



# Ohio's Clean Energy Report Card

**How Wind, Solar, and Energy Efficiency  
are Repowering the Buckeye State**



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# Executive Summary

Ohio currently generates 85 percent of its electric power from coal, one of the dirtiest energy sources in existence. That makes our state the nation's second-leading emitter of global warming pollution, costs us \$1.5 billion annually on coal imported from other states, and threatens public health and the environment by releasing hundreds of thousands of tons of toxic chemicals into our air each year.

Renewable energy and energy efficiency offer better ways to power our state. By decreasing the need for electricity from fossil fuels, these technologies help clean up our air and protect our environment, while also creating new jobs and new investment.

Seeking to take advantage of this potential, Ohio adopted a Clean Energy Law in 2008 that puts the state on track to meet a significant portion of its energy needs with energy efficiency and renewable energy.

Two years into the implementation of the law, Ohio is **saving enough electricity each year to power 43,000 homes**, among other significant benefits.

However, Ohio utilities vary greatly

in their performance in meeting the requirements of the Clean Energy Law. **While most of the state's investor-owned utilities have made significant progress, the state's largest utility—FirstEnergy—has fallen far short.**

All of Ohio's utilities need to build on the state's success to date by becoming leaders—not laggards—in the drive to a clean energy future.

**Ohio's plan to develop its renewable energy and energy efficiency resources is already producing results.**

- Energy efficiency programs implemented in 2009 saved 477,000 megawatt-hours (MWh) of electricity—enough to power 43,000 homes.
- Ohio's investor-owned utilities reduced their peak demand by 815 megawatts (MW) in 2009—more than the capacity of an average-sized coal power plant.
- All four utilities purchased enough renewable energy credits in 2009 to meet their requirements under the

Clean Energy Law, spurring new renewable development in Ohio. By the end of 2010, the state had 177 renewable energy generating facilities.

- Although no utility fully met its solar energy requirement in 2009, by the end of 2010 Ohio had 20 MW of approved solar generating facilities, enough to power 2,400 homes.

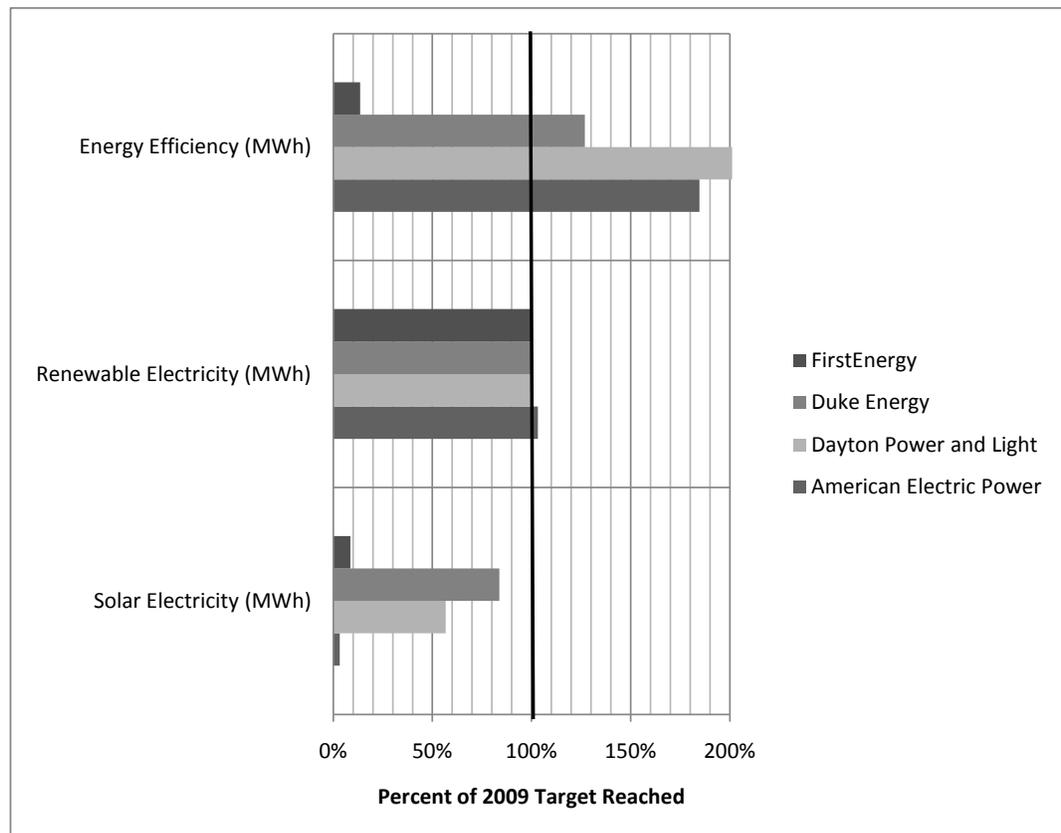
**Ohio’s utilities made significant progress towards a clean energy future in 2009, with some performing better than others.** This report provides a detailed evaluation of utilities’ progress toward a clean energy future—measuring the utilities’ success in developing renewable energy resources and effective energy efficiency programs under the Clean Energy Law. (See Figure ES-1.)

(A detailed description of the grading criteria can be found in Appendix B.)

According to our scorecard:

- **Duke Energy performed best**, receiving an **A** and scoring **15.5 out of 16** points. Duke led all Ohio utilities in its commitment to solar energy, and saved large amounts of electricity by helping its customers purchase efficient products.
- **Dayton Power & Light (DP&L)** also scored well, receiving an **A** for its score of **15 out of 16** points. DP&L was second only to Duke in procuring solar energy in 2009, and constructed its own solar facility in 2010.
- **American Electric Power (AEP)** met its efficiency and overall renewables

**Figure ES-1: Utilities’ Success at Developing Clean Energy**



goals, but fell well short of its solar goal, and received a **B** for its score of **13.5 out of 16**. AEP has since taken significant steps to remedy its solar shortfall for 2010 by purchasing solar from the Wyandot solar facility, a new generating facility in Upper Sandusky Township. AEP has also led the way in making long term deals to purchase renewable power.

- **FirstEnergy scored worst**, meeting only a small fraction of both its energy efficiency goal and its solar goal. FirstEnergy received an **F** for its score of **8.5 out of 16** points. FirstEnergy needs to make major improvements in its programs and a much greater overall effort in future years.

### **Ohio has only begun to tap its potential for energy efficiency and renewable energy.**

- The American Council for an Energy-Efficient Economy (ACEEE) estimates that Ohio could reduce its energy consumption by 33 percent by 2025 through cost-effective efficiency measures.
- Energy efficiency is the lowest cost energy resource available to Ohio.
- Ambitious energy efficiency efforts have been shown to deliver greater benefits at lower costs to consumers than more modest efforts.
- Ohio has the potential to generate 288,000 gigawatt-hours (GWh) of electricity from wind turbines

throughout the state and in Lake Erie, and 34,000 GWh from solar. Combined, Ohio's solar and wind resources could generate enough electricity to power all the state's homes six times over.

### **Lawmakers and public officials should ensure that Ohio captures the full benefits of its potential for renewable energy and energy efficiency.**

- The Public Utilities Commission (PUC) should **hold utilities accountable** for hitting their requirements under the Clean Energy Law. After issuing waivers to utilities that fell short of their goals in 2009, the PUC needs to make it clear that future benchmarks will be enforced.
- The legislature should require that efficiency requirements be met by delivering real, new energy savings, ending the practice of crediting savings from programs that were implemented as far back as 2006.
- Ohio should expand and strengthen its renewable energy and energy efficiency policies to match policies adopted by leading states.
- Ohio should adopt a suite of policies to support the Clean Energy Law, such as enabling low-cost financing for clean energy projects, investing in research and small business development, and raising the minimum efficiency standards for new buildings.

