

INVESTING TO RE-ENERGIZE OHIO

A REPORT FROM

POLICY MATTERS OHIO

AND



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Executive Summary

Ohio uses a large amount of energy, most of it from fuel produced elsewhere. We rank fourth among states for industrial energy use and sixth for total energy consumption. We import two-thirds of our coal, 89 percent of our natural gas, and 98 percent of our oil and petroleum products. At current energy prices, Ohioans send \$20 billion a year out of our state economy. To make our economy more energy independent—by becoming more efficient, self-sustaining, and renewable—Ohio should expand its clean energy fund.

Clean energy funds, such as Ohio's Advanced Energy Fund, help break down market barriers standing in the way of meeting renewable energy goals. Gov. Ted Strickland proposed a plan for "Energy, Jobs, and Progress for Ohio" that would require 12.5 percent of Ohio's energy to come from renewable energy sources such as wind, solar, and biomass. While Policy Matters Ohio supports a stronger standard—20 percent of all energy in Ohio should come from renewable energy—a strong fund complements either standard.

Eighteen states use clean energy funds to encourage consumers and suppliers to invest in clean energy products and services: by reducing equipment costs through use of consumer rebates, grants, and low-interest loans; by conducting statewide public-awareness campaigns; by providing incentives for industrial recruitment, retention, and production; and, by training workers for the green economy. The American Council for an Energy Efficient Economy (ACEEE) reported that for every public dollar spent, public benefits funds for clean energy leverage an additional \$3 in related business and consumer investment.

Clean Energy Funds range from \$2.3 million to \$440 million dollars per year across the 18 states. Together these states and Washington, D.C., set aside nearly \$2 billion a year for clean energy projects. A surcharge on Ohio electric utility bills, currently adding 9 cents to every customer's monthly bill, generates \$5 million each year for Ohio's Advanced Energy Fund and puts Ohio at the bottom of the pack. Other industrial states collect more money than Ohio annually—Michigan over \$66 million, New York \$175 million, and Wisconsin over \$82 million. Pennsylvania's governor has proposed an \$850 million energy fund (\$72 million from utility surcharges leveraging \$850 million in bonds). The most comprehensive state programs collect 2 to 3 percent of total utility revenues. In comparison, Ohio spends less than 0.3 percent on clean energy. We do spend in other ways: \$12 million yearly for low-income household weatherization and energy-efficiency and \$65 million over the past 5 years for energy-related research and development, but Ohio's Advanced Energy Fund should be strengthened.

The Advanced Energy Fund, housed in the Ohio Department of Development's Energy Office, uses grants, contracts, loans, linked deposits and production incentives to encourage renewable energy. Residential customers, housing developers, commercial and industrial businesses, local governments, educational institutions, nonprofit entities, and agricultural customers can apply. However, only investor-owned electric utility customers are paying into the fund, and eligible to apply, so the program is not available statewide.

Total revenues collected from utility surcharges, since the Advanced Energy Fund's inception in 1999, exceed \$77 million (with residential consumers financing the bulk of the fund). Approximately \$8 million has been deposited in banks and used to lower interest rates on consumer loans (the deposits will be returned but the \$1.85 million in interest accrued is sacrificed). Almost \$3.5 million has been allotted for grants. Twenty million dollars is set aside for projects in process, such as making a new low-income housing project more energy efficient. Since the Advanced Energy Fund got off to a slow start—due to its modest size, administration difficulties, and economic conditions—funds sat for some time, and Ohio's legislature transferred or set aside \$24 million of that \$77 million for other programs. Although some of those transfers relate to the fund's purpose, such as biodiesel for school buses, most were used to meet budgetary shortfalls for non-related purposes.

The funds spent on clean energy indicate potential for more far-reaching gains. A little over \$5 million in Advanced Energy Funds leveraged an additional \$21 million in outside investment. Ohio consumers eagerly took advantage of the funds to invest in energy efficiency, solar power, wind power, and biomass equipment. Recently, \$5 million in grant funding was allocated from the Advanced Energy Fund to aid in the creation of two large-scale wind farms that will help provide electricity to 45,000 Ohioans.

Ohio's Advanced Energy Fund, small as it is, will halt in 2011. The Advanced Energy Fund should be expanded, made permanent, and used to encourage both the supply of and demand for energy efficiency improvements and renewable energy systems. A \$0.003 per kilowatt-hour surcharge on energy use would generate an annual fund of over \$465 million—representing about a \$2.80 monthly increase for the average residential consumer.

RECOMMENDATIONS FOR AN EXPANDED ADVANCED ENERGY FUND

- Implement a statewide outreach campaign to educate the public on energy efficiency and renewable energy (both consumers and suppliers). Use Advanced Energy Funds to offer free energy audits to Ohioans.
- Market consumer incentives such as simple customer rebates for green products.
- Collect Advanced Energy Funds from all utility customers, not just investor-owned.
- Provide low-income residents with solar thermal water-heating systems.
- Provide more financial incentives for suppliers and potential suppliers of green energy products and service to expand Ohio's green supply chain.
- Promote economic development by providing "green incentives" with Advanced Energy Funds. Instead of offering dollars to lure companies, offer wind turbines or rooftop solar panels to reduce their energy costs and consumption.
- Create a Green Jobs Corps program that provides green employment services and also weaves together vocational skills training programs, union apprenticeship programs, and recognized pre-apprenticeship programs for job seekers.
- Encourage the creation of a federal national public benefits "matching fund."

A strengthened and expanded Advanced Energy Fund would improve Ohio's economy and reduce our need to import expensive and polluting fuels.

I'd put my money on the sun and solar energy. What a source of power. I hope we don't have to wait 'till oil and coal run out before we tackle that.

Thomas Edison

Introduction

As a manufacturing powerhouse, Ohio uses a large amount of energy. In 2006, Ohioans spent over \$40 billion on energy.¹ Because of Ohio's energy-intensive industry, rising energy costs hit Ohio hard. Ohio ranks fourth in the nation for the amount of energy our industry uses, and we rank sixth for total energy consumption.²

Ohio imports the vast majority of the fuel for this energy from other states and other countries. At current market prices for energy, over \$20 billion a year flows out of our state's economy.³ Instead of sending so much of Ohio's money out of the state and out of the country, we should create more of our own energy, use more renewable energy sources, become more energy efficient, and employ Ohio workers in the process.

The state of Ohio's Advanced Energy Fund could jump-start Ohio's economy by providing incentives for Ohioans to invest in renewable energy and energy efficiency. However, the fund is small and needs to be much larger to make a significant impact. A larger fund would accelerate the development of Ohio's green economy—creating thousands of green collar jobs—and reduce our dependence on imported fossil fuels.⁴

Public benefits funds, such as Ohio's Advanced Energy Fund, create economic benefits for individual consumers, as well as local and state economies.⁵ Consumers use these funds to invest in a diverse assortment of green energy options—wind, solar, biomass, and efficiency, among others. In turn, each consumer dollar invested in renewable energy and energy efficiency creates more manufacturing, construction, retail, and service jobs than

¹ Martin Kushler, Ph.D. *Ohio's Energy Crisis and Why Energy Efficiency Should be a Top Policy Priority*, ACEEE Testimony to Ohio House of Representatives Alternative Energy Committee (June 13, 2007).

² Energy Information Administration, *Energy Consumption by Sector, Ranked by State, 2004* at http://www.eia.doe.gov/emeu/states/sep_sum/html/pdf/rank_use.pdf.

³ Calculations based on Energy Information Administration, *Ohio Energy Consumption Estimates, 2004, Ohio Energy Prices, April 2007*, listed at http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=OH#map, EIA Energy Production Estimates for Ohio.

⁴ See Amy Hanauer, Policy Matters Ohio and Apollo Alliance, *Generating Energy, Generating Jobs (October 2005)* at http://www.policymattersohio.org/pdf/generating_jobs.pdf. See also *Economic and Jobs Impacts of the Renewable Energy and Energy Efficiency Industries: U.S. and Ohio*. Roger H. Bezdek, Ph.D. President, MISI, Washington, D.C., Summary Released at Closing Luncheon of SOLAR 2007 - July 12, 2007, Full 150 Report on ASES web site in late July.

⁵ B. Prindle & M. Eldridge of American Council for an Energy-Efficiency Economy, and M. Eckhardt & A. Frederick, American Council on Renewable Energy, *The Twin Pillars of Sustainable Energy: Synergies between Energy Efficiency and Renewable Energy Technology and Policy* (May 2007).

an equivalent dollar spent on conventional energy. An aggressive investment in renewable energy could lead to over 20,000 manufacturing jobs in Ohio.⁶

A number of other states recognize the importance of these public benefit funds to advance their economy for renewable energy and energy efficiency measures. Eighteen states and Washington, D.C., together set aside nearly \$2 billion each year in public benefits funds.⁷ Over a three-year period, from 2006 to 2008, California will invest an additional \$2 billion on energy-efficiency measures alone. Gov. Ed Rendell of Pennsylvania, a state with an economy similar to Ohio, has proposed the creation of an \$850 million Energy Independence Fund—using \$72 million collected through a public benefits surcharge to leverage \$850 million in state bonds for renewable energy and energy efficiency purposes.⁸

Ohio collects just \$5 million a year for its Advanced Energy Fund to provide green-energy incentives, and the collection of those funds will halt in 2011. Ohio spends an additional \$12 million from the Universal Service Fund each year from a universal service charge on electric utility bills to provide nearly 10,000 low-income energy consumers with weatherization and energy-efficiency services, and energy education.⁹ The state's Third Frontier Program—a program designed to encourage research and development and high-tech jobs in Ohio—also awarded 10 percent of its R&D grants for Power and Propulsion technologies such as fuel cells and turbines (\$65 million since the fund's inception in 2002).¹⁰

Recently, Gov. Ted Strickland announced his plan for “Energy, Jobs, and Progress for Ohio.” To promote the use of cleaner energy, Governor Strickland proposed an Advanced Energy Standard that would require 25 percent of all of Ohio's energy to come from “advanced energy” sources by 2025—including renewable energy sources, as well as clean coal and what supporters describe as advanced nuclear power sources. Half of this power would be required to be generated within Ohio. Also, half of that 25 percent of advanced

⁶ Hanauer, Amy, Policy Matters Ohio and The Apollo Alliance, *Generating Energy, Generating Jobs* (October 2005) at http://www.policymattersohio.org/pdf/generating_jobs.pdf.

⁷ EPA, *Public Benefits Funds for Energy Efficiency*, at Ch. 4 of CLEAN ENERGY ENVIRONMENT GUIDE TO ACTION (2006).

⁸ Pennsylvania, *Energy Independence Strategy*, FAQs.

⁹ Through the Universal Service Fund. See Ohio Partners for Affordable Energy, *Weatherization Program Cheat Sheet* (August 2007) at <http://www.ohiopartners.org/doc.htm>. An additional \$50 million in federal and utility funds are also used for low-income weatherization and energy efficiency efforts. See also B. Hoffmeister, *Analyzing budget for Department of Development, FY 2008 – FY 2009 Final Fiscal Analysis*. Ohio also exempts certain clean energy property from real and personal property taxes, use and sales taxes, and corporate franchise taxes). Some Ohio utilities, including Duke Energy, Paulding-Putnam EC, and The Energy Cooperative, also offer rebates for energy efficient appliance purchase or use.

