Producer Price Index-Commodities, Available at: http://data.bls.gov/PDQ/servlet/SurveyOutputServlet.

[12] EIA, Annual Energy Outlook, Electricity Demand Section, pgs. 7-8.

[13] Natural Gas Source: EIA, U.S. Natural Gas Wellhead Price (Dollars per Thousand Cubic Feet), available at: http://tonto.eia.doe.gov/dnav/pet/hist/n9190us3a.htm.

[14] Oil Price Source: EIA, Cushing, OK WTI Spot Price FOB (Dollars per Barrel), available at: http://tonto.eia.doe.gov/dnav/pet/hist/rwtca.htm.

[15] Gasoline Price Source: EIA, New York Harbor Conventional Gasoline Regular Spot Price FOB (Cents per Gallon), available at: http://tonto.eia.doe.gov/dnav/pet/hist/rrunyha.htm.

of these market dynamics. For example, a recent survey of Canadian businesses has found that "three quarters of the executives indicated their companies have absorbed all or some of the increasing energy costs they face."[16]

Consider the example of Quad/Graphics, one of the world's largest printing companies, for whom energy is one of their top three expenditures. Today, Quad/Graphics is selling printing jobs for less than they sold them five years ago, despite a 40% increase in their production costs over the same period.[17] Quad/Graphics is, by no means, alone in this scenario; many companies are feeling the squeeze of higher energy costs and restrained end prices. This has left them facing the difficult choices of how to address this untenable situation. Another example is the cement industry, where "profit erosion due to rising prices is a serious threat."[18] Moreover, it is not only large businesses that are feeling the squeeze of higher energy prices. The impact of rising prices is acutely felt by small businesses, which form the backbone of most communities, from the local farmer, to the metal fabrication shop to the local diner.[19] Higher energy costs have also led to the closing of over 260 paper and pulp mills, and some of the mills still in operation have seen energy costs exceed their employee compensation costs.[20] High energy costs also make attracting new plants difficult for local communities as evidenced by the chemical industry. Of the 120 chemical plants being built across the globe, only 1 is being built in the United States.[21]

Energy costs are likely to continue to be a critical issue for businesses, despite the 'traditional' energy efficiency programs which exist in many of the states. The utility industry faces a significant expansion requirement to meet demand needs,[22] global competition causes the prices for fuel and fuel stocks to escalate,[23] and the looming likelihood of greenhouse gas regulations.[24] Without economic development assistance, many companies will find it increasingly difficult to retain jobs in their communities, let alone create jobs, rather than exporting to regions or countries where lower energy prices provide them a greater opportunity to compete.

Challenges Facing Energy Efficiency Implementation by Businesses

If businesses are facing such significant pressure from rising energy prices, and energy efficiency represents a significant boon to them, why should an energy efficiency-based

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[16] Eric Beauchesne, "High Energy Costs Sap Corporate Confidence," Financial Post, 12 August 2008, 2 pgs. Available at: http://www.financialpost.com/story-printer.html?id=718732.

[17] Internal corporate research – validation of statistics available upon request and signature of appropriate disclosure agreements.

[18] Walsh, Allen. Open Letter to Other Cement Producers, 7 November 2005, pg. 1.

[19] For an excellent discussion of the impacts of energy prices on small businesses, see the report by the Democratic Staff of the House Small Business Committee, *Impact of Rising Energy Costs on Small Business,* 10 August 2006, 8 pgs.

[20] *Ibid.*

[21] *Ibid.*

[22] According to NOIA, the U.S. population has increased by 40% over the last 30 years, but our demand for electricity has increased by 47% over the same period (NOIA, p. 1); furthermore, the North American Electricity Reliability Council (NERC) anticipates that most regions of the country will be operating their generating systems at the full capacity, and inviting reliability issues by the middle of the next decade (NERC, 2007 Long Term Reliability Assessment, p. 11).

[23] See discussion above and footnotes 18-21.