# Introduction

Clean energy is coming to Ohio. Our state, which has long been reliant on dirty and dangerous sources of energy, is finally beginning to turn the corner toward a cleaner future. The signs of change are not hard to see. In Upper Sandusky Township, 159,000 solar panels are now converting the sun's energy into electricity for Ohio's consumers. With those solar panels in place, what was once a soybean field roughly 75 miles south of Toledo is now the Midwest's largest solar facility, and one of the largest anywhere east of the Mississippi.

The story of how a farm field became one of the nation's leading renewable energy facilities begins with the passage of Ohio's Clean Energy Law in 2008. That law requires utilities to develop clean energy resources, including solar energy. For Ohio's second-largest utility, American Electric Power, that meant finding a partner with whom to conclude a long-term contract for solar power.

In 2008, there were no solar facilities in Ohio large enough to satisfy AEP's needs. And so, in October 2009, workers

broke ground on the Wyandot Solar facility—a project enabled by a 20-year contract AEP inked to purchase power from that facility.

During the six months it took to build the plant, a local contractor employed and trained more than 50 skilled workers for the construction project.<sup>1</sup> The 159,000 panels those workers installed were produced by First Solar, most at its facility in Perrysburg. The power stations that house the equipment linking the solar panels to the electrical grid were built by Myers Controlled Power, a company based in Canton.<sup>2</sup>

The end result is 80 acres of solar panels, operating since May 2010, which are providing enough pollution-free electricity every year to power 1,400 Ohio homes. And this facility is just the first of many; Ohio's utilities will need to keep aggressively developing renewable energy to keep up with the requirements set in the Clean Energy Law. Already, AEP has announced plans for its own next step—a facility built on top of an abandoned coal strip mine in southeastern Ohio four times as large as the Wyandot plant.

Clean energy is coming to Ohio. That means cleaner skies and healthier kids. It means spending less money on importing fossil fuels. And it means that the

transformation of 80 acres of soybeans into a bustling job site and renewable energy hub will be played out over and over again, all across Ohio.

# Clean Energy Can Reduce Fossil Fuel Use in Ohio

**B**urning fossil fuels to generate electricity threatens our economy, our environment, and our health. Fortunately, Ohio has the potential to replace dirty energy with energy efficiency and renewable energy, cutting pollution while creating clean energy jobs here in our state.

## Fossil Fuels Threaten Ohio's Economy, Health, and Environment

Most of Ohio's electricity is generated by burning coal, the dirtiest source of electric power. Coal accounted for 85 percent of Ohio's electric generation in 2008.<sup>3</sup> That heavy coal dependence makes Ohio a leading source of global warming pollution, as well as the pollutants that cause smog and acid rain. It also comes at an economic cost; in 2008, Ohio imported, on net, 32.7 million short tons of coal from other states, at a cost of \$1.5 billion.<sup>4</sup>

In 2008, Ohio's electric power sector

ranked first in the nation for the emission of nitrogen oxides, a major component of smog, emitting 222,000 metric tons of those pollutants.<sup>5</sup> Smog exposure can damage lungs, cause asthma and trigger breathing difficulties, sending vulnerable people to the emergency room.<sup>6</sup>

Ohio's power plants also ranked high for their emissions of mercury. Mercury interferes with nervous system development, and can produce lasting mental impairments in children who are exposed to it *in utero*.<sup>7</sup> Nationwide, one in six women of childbearing age have enough mercury in their bloodstreams to put their children at risk if they become pregnant.<sup>8</sup> Ohio's power plants emitted over 9,500 pounds of mercury in 2009, the third most of any state.<sup>9</sup>

Ohio's power sector also emitted 725,000 metric tons of sulfur dioxide, the primary component of acid rain, in 2008—the second highest amount of any state. Acid rain can devastate forests and lakes, and sulfur dioxide in fine particulate form can threaten human health.

Ohio's power sector is also a significant emitter of global warming pollution. In

2008, power plants in Ohio released 128 million metric tons of carbon dioxide, again the second highest amount in the nation.<sup>10</sup>

## Renewable Energy and Energy Efficiency are Good Solutions for Ohio

Rather than relying on dirty imported fuels for electricity, Ohio can turn to clean energy resources available right here in our state. We can generate clean electricity through renewable energy, and get more done with less energy by taking advantage of energy efficiency opportunities.

## Ohio Has Excellent Renewable Electricity Potential

Ohio has 4,240 square miles of land suitable for wind energy development with current technology, excluding developed or ecologically sensitive areas.<sup>11</sup> That land could host up to 54 GW of wind capacity—enough to power all of Ohio’s homes almost three times over.<sup>12</sup> In addition, Ohio has the potential to install more than 45 GW of wind

capacity offshore in Lake Erie—enough to power all the state’s homes an additional two and a half times over.<sup>13</sup>

Solar energy can also power Ohio’s future. Photovoltaic cells can be deployed directly on homes and commercial buildings, or as part of larger solar power facilities. When placed on homes and businesses, solar panels help cut transmission losses in the electrical system by producing power close to where it is consumed.



*A 10.8 kW solar array on top of an apartment building in Cleveland. Credit: Dovetail Solar and Wind*

A 2008 study conducted for the National Renewable Energy Laboratory concluded that by 2015, Ohio would have the potential to install more than 26 GW of solar generating capacity just on residential and

## Energy Capacity and Production

At various times in this report, electricity supply and consumption are discussed in two different terms: capacity and production. Renewable energy installations’ *capacity*, measured in kilowatts (kW), megawatts (MW), or gigawatts (GW), is the greatest instantaneous level of electricity production they can achieve. Expected *savings* from an efficiency measure, or expected *production* from a renewable generation facility, measured in kilowatt-hours (kWh), megawatt-hours (MWh), or gigawatt-hours (GWh), is the total amount of electricity they will produce or save in an average year.

commercial rooftops.<sup>14</sup> Those panels could produce 34,000 gigawatt-hours (GWh) of electricity annually, the amount of electricity it takes to power one fifth of Ohio's homes.<sup>15</sup> Dedicated solar fields—like the Wyandot power station already operating in Upper Sandusky—could produce even more energy. Ohio's solar resource is significantly better than that of Germany, the world's leading country for solar electricity generation, and Ohio receives only slightly less sunlight than New Jersey, the nation's second-largest producer of solar energy.<sup>16</sup> The difference between Ohio and leading solar states is less about technical potential for solar, and more that Ohio has pursued solar energy less aggressively than those states.

Ohio's clean energy law also allows utilities to develop other sources of electricity to meet their renewable energy requirements. These include landfill gas combustion, biomass combustion, and small-scale hydroelectric generation. Done properly, each of these can be a valuable clean energy resource, but all of them (and biomass in particular) can also be detrimental.