¹⁰ See Ohio Department of Development Presentation Materials for the Third Frontier Commission and Advisory Board (August 21, 2007), found at http://www.ohiochannel.org/your_state/third_frontier_project/index.cfm. It is likely that greater proportions of Third Frontier funds will go towards green innovation in the future—Governor Strickland appointed his Energy Advisor to sit on the Third Frontier Commission, and the Ohio Department of Development recently advised the Commission to create an Advanced Energy program and allocate \$21 million in Third Frontier funds in FY2008 for advanced energy projects (\$10 million operating costs, \$11 million capital).

energy, or 12.5 percent, would be required to come from pure renewable energy sources. Governor Strickland's proposal would also require any expected growth in electricity use to be reduced by 25 percent, and total peak demand to be reduced by 10 percent, through energy efficiency measures.

Policy Matters Ohio supports a stronger standard that would require 20 percent of all energy used in Ohio to come from renewable resources by 2025. We also recommend an efficiency standard that would require utilities to reduce total electricity use in Ohio 20 percent by 2025. Strong standards drive innovation and the adoption of best practices, and create economies of scale from large-scale adoption of innovative goods and services in order to meet those standards.

A strong public benefits fund would complement either of these standards. Such a fund can help break down market barriers standing in the way of meeting renewable energy and energy efficiency standards—such as lack of public awareness, lack of information and training for potential suppliers, limited product availability, lack of money or financing and up-front capital for projects, and high transactions costs (such as becoming fully informed of clean energy options). The funds also help reduce prices for things that have social benefits, making the market work more efficiently. Public benefits funds reduce equipment costs—for Ohio's consumers, producers, and utility companies—and, provide education, training, and outreach to potential consumers and suppliers of clean energy products and services.¹¹ In California, public benefits funds were even used to pay the incremental cost of utility compliance with California's renewable energy standard.¹²

An expanded Advanced Energy Fund could provide the state with strategic opportunities to develop a cohesive strategy for clean energy support programs—to stimulate the clean energy market for commercially-ready clean energy technology, support research and development of innovative technologies and demonstration projects, and provide outreach and education services.

Rising Energy Costs Burden our Economy

Ohio imports the vast majority of its fuel from other states and other countries. We import 89 percent of our natural gas, and 98 percent of the oil and petroleum products consumed in the state.¹³ Ohio produces only about one-third of the coal used in the state and imports the rest.¹⁴

¹¹ EPA, *State Clean Energy Funds: An Effective Mechanism to Encourage Clean Energy Supply*.

¹² EPA, *Clean Energy Guide to Action*, Sect. 5.2 *Public Benefits Funds for State Clean Energy Supply Programs* (2006).

¹³ Sara Ward, Ohio Department of Development, Ohio Energy Office, *Ohio Energy Policy: Economic, Environmental, and Social Impacts* (October 2, 2006). See powerpoint presentation at <http://www.oardc.ohio-state.edu/amp/OSU,%20Oct%202,%202006.pdf>.

¹⁴ *Ohio Energy Profile*, Energy Information Administration, at http://tonto.eia.doe.gov/state/state_energy_profiles.cfm?sid=OH

These imports are costly already and energy prices continue to rise. Since 2000, oil and coal prices doubled while natural gas prices nearly tripled.¹⁵ The average national household spent \$1,600 more for energy in 2006 than it did four years earlier. In 2002, the average household spent about \$3,000 on energy—half for transportation, and half for home uses. By 2006, that amount increased by 50 percent to \$4,600 per year.

As Dr. Martin Kushler from the American Council for an Energy Efficient Economy testified to Ohio's Alternative Energy Committee this past spring, "Ohio's economy is getting clobbered by high energy import costs!"¹⁶

Public Benefits Funds for Green Energy Will Stimulate Ohio's Economy

Historically, electric utility companies have provided public services, called "system benefits," which support energy efficiency measures, assist low-income consumers, and stimulate research and development.¹⁷ The movement toward electric deregulation and "competition" in the electric industry, however, led utilities to cut costs and eliminate these system benefits. As a result, many states stepped in and passed legislation creating public benefits funds to ensure a continued stream of revenue for these kinds of public services.¹⁸ In the early stages, these funds were primarily used for low-income programs and energy-efficiency measures. Seventy percent of public benefit funding has gone toward energy efficiency and load-management programs.¹⁹ Increasingly though, these funds are also being used to support the supply of clean energy—including renewable energy and combined heat and power technologies. Because these funds support both energy efficiency and renewable energy, they are often referred to as clean energy funds.²⁰

Clean energy funds are typically generated by levying a small surcharge on each kilowatt-hour of electricity used by consumers. Funds have different types of administrators across the states—state energy offices, quasi-public agencies, public regulatory agencies, non-profit organizations, or utilities.

A number of states, including Ohio, use these state-controlled public benefits funds on focused efforts to develop their new green economies. Specifically, public benefits funds can be used to educate consumers and suppliers on their green energy options, and to provide financial incentives for the use and production of green energy products and services. Clean energy funds are used to narrow the gap between the price of traditional electricity and the price of generating alternative energy in order to encourage private

¹⁵ See Kushler, ACEEE Testimony, note 1.

¹⁶ See Kushler, ACEEE Testimony, note 1.

¹⁷ American Council for an Energy Efficient Economy "A Federal System Benefits Fund: Assisting States to Establish Energy Efficiency and Other System Benefit Programs" at www.aceee.org/energy/pbf.htm. Ohio flirted with demand side management programs (DSM) in the 1990s. Only Duke Energy Ohio has continued to operate DSM programs.

¹⁸ Glossary, www.dsireusa.com

¹⁹ ACEEE and ACRE, *Twin Pillars of Sustainable Energy*, see note supra.

²⁰ <http://www.epa.gov/cleanenergy/pdf/summary-matrix.pdf>.

investments into the green economy.²¹ These financial incentives are also used to alleviate some of the sting from up-front investment costs for green energy projects. While green energy often pays for itself over time—and the higher conventional energy prices go, the better these payoffs look—it usually requires a substantial initial investment. See Box 1 describing the types of financial incentives states use. As with any financial incentive, there should be standards and disclosure.

Box 1. States Use Public Benefits Funds to Provide Financial Incentives*

Rebate Programs. Rebate programs encourage homeowners and businesses to purchase and install renewable energy equipment (*e.g.* solar hot-water heaters and solar electric systems).

Loan Programs. Low- or no-interest loans help finance green energy projects (available to residents, businesses, industry, non-profit institutions, and public agencies).

Grant Programs. Grants can be used to encourage the use and development of renewable energy and energy efficiency products and services.

Industrial Recruitment and Retention. Grants can be used to attract renewable-energy manufacturers, retool existing infrastructure and retrain workers for green energy projects and jobs.

Production Incentives. Cash incentives are used to encourage the production of renewable energy, and can be performance based (per kilowatt-hour, or per gallon of biofuel produced).

Source: Database of State Incentives for Renewable Energy (dsreusa.org)

According to one Ohio retailer of solar and wind products, properly sited utility-scale wind turbines can pay for themselves in 6-10 years, but a typical small wind generator can take up to 18 years before the initial investment is recovered.²² Solar thermal hot water heating systems take 10-15 years to pay back their up-front costs through utility bill savings. Solar panels take longer. However, a solar panel used for commercial purposes—with the help of a state grant, federal tax credits, and tax benefits from accelerated depreciation—could pay for itself as early as seven years after the initial investment.²³

Continued demand for renewable-energy products encourages innovation in these developing markets. Improvements in renewable energy technology will continue to lower the cost of equipment and make the equipment more efficient—ultimately providing for a faster return on investment (and shorter payback period).

²¹ EPA, *State Clean Energy Funds: An Effective Mechanism to Encourage Green Energy Supply*

²² Dovetail Solar and Wind at <http://www.dovetailsolar.com/faq.htm>

²³ Dovetail, see note supra (assuming a 5 percent annual utility inflation rate, a 30 percent federal tax credit that is not capped, and MACRS accelerated depreciation method).

An Akron-area wind developer is currently working on wind technology he believes will dramatically reduce the payback period for wind turbines (by using wind cubes to amplify wind speed). He hopes to bring these wind cubes to market soon and employ Ohioans to produce them. Green Energy Technologies, <http://getsmartenergy.com/>

To ensure continued demand for green energy products and services, and to promote economic development in the renewable energy industry, a number of states provide financial incentives to consumers, and conduct statewide public awareness campaigns. Educating consumers on the advantages of generating their own energy—locking in the costs for a portion of their energy use, and getting energy essentially free after the initial payback period—encourages people to invest their own dollars into advanced energy products and services (especially when coupled with financial incentives such as renewable energy equipment rebates). American Council for an Energy Efficient Economy (ACEEE) reported that for every public dollar spent, public benefits funds leverage an additional \$3 in related business and consumer investment.²⁴ And according to program evaluations of public benefits funds in California, New England, and New York, these investments pay off—households using public benefits funds yielded energy savings that were double their initial costs for clean energy projects.²⁵

Public Benefits Funds Benefit the Public

Public benefits funds benefit the public—reducing utility bills, improving public health by reducing pollution emissions, boosting the economy by reducing energy imports, and creating good jobs.²⁶ Electric utility bills are a function of the amount of energy consumed (quantity) and the rate for each kilowatt-hour of energy consumed (price). Renewable energy products and energy-efficiency measures reduce the quantity of conventionally generated energy we use (and pay for). In the long run, these measures work to lower the price of energy as well because of this reduced demand for conventional energy, as well as the availability of competing alternative options to traditional energy sources. While a public benefits surcharge does raise slightly the rate for a kilowatt-hour of electricity, this surcharge is offset by lower utility bills from reductions in the amount of energy used and downward pressures on the price of energy.

²⁴ American Council for an Energy Efficient Economy “A Federal System Benefits Fund: Assisting States to Establish Energy Efficiency and Other System Benefit Programs” at www.aceee.org/energy/pbf.htm.

²⁵ H. Geller & S. Nadel, ACEEE, *Saving Money and Reducing Pollutant Emissions Through Greater Energy Efficiency* (2001).

²⁶ See EPA, *Public Benefits Funds for Energy Efficiency*, Ch.4 of EPA CLEAN ENERGY-ENVIRONMENT GUIDE TO ACTION.

As Janine Migden-Ostrander, Ohio's Consumers' Counsel, has said—"The cheapest kilowatt hour is the kilowatt hour not consumed."²⁷ The average cost of energy efficiency measures is about 3 cents per kilowatt-hour (significantly less than the cost of generation, transmission, and distribution of electricity). There is much potential to lower utility costs through energy efficiency.²⁸ Investments in renewable energy that lead to distributing generation at or near the point of use reduce peak electrical demand and grid congestion, and displace more expensive transmission.²⁹ Reducing peak demand also reduces the threat of blackouts, increasing the reliability of conventional energy distribution.³⁰

Low-income weatherization and energy efficiency programs result in fewer disconnections and defaults on utility bills, ultimately lowering utility bills for paying customers.³¹ Low-income consumers tend to live in energy-inefficient buildings, and spend a high proportion of their income on energy. This can lead to more frequent defaulting on utility bills. Weatherizing these buildings, making them more energy efficient, and providing them with access to efficiency improvements and renewable energy sources can help low-income consumers permanently lower their electricity bills. Evaluations of Ohio's low-income programs show an average reduction in energy use for heating of 30 percent and an overall reduction in energy use of 22 percent. Electric efficiency program savings range from 12-18 percent.³²

Public benefits funds are also an economic stimulus because they are invested in technologies that create more jobs per dollar invested than most conventional energy sources. Investments in either renewable energy or energy efficiency create more jobs than equivalent amounts spent on fossil fuels—jobs in manufacturing, sale, and installation of these products—and are more likely to remain in Ohio. Energy efficiency measures encourage similar local economic development. For instance, better insulation of existing buildings can reduce an enormous amount of energy waste—there are Ohio companies manufacturing insulation materials, and, obviously, installation of insulation into buildings must be done locally, not from China or India.