[24] For a discussion of the likelihood that U.S. will soon experience greenhouse gas regulation, see Darren Samuelsohn, "Campaign 2008: McCain, Obama on same page with EPA climate regulations" available at: www.eenews.net/public/greenwire/2008/07/15/3.

economic development policy be needed? This is a legitimate question/concern, especially as economic development dollars must be stretched thinner and thinner to foster local growth. Many energy efficiency technologies have yet to be adopted because of the barriers to implementation that exist in many companies. These barriers include both investment (internal customer apathy toward saving energy[25], rate of return hurdles[26], competition with process investments[27], or lack of capital funding[28]) and/or institutional (consumer disincentives to save energy or information adequacy[29]). Local economic development programs that fund energy efficiency programs can assist firms in overcoming these barriers and thereby make them more efficient and assist them in retaining jobs. By providing education and technical assistance (either directly or through contracting with energy efficiency providing firms), development-based efficiency programs can overcome the challenges of convincing firms that just because they have a system (lighting, HVAC, compressed air) does not mean that the business cannot experience significant improvements from upgrading the system. Additionally, by providing experts in the field, development-based energy efficiency programs can assist customers in overcoming the lack of expertise by fostering the firms that can provide that expertise to customers and who can assist customers in optimizing the operations of their energy consuming systems. By providing the validation and verification of services, development-based energy efficiency policies can help assist firms overcome the challenges associated with proving that promised energy savings would be delivered. Finally, by providing incentives and financial assistance, development-based energy efficiency programs can assist those customers who would like to pursue energy efficiency upgrades to improve their competitiveness and job retention, but due to current capital requirements are unable to do so. By helping local businesses manage and reduce their energy consumption and costs, development-based energy efficiency programs help local companies to compete, thrive, and flourish in the local community, which helps protect local jobs. By providing incentives, validation, and education, energy efficiency-based development policies can help companies overcome the barriers to implementation. ***The only question that remains is whether energy efficiency-based policies meet the parameters of economic development policies in terms of job creation/retention, local income growth, and tax base expansion.***

Energy Efficiency Policies and Job Creation

Energy policies that assist local businesses to combat rising energy costs will serve as an effective job retention/creation option. Energy efficiency policies can provide that measure of energy cost control that firms desire. As Nancy Creed of Western Massachusetts Electric has noted, "we cannot control the marketplace, but we can help people control their consumption."[30] As such, this consumption control should be considered valuable economic development tools by development planners and municipal authorities. Energy efficiency programs can allow local development authorities to swiftly and decisively combat the rising energy costs that plague

[25] Barriers and Opportunities: A Review of Selected Successful Energy efficiency Programs. Worrell, Ernst. Price, Lynn. Lawrence Berkeley National Laboratory. Pg. 1.
[26] Getting ahead of the curve: Corporate Strategies That Address Climate Change. Andrew J. Hoffman. Pew Center on Global Climate Change Pg 18 & 95.
[27] Ibid.
[28] Gary Shamshoian et al., "High Tech Means High Efficiency," Forbes, 18 November 2005, pg. 2.
[29] National Action Plan for Energy Efficiency. EPA, US DOE. Page 1.9.
[30] N/A, "Soaring Energy Costs Fuel Speculation in Manufacturing" BusinessWest, pg. 2.

many of their local businesses. By reducing their energy consumption, firms necessarily blunt the impact of the skyrocketing prices of energy. By helping firms to lower the costs of production, energy efficiency development policies can position them more effectively in the increasingly competitive global marketplace. In addition, these policies often had the added benefit of resulting in improvements to product quality and/or worker performance.[31]

Efficiency-based local development programs themselves foster the creation of jobs within the community. This happens because when the local development authority invests their economic development dollars in energy efficiency, they both spawn direct job creation in the energy efficiency industry and induce further job creation in the community at large. For example, as the Department of Energy points out, energy efficiency investments by local development authorities have three types of job creation impacts: 1) direct, 2) indirect, and 3) induced.[32]