### **Ohio Can Benefit from Energy Efficiency**

Ohio's cheapest, cleanest source of energy, however, isn't generated by the wind or the sun, but rather the energy that can be saved by eliminating waste. A 2009 survey by the American Council for an Energy-Efficient Economy (ACEEE) determined that Ohio could reduce its projected electricity consumption in 2025 by 33 percent through cost-effective energy efficiency measures—a reduction of more than 64,000 GWh.<sup>17</sup>

Ohio's energy efficiency potential is distributed throughout the economy in a way that ensures the vast majority of electricity customers can participate in and benefit from efficiency policies. Across the state, efficiency opportunities are available in homes, businesses, and

factories. ACEEE estimates that residential customers could reduce their 2025 electricity consumption by 34 percent through efficiency measures, while commercial and industrial customers could reduce their consumption 27 percent and 23 percent, respectively.<sup>18</sup> Additionally, using combined heat and power technology (which uses the waste heat from electricity generation to heat buildings or provide industrial process heat) in the commercial and industrial sectors could produce savings equivalent to reducing the combined power consumption of those two sectors by 8 percent.<sup>19</sup>

### **Energy Efficiency is the Cheapest Energy Solution for Ohio**

While buying a more efficient piece of equipment or retrofitting a home to be more energy efficient requires an initial investment, energy efficiency saves consumers money in the long run by cutting their electricity consumption and power bills.

Across the country, the average cost of energy saved through efficiency improvements is 2.5 cents per kWh.<sup>20</sup> Of the utility-operated energy efficiency programs in 16 states, outlays by utilities ranged from 1.6 cents per kWh to 4.4 cents per kWh. In some cases, consumers had to contribute additional funds. For utilities and consumers, this is less expensive than buying power. In 2008, the average price of electricity in Ohio was 8.39 cents per kWh.<sup>21</sup> ACEEE found that, in 2006 dollars, the cost of energy efficiency programs sufficient to meet the requirements of Ohio's Clean Energy Law would not exceed 3 cents per kWh on average in any sector, making efficiency significantly cheaper than the current and projected cost of electricity.<sup>22</sup>

Aggressive efficiency programs can actually deliver the cheapest benefits to customers. An analysis by Synapse Energy Economics of energy efficiency programs in other states suggests that

more ambitious and larger energy efficiency programs obtain savings at a lower cost per kWh than do more modestly sized endeavors.<sup>23</sup> In other words, when utilities “go big” on energy efficiency, they can deliver greater savings more cost-effectively. The authors of the study suggest that this effect may result from decreased per-unit administrative costs when programs are more ambitious, and possibly also from economies of scale in implementing the programs.

Investments in energy efficiency also avoid the need for expensive infrastructure upgrades paid for by all consumers. Constructing a new power plant or power line can cost billions of dollars. Incremental investments in energy efficiency, renewable power and peak demand reduction can render unnecessary the construction of large power plants which would otherwise have increased electricity rates.

### Types of Energy Efficiency Programs

Utilities can utilize a number of different strategies to help their customers take advantage of efficiency opportunities. Among the programs with a track record of success that have been employed here and in other states are:

- **Residential appliance, heating and cooling system, and light bulb subsidies** encourage residential customers to replace older, inefficient appliances, light bulbs, boilers, and other equipment with newer and more efficient versions. The U.S. Department of Energy’s *Energy Star* program identifies a number of qualifying high-performance appliances, allowing utilities to easily design incentive programs.
- **Residential home retrofit** programs provide financial assistance to homeowners seeking to improve their homes’ energy performance. Home



*A worker in Cincinnati installs insulation in a home. Photo Courtesy of DOE/NREL  
Credit: Karen Doherty*

retrofit programs often offer free or discounted home energy audits to utility customers to identify efficiency opportunities and help cover the cost of implementing cost-effective efficiency measures. They also make the process of retrofitting easier for homeowners by providing guidance and helping to identify contractors.

- **Residential low-income** programs provide free or heavily discounted energy audits and weatherization services to low-income utility customers, who may otherwise be unable to take advantage of efficiency programs due to the cost.
- **New home efficiency** programs subsidize the construction or purchase of more efficient new homes, frequently using the Department of Energy’s *Energy Star* standard for new homes as a benchmark.
- **Commercial and industrial prescriptive incentive** programs offer incentives for purchasing selected efficient appliances, HVAC equipment, and other machinery. They also help ensure that efficient options are available on the market when machinery needs to be replaced on short notice.

## Self-Directed Efficiency Programs

One category of efficiency program recognized under Ohio's Clean Energy Law is "self-directed" programs, under which large utility customers apply for reductions in their energy bill to finance efficiency measures that they carry out on their own. Carried out properly, programs of this sort can allow utilities to support large-scale efficiency measures that are specific to the unique setup of a factory or other large business.

Ohio's law allows utilities to count not only new efficiency measures, but also improvements undertaken as far back as 2006, as self-directed efficiency savings.<sup>24</sup> This raises the risk that funds intended for the creation of new efficiency measures will be diverted to paying for improvements already undertaken on their own merits in the past. Money disbursed to companies for historical programs and money spent on verifying and improving those programs could—and should—instead be used for programs that result in new energy savings.

- **Commercial and industrial custom incentive** programs allow large-scale energy consumers to work with utility representatives to design an efficiency program specific to their own energy needs. These programs allow utilities to work with customers to pursue the most effective efficiency strategy for their business, and to incentivize the purchase of efficient equipment more specific in purpose than that covered by broad programs like *Energy Star*. Custom incentive programs can take advantage of large-scale savings opportunities like reworking an entire industrial process chain for greater efficiency.
  - **Commercial and industrial retrofit** programs incentivize energy efficiency building retrofits for commercial and industrial customers.
  - **Commercial and industrial new building** programs subsidize the construction of energy-efficient buildings for commercial and industrial utility customers, and educate designers about energy saving opportunities.
  - **Commercial and industrial self-directed** programs provide large-scale commercial and industrial customers with credit for energy efficiency programs carried out at their own initiative, without the utility's direct involvement or supervision.
  - **Transmission and distribution system** improvements decrease electricity losses in power lines and other utility hardware, allowing a higher percentage of the electricity produced at power plants to reach customers.
- In addition to energy efficiency, which reduces both overall demand for electricity and peak energy demand, utilities can save money that would otherwise be spent on costly generating equipment through **demand response** programs, which shift demand away from peak load

times. Typically, the design of these programs calls for customers who opt in to allow the utility to temporarily switch off energy-intensive equipment like air conditioners, clothes driers, or large-scale commercial or industrial machinery. Demand response programs meet a different

need than energy efficiency—they shift the timing of electricity use rather than actually reducing electricity use—but they can help states avoid having to build expensive new power plants by capturing potential demand savings beyond those delivered by efficiency programs.

# Ohio's Clean Energy Law Puts Our State on the Path to a Clean Energy Future

In 2008, Ohio passed Senate Bill 221, which committed the state to using large amounts of renewable electricity and energy efficiency to meet future energy needs. The law sets requirements for renewable energy and energy efficiency for each of the state's four investor-owned utilities (IOUs), which between them provide the majority of Ohio's electricity. Under the schedule laid out in the Clean Energy Law, the utilities are responsible for purchasing or generating more renewable electricity each year until 2025, when each utility is expected to obtain 12.5 percent of its electricity from renewable sources, including 0.5 percent that must come from solar energy.<sup>26</sup> The utilities are also required to implement efficiency programs to hit energy savings requirements each year, building to a cumulative goal of saving 22 percent of their total sales volume through efficiency by 2025.<sup>27</sup> Utilities can meet this goal either by implementing savings programs of their own, or by crediting large-scale customers with savings from efficiency measures undertaken without utility involvement at any time since 2006.<sup>28</sup>