Of course, investments in renewable energy and energy efficiency also reduce the rate of pollution emissions, and in turn improve the health of Ohioans.

²⁷ Testimony presented to the Senate Energy and Public Utilities Committee (Dec. 12, 2006).

²⁸ Office of the Ohio Consumers' Counsel, *Integrated Portfolio Management* in a Restructured Supply Market (2006).

²⁹ EPA, *State Clean Energy Funds*, see note supra.

³⁰ ACEEE & ACRE, *The Twin Pillars of Sustainable Energy*, see note supra.

³¹ MEEA, *Ohio's Best Defense*, see note supra.

³² WarmChoice Program Evaluation, 1996-2001. See also M. Blasnik, Ohio Electric Partnership Program Impact Evaluation: Results for April 2004- March 2005 Participants (2006) at http://www.odod.state.oh.us/cms/uploadedfiles/CDD/OEO/EPP_ImpactEval_yr3_final.pdf.

A Number of States Use Clean Energy Funds to Better their Economy and Reduce Pollution

Many of the nation's states are investing in clean energy—advancing renewable energy and energy efficiency technology, encouraging research and development, and investing in low-income housing weatherization and energy efficiency programs—to stimulate their economies. America's industrial infrastructure is being retooled, and America's labor force is being retrained, to produce green energy products and services. Many of the component parts of green energy products are similar to parts in other products we produce or have produced in the past. Existing industrial infrastructure currently sitting idle could be retooled for renewable energy equipment production, while other manufacturing facilities could be expanded. Some of these products require a high degree of skill that is less easily outsourced. Furthermore, renewable energy and energy efficiency installations, and maintenance of those installations, requires local labor.

Eighteen states implement funds for clean energy, and sixteen states use those funds for both renewable energy and efficiency purposes. Most states have some sort of low-income energy assistance program funded separately. Not counting low-income energy assistance, 70 percent of funds are used for energy efficiency, and 30 percent for renewable energy. *See Appendix C* (Public Benefits Funds in 18 states).

Funds in the eighteen states range from \$2.3 million to \$440 million a year (see Appendix III showing the states with public benefits funds).³³ Ohio collects just \$5 million a year. The most comprehensive program funds collect 2 to 3 percent of total utility revenues. In comparison, Ohio spends less than 0.3 percent of its utility revenues on clean energy projects. Other industrial states collect more money than Ohio for what they consider to be their “new” economy—Michigan collects over \$66 million each year, New York collects \$175 million, and Wisconsin collects \$82 million. Since their funds' inception, and over several years, a few states have accumulated more than \$1 billion. Over a three-year period, California directed its utility companies to spend an additional \$2 billion dollars from 2006 to 2008, on top of the \$440 million dollars it is already spending in public benefits funds.

Other states also spend more per capita. Ohio currently collects just 43 cents per capita for its Advanced Energy Fund (\$1.57 per capita when Ohio's low-income energy-efficiency and weatherization efforts from the Universal Service Fund are factored into the equation). Vermont spends \$50 per person on energy-related endeavors (each year).³⁴ Ten states spend over \$10 per capita. The average state with a public benefits fund collects \$13.60 per person.

Program evaluations for New England, New York, and California show that households using public benefits funds achieved energy cost savings over the life of the

³³See <http://www.epa.gov/solar/stateandlocal/pbf-2.htm> (including CA, CT, DE, IL, ME, MA, MI, MN, MT, NH, NJ, NY, OH, OR, PA, RI, VT, WI.). The District of Columbia the City of Boulder, Colorado also have public benefits funds.

³⁴ Interview with Sara Ward, Judy Jones, and Greg Payne of the Ohio Energy Office.

project that ultimately amount to twice the size of initial project costs.³⁵ Twelve states, spending \$870 million in 2002/2003 on energy efficiency measures, saved almost 2.8 million megawatt-hours of electricity.³⁶ Altogether, 178 renewable energy projects totaling 1116 Megawatts have been built, and 56 projects totaling 1133 MW are in the process of being built.³⁷

Of the many activities being undertaken in states around the country, described in greater depth in Appendix A, five are particularly relevant to Ohio:

- New York’s efforts have generated \$2.40 in savings for each dollar spent.
- New Jersey’s program has targeted \$273 million toward renewable energy to provide customer rebates for renewable energy equipment of up to 70 percent; incentives and financing for renewable energy generation facilities; and, incentives, business loans, and business incentives to renewable energy companies.
- A Pennsylvania proposal, not yet passed, is touted to create 13,000 direct jobs, 22,000 indirect jobs and saving \$1 billion annually, reducing prices for families, businesses, and especially industry.
- California’s public benefits programs reduced peak demand by 10 percent and helped alleviate rampant blackouts in the state.
- Vermont, Massachusetts, and Oregon lead the states in energy efficiency programming—spending what amounts to 2 percent of utility revenues on energy efficiency measures.

The History of Ohio’s Advanced Energy Fund

As part of the Ohio Electric Restructuring Act in 1999, the Ohio Legislature created the Advanced Energy Fund (originally referred to as the Energy Efficiency Revolving Loan Fund). This public benefits fund is designed to help “ensure diversity [of Ohio’s electric supply], encourage innovation ... and promote customer choice.”³⁸ The law requires investor-owned electric utility companies to collect public benefits funds, for renewable energy and energy efficiency measures, through a monthly surcharge on each customer’s electric bill.³⁹ Municipal utility and rural cooperative customers are exempt from this surcharge.

³⁵ Apollo Alliance, *Public Benefits Funds* at

http://www.apolloalliance.org/strategy_center/model_financing_strategies/pbfs.cfm.

³⁶ MEEA

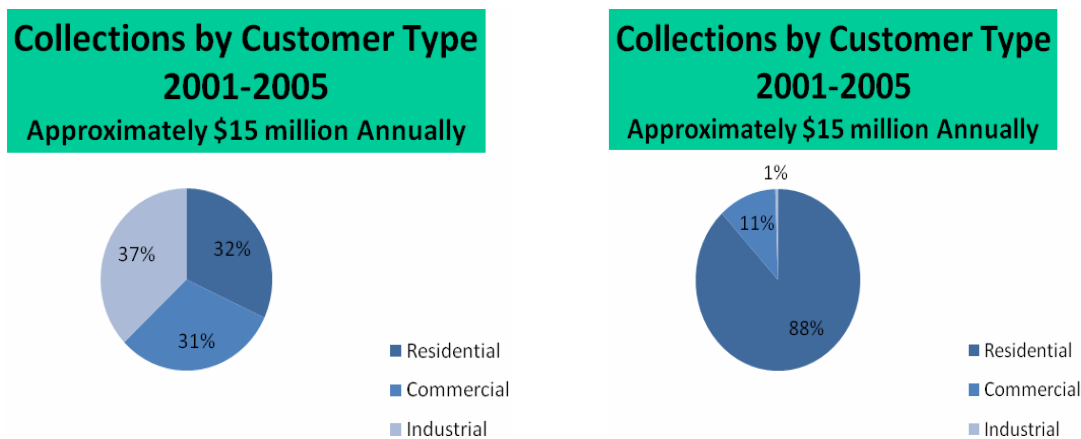
³⁷ ACEEE & ACRE, *The Twin Pillars of Sustainable Energy*.

³⁸ Ohio Revised Code §4928.02 (stating “[i]t is the policy of this state to ... (C) Ensure diversity of electricity supplies and suppliers, by giving consumers effective choices over the selection of those supplies and suppliers and by encouraging the development of distributed and small generation facilities; (D) Encourage innovation and market access for cost-effective supply- and demand-side retail electric service; (E) Encourage cost-effective and efficient access to information regarding the operation of the transmission and distribution systems of electric utilities in order to promote effective customer choice of retail electric service[.]”

³⁹ Ohio Revised Code §4928.61(B)(1) states “Revenues remitted to the director (of development) after collection by each electric distribution utility in this state of a *temporary* rider on retail electric distribution The rider

Pursuant to the 1999 electric restructuring legislation creating the energy fund, the targeted amount to be collected approached \$15 million per year from 2001 to 2005. The law required that amount to be phased down, however, to \$5 million per year from 2006 to 2011. With the current target revenue being \$5 million, the surcharge adds an additional nine cents to every customer’s monthly bill.

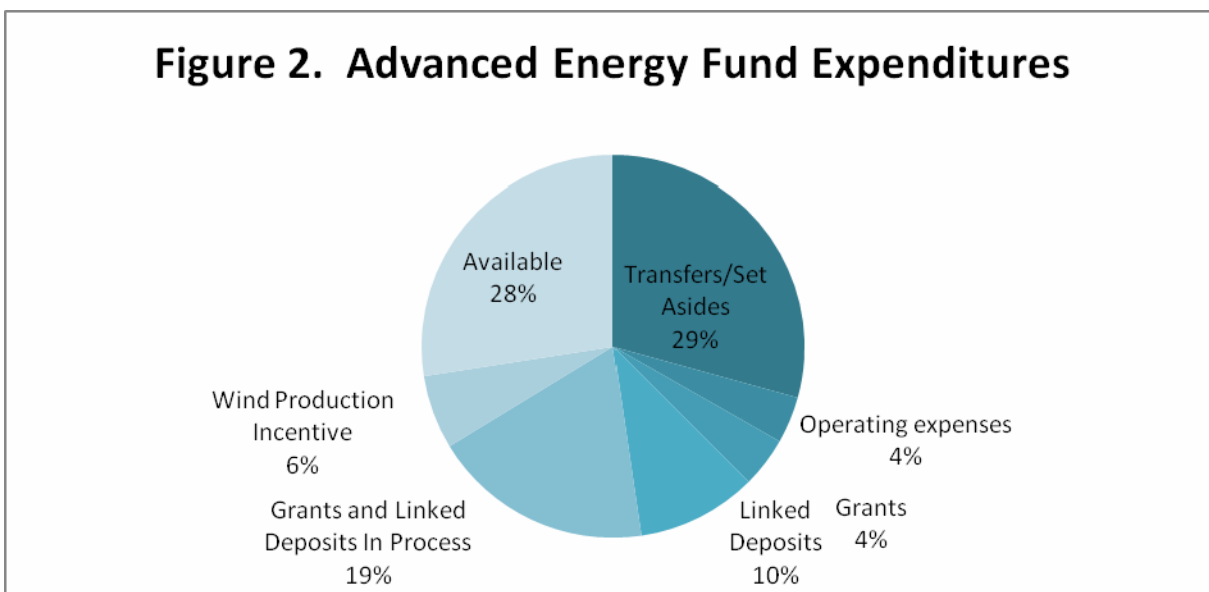
Originally, collections were based on the amount of energy electric customers actually used—there was a \$0.00019758 surcharge for each kilowatt-hour used by customers. The rules were revised in 2005, and the funding mechanism changed from a per kilowatt-hour charge to a flat fee in 2006. The Ohio Department of Development determines the size of the monthly utility bill surcharge by dividing the yearly revenue target by the number of electric utility customers. This alteration in the funding mechanism changed the fund’s makeup—the burden of paying for the fund went from being equally distributed among residential, commercial, and industrial customers, to largely being funded by residential customers. The residential share of funds climbed from approximately one-third of the total revenues collected to 88 percent of revenues collected. Industrial customers barely contribute to the fund now. Figure 1 shows how the share of funds collected from residential, commercial, and industrial sources changed with the change in funding structure. As noted, the fund also shrunk in size from \$15 million to \$5 million in 2006.