1. **Direct Job Creation**: Direct jobs are those that created directly in response to the energy efficiency development program. These jobs include those jobs that perform "the work created in the administrating body."[33] Whether the local development authority program administers the program directly, hires a third party to administer the program, or contracts with energy efficiency providers to drive the program, the creation of the program will, in and of itself, create jobs for the community. Moreover, the Department of Energy points out, local development-based energy efficiency programs also creates jobs for the firms who sell the energy efficiency units and for the contractors who install it.[34] Finally and most obviously, if communities invest in local-development based energy efficiency policies, they are likely to attract companies who develop, design, and manufacture energy efficiency technologies to their communities, and the jobs these enterprises would create are also direct jobs.
2. **Indirect Job Creation:** Indirectly created jobs are those that created by firms who service those who experience direct job creation. The vendors who see an uptake in purchases in the local community will require additional local support staff or warehousing services, for example, which in turn results in further job creation.[35] Moreover, the installers who see additional business will drive additional demand for the local equipment and services that they employ in their direct work, which further creates additional jobs for those supplying firms.[36]
3. **Induced Job Creation**: By adding more jobs to the community, the programs increase demand for all products from local firms, like restaurants, movie theaters, or professional services providers.[37] To meet this increased demand, local businesses will be induced to create additional jobs to serve this demand.[38] In this manner, local development-based energy efficiency programs are a rising tide that lifts all boats.

   In a recent response to the question and answers regarding the Energy Efficiency and Conversation Block Grants (EECBG) being provided by the Federal Government, the

[31] Shamshoian, p. 2.
[32] DOE, The Job Connection, p. 3.
[33] ACE, "Employment Impacts of Energy Efficiency Investment," p. 1.
[34] DOE, The Job Connection, p. 3
[35] DOE, The Job Connection, p. 3.
[36] ACE, "Employment Impacts of Energy Efficiency Investments," p. 2.
[37] DOE, The Job Connection, p. 3.
[38] *Ibid.*

Department of Energy has stated that for every $92,000 invested in energy efficiency, there is one (1) new job created or retained for the local economy.[39] ***It is clear that local development-based energy efficiency policies meet the first standard of an economic development tool; they both retain and create jobs in the local community.***

Energy Efficiency Policies and Income Creation

Development-based energy efficiency policies will have a positive impact on the income levels of the local communities. This is driven by a couple of factors – the first of which being the job creation/job retention component of the policies themselves, and the second is the income multiplier effects associated with the investment in local development-based energy efficiency policies.

The first and obvious income impact from energy efficiency development policies is the job retention component discussed above. Although this should be clear, it cannot go unmentioned. Firms who remain in business in their community retain more jobs than the new firms that are recruited to the community to replace them after their loss. For example, the city of Manitowoc, Wisconsin lost 900 workers when the Mirro cookware manufacturing plant closed. Although an independent aluminum mill and Orion Energy Systems have replaced the facility, the two firms together employ perhaps a third of the people that Mirro once did in the city.[40] When economic development policies can keep firms in the community from relocating to other parts of this country or out of the country altogether, they have a significant impact on local incomes by not lowering them. Although this is not income growth per se, it is helping the community to maintain its income level, rather than having to start over from the depressed spot of trying to attract business after its core employers have departed from the community. When a major employer leaves a community, many employees also leave as they pursue jobs elsewhere. These departures further dry up demand for services in the community, thereby further reducing jobs and incomes in the community.

"Increasing spending in one part of the economy starts a chain reaction that results in an overall increase in economic activity."[41] This is the description of the multiplier effect. More exactly, the multiplier effect says that for every dollar spent in the community, a portion of the dollar is saved and a portion spent – typically in the local community – and so on. This means that every dollar spent in a community has more than a dollar in overall economic impact for the community.[42] As local development authorities and municipal agencies invest funds in their local communities through energy efficiency programs with their local businesses, they both help the firms create or retain jobs by assisting them in managing and controlling their energy costs. These same policies are also creating additional income for the community.

The additional income created by energy efficiency policies is generated as follows. The goal of energy efficiency-based local development, as stated above, is to develop policies that assist businesses in reducing their energy costs. By reducing the energy costs, companies have additional funds to re-invest in their companies, typically at a rate of 90% of every dollar saved according to the American Council for an Energy Efficiency Economy, or to weather the impact of increased global competition without re-locating production or shedding employment. These

[39] Information provided by the American Public Power Association (APPA) at their May 19-20 seminar on the EECBG program in Chicago, Illinois.
[40] N/A, "Export Boom fuels Town's Revival" Wall Street Journal
[41] Windustry, "Definition of the Multiplier Effect," p.1; available at www.windustry.com/multiplier-effect.
[42] Wayne P. Miller, "Economic Multipliers: How Communities Can Use Them for Planning," pgs. 1-2.

additional funds represent monies which flow into the community and are re-circulated and spent on most local items, which in turn raises the overall income level of other local companies, and in turn begins the re-investment cycle again, albeit on a decreasing scale.