Meeting renewable energy and energy efficiency goals benefits Ohio's economy. Carrying out energy efficiency projects creates economic activity and jobs in the short term and saves utility customers money on electricity in the long term. An ACEEE analysis of the impacts of the energy efficiency provisions of the Clean Energy Law found that it will create more than 32,000 jobs in Ohio by 2025, increase the total value of the state's economy in that year by \$2.5 billion, and save Ohio utility customers \$19 billion between 2008 and 2025.<sup>29</sup>

The energy savings and clean energy development prompted by the Clean Energy Law will significantly cut pollution from Ohio's electric power sector. A 2010 report by Policy Matters Ohio estimates that the renewable energy and energy efficiency measures included in the legislation will reduce Ohio's emissions of carbon dioxide by 310 million tons between now and 2025, and reduce emissions of sulfur dioxide and nitrogen oxides by 1.8 million tons and 520,000 tons respectively.<sup>30</sup>

## Ohio's Clean Energy Law: The Details

Passed in 2008, the Clean Energy Law calls for Ohio's major utilities to save 22 percent of their sales volume through energy efficiency and generate 12.5 percent of their electricity from renewable energy by 2025. The law sets four separate clean energy requirements, requiring the state's investor-owned utilities to:

- Save 22 percent of sales through efficiency by 2025
- Reduce peak demand by 1 percent in 2009 and by 0.75 percent in each year of 2010–2018
- Develop or purchase renewable electricity accounting for 12.5 percent of their sales in 2025
- Develop or purchase solar electricity accounting for 0.5 percent of their sales in 2025

The law sets annual benchmarks for the efficiency, renewables, and solar requirements, beginning with small steps in the first few years and then requiring greater annual savings later, once Ohio's clean energy industry has had time to expand.<sup>25</sup>

## The Clean Energy Law Is Already Producing Results for Ohio

In the two years that the Clean Energy Law has been in effect, Ohio has already begun to enjoy the benefits of the legislation. The requirement that utilities pursue efficiency opportunities and procure renewable energy has launched a market for renewable energy and prompted utilities to make energy efficiency savings opportunities available to their customers.

In 2010, energy efficiency measures undertaken by Ohio's investor-owned utilities saved 477,000 MWh of electricity—enough to power 43,000 homes.<sup>31</sup> Peak demand at those utilities fell by 815 MW—more than the capacity of an average-sized coal power plant.<sup>32</sup> (Some of this decline resulted from lower rates of energy use during the recession, but some is also due to demand reduction measures undertaken by utilities.)

Renewable energy development has also taken off in Ohio. Solar development has been the most striking example. In 2009, there was so little solar energy in Ohio that utilities were unable to purchase enough solar electricity in Ohio to meet their in-state solar requirement for that year. By the end of 2010, however, the Public Utilities Commission (PUCO) had certified 20 MW of solar facilities in Ohio, enough to produce 26,000 MWh of electricity annually—the amount of electricity it takes to power 2,400 homes, and more than enough to meet all the utilities' in-state solar requirements for 2010.<sup>33</sup> That figure includes some of the largest solar facilities in the Midwest, including the 12 MW Wyandot solar facility in Upper Sandusky Township and Dayton Power & Light's 1.1 MW Yankee Solar Station. In total, PUCO had certified 177 renewable energy facilities in Ohio as of the end of 2010.<sup>34</sup>

## Some Utilities Lead, Others Lag

In 2009, the first year in which utilities had to meet requirements under the 2008 law, the quality of the utilities' efforts varied significantly. All the utilities obtained significant amounts of renewable energy, and reduced their peak demand significantly. The top performing utilities, Duke Energy and Dayton Power & Light, not only saved a large amount of energy through efficiency measures, but also led the state in their commitment to solar energy. Duke Energy in particular succeeded in incorporating a large amount of solar energy, obtaining the most solar electricity of any utility despite being only the third-largest utility in the state. Both American Electric Power and FirstEnergy failed to procure much solar energy, though AEP has since invested heavily in solar. FirstEnergy also fell well behind the other utilities in energy efficiency, implementing only a few programs that achieved a small amount of savings in 2009.

### American Electric Power

American Electric Power (AEP) is Ohio's second largest investor-owned utility. Through its subsidiaries Ohio Power and Columbus Southern Power, the utility serves 1.4 million customers in central, southwestern, and northeastern Ohio.<sup>36</sup>

AEP has chosen to meet its efficiency requirements through a mix of programs heavily oriented towards incentives for purchasing energy-efficient equipment, lighting, and appliances. Three programs—one that subsidizes specific products for non-residential customers, one that subsidizes energy-efficient purchases for residential customers and one that allows non-residential customers to design efficiency incentives tailored to their business—account for 23 percent, 42 percent, and 19 percent of AEP's planned savings, respectively.<sup>37</sup>

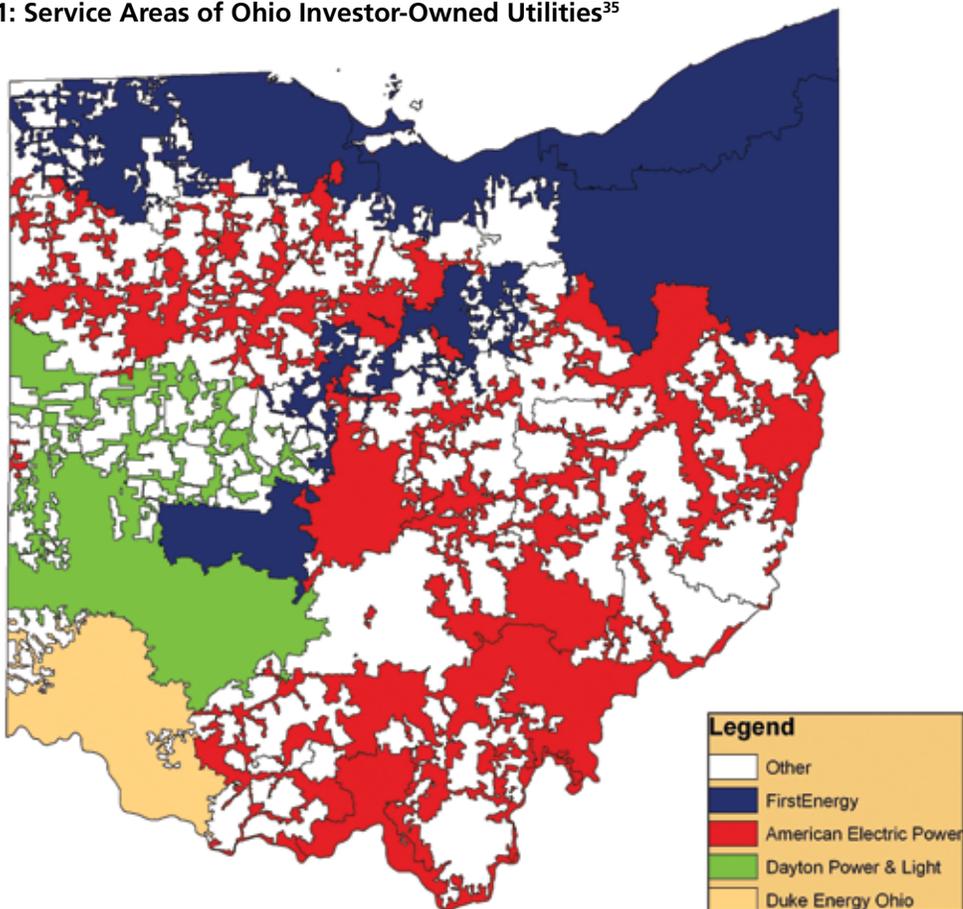
AEP met both its peak demand reduction requirement and its efficiency savings requirement in 2009. The utility had a benchmark for 2009 of 137,000 MWh of energy efficiency savings; its programs delivered actual savings of 253,000 MWh.