Once utility companies collect the funds, they forward them to the Ohio Department of Development (ODOD) to be deposited into Ohio’s Advanced Energy Fund. The Ohio Energy Office, an office within the ODOD, administers those funds.

shall be a uniform amount statewide... determined by dividing an aggregate revenue target for a given year ... by the number of customers of electric distribution utilities in this state in the prior year. Such aggregate revenue target shall not exceed more than fifteen million dollars in any year through 2005 and shall not exceed more than five million dollars in any year after 2005. The rider... shall terminate at the end of ten years following the starting date of competitive retail electric service or until the Advanced Energy Funds, including interest, reaches one hundred million dollars, whichever is first” (emphasis added).

Total revenues collected from utility surcharges, since the fund’s inception, exceed \$77 million (*see appendix for budget*). An additional \$3 million has been earned from accumulated interest and loans repayments. However, over \$24 million of those dollars have been transferred or set aside by Ohio’s legislature to be used by other departments or specific projects (some of those transfers and set asides are clean energy related, but see the later discussion on how the vast majority went to meet other budget shortfalls). Almost \$8 million is currently deposited in banks, linked to consumer loans in order to lower their interest rates, and will eventually be returned to the Advanced Energy Fund (these deposits are referred to as linked deposits). About \$3.5 million have been allotted for energy grants. Projects in process account for another \$20 million in public funds, including a new low-income housing project being made energy efficient. Approximately \$21 million in funds are currently available for use. About \$3 million dollars were disbursed to cover administrative expenses. Figure 2 demonstrates the breakdown of fund expenditures.

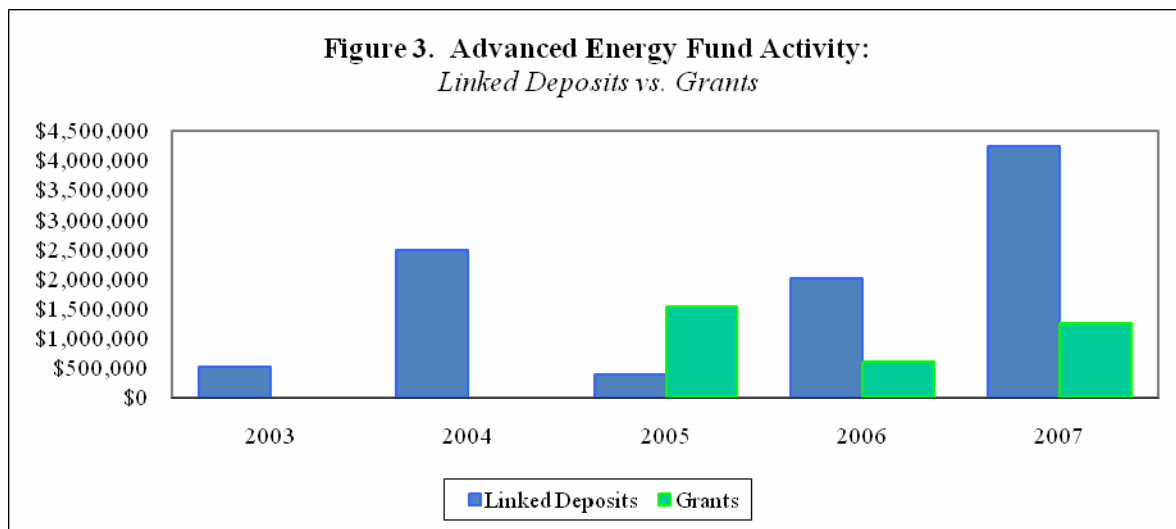


Slow Start for Advanced Energy Fund

Use of the Advanced Energy Fund got off to a slow start. It was originally set up as the Energy Efficiency Revolving Loan Fund, and used only to lower interest rates for consumer loans on green energy products and services (by linking public benefit dollar deposits to consumer loans in order to lower interest rates). The introduction of the Energy Efficiency Revolving Loan Fund Program, however, coincided with plummeting interest rates in 2001. Rock bottom interest rates reduced the attractiveness of the lower interest rate available through the linked deposit mechanism, according to Judy Jones, Loan Fund Administrator and Assistant Office Chief at the Ohio Energy Office. In the early stages of the program, no banks even chose to participate. Other observers have noted that the loans

were also difficult to apply for in the beginning, and took a long time to process, further deterring participation.

Eventually, the OEO could offer grants as well as loans, and interest rates rose (making the linked deposits more attractive). At this point, banks became willing to participate in the program. Figure 3 shows how use of the program grew in more recent years once interest rates increased and once grants became an option.



Total revenues for Ohio's Advanced Energy Fund, including interest earned and loan repayments, have amounted to \$79,904,430. However, the Ohio Legislature has been transferring money out of the Advanced Energy Fund to meet budget shortfalls since the fund's inception, and continues to do so. Because the Energy Efficiency Revolving Loan Funds sat unused for some time, the funds were often used for other purposes. Even after loan activity picked up and the rules changed to allow the OEO to offer grants as well, the transfers continued. The most recent budget bill, for 2008-2009, transferred or set aside over \$11 million. *See Appendix for breakdown of the transfers.* This has been a common problem among states with public benefits funds because of flagging state economies that have led to budget crises.

In large part, rate payer funds that have been transferred have gone towards non-energy related endeavors. To date, the Ohio Legislature transferred or set aside over \$24 million from the Advanced Energy Fund for other departments and projects.⁴⁰ Some of the funds transferred or set aside were used for energy-related endeavors such as biodiesel for school buses and the Alternative Fuel Transportation fund. However, the bulk of the transfers were not for energy-related purposes (see Appendix B for budget allocations).

⁴⁰ Based on data received from the ODOD Ohio Energy Office.

Advanced Energy Funds Are Used to Create Jobs and Encourage Innovation

The Ohio Department of Development's Energy Office uses Ohio's public benefits funds to develop Ohio's green economy by "award[ing] grants, contracts, loans, loan participation agreements, linked deposits, and energy production incentives"⁴¹ for "advanced energy projects" in order to "create new jobs preserve existing jobs ... or use innovative technologies or materials."⁴² The OEO solicits applications from residential customers, low-income housing developers, small commercial and industrial businesses, local governments, educational institutions, nonprofit entities, and agricultural customers.

Municipal utilities and rural electric cooperatives are not required to participate in the program, but are given the option to participate if they so choose. However, since none of these utilities chose to participate, funds are not available to customers of municipal utilities or rural cooperatives. Only investor-owned electric utility customers, those customers paying into the public benefits fund, can apply for the low-interest loans and grants.⁴³ This lack of statewide participation makes statewide programs, such as consumer rebates for green energy products, and statewide marketing campaigns difficult to administer.

Low-Interest Loans. The OEO lowers consumers' interest rates for green energy projects by offering linked deposits for bank loans. Linked deposits lower interest rates by putting government assets into participating banks for a period of five to seven years. The interest the government would otherwise earn on those assets is used to reduce the interest rate on consumer loans. The interest rate reduction for a consumer from a linked deposit may be as much as 50 percent of the market rate.⁴⁴

Grants. In 2005, The OEO began offering grants as well as loans. The OEO provides up to 50 percent of the up-front costs for renewable energy and energy efficiency projects. Since Advanced Energy Funds are limited, grant awards are made on a first-come, first-served basis, and grants are limited in size. Because of the high demand for these products and services, the funds are typically accounted for within a matter of weeks of the announcement of their availability.

The maximum grant for a residential customer is \$25,000, and the size of the grant depends on the size of the renewable energy system being installed—a solar electric system garners \$3.50 per watt (complete systems cost anywhere from \$7-12 per watt, with solar panel sizes ranging in the kilowatts); a wind electric system gets \$2.50 per watt in grants (a small wind turbine, 500 watts to 3kW, costs anywhere from \$6,000 to \$30,000).⁴⁵

⁴¹ ORC §4928.62(B)(1).

⁴² ORC §4928.62(B). According to Sara Ward, OEO Office Chief, "innovative" was added at the 11th hour to include R&D.

⁴³ Including customers of AEP(Columbus Southern Power and Ohio Power), Cinergy (Cincinnati Gas and Electric), First Energy (Cleveland Electric Illuminating, Ohio Edison, and Toledo Edison), Dayton Power and Light, and Monongahela).

⁴⁴ EnergyLoan Fund brochure.

⁴⁵ <http://www.dovetailsolar.com/faq.htm>.

The OEO grants for non-residential systems are capped at \$150,000 and work similarly to residential grants, with grants based on the size of the generator. However, the dollar amount per watt for non-residential grants phases down as the size of the generator increases: \$3.50 per watt for the first 10 kW; \$2.50 for the next 15 kW; and \$1.50 for the next 50 kW.⁴⁶ While the phase-down serves to limit the size of grants, since the Advanced Energy Fund is limited, it discourages large-scale commercial investments. With a larger fund, these investment limitations could be removed and large-scale investments could be encouraged.

The OEO uses Advanced Energy Funds to encourage Ohioans to invest in Ohio's fledgling green economy.⁴⁷ For every public dollar spent by OEO in Ohio since 2001 on green energy projects, Ohio consumers, businesses, and other public entities put an additional four dollars into those projects.⁴⁸ Over \$21 million in outside funds—private, non-profit and educational institutions, and local government entities—were spent in conjunction with the \$5.25 million in Advanced Energy Funds used for residential, commercial, institutional, and industrial green energy projects. Table 1 demonstrates the amount of OEO and leveraged funds that were invested in green energy projects—\$3.4 million in grants, \$1.8 million in foregone interest while linked deposits were held by participating banks, and \$21.2 million in leveraged investments.