The flip side of this effect is also true. Every dollar that the community sends out of the community to purchase fuel supplies is a dollar lost to the community's economic development engines. For example, according to the Department of Energy, the city of Wooster, Ohio has a $110 million annual energy bill, of which 90% of the funds flow out of the community.[43] This means $99 Million dollars worth of income flows out of the community and cannot be employed for the creation of additional income within the community. Clearly local development-based energy efficiency policies can have a significant income creation impact even if they only capture a quarter of this income outflow.

It should be noted that the Department of Energy has found that the income creation impact of energy efficiency spending is far higher than many other avenues of income creation. The income multiplier for the investments in energy efficiency is $1.32.[44] This means that the end result of the reinvestment cycle discussed above is that for every $1.00 spent on energy efficiency by the local development authorities, $2.32 of income is created in the local community. As can be seen from the following chart, investments in energy efficiency can have some of the greatest income creation impacts for the local community.

Table II: U.S. Multiplier Effects by Sector[45]

Sector	Multiplier
Manufacturing	1.59
Agriculture, forestry, fishing, and hunting	1.34
Energy Efficiency[46]	1.32
Information	1.28
Finance, insurance, real estate, rental, and leasing	1.27
Professional and business services	1.21
Mining	1.17
Transportation and warehousing	1.15
Wholesale trade	1.04
Arts, entertainment, recreation, accommodation, and food services	1.03
Other services, except government	1.02
Government	1.02
Educational services, health care, and social assistance	1.01
Retail trade	1.01
Construction	1.01
Utilities	1.00
Economy Average	1.15

To understand the chart above, consider the following – a community spends $1.00 on government services. The government services are 1.02, so the investment impact of spending $1.00 on government services is $2.02 (the $1.00 initial investment plus $1.02 of income created by the investment).

[43] DOE, The Job Connection, p. 2.
[44] Department of Energy, Office of Energy Efficiency and Renewable Energy, Available at: www.eren.doe.gov/cities_counties/energyeff.html, pp. 2-3
[45] Source: United States Department of Commerce, 2006 Annual Input-Output Tables.
[46] Department of Energy, Office of Energy Efficiency and Renewable Energy, Available at: www.eren.doe.gov/cities_counties/energyeff.html, pp. 2-3.

It should be noted that the greatest multiplier factor in the chart above is for investment in manufacturing. Investing in local development-based energy efficiency policies, however, will help the local community's manufacturing base become more efficient and consume less energy, which in turn will likely lead to those companies to re-invest at least a portion of those savings back into their communities. Therefore, this will create an additional feedback loop of income creation from the investment in energy efficiency for the community.[47] It has been argued by the Department of Energy and the American Council for an Energy Efficient economy that the income creation impacts from the savings generated by the energy efficiency investments may significantly exceed the income effects from the investments themselves.[48] This additional feedback loop of freeing up additional income to be re-invested in the community only comes from investment in energy efficiency. Therefore, this is why investing in energy efficiency is as effective, if not more, than investing in traditional manufacturing-based local development policies.

To demonstrate the impacts of energy efficiency-based (i.e. incentives, education, and validation) vs. traditional manufacturing-based (i.e. tax breaks, loans, job creation credits) local development policies, consider the following hypothetical example:

- A community that consumes $110 Million worth of energy (90% of which flows out of the community) elects to spend $25 Million in development dollars to improve the local economy. They can invest development funds in either:
  - Tax breaks, low-interest loans, and job creation credits to successfully attract new manufacturing businesses to the community (traditional manufacturing-based development); or
  - Equipment incentives, education, monitoring and verification and resource acquisition through energy efficient technology investment (energy efficiency- based development policies).
- For the sake of discussion, this analysis makes the simplifying assumption that either policy will be successful in its intended aims of generating new income. The energy efficiency policy, however, because of the energy savings/re-investment feedback loop, will generate significantly more income development than the traditional manufacturing- based approach.
- Manufacturing-Based Development generates an additional $39.75 Million dollars income from the initial $25 Million investment, or a return on investment of 159%.
  - To determine the impact of manufacturing-based development, the initial investment of $25 Million is multiplied by the U.S. manufacturing multiplier of 1.59, as every $1 spent on manufacturing-based development will generate an additional $1.59 income for the community ($25 Million * 1.59 = $39.75 Million)
  - The total impact of the traditional manufacturing-based development policy is the sum of the initial investment ($25 Million) plus the incomes created by the multiplier ($39.75 Million) for a total of $64.75 Million.
  - The percent of new incomes created is calculated by taking the created income ($39.75 Million) is divided by the initial investment ($25 Million) to determine the change in income (1.59) and multiply by 100 to get 159%.