## Setting Standards for Ohio's Utilities

The Clean Energy Law requires Ohio's investor-owned utilities to meet certain levels of renewable generation and efficiency savings in each year. This does not mean, however, that utilities should not aim to exceed those requirements. Those requirements are a floor, not a ceiling. Utilities should pursue all available clean energy options in order to best serve their customers, irrespective of what is required by law.

Since 2009 was the first year in which the Clean Energy Law was in place, utilities had a limited time to develop clean energy resources. Accordingly, we have graded them only on their compliance with the law's requirements in this report, and assigned full marks to any utility that met its minimum requirements. In general, however, compliance with the minimum is only enough for a passing grade; real leadership—as several utilities have already shown by significantly exceeding their efficiency targets or helping to drive large-scale renewable energy investment—is the goal toward which Ohio's utilities should strive.

Figure 1: Service Areas of Ohio Investor-Owned Utilities<sup>35</sup>



AEP met its overall renewable energy requirement in 2009, but fell well short of its solar energy requirement, obtaining just under 10 percent of its solar benchmark.<sup>38</sup> **In total, AEP received a B on our scorecard**, losing points only for its failure to meet its solar requirement.<sup>39</sup>

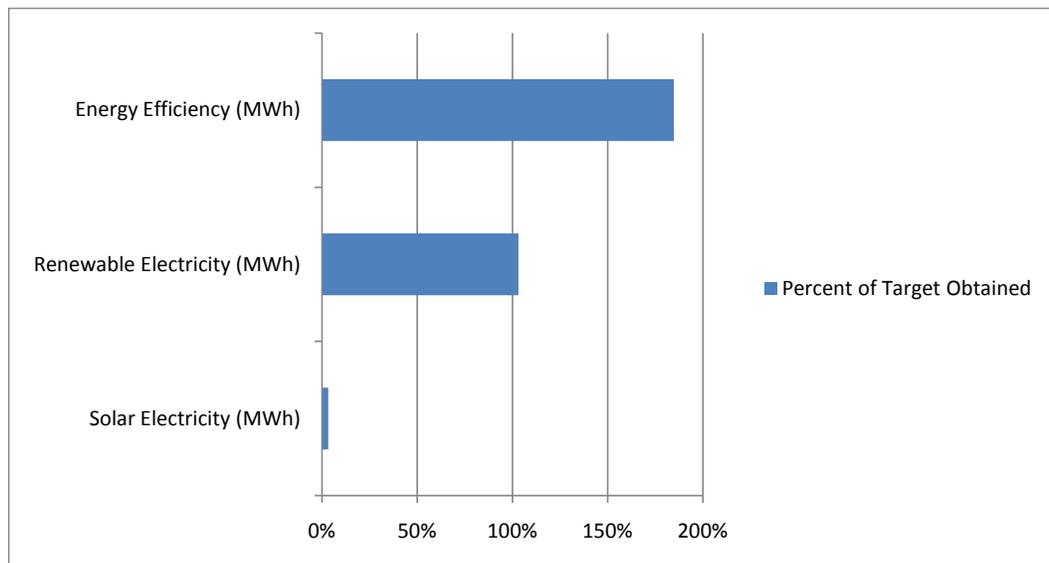
Since 2009, AEP has adopted an aggressive strategy toward solar and renewables development. As of April 2010, it is purchasing all power produced by the Wyandot Solar facility in Upper Sandusky Township, currently the largest solar facility in the Midwest.<sup>40</sup> Looking towards the future, AEP has begun planning for the construction of an even larger facility on the site of an old coal mine in southeastern Ohio.<sup>41</sup> (If it came

on line in March 2011, it would be the largest photovoltaic facility in the country.) With these facilities filling the only major gap in its clean energy programs, AEP should be able to meet all its requirements in the future. AEP also took the lead on overall renewables development in 2010, signing a 20-year contract with a wind developer to purchase all the electricity from a new 99 MW wind farm in Ohio. Power purchasing agreements, which AEP has used to meet its renewable goals, are a better tool for encouraging renewable electricity development than year-to-year renewable energy credit purchases, since they ensure that renewable developers will have a market for their power over the long term.

**Table 1: American Electric Power Program Results 2009<sup>42</sup>**

	Requirement	Actual	Percent Attained
Solar Electricity (MWh)	1,826	61	3%
Renewable Electricity (MWh)	112,294	115,929	103%
Energy Efficiency (MWh)	136,944	253,000	185%

**Figure 2: American Electric Power's Performance Relative to Clean Energy Law Requirements in 2009**



## Dayton Power & Light

Dayton Power & Light (DP&L) is Ohio's smallest investor-owned utility. It serves 515,000 customers, mostly in the Dayton area.<sup>43</sup>

DP&L plans to meet its energy efficiency requirement by pursuing large savings from a small number of major programs. A residential compact fluorescent light (CFL) distribution program is expected to account for 54 percent of the utility's energy savings requirements in the next few years.<sup>44</sup> The utility also intends to derive significant savings from two large non-residential programs—a non-residential efficiency incentive program and a program under which

large customers can carry out their own efficiency measures—which account for 19 percent and 10 percent of planned savings, respectively.<sup>45</sup>

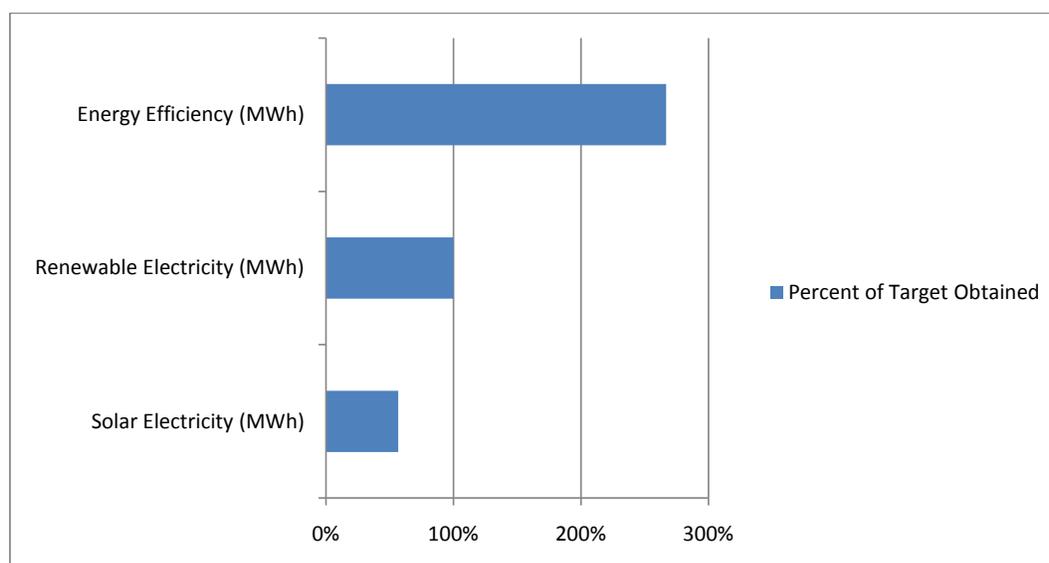
DP&L achieved both its energy efficiency requirements and its peak demand reduction requirements in 2009, achieving greater efficiency savings relative to its sales than any other utility.<sup>46</sup> The utility achieved energy efficiency savings of 115,279 MWh, against a requirement of 43,919 MWh, and peak demand reductions of 176.5 MW, against a requirement of 29.6 MW.