Customer Type	Grants	Linked Deposit Interest	Leverage
Residential	\$789,143	\$547,226	\$9,715,332
Commercial	\$1,867,326	\$1,112,379	\$6,174,998
Industrial	\$741,297	\$190,270	\$5,292,470
Total	\$3,397,766	\$1,849,875	\$21,182,800

Residential, commercial, and industrial customers took advantage of grants and low-interest loans for various green-energy projects. Energy efficiency projects received more

⁴⁶ http://www.dsireusa.org/library/includes/incentive2.cfm?Incentive_Code=OH12F&state=OH&CurrentPageID=1&RE=1&EE=0

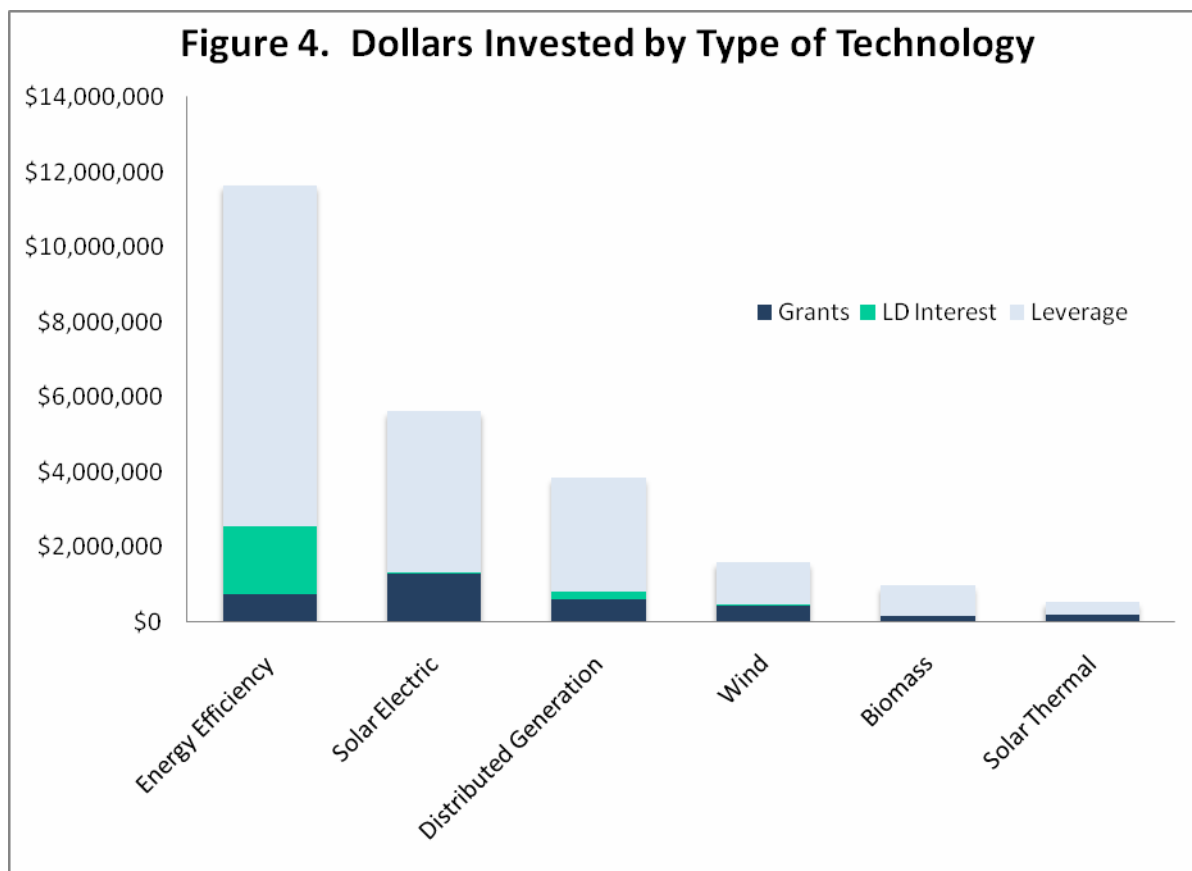
⁴⁷ See ORC §4928.63 and ORC §4928.01(A)(25) (defining “advanced energy projects” as “any technologies, products, activities, or management practices or strategies that facilitate the generation or use of electricity and that reduce or support the reduction of energy consumption or support the production of clean, renewable energy for industrial, distribution, commercial, institutional, governmental, research, not-for-profit, or residential energy users. Such energy includes, but is not limited to, wind power; geothermal energy; solar thermal energy; and energy produced by micro turbines in distributed generation applications with high electric efficiencies, by combined heat and power applications, by fuel cells powered by hydrogen derived from wind, solar, biomass, hydroelectric, landfill gas, or geothermal sources, or by solar electric generation, landfill gas, or hydroelectric generation.”)

⁴⁸ Ohio's Ohio Energy Office.

funds than other types of projects from the Ohio Energy Office, largely through the low interest loan mechanism, and leveraged far more in outside investments. Solar electric projects were awarded more grant money than energy efficiency projects, but ranked second in the total OEO investment after foregone interest expenditures are considered. Distributed generation, technology enabling on-site generation of energy, ranked third on the OEO award list. Much smaller amounts of both public and private funds supported projects related to wind, biomass and solar thermal.

Ohio’s Advanced Energy Fund Shows Potential for the Advancement of Clean Energy

Up to now, the size of the Advanced Energy Fund has been modest. Its initial start-up was hampered by existing economic conditions and it has not led to major gains in energy efficiency and renewable energy use. However, the small funds that have been spent indicate the potential for much more far-reaching gains. Figure 4 shows how much of the Advanced Energy Fund went into each type of clean energy project.



Energy Efficiency. The Ohio Energy Office tries to encourage energy efficiency in homes and businesses that want to generate their own energy. According to Sara Ward, recently retired Office Chief of the Ohio Energy Office, there is no point putting solar panels on an energy inefficient building, or creating renewable energy only for it to be wasted. Therefore,

the OEO requires residents and business to “plug the leaks” and become Energy-Star® certified before they provide grants for renewable energy generators to them.⁴⁹ As a result of this policy, a large bulk of Advanced Energy Funds went to energy efficiency projects. The Ohio Energy Office granted \$752,368, and sacrificed \$1.8 million in linked deposit interest, to secure over nine million dollars in outside investments in energy efficiency measures. Energy efficiency projects were undertaken by residents and businesses as well as municipalities and institutions. Efficiency projects must meet certain performance standards—energy savings must pay back project costs within the life of the loan, energy use must be reduced by at least 15 percent, and the expected life of the improvements must be longer than the payback period.

The City of Bedford Heights in Cuyahoga County took advantage of the business and institutional efficiency program in order to reduce the \$750,000 the city spends on energy every year (a bill ultimately footed by the city’s taxpayers).⁵⁰ Bedford Heights Development Director Martine Divito says “saving energy means saving money.” The OEO provided a grant for half the cost of an energy audit on the city’s energy usage. The energy auditor was then able to convince city officials that the city could be saving taxpayer money by becoming more energy efficient and encouraged them to take action sooner rather than later. Following suggestions from the energy auditor, the city immediately retrofitted its water pump stations at the water treatment facility to improve its energy efficiency by 200 percent—using \$50,000 in OEO grant money, and investing an additional \$150,000 (through a state bond program authorized for municipal energy efficiency measures). The city expects its energy-efficiency investment to pay off within two years. The city is now working on other energy-saving and energy-generating projects, such as converting methane gas created at its water treatment facility into a source of renewable energy, and encouraging private companies located in the city’s industrial park to become more energy efficient and to use renewable fuels. The city is also working with the OEO and local companies to place a biodiesel fuel station within their industrial park for the 1,000 semi-trailer trucks that pass through daily, and to help area truck drivers to retrofit their trucks with fuel-efficient idle-reduction equipment.

Solar Electric (On-Site Generation). Solar energy’s long term potential is to meet peak energy needs because the sun’s energy is most potent during the peak hours of the day when energy is most in demand and most costly. Photovoltaic (PV) technology also converts the sun’s energy into electricity at the site where it will be used. Therefore, the amount of electricity loss from central generation and transmission is reduced. PV cells are not as cost-efficient as solar thermal (described below), but with tax credits, rebates, and environmental benefits factored in, they can become a viable option for consumers. A number of businesses and community groups are investing in solar energy in order to lead by example. The OEO

⁴⁹ Unless residents show they use an average of 650 kw-hours or less per month.

⁵⁰ Interview with City of Bedford Heights Development Director, Martine Divito (August 24, 2007).

spent \$1.3 million in grants, and \$31,767 in foregone interest, on solar electric between 2003 and 2007—leveraging an additional \$4.3 million in outside investments.

With a \$25,000 grant, and \$27,000 in private funds, an architect built a model home in Hamilton County with a large PV unit, as well as a geothermal heating system to reduce heating and air conditioning costs, in order to offset a substantial portion of his home's energy use and to use as a demonstration project for his clients.⁵¹ An Ohio manufacturer of HVAC systems, Melink Corp. in Clermont County, used OEO grants to position itself as a leader in the green movement—investing nearly \$100,000 in outside funds to put 11kW of solar panels on its already energy efficient building— with a little less than \$40,000 in grant money from the OEO. According to Stephen Melink, Chief Executive Officer of Melink Corp., the price of solar electricity is not yet competitive enough for most Ohio businesses (even when coupled with OEO grants and federal tax credits).⁵² However, he expects improvement in renewable technology to lower these costs in the near future, and he wants to be out front when declining green energy costs cross paths with rising fossil-fuel energy prices.

Distributed Generation. Nearly 70 percent of all power generated is lost during generation or transmission on our antiquated grid system. This means that for every 1 kw-hour of energy saved by retail customers or created on site, power plants will actually reduce the need for conventional generation by 3.3 kilowatt-hours.⁵³ Therefore, it is prudent to decentralize electrical generation and enable more on-site generation (which is much more efficient although not 100 percent efficient). Aside from solar, wind, and biomass, one method to accomplish this goal is by using combined heat and power technology, or cogeneration. When there is a need for both electricity and process steam at an industrial location, combined heat and power (CHP) facilities use fuel to make steam in order to turn an electric generator, and then use the leftover steam in the factory's processes.⁵⁴ These plants reduce manufacturing costs and use resources in a much more efficient manner.⁵⁵

Commercial, industrial, and institutional combined heat and power systems, up to 25 megawatts, are eligible for both grants and loans. The OEO awarded \$599,524 in Advanced Energy Fund grants, and forewent \$221,233 in linked deposit interest, to stimulate \$3,027,934 in outside investments by Ohio's industry in distributed generation systems.

⁵¹ Southwest Ohio Solar Tour Guide, Green Energy Ohio at <http://www.greenenergyohio.org/page.cfm?pageID=1064>.

⁵² Interview with Stephen Melink (August 22, 2007).

⁵³ EIA, State Energy Data, 2004, p. 4-6, at http://www.eia.doe.gov/emeu/states/sep_sum/html/pdf/sum_use_all.pdf.

⁵⁴ J. Peter Lark, *Michigan's 21st Century Electric Energy Plan*, STATE OF MICHIGAN PUBLIC SERVICE COMMISSION, (January 30, 2007) http://www.michigan.gov/documents/mpsc/21stcenturyenergyplan_185274_7.pdf

⁵⁵ Prohibitively high stand-by tariffs are charged by utility companies to distributed generation companies for standing by to serve these companies when they do need energy from a traditional power source.

However, Ohio ranks low in the nation for the adoption of this technology—leaving room to achieve significant savings from additional use of this technology.⁵⁶

Kent State University provides an example of how large amounts of energy can be created and distributed close to the where it is needed. Kent built a \$23 million dollar combined heat and power plant, with two CHP generators, to reduce fuel consumption, decrease emissions, and lower their cost of electricity. Advanced Energy Funds of \$75,000 contributed in a small way to allowing Kent to invest in co-generation power. In the winter, these CHP generators will provide 90 percent of the university's electricity needs. In the summer, they will provide 60 percent. As a result, Kent expects to save \$700,000 in fuel costs each year, and spend \$400,000 in maintenance of the plants for a net energy cost savings of \$300,000 each year.