[47] DOE, The Job Connection, p. 3.
[48] *Ibid.*

- Energy Efficiency-Based Development generates an additional $103.24 Million in income from the initial $25 Million investment, or a return on investment of 413%.
  - The first component to the return on investment for the energy efficiency-based development is the initial investment ($25 Million) times the energy efficiency multiplier (1.32), which yields the investment multiplier proceeds ($33 Million).
  - The second component comes from the community's energy savings which can be and will be re-invested in the community at a rate of approximately 90%.[49]
    - The energy savings captured by the project is based on 33% reduction in the community's spending on energy efficiency, which is consistent with the authors' company's field experience.
      - Therefore, if the community spends $110 Million on energy, the impact of the proposed energy efficiency-based development policy would be a reduction in spending of $36.3 Million ($110 Million *0.33 = $36.3 Million)
      - As noted above, 90% of this $36.3 Million, or $32.67 Million, is re-invested into the community by the companies that save it. This re-investment is an income inflow for the community.
      - In addition, when the energy savings are re-invested in the community, those funds will also create their own income multiplication impact at the national economy wide average of 1.15. This means that for every dollar of the re-invested energy savings ($32.67 Million), an additional $1.15 of income is created for the community (S37.57 Million).
      - Therefore, the total income creation impact of the local development energy efficiency policies is the sum of the initial investment ($25 Million), the efficiency multiplier proceeds ($33 Million), the energy-savings re-investment ($32.67 Million) and the multiplier proceeds from the energy savings re-investment ($37.57 Million). This totals the $128.24 Million impact shown above.
      - The percent of new incomes created is calculated by taking the created income ($103.24 Million) is divided by the initial investment ($25 Million) to determine the change in income (4.13) and multiply by 100 to get 413%.
- In addition, based on the assumption that the average community spends approximately 5% of their income on energy consumption[50]:
  - The Manufacturing-Based Development plan increases the city's energy bill to $113.24 Million per year.
    - Since this policy would increase local incomes by $64.75 Million, the additional impact on electric bills would be $3.24 Million per year ($64.75 Million * 0.05 = $3.24 Million).
    - The city's total bill therefore is the existing energy bill ($110 Million) plus the increase in bills generated by the manufacturing-based development policy ($3.24 Million).

[49] According to ACEEE report cited in the DOE, The Job Connection, p. 3 – energy savings re-investment is approximately 90%.

[50] According to DOE study reported in Edison Electric Institute paper, "LIHEAP Funding Levels Must Be Increased," the average U.S. family spends 3.5% of their income on energy – so this 5% is probably a reasonable, albeit conservative estimate of how much additional energy spending will be generated by the development polices.

- The Energy Efficiency-Based Development plan reduces the city's energy bill to $80.11 Million per year.
  - The energy efficiency-based local development policy will increase local incomes by $128.24 Million, and therefore add $6.41 Million to the community's electric bill ($128.24 Million * 0.05 = $6.41 Million).
  - However, the energy efficiency local development based policy also reduces overall energy spending, as noted above, by $36.3 Million.
  - Therefore, the overall impact to the community's electric bill is the initial energy costs ($110 Million) minus the energy savings generated by the energy efficiency development policy ($36.3 Million) plus the bill impact from the increased income generation ($6.41 Million), or $80.11 Million.