DP&L also met its renewable energy requirement, but obtained only 57 percent of its required level of solar genera-

**Table 2: Dayton Power & Light Program Results 2009<sup>49</sup>**

	Requirement	Actual	Percent Attained
Solar Electricity (MWh)	600	340	57%
Renewable Electricity (MWh)	36,742	36,742	100%
Energy Efficiency (MWh)	43,193	115,279	267%

**Figure 3: Dayton Power & Light's Performance Relative to Clean Energy Law Requirements in 2009**



tion—340 out of a requirement of 600 MWh.<sup>47</sup> In 2009 DP&L scored second-highest of the utilities on our scorecard, receiving a perfect score for its energy efficiency programs and coming second closest to its solar requirement; in total, **DP&L received an A.**<sup>48</sup>

DP&L has taken effective steps to remedy its shortfall in solar generation since 2009. Yankee Solar Array, a DP&L-owned generating facility near Dayton, opened in 2010 and exceeded expectations by producing 1,334 MWh of electricity between April and December of that year, more than enough electricity to meet DP&L’s in-state solar requirement for 2010.<sup>50</sup>

## Duke Energy

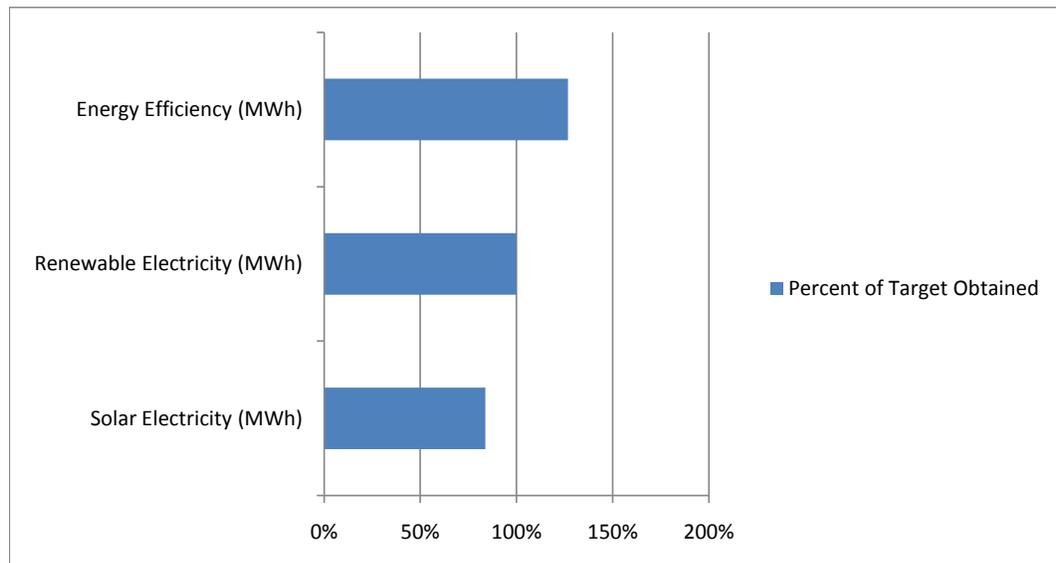
Duke Energy is Ohio’s third largest investor-owned utility. The utility serves 684,000 customers in southern Ohio, mostly in the Cincinnati area.<sup>51</sup>

Duke Energy’s efficiency plans rely primarily on two blanket efficiency incentive programs, the residential and commercial Smart Saver programs, under which the utility intends to incentivize a wide range of efficient appliances and other equipment. The residential and commercial versions of this program account for 23 percent and 39 percent of Duke’s overall efficiency requirement, respectively.<sup>52</sup>

**Table 3: Duke Energy Program Results 2009<sup>56</sup>**

	Requirement	Actual	Percent Attained
Solar Electricity (MWh)	726	608	84%
Renewable Electricity (MWh)	44,5804	44,580	100%
Energy Efficiency (MWh)	68,1274	86,402	127%

**Figure 4: Duke Energy’s Performance Relative to Clean Energy Law Requirements in 2009**



Duke Energy reached both its energy efficiency and its peak demand reduction goals in 2009, due to a large volume of savings from energy efficiency programs it has operated since before the passage of Senate Bill 221.<sup>53</sup>

Duke Energy hit its requirements for renewable energy procurement, and came the closest of any of the four major utilities to hitting its solar goals. Duke filled 83 percent of its solar energy requirement, a significantly better performance than the other utilities. Duke's strategy involved both seeking out solar facility owners to negotiate purchases and directly stimulating solar development in its service area by donating solar panels to local projects. Those panels eventually provided over 20 percent of the solar energy Duke obtained in 2009.<sup>54</sup>

In total Duke Energy scored the best of any utility on our scorecard, **receiving an A for its clean energy development efforts**.<sup>55</sup> For future years, Duke has yet to sign any long-term purchasing agreements for solar or other renewables. Duke should pursue such agreements to ensure that it maintains and improves upon its performance from 2009.

## FirstEnergy

FirstEnergy is Ohio's largest investor-owned utility, accounting for 40 percent of the state's investor-owned utility market. FirstEnergy operates three major Ohio utilities: Ohio Edison, Toledo Edison, and the Cleveland Electric Illuminating Company. These three companies serve 2.1 million customers in northern and eastern Ohio.<sup>57</sup>

FirstEnergy's proposed strategy for meeting its energy efficiency requirements under Ohio's Clean Energy Law relies on a mix of residential programs, weighted heavily towards a large CFL

distribution program, and a mix of non-residential programs weighted heavily towards a self-directed program for large non-residential customers. In a plan filed in December 2009, FirstEnergy indicated that it intended to obtain 25 percent of its required savings in the 2010-2011 period through a program that credits non-residential customers for savings from projects undertaken at their own initiative, and a combined 26 percent of its savings through two residential CFL programs—one general program, and one specifically required for low-income customers. One other program, a commercial lighting and equipment program, is expected to account for 12 percent of FirstEnergy's total savings goal.<sup>58</sup>

Between them, these programs account for more than 60 percent of FirstEnergy's total efficiency plan. The remainder of the plan's efficiency savings comes from smaller-scale programs. In total, savings in the residential sector account for 45 percent of FirstEnergy's planned total, and savings in other sectors for 55 percent.<sup>59</sup>

FirstEnergy hit only two of its four goals in 2009. The utility met its renewable energy goal exactly, and achieved 267 MW of peak demand reductions, against a requirement of 115 MW. It fell well short of both its solar energy requirement and its energy efficiency requirement—obtaining only 61 MWh of the 1,836 MWh required under the law, and achieving efficiency savings of only 22,614 MWh against a requirement of 166,310 MWh.<sup>60</sup>

For both requirements that it missed, FirstEnergy received a waiver from the Public Utilities Commission allowing it to meet the remainder of its 2009 requirements in future years. Clearly, however, the difference between the FirstEnergy's performance and that of other utilities—particularly on the energy efficiency goals, which all other utilities

met—shows that FirstEnergy could have performed *much* better in 2009. As such, FirstEnergy scored the worst of the four utilities on our scorecard. FirstEnergy earned no points for either energy efficiency or solar development, **and received an F on our scorecard.**<sup>61</sup>