Wind. The Ohio Energy Office awarded \$435,757 of Ohio's Advanced Energy Funds for wind projects, and spent \$23,505 in forgone interest from linked deposits. These public funds leveraged an additional \$1.1 million in wind-related investments across the state (twelve counties and every region). With a \$20,000 grant from the OEO, and \$20,000 in private money, one family in southwestern Ohio powers their home with a 20 kilowatt wind turbine.⁵⁷ The turbine is connected to the power grid so the family can use traditional power if they need to do so, and they can also be credited for any energy transmitted back to the grid (when the family produces more energy than it needs).⁵⁸

Wind Production and Manufacturing Incentive Program. In the spring of 2007, \$5 million in grant funding was allocated from Advanced Energy Funds for the Ohio Wind Production & Manufacturing Incentive Program. The money will be used for two large-scale wind projects—\$3 million will support a 100 MW wind farm that will supply electricity to 30,000 homes in Logan and Champaign Counties; \$2 million will fund a 49.5 MW project supplying electricity to 15,000 Ohioans in Wood County. This production incentive pays a rate of 1 cent per kilowatt-hour generated (on top of the market rate paid by utilities to produce that energy). Projects using wind turbines “predominantly” manufactured in Ohio would have receive an additional incentive of 0.2 cents per kilowatt-hour generated. However, Ohio's wind turbine supply chain is not yet developed enough to make this happen for this round of grants. The Ohio Department of Development is planning to continue the production incentive program, however, and is hopeful the supply chain for wind turbines will be in

⁵⁶ Testimony of Janine Migden-Ostrander (December 12, 2006).

⁵⁷ OEO, *Comprehensive List of Advanced Energy Fund Grants*, August 2007 at <http://www.odod.state.oh.us/cms/uploadedfiles/CDD/OEO/Grant%20Award%20List.pdf>.

⁵⁸ Southwest Ohio Solar Tour Guide, Green Energy Ohio at <http://www.greenenergyohio.org/page.cfm?pageID=1064>.

place for future grant awards. Both large, utility-scale wind projects and smaller wind projects were eligible to apply.

Solar Thermal. The OEO awarded \$188,379 in grants for solar thermal systems, leveraging \$348,577 in outside investments. Solar thermal hot-water heaters harness energy from the sun to directly heat water (as opposed to generating electricity first). Solar hot water heaters are efficient, and can be financed by an addition to a home mortgage—paying off immediately by lowering energy costs by more than the additional mortgage cost each month.

Even without an Advanced Energy Fund grant or a low-interest loan, an average family of four can save money by installing a solar hot water heater. According to the U.S. Department of Energy, Energy Efficiency and Renewable Energy, adding a solar hot water heater to a new 30-year mortgage costs about \$13-20 per month (before any interest rate reduction on the loan from an advanced energy linked deposit). A purchaser can also claim a federal tax deduction for the mortgage interest totaling \$3-5 per month, and a 30 percent federal tax credit for solar installation.⁵⁹ Plus, solar water heaters save between 50-80 percent of hot water heating costs, depending on geographical location.

Despite these potential savings, there are very few solar hot water heaters installed in Ohio. Few people even know of this option (consumers or suppliers). However, a statewide rebate program for solar hot water heaters, and a public education campaign, could stimulate demand. Furthermore, solar thermal water-heating systems offer a viable option to bring low-income consumers into the renewable energy world.⁶⁰ Public benefits funds can be used to do an appliance swap—incorporating a solar-thermal water-heating system program into current low-income energy-efficiency programs—to permanently lower utility bills for low-income consumers that are now using energy-inefficient hot water tanks.

The 577 Foundation in Wood County is in the process of installing solar electricity panels and a solar thermal water-heating system, in order to provide an example to the community for environmentally-friendly practices. According to Mary Mendel of the 577 Foundation, the grants provided by the Ohio Energy Office to them were instrumental in developing their plans to make these renewable energy projects happen.⁶¹ While their 1-kilowatt solar-electric panel is not expected to reduce energy use enough to pay for itself, they expect solar panels to become efficient enough over time to do so and they plan to educate their community in the meantime. Their solar thermal hot-water heating system, on the other hand, is expected to pay for itself in the long run—possibly enough to cover the costs of two traditional hot water tanks.

⁵⁹ The federal subsidy on solar energy is a credit worth 30 percent of the cost of installation up to \$2,000. http://www.solarenergy.com/state_incentives.htm

⁶⁰ Per Discussion with Dave Rinebolt, Executive Director of Ohio Partners for Affordable Energy (administrator of several of Ohio's low-income energy-assistance programs).

⁶¹ Email exchange with Mary Mennel, Director of the 577 Foundation (August 21, 2007).

Biomass. Electricity can be produced from biomass such as wood; cornstalks; wastewater treatment plant waste; cattle, swine and poultry waste; and landfill gas.⁶² Grants of \$150,000 from Advanced Energy Funds and \$822,000 in additional public and private funds were invested in biomass technology from 2003 to now. There is room for Ohio's economy to grow by promoting alternative biomass sources of energy—investing in Ohio's farmers, and reducing the amount of money sent out of Ohio for petroleum products.

In addition to the Advanced Energy Fund, the Alternative Fuel Transportation Grants program provides additional support for biomass technology. The Ohio Department of Development administers the Alternative Fuel Transportation Grant fund—providing grants to Ohioans to install alternative fuel refueling stations and distribution facilities, and purchase alternative fuel. It also pays the costs for educational outreach and promotional materials related to alternative fuel consumption. This fund will award \$900,000 this year for retail stations. Grants were also announced for ethanol and biodiesel blending production.⁶³ Appropriations for the Alternative Fuel Transportation Grants were increased to \$2.5 million for the next bi-annual budget and are expected to result in the installation of 40 alternative fuel pumps (\$1.5 million in FY2008 and \$1 million in FY2009).⁶⁴

Jumpstarting the Green Economy

Recent changes in the law regarding Ohio's Advanced Energy Fund gave the Ohio Energy Office more flexibility on how the funds can be used—grants in addition to loans, and production incentives as well as consumer incentives. But the fund is still small, limiting projects in size and scope. An increase in Ohio's public benefits fund, combined with the recent increase in flexibility on how the funds can be used, could jumpstart Ohio's green economy. If the public benefits funds in Ohio were increased and used properly, building on best practices in other states, Ohio's industry could be manufacturing the component parts for wind turbines, and Ohio business could be selling and installing green products and services.

Continued and larger investments should be made in solar electric, solar thermal, wind, energy efficiency, biomass, and distributed generation. A larger fund could stimulate the green economy and train Ohio's workers for the ensuing green jobs. Advanced Energy Funds could be used to provide more and better incentives to both consumers and suppliers of green energy products and services, and provide free energy audits to educate consumers about their current energy use and renewable energy options. Large green energy projects can also serve a dual purpose of training Ohio's "greenforce." The federal government should

⁶² J. Peter Lark, *Michigan's 21st Century Electric Energy Plan*, STATE OF MICHIGAN PUBLIC SERVICE COMMISSION, (January 30, 2007).

⁶³ Testimony by Lt. Governor Lee Fisher on April 11, 2007 (see earlier note).

⁶⁴ B. Hoffmeister, *Analyzing budget for Department of Development, FY 2008 – FY 2009*.

also match Ohio's energy fund investments through the State Energy Program (a federally funded energy program currently matching a very small portion of state funds).

Funding the Expansion of the Advanced Energy Fund.

The Advanced Energy Fund should be expanded and made permanent. Advanced Energy Fund collections are set to expire in 2011, or when total funds collected plus interest reach \$100 million, whichever is first. The fund should not be allowed to lapse, and should be expanded instead. A larger fund could finance more and bigger projects.

To expand the fund, the Apollo Alliance advocates that states take a moderately aggressive approach—placing a \$0.003 surcharge on every kilowatt-hour consumed (this amount is based on a survey of public benefits funds in other states). Surcharges across the states range from \$.00003 per kilowatt-hour to \$0.008 per kilowatt-hour. We recommend Ohio adopt a per kilowatt-hour surcharge instead of an across-the-board charge as is currently in place. A per kilowatt-hour surcharge is the most equitable way to generate funds. The fund should be generated based on energy use—if you use less energy then you pay less into the fund. Energy inefficient consumers, on the other hand, should pay more into the fund. This method allows part of the cost of pollution to be reflected in the market, encourages big energy users to become more energy efficient, and enables more green energy projects to be funded.

While this surcharge represents an increase to the per kilowatt-hour price of electricity, the increase should be offset by a reduction in the amount of traditional energy used and the decrease in the amount spent on energy. Table 2 demonstrates from whom those funds would be collected and at what levels, based on the average energy use of Ohio residences, business, and industry.

Table 2. Expanding Ohio's Advanced Energy Fund: Adding a \$0.003 per kw-h public benefits charge to all electric utility customers in Ohio.				
	Residential	Commercial	Industrial	All sectors
Average retail price (cents/kw-h)	9.42	8.48	5.52	7.71
Average retail price + 3 mills (cents/kw-h)	9.72	8.78	5.82	8.01
Difference	3.18%	3.54%	5.44%	3.89%
Ohio's annual energy use (mw-h)	51,759,650	46,313,926	56,974,343	155,093,417
Funds generated with new 3 mill charge	\$155,278,950	\$138,941,778	\$170,923,029	\$465,280,251
<small>Table by Eric Sundquist, Center on Wisconsin Strategy (in conjunction with the Apollo Alliance). Sources: Electrical consumption and prices by sector are for 2006, from the U.S. Department of Energy (http://www.eia.doe.gov/cneaf/electricity/page/eia826.html). * Some customers may already be paying a smaller PBF charge; this analysis does not net out those payments, but assumes a uniform, new 3 mill charge across all customers, sectors and utilities.</small>				

A \$0.003 per kilowatt-hour surcharge on energy use in Ohio would generate a fund of over \$465 million to invest in Ohio's green energy economy each year. The shares collected from this per kilowatt-hour surcharge method are fairly well distributed among residential, commercial, and industrial consumers. For an average residential household, using 923 kilowatt-hours a month, the surcharge would increase the monthly electric bill from \$86.95

to \$89.72, or \$2.77 each month (representing a 3.5 percent increase). Commercial business would be similarly affected with a 3.8 percent increase. Public opinion surveys show residential consumers are willing to pay extra to support renewable energy.⁶⁵ In fact, a number of utilities, both in Ohio and other states, have successfully created a green energy option, allowing people to voluntarily pay into a fund used to invest in green power.⁶⁶ As stated previously though, a properly used public benefit fund should lower utility bills in the long run, offsetting any increase. This has been the result in other states because consumers ultimately use less energy, create some of their own energy, and become more energy efficient and independent. In the meantime, low-income consumers could be subsidized or exempted from any increase in their utility bill, and some of the monies collected could be directed into the weatherization and energy-efficiency programs for low-income households and used to expand the program to provide solar-thermal hot water heating systems to low-income households.

Ohio's industry will likely oppose the 5.9 percent rate increase it would see as a result of expanding Ohio's public benefits fund this way. Paying a surcharge on the energy they use could prove a difficult sell to an already stressed industrial sector. A few states collecting public benefit funds on a per kilowatt-hour basis, with large industrial customers like Ohio, offer an opt-out option for industrial users. Large electric users designated as "manufacturers"—such as those with above 1 megawatt of electric load—can opt out of the statewide public benefits fund program after demonstrating that they have undertaken equivalent energy efficiency and/or renewable energy projects in their own facilities (provided by an independent and certified third-party contractor).⁶⁷

Essentially, large-scale electricity users can choose to fund internal energy programs with the money that otherwise would go from them to the Advanced Energy Fund. If Ohio were to offer this option to industrial consumers, strong controls must be in place to ensure that industrial customers really implement the efficiency measures they claim. Measures taken would need to be seriously monitored, or administered by an independent third party, to ensure compliance. Plus, an option to accumulate these funds over a period of a few years may be necessary. For instance, it may be more fruitful for industrial customers to be on a three year plan—saving up their portion over three years, and then investing those funds at

⁶⁵ One such survey charted by Cleveland Foundation and conducted by Marcus Thomas. [ask David]

⁶⁶ AMP-Ohio, AEP-Ohio, Duke Energy Ohio, and First Energy will now offer green options in Ohio.