The table below shows how the above information was arrived:

Table III: Manufacturing vs. Energy Efficiency Local Development Comparison

Variable	Manufacturing Based Development	Energy Efficiency-based Development
Pre-Development Energy Costs	$110 Million	$110 Million
Development Investment	$25 Million	$25 Million
Investment Multiplier	1.59	1.32
Investment Multiplier Proceeds	$39.75 Million	$33.00 Million
Energy Savings	N/A	$36.3 Million
Energy Savings Re-Investment	N/A	$32.67 Million
Re-Investment Multiplier	N/A	1.15
Re-Investment Proceeds	N/A	$37.57 Million
Total Income Creation	$64.75 Million	$128.24 Million
Additional Energy Costs	$3.24 Million	$6.41 Million
Post-Development Energy Costs	$113.24 Million	$80.11 Million
Return on Development Fund Investment	159%	413%

It is also clear that efficiency-based development policies meet the second economic development policy standard; as this analysis shows they create significant amounts of income for the local community.

Energy Efficiency and Tax Base Creation

The final requirement for effective local development policies is policy implications on government tax revenues. Although efficiency-based policies may not immediately expand the tax base in the traditional manner, namely more taxpayers, they will expand the tax revenue by creating new taxable income or the tax rolls by creating new jobs or retaining jobs that otherwise would have left the community. The following section will discuss the impacts of local efficiency-based development policies on the government tax base.

Governments traditionally earn tax revenues both on consumer/business spending and also on utility sales. Typically, governmental entities have not been supportive of efficiency-based development initiatives due to the lower tax revenues these policies are perceived to deliver due to lower utility sales. The following two charts will investigate the implications on government tax revenues from the three capacity applications proposed by the utility in this example.

Employing efficiency-based development policies will reduce the revenues that the government will collect taxing utility sales. These reductions, however, are significantly lower than the increase in tax revenue associated with the growth in both local employment and local income that the community sees. By retaining/creating jobs, efficiency-based development policies increase payroll, income, and various other employment related taxes for the community. By increasing community income, it is likely that efficiency-based development policies will deliver numerous opportunities for tax increases for the community in the form of higher income tax revenues, higher sales tax revenues, higher fees, and so on, or in higher returns to the community from state/federal taxes receipts, which also will increase from the increased income created by the energy efficiency local development based policy. ***It is clear that by increasing employment levels and incomes without providing additional tax breaks, local efficiency-based development policies will necessarily expand the tax base, thereby meeting the third requirement of effective economic development policies.***

Conclusions

Energy efficiency policies, although seldom considered as economic development tools, do retain/create jobs, increase income and expand the local tax base. Therefore when considering how to invest development funding in their communities, development authorities should strongly consider energy efficiency development policies. The question then remains how to move energy efficiency local development policies from the realm of the hypothetical example discussed above to a concrete implementation. It is the author's belief that the current influx of federal funding under the 2009 stimulus programs will create such an opportunity to fund the program for many communities.

As noted above, communities looking to implement an energy efficiency-based development policy should establish the appropriate mechanisms to move funds into the community to help local firms reduce their energy consumption. These mechanisms should include:

1. Education and outreach initiatives across the local business base
    a. Education regarding the different types of technologies available to firms in the community to reduce their energy needs – perhaps through an energy efficiency technology exposition for local businesses;
    b. Energy audits to help local businesses understand why and how they consume energy;
    c. Identification of energy savings opportunities for the local business community;
2. Incentivize energy efficiency behavior; and
    a. This should represent the bulk of funding spent on the local development program;
    b. Like traditional economic development approaches, firms receiving energy efficiency funding from the local community should be required to commit to a job creation/retention total as pre-condition of funding;
    c. In addition, the funding should be required to go to indentified energy savings projects, from a city-sanctioned energy audit, to ensure that energy savings do occur;
    d. The city should also consider contracting with local/outside energy efficiency providers to deliver firm capacity reductions through energy efficiency.

3. Validate the energy savings;
   a. The local government should spend some portion of the funding on measurement and verification to ensure that proposed energy savings are being delivered at the customer sites;
   b. In addition, the community will be able to measure the number of jobs retained through the customer commitments as part of the energy funding, and if the company does not meet the agreed commitments, the city should develop a mechanism to re-capture funds as necessary.

These concepts represent a summary of the possible mechanisms for the development of energy efficiency-based local development policies, but by no means represent the only manner in which such policies could or should be implemented. The authors' goal with this analysis is to initiate a dialogue on the role of energy efficiency-based local development policies.

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