In all, FirstEnergy’s efforts to comply with Ohio’s Clean Energy Law have been too small and often poorly organized. Unlike the other three utilities, FirstEnergy did not submit an efficiency plan to the PUC in 2008, rendering it difficult for the commission to weigh its proposed programs.<sup>63</sup> Some of the utility’s programs have been flawed or not allowable under Ohio’s Clean Energy

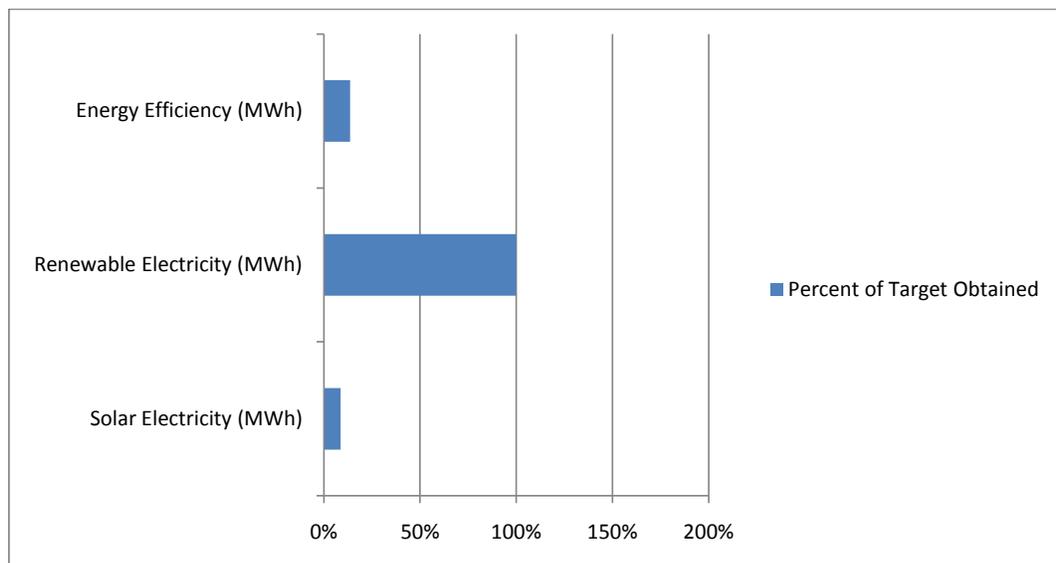
Law; in 2009, for instance, the utility began implementation of a CFL program that had been criticized by consumer and environmental groups (the program involved delivering CFLs directly to customers, without giving them a chance to opt out), but was forced to replace it when public officials and members of the public protested its design.<sup>64</sup>

One additional item of concern in FirstEnergy’s plans is its heavy reliance on the mercantile self-directed component of its program for savings. Policy Matters Ohio, in their report examining progress on Ohio’s Clean Energy Law, concluded that FirstEnergy’s mercantile self-directed programs were in large part

**Table 4: FirstEnergy Program Results 2009<sup>62</sup>**

	Requirement	Actual	Percent Attained
Solar Electricity (MWh)	1,886	163	9%
Renewable Electricity (MWh)	115,929	115,929	100%
Energy Efficiency (MWh)	166,310	22,614	14%

**Figure 5: FirstEnergy’s Performance Relative to Clean Energy Law Requirements**



counting savings achieved in the past rather than incentivizing customers to undertake new efficiency programs.<sup>65</sup>

FirstEnergy has taken some positive steps since 2009. Most notably, its subsidiary FirstEnergy Solutions recently signed a 20-year agreement to purchase 100 MW worth of wind power from the

304 MW Blue Creek Wind Farm, which Iberdrola Renewables is constructing in western Ohio.<sup>66</sup> FirstEnergy has also agreed to put out a request for proposals from contractors for a long term solar power purchasing agreement, which could put it on track to meet its solar requirements in the future.<sup>67</sup>

## Policy Recommendations

Ohio is already on the road to receiving the environmental and economic benefits that energy efficiency and renewable energy offer to our state. To sustain this progress and ensure that Ohio receives the greatest possible benefit from its renewable energy and energy efficiency potential:

- The Public Utilities Commission should **hold all utilities accountable** for their renewable energy and energy efficiency requirements under Ohio's Clean Energy Law. In 2009, the PUCO waived the solar requirements for all the utilities, and waived FirstEnergy's energy efficiency requirement. Solar electricity production has boomed in Ohio since 2009, and all utilities should be able to meet their solar requirements with appropriate efforts; additionally, all utilities will now have had more than enough time to implement effective energy efficiency programs.
- Utilities should **ensure that energy efficiency programs deliver real savings to customers**. Several utilities have achieved portions of their savings through programs that credit large non-residential customers for past improvements. These programs fail to deliver benefits to utility customers, while costing money in utility payments for historical savings and in state resources dedicated to examining applications for efficiency credits from old projects. Utilities should change their practices to rely on new savings instead. If this problem persists, the legislature should change the law to require that savings come from new programs.
- The Public Utilities Commission should **facilitate the signing of long-term contracts for renewable energy**. Long-term power purchasing agreements are the best tool for encouraging renewable energy developments. Unlike year-to-year markets for renewable energy credits, they provide renewable energy developers with certainty about returns on their investment over the long term. Since renewable energy pays off over

the long term after a large initial investment, a contract that ensures steady demand for electricity from the facility over several decades makes the decision to invest in renewable energy much less risky.

- Ohio should **strengthen the renewable energy requirements** of the Clean Energy Law to prompt further development of Ohio's renewable energy resources, cut pollution and spur growth. Ohio has the potential to produce much more renewable energy than the current requirement of 12.5 percent of energy consumption. Leading states in renewable energy development have set requirements as high as 33 percent of consumption, and Ohio should follow suit.
- The Public Utilities Commission should **require utilities to present information about their plans and compliance with Ohio's Clean Energy Law in a clear and standardized fashion**. Currently, utility filings with the PUC vary in format and level of detail. The PUC should require all utilities to submit information on their performance in detail and in a standardized format, allowing members of the public to easily follow progress towards Ohio's clean energy requirements.

Ohio will benefit most from clean energy if it augments the Clean Energy Law with policies that remove barriers to renewable energy and energy efficiency development.

- Programs that **allow property owners to pay for clean energy over the lifetime of their investment** reduce the up-front cost of energy efficiency and solar energy for property owners. Policies like **Property Assessed Clean Energy (PACE)** financing allow more residential and commercial customers to benefit economically from clean energy. Cities should move to introduce these programs under Ohio's current PACE law, and Congress should act to remove obstacles to these programs at the national level so that all residential property owners can take advantage of this low-cost financing mechanism.
- Ohio should **restore its Advanced Energy Fund, an incentive for renewable energy installation**. The fund, which expired at the end of 2010, was financed by a small monthly surcharge (9 cents) on utility bills and provided an incentive to invest in pollution-free technologies like wind, solar, and efficiency.
- Ohio should complement its existing efficiency programs by **adopting the latest model energy codes from the International Codes Council**. Home and building energy codes ensure that new houses and buildings take advantage of opportunities for energy efficiency—locking in savings from the time of construction at the lowest possible cost.