⁶⁷ Wisconsin, Montana, Vermont. *Wisconsin Large Customer Programs*. Utilities recover the cost of energy efficiency and renewable resource programs from their customers, through rates. Each bill includes an amount that is that customer's share of the utility's cost recovery. The act allows a large utility customer to implement and fund an energy efficiency or renewable resource project on its own facilities and, with PSC approval, deduct the cost of the project from the amount the customer is required to pay the utility for cost recovery. The utility, in turn, deducts that amount from the amount that it is required to spend on statewide or utility-administered programs. A "large energy customer" is defined as a customer that has a monthly energy demand of at least 1,000 kilowatts or 10,000 therms of natural gas and, in any month, has been billed at least \$60,000 for electricity or natural gas -- or both -- for all its facilities within a utility's service territory.

one time. Again, strong controls would need to be in place to ensure those funds are being set aside and there is an energy investment plan in place. With an industrial opt out provision, the remaining consumers, primarily residential and commercial, would generate a minimum of \$294 million Advanced Energy Fund (as opposed to \$465 million). However, Ohio's industry would be required to directly invest an additional \$171 million towards becoming more energy independent and energy efficient.

Alternative Methods to Expanding the Advanced Energy Fund

There are alternative methods to generate additional revenue for the Advanced Energy Fund. One method is to require that a certain percentage of gross utility revenues be spent on renewable energy and energy efficiency projects. Ohio utilities collect billions of dollars every year from electricity consumers. The Ohio Legislature could direct two to three percent of those revenues towards the Advanced Energy Fund. New York collects 1.42 percent of yearly utility revenues while Montana collects 2.4 percent of 1995 utility revenues. The Ohio Chapter of the Sierra Club recommends Ohio spend 3 percent of total annual gas and electric revenues, non-bypassable, on energy-efficiency programs—amounting to \$300 million per year for electricity, and possibly another \$200 million for natural gas.

A third method of expanding Ohio's Advanced Energy Fund involves establishing renewable-energy and energy-efficiency targets for utilities to meet, such as generating 25 percent of energy from renewable energy sources and reducing energy use by 20 percent through efficiency measures—with an alternative option for utility companies to pay into Ohio's Advanced Energy Fund if they cannot meet the targets. Renewable portfolio standards require utility companies to procure some percent of their energy from renewable energy resources. Energy efficiency standards require utility companies to reduce the amount of energy generated by a certain percentage (through more efficient generation, transmission, and use). However, a number of states with these standards allow utility companies to make alternative compliance payments in lieu of meeting those requirements.⁶⁸ Alternative compliance payments make compliance easier for small utilities. These payments should reflect the unit cost avoided by renewable energy generation or energy efficiency. Due to the difficulty in determining such a number, however, Ohio's Consumers' Counsel recommends 5 cents per kilowatt-hour as a reasonable alternative compliance payment for failure to meet the renewable energy or efficiency standard (or \$50 per megawatt-hour), as done in Massachusetts and Connecticut.⁶⁹

As previously mentioned, Governor Strickland announced his plan for "Energy, Jobs, and Progress for Ohio" that would require by 2025 that 12.5 percent of all Ohio's energy come from renewable energy sources, expected growth in electricity be reduced by 25

⁶⁸ Michigan report, p. 39(stating that twelve states are experiencing success with Alternative Compliance Payments).

⁶⁹ OCC, *Integrated Portfolio Management*, see note supra.

percent, and total peak demand be reduced by 10 percent. A strong public benefits fund can be used in conjunction with these or stricter standards to help utility companies attain these goals. Alternatively, failure to meet these standards can generate additional funds in the form of alternative compliance payments to be placed into the Advanced Energy Fund.

Protect Ohio's Advanced Energy Fund from Legislative Raids.

The Apollo Alliance recommends incorporating written protections into utility-restructuring legislation that will keep public benefits funds separate from general revenue funds. Governor Strickland, in his new energy proposal, assigned the role of providing energy efficiency incentives and leading renewable energy installations to the Ohio Air Quality Development Authority.

Use Ohio's Advanced Energy Fund to Become More Energy Independent

Use Advanced Energy Fund to encourage both the supply of and demand for energy efficiency improvements and renewable energy systems. There should be a statewide outreach campaign to educate the public on energy efficiency and renewable energy. Consumer incentives, such as customer rebates for green products, should be marketed and made available statewide. Therefore, Advanced Energy Funds should be collected from all utility customers (not just customers of investor-owned utilities). Advanced Energy Funds should also be used to provide information and support to potential suppliers of green energy products and services (retailers, contractors, manufacturers). With a larger fund, there could be more incentives for suppliers of green products and services. The Ohio Blue Green Alliance, of which Policy Matters Ohio is a member, advocates that the administrator of the fund give priority to applicants of production grants to applicants using Ohio based components, paying prevailing wages, and hiring local. Advanced Energy Funds should also be used to expand the Electric Partnership Program to provide low-income residents with solar thermal water-heating systems and other energy efficiency services.

Use Advanced Energy Funds for "Green Incentives" to Promote Economic Development in Ohio. To promote economic development in Ohio, including job creation and job retention, renewable energy equipment could be offered as an incentive to companies to locate in Ohio or stay in Ohio and continue to employ Ohioans.⁷⁰ Wind turbine or rooftop solar panels could be installed as an incentive for companies to locate in Ohio, or to remain viable in Ohio—by reducing the energy burden of these companies and lowering the risk of rising energy costs—while also serving the social welfare of Ohioans by lowering pollution emissions and stimulating the clean energy industry by purchasing green energy equipment. This new concept for economic development is a "win, win, win," according to Toledo Area

⁷⁰ Interview notes with Eileen M. Granata, Toledo Area Regional Economic Development Director (September 4, 2007).

Regional Development Director Eileen M. Granata. Green incentives can reduce the energy burden of Ohio's industry and the risk of rising energy costs, while simultaneously stimulating the clean energy industry and serving the social welfare of residents by lowering pollution emissions. While no other state has employed this sort of measure, Granata believes Ohio could lead the nation in this sort of green economic development.

Use Advanced Energy Funds to offer free comprehensive energy audits to Ohioans. This program should rate homes and commercial buildings on their energy efficiency, and providing efficiency recommendations (by properly certified individuals).⁷¹ Free energy audits would ease the application process for OEO grant and loan requirements to obtain Energy Star® Certification. The results of those audits should also be required to be disclosed upon any property transfer (whether sale or lease). Energy grades on homes puts potential home renters and buyers on notice of expected future energy bills, and increases the value of energy-efficient and energy-generating property. Many states and utility companies offer free or subsidized energy audit programs.

Use Advanced Energy Funds to create a Green Jobs Corps program that provides green employment services. A Green Jobs Corps program can connect the green labor force with demand for green labor (and even serve to boost that demand by designating green labor projects). A green labor agency can weave together vocational skills training programs, union apprenticeship programs, and recognized pre-apprenticeship programs for low-income individuals (while providing ongoing support for trainees in their first few months of employment, case management, job readiness skills, stipends, career counseling services, and certification of acquired skills).

Allot a percentage of Advanced Energy Funds to develop and monitor progress against well-established goals. There should be clearly established goals for an expanded Advanced Energy Funds such as targets for the development of renewable energy and distributed generation, infrastructure development, and consumer awareness. Program evaluations to identify and mitigate issues should be a priority, and funds should be set aside to ensure this happens.

*Create a national system benefits "matching fund" to support Ohio's Advanced Energy Fund.*⁷² The State Energy Program is a national matching fund already in place, but the size of the fund is miniscule. The national SEP program could be increased considerably. The federal government should reward states for using their own resources to support programs that provide both regional and national benefits.⁷³

⁷¹ A certified Home Energy Rater, or RESNET Certified.

⁷² ACEEE, *A Federal Systems Benefits Fund*, see note supra.

⁷³ <http://www.aceee.org/energy/pbf.htm>

Conclusion

Ohio's economy is struggling due to rising energy costs. We are sending billions of dollars out of state and out of the country each year to support our energy use. Ohio should diversify its energy portfolio, reduce our energy use, create renewable energy here in Ohio, and put Ohioans to work in the process. If we reduced the amount we spend on imported energy, more money could be kept local, supporting Ohio's economy. To stimulate the green economy, and get it off the ground, we should expand Ohio's Advanced Energy Fund and use it to provide incentives to both suppliers and consumers of green energy products and services, educate Ohioans on their green energy options, and train Ohio's future "greenforce."

Appendix A: Public Benefits Funds as of July 2007 (in millions)

	PBF Annual Budget	Renewables	Efficiency	R&D	Pop.	Per Capita Spending	Notes
CA	440.5	150.0	228.0	62.5	36.0	\$ 12.24	8 mills per kw-hour. Additional \$2 billion fund allotted for efficiency
CT	90.0	20.0	70.0		3.5	\$ 25.71	4 mills per kw-hour
DE	2.3				0.9	\$ 2.56	0.178 mills per kw-hour
IL	8.0	5.0	3.0		12.8	\$ 0.63	Utilities contribute a pro rata share of the annual budget for efficiency
ME	9.7	0.1	9.6		1.3	\$ 7.46	1.45 mills/kw-h for effic. Contribution to the renewable fund is voluntary
MA	149.0	25.0	124.0		6.4	\$ 23.28	3 mills per kw-h; Separate surcharges for renewable and efficiency
MI	66.3				10.1	\$ 6.56	Utilities directly charged; utilities recoup costs by charging customers
MN	16.0				5.2	\$ 3.08	Xcel (nuclear power plant owner) pays the \$16 million yearly for waste storage
MT	14.9				0.9	\$ 16.56	2.4% of utilities 1995 revenue collected by a surcharge that varies yearly. Large consumers may invest in their own energy programs rather than remit money to the fund
NH	19.0				1.3	\$ 14.62	1.8 mills per kw-h
NJ	186.3	46.6	139.7		8.7	\$ 21.41	funded by a surcharge that varies yearly
NY	175.0	22.8	132.9	22.8	19.3	\$ 9.07	1.42% of utility revenue
OH	5.0				11.5	\$ 0.43	current collection rate is 5 million, but first five years collected 15 million
OR	64.0	12.0	52.0		3.7	\$ 17.30	1.25-3% public purchase charge
PA*	78.5				.0		The result of individual settlements with each utility company, collected through utility distribution rates.
RI	20.8	2.4	18.4		1.1	\$ 18.91	2.3 mills per kw-h
VT	30.0	7.2	24.0		0.6	\$ 50.00	Renewable energy is funded by nuclear storage as in MN, while efficiency funding by energy effic. charge.
WI	82.4				5.6	\$ 14.71	1.2% of gross revenues. With approval, large individual customers may spend money on internal energy projects rather than remit to the fund.

Source: *dsire.org*. *The \$78.5 million in Pennsylvania is currently a one-time fund, and not an annual collection. The creation of an \$850 million annual Energy Independence Fund is currently being debated in Pennsylvania (where \$72 million collected annually as a surcharge is used to leverage \$850 million in bonds).

New York. The New York Smart Energy Program, administered by The New York State Energy Research and Development Authority (NYSERDA), houses research and development, energy efficiency and renewable energy programs, and environmental protection under one roof.⁷⁴ NYSERDA administers a loan program to provide interest rate reductions on home loans for energy efficiency or renewable energy projects and administers other programs to increase the use of clean energy, and accelerate the development of the New York's clean energy industry. NYSERDA provides production incentives for large scale renewable energy projects—helping renewable energy suppliers with their initial projects costs, and further incentives based on the per kilowatt-hour of renewable energy produced (25 percent of any allotted grant goes towards initial project costs while 75 percent of a grant is tied to the amount of energy produced). The fund was initiated in 1998, and recently extended to run through 2011. It is generated from a small percentage—approximately 1.42 percent—of utility company revenues, generating \$175 million per year. Through 2011, the fund is expected to generate nearly \$2 billion for renewable energy and energy efficiency measures. Approximately 17 percent of the fund goes to support renewable energy projects, and 83 percent supports energy efficiency.

Program evaluations of the New York Energy Smart Program demonstrate the public benefits generated by an aggressive clean energy fund—improving energy system reliability, reducing the energy cost burden on New Yorkers, mitigating health impacts of emissions, and creating economic opportunity.⁷⁵ Using a conservative analysis, New York's program administrators determined they achieved a benefit-cost ratio of 2.4 (for every dollar spent, the program generated \$2.40 in benefits).⁷⁶ The program saved New Yorkers \$340 million in energy costs in 2006 (reducing utility bills by \$230 million for participating customers), provided 60,000 low-income customers with direct assistance (saving them \$220 per year in energy costs), saved over four million dollars in gas and oil spending, and served 2200 small businesses. They created 100 gigawatt-hours of renewable energy, saved 2,360 gigawatt-hours of electricity from being used, and reduced peak demand by 1,000 MW. In turn, they reduced NO_x emissions by 2,060 annual tons, SO_x by 3800 annual tons, and 1.6 million annual tons of CO₂ (removing an equivalent of 320,000 cars from New York roadways). New York's public benefits fund also helped to develop supply of renewable energy and create jobs as well by offering training events, and assisting installers in the certification process; and, creating and sustaining 8,600 jobs, increasing labor income by \$182 million per year, and increased the state's output by \$456 million per year.

New Jersey. The New Jersey Clean Energy Program, administered by the New Jersey Board of Public Utilities, provides consumer education and training, statewide financial incentives for residents, business and industry, as well as utilities, municipalities, and schools. The program has three components: Residential, Commercial and Industrial, and renewable energy programs. There is also a program that provides support for low-income households. Residential programs include rebates for weatherization equipment and solar panels, and home energy audits. A Business and Industry component includes combined heat and power technology. From 2001 to 2008, New Jersey will accumulate total funds of \$1.23 billion for renewable energy and energy efficiency measures. In 2004, funding for 2005-2008 was established at \$745 million, with \$273 million going towards renewable energy (making New Jersey's program one of the most aggressive renewable energy programs in the states). The renewable energy program provides customer rebates for renewable energy equipment of up to 70 percent; incentives and financing for renewable energy generation facilities; and incentives, business loans, and business incentives to renewable energy companies. New Jersey also works to ensure that renewable portfolio standard efforts work together with its public benefits program efforts.

⁷⁴ EPA, *State Clean Energy Funds: An Effective Mechanism to Encourage Clean Energy Supply* (April 2007).

⁷⁵ New York State Energy Research and Development Authority (NYSERDA), *New York Energy SmartSM Program Evaluation and Status Report* (March 2007).

⁷⁶ They used Total Market Effects Test Scenario.

The Center for Energy, Economic and Environmental Policy at Rutgers, the State University of New Jersey, estimated a benefit to cost ratio of 2.74 for New Jersey's Clean Energy Program for its residential, commercial, and industrial energy efficiency measures installed in 2003, and nearly \$140 million in net benefits (before environmental benefits are added).⁷⁷ If environmental benefits are factored in, that ratio increases to 3.63, for a net benefit of \$213 million.

Pennsylvania. From 2005 to the beginning of 2007, Pennsylvania spent \$21 million on 57 clean energy projects, leveraging \$240 million in additional funds, and creating 900 jobs.⁷⁸ Since Pennsylvania was only able to fund a small share of the eligible projects, Governor Rendell is now proposing to create the Energy Independence Fund. He proposes collecting \$72 million each year from a \$0.0005 surcharge per kilowatt-hour used, and then investing those funds to make \$850 million in bonds. Proponents argue that the Energy Independence Fund, coupled with energy-efficiency requirements, will save up to a billion dollars every year in energy costs—\$73 per year for an average residential consumer, \$425 for the average commercial consumer, and \$10,500 for the average industrial customer—while simultaneously creating 13,000 direct jobs and 22,000 indirect jobs in the process and leveraging an additional \$3.5 billion in investments. Over 100 million dollars of the fund would go towards research and development efforts (research, incubator support, and venture capital partnerships). There would be \$500 million in Energy Independence grants and loans for equipment purchases given to companies, non-profit organizations, and local government entities with the priority being to spur industrial economic development projects. There would also be \$250 million in consumer rebates for energy efficient appliances and renewable energy equipment such as solar panels. The necessary legislation to put this plan into effect has been proffered, but opposing forces have mobilized and the future of this proposal is unclear.

California. California's early public benefits programs (2001) supported energy efficiency measures, reducing peak demand by 10 percent and helping to alleviate rampant blackouts in the state.⁷⁹ Because of their success, California passed legislation extending its public benefits funds through 2012, for renewable, energy efficiency, and research and development. Total surcharges across all programs vary by utility and customer type, but amount to approximately 8 mills per kilowatt-hour (or eight-tenths of a cent). California will spend \$150 million annually on renewable initiatives, \$228 million on energy efficiency, and \$62.5 million on R&D. Plus, California authorized an additional \$2 billion on energy efficiency measures by the state's utilities from 2006-2008. California renewable energy program has four primary components: Existing Renewable Resources (providing incentives to producers of renewable energy through per kilowatt-hour payments); New Renewable Resources (encouraging renewable energy projects also through cents/kWh); Emerging Renewable Resources (providing rebates to purchasers on a dollar-per-watt basis); and Consumer Education (informing the public about the benefits and availability of renewable energy technology).

Massachusetts. The Massachusetts Renewable Energy Trust, managed by an independent economic development agency, focuses on expanding the renewable energy economy and encouraging renewable technology innovation in Massachusetts. The program's goal is to create new high-tech jobs and produce clean energy. Massachusetts' energy efficiency program, adopted in 1997, resulted in \$21 million in energy savings on electric bills every year.⁸⁰ The program also lowered wholesale prices enough to save Massachusetts

⁷⁷ *Program Cost-Benefit Analysis of 2003 New Jersey Clean Energy Council Energy Efficiency Program* (July 2005).

⁷⁸ Pennsylvania, *Energy Independency Strategy FAQs*.

⁷⁹ ACEEE & ACRE, *The Twin Pillars of Sustainability*, see note supra.

⁸⁰ Midwest Energy Efficiency Alliance (MEEA), *Analysis of SB 1184 if Passed in 2007*. (analyzing an energy bill introduced in Illinois State Legislature).

customers an additional \$19 million (over five years). Because of this success, Massachusetts is now spending about \$124 million annually in systems benefit funds for energy efficiency (\$20.81 per person), and \$25 million to support renewable technologies.

Connecticut. The Connecticut Clean Energy Fund, managed by a quasi-governmental investment organization, creates long-term energy contracts for green energy projects, and has incentive programs for on-site installations. Second, the fund is used for a program to host demonstration projects for new clean energy technology, and provide infrastructure support to the clean energy industry. Third, funds are used to create public awareness and provide education for energy consumers about their green energy options.

Vermont. Vermont has two public benefits funds: the Clean Energy Development Fund which supports renewable energy, and Efficiency Vermont which supports energy efficiency measures. Vermont is the leader in energy efficiency. In 2006, Vermont met five percent of the state's energy needs through energy efficiency improvements.⁸¹ In 2006, program administrators of Efficiency Vermont determined that approximately \$15 million in public benefits funds for efficiency measures, used in conjunction with \$14 million in consumer funds, generated over \$47 million in lifetime benefits and produced a net lifetime economic value of about \$19 million.⁸² They spent 3.5 cents per kW-h for these energy efficiency measures—reducing the need for generation of electricity by 59,500 MW-h, 11 MW of summer peak demand, and 9 MW of winter peak demand—compared to a cost of producing, transmitting, and distributing that saved energy of 10.2 cents per kW-hour (avoided costs for utility companies to supply that energy). Each \$10,000 spent resulted in 40 megawatt-hours of savings. Efficiency Vermont also conducted a massive outreach campaign to promote public awareness that energy efficiency is the state's least-cost energy source—educating consumers and informing potential suppliers.

Wisconsin. Wisconsin investments in clean energy have saved the average homeowner \$60, and the average business \$2,012, every year in energy costs. Wisconsin estimates that for every dollar spent, they received three dollars in energy savings.[1] When indirect benefits are counted, including economic and environmental benefits, Wisconsin estimates a benefit to cost ratio of 6:1 for their energy efficiency program.

⁸¹ M. Eldridge, B. Prindle, D. York, and S. Nadel, ACEEE, *The Energy Efficiency Scorecard for 2006* (June 2007).

⁸² *Efficiency Vermont 2006 Preliminary Executive Summary*.

APPENDIX B. Energy Efficiency Revolving Loan Fund / Advanced Energy Fund

Revenues, Expenditures, and Transfers (As of April 20, 2007)

Collection rate 2001-2005 0.00010758/kWh up to \$15m./year

Collection rate 2006-2010 \$0.09 cents per customer/month -\$5m./year

Total contributions 2000 through April 2007	\$	77,108,942
Other Revenue (Repayments)	\$	346,190
Interest Earned	\$	2,449,298
Total Revenues	\$	79,904,430
Transfers and Set-asides		
Budget balancing transfer-2002	\$	(2,500,000)
Transfers per HB Budget FY 2006 and 2007		
To Alternative Fuel Transportation Fund 2006	\$	(150,000)
To Alternative Fuel Transportation Fund 2007	\$	(150,000)
To Rail Transload Facilities Fund 2006	\$	(500,000)
To Industrial Site Improvement Fund 2006	\$	(2,500,000)
To Industrial Site Improvement Fund 2007	\$	(2,500,000)
Transfers per HB 245 to Alt Fuel Transport Fund 2007	\$	(1,000,000)
Transfer per HB 251 to DAS State Facilities	\$	(3,600,000)
Transfers in HB 119, Budget 2008-2009		
To Division of Geological Survey 2007		(90,485)
To Industrial Site Improvement Fund 2008	\$	(4,500,000)
To Industrial Site Improvement Fund 2009	\$	(4,500,000)
To Division of Geological Survey 2008		(64,557)
Set-asides in HB 119 Budget 2008-2009		
Biodiesel purchase in School District for pupil transport	\$	(500,000)
Anaerobic digester projects	\$	(1,500,000)
Total Transfers/set aside	\$	(24,055,042)
Net	\$	55,849,388
Total Disbursements 2000 through April 2007		
7.25 years operating expenses	\$	(3,161,221)
Grants	\$	(1,209,374)
Linked Deposits	\$	(8,139,652)
Total Disbursements	\$	(12,510,247)
Net	\$	43,339,141
Projects in Process		
Encumbered grants and linked deposits in process	\$	(9,325,017)
Wind Production Incentive RFP	\$	(5,000,000)
Unencumbered projects in process	\$	(7,729,655)
Total Project in Process	\$	(22,054,672)
Balance currently available for programming	\$	21,284,469

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