# Appendix A: Utility Performance Data

**Table A-1: Renewable Energy Performance by Utility<sup>68</sup>**

Utility	Solar Electricity (MWh)			Renewable Electricity (MWh)		
	Requirement	Actual	Percent Attained	Requirement	Actual	Percent Attained
American Electric Power	1,826	61	3%	112,294	115,929	103%
Dayton Power & Light	600	340	57%	36,742	36,742	100%
Duke Energy	726	608	84%	44,580	44,580	100%
FirstEnergy	1,886	163	9%	115,929	115,929	100%
Total	5038	1172		309545	313180	

**Table A-2: Energy Efficiency and Demand Reduction Performance by Utility<sup>69</sup>**

Utility	Energy Efficiency (MWh)			Peak Demand Reduction (MWh)		
	Requirement	Actual	Percent Attained	Requirement	Actual	Percent Attained
American Electric Power	136,944	253,000	185%	86	275	320%
Dayton Power & Light	43,193	115,279	267%	29.6	176.5	596%
Duke Energy	68,127	86,402	127%	44.6	97.4	218%
FirstEnergy	166,310	22,614	14%	115	267	232%
Total	414574	683916		275.2	815.9	

## Appendix B: Methodology

Our grading system for Ohio's investor-owned utilities draws on information released by those utilities and the Public Utilities Commission (PUCO) to compare each utility's performance in 2009 to its goals under the 2008 Clean Energy Law.

We awarded points to utilities in five categories. First, each utility could earn a single point for filing all of its data with PUCO in a timely fashion. Second, each utility could earn between zero and five points in each of two categories, renewable energy and energy efficiency. In each of those categories, points were awarded as follows:

- **5 points** for meeting 100 percent or more of the utility's 2009 requirement.
- **4 points** for meeting between 75 and 100 percent of the utility's 2009 requirement.
- **3 points** for meeting between 50 and 75 percent of the utility's 2009 requirement.
- **2 points** for meeting between 25 and

50 percent of the utility's 2009 requirement.

- **0 points** for meeting less than 25 percent of the utility's 2009 requirement.

Lastly, each utility could earn between zero and 2.5 points in each of two categories, peak demand reduction and solar electricity. In each of those categories, points were awarded as follows.

- **2.5 points** for meeting 100 percent or more of the utility's 2009 requirement.
- **2 points** for meeting between 75 and 100 percent of the utility's 2009 requirement.
- **1.5 points** for meeting between 50 and 75 percent of the utility's 2009 requirement.
- **1 points** for meeting between 25 and 50 percent of the utility's 2009 requirement.
- **0 points** for meeting less than 25 percent of the utility's 2009 requirement.

We assigned a score of zero for achieving less than 25 percent of any requirement since such a low percentage generally indicates no concerted effort to meet the requirement.

We graded the utilities by calculating their percent score, and assigning grades accordingly (i.e. 93% and up would be an A, 90-93% an A-, 87-90% a B+, and so on).

**Table B-1: Utility Scorecard**

	<b>American Electric Power</b>	<b>Dayton Power &amp; Light</b>	<b>Duke Energy</b>	<b>FirstEnergy</b>
<b>Timeliness Score (out of 1)</b>	<b>1</b>	<b>1</b>	<b>1</b>	<b>1</b>
Percent of Peak Demand Reduction requirement	320%	596%	218%	232%
<b>Peak Demand Reduction Score (out of 2.5)</b>	<b>2.5</b>	<b>2.5</b>	<b>2.5</b>	<b>2.5</b>
Percent of Efficiency Requirement	185%	267%	127%	14%
<b>Efficiency Score (out of 5)</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>0</b>
Percent of Renewable Energy Requirement	103%	100%	100%	100%
<b>Renewables Score (out of 5)</b>	<b>5</b>	<b>5</b>	<b>5</b>	<b>5</b>
Percent of Solar Energy Requirement	3%	57%	84%	9%
<b>Solar Score (out of 2.5)</b>	<b>0</b>	<b>1.5</b>	<b>2</b>	<b>0</b>
<b>Total Score</b>	<b>13.5</b>	<b>15</b>	<b>15.5</b>	<b>8.5</b>
<b>Letter Grade</b>	<b>B</b>	<b>A</b>	<b>A</b>	<b>F</b>

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6 US EPA, *Health: Nitrogen Dioxide*, 28 October 2010, downloaded from [www.epa.gov/oaqps001/nitrogenoxides/health.html](http://www.epa.gov/oaqps001/nitrogenoxides/health.html) on 18 February, 2010.

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11 Land outside of developed and ecologically sensitive areas with wind capacity factors of 30 percent or higher at 80 meters above ground level. National Renewable Energy Laboratory, “30% Capacity Factor at 80 Meters” in *Wind Powering America: 80 Meter Wind Maps and Wind Resource Potential*, 9 December 2010. Downloaded from [www.windpoweringamerica.gov/wind\\_maps.asp](http://www.windpoweringamerica.gov/wind_maps.asp) on 11 January 2011.

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*Assessment of Offshore Wind Energy Resources for the United States*, June 2010. 45 GW of turbines producing at a 35% capacity factor for 1 year would produce 137,000 GWh of electricity. See note 12 for Ohio residential consumption.

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15 Assuming a capacity factor of 15% for installed solar facilities. Ohio's homes consumed 53,000 GWh in 2008, according to Department of Energy, Energy Information Administration, "Ohio" in *State Electricity Profiles, 2008 Edition*, March 2010.

16 Calculated by comparing selected data points from NASA, *Surface Meteorology and Solar Energy Dataset*, accessed at [eosweb.larc.nasa.gov/cgi-bin/sse/grid.cgi](http://eosweb.larc.nasa.gov/cgi-bin/sse/grid.cgi) on 10 January 2010. Average horizontal-surface insolation in Ohio ranges from 3.64 kWh/m<sup>2</sup>/day in the northeast to 3.79 in the southwest, while Germany's ranges from 2.75 in the north to 2.90 in the south. New Jersey's insolation ranges from 3.80 in the north to 3.91 in the south.

17 American Council for an Energy Efficient Economy, *Shaping Ohio's Energy Future: Energy Efficiency Works*, March 2009.

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20 Katherine Friedrich, et al., American Council for an Energy-Efficient Economy, *Saving Energy Cost-Effectively: A National Review of the Cost of Energy Saved Through Utility-Sector Energy Efficiency Programs*, September 2009.

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38 See AEP's initial filings in PUC Dockets 10-0486-EL-ACP and 10-0487-EL-ACP. As with energy efficiency plans, the Policy Matters Ohio report cited above provides a clearer interpretation of the data regarding renewable electricity compliance than the PUC filings.

39 See Appendix B.

40 See note 1.

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42 See Appendix A.

43 Department of Energy, Energy Information Administration, *Form EIA 861: Annual Electric Power Database, 2009, 2010.*

44 See DP&L's initial filings in PUC Dockets 09-1986-EL-POR and 10-0303-EL-POR.

45 Ibid.

46 See DP&L's initial filing in PUC Docket 10-0303-EL-POR.

47 See DP&L's initial filing in PUC Dockets 10-0489-EL-ACP and 10-0492-EL-ACP.

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56 See Appendix A.

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60 See FirstEnergy's filings in PUC Dockets 10-0227-EL-EEC, 10-0499-EL-ACP, and 09-1949-EL-POR.

61 See Appendix B.

62 See Appendix A.

63 See PUCO's ruling in PUC Dockets 09-1004-EL-EEC, 09-1005-EL-EEC, and 09-1006-EL-EEC.

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69 Based on data contained in PUC dockets 10-227-EL-EEC, 10-303-EL-POR, 10-317-EL-EEC, 10-318-EL-EEC, and 10-321-EL-EEC. Duke’s 2009 energy efficiency savings calculated from Appendix A of case 10-317-EL-EEC.



