



## AN ENVIRONMENTALLY SOUND ENERGY POLICY

### ONE KEY TO INDIANA'S ECONOMIC FUTURE

Determining Indiana's energy policy involves some of the most important decisions state political leaders will make in the coming years. The energy choices, and the associated environmental consequences, will have a profound effect on Indiana's quality of life, natural resources and economy.

At the federal level, energy and environment discussions often center on national energy security, reducing greenhouse gas emissions and job growth. While each state plays a role in achieving those aims, Indiana leaders also must enact policies that promote the state's interests. Among other things, state-specific energy policies can help Indiana capitalize on changes in energy policy and technology.

The policy options suggested in this brief were informed by the work of the Commission on Energy and the Environment – one of three convened in 2010 to address the most critical issues facing our state's future.

#### Indiana's opportunities to address energy and environmental challenges

To increase state and national energy security, we must reduce our dependence on foreign oil. Fortunately, Indiana has assets that can help. Indiana's rich coal and biomass resources can, for example, provide a domestic alternative to liquid fuel production. Also, Indiana's electric vehicle and battery prowess can drive expanded development of alternative-vehicle and energy-storage technologies.

To reduce greenhouse gas emissions nationally and globally, we'll need to reduce fossil-fuel dependence. That will require more low-carbon and non-carbon sources of

energy, which may include natural gas, solar, wind, hydro or other sustainable or renewable power sources. Additional alternatives may include coal-fueled electricity coupled with carbon capture. This may involve carbon sequestration or the use of CO2 to harvest more natural gas from the subsurface. Increased energy efficiency also can reduce the need to build new energy-production facilities.

Toward these ends, Indiana may be able to help – and to boost its economy in the process – through several measures, including:

- Advanced biofuels
- Electric vehicles and battery technology
- Energy efficiency
- Carbon capture and storage

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## Advanced biofuels

Indiana has significant potential to use its agricultural resources for biofuels or biopower. In either case, cellulosic feedstocks (corn stover, miscanthus, switchgrass, forest residues, etc.) are grown, collected and converted to usable energy.

Still, Indiana has the potential to be a national frontrunner in producing advanced biofuels from cellulosic feedstock. Corn stover is available in the northern part of Indiana and new crops of switchgrass or miscanthus could be grown in the southern parts of the state. All in all, Indiana has the natural-resource capacity to support about five cellulosic ethanol plants using corn stover.

Production facilities for these fuels would provide tremendous benefits to local and state economies. Unlike other industries that must import many manufacturing or process components, ethanol plants are built locally. Feedstocks also must be local.

But to secure first-mover advantages, Indiana must act quickly. There is more biomass available in Indiana and other agricultural states than is required by federal mandates, and facilities are now being developed in other states.

In this context, biopower production would use biomass as a partial substitute for coal. In states that have a Renewable Portfolio Standard (RPS), this option provides one means of reaching the RPS renewable-energy target. Some utilities may be interested in this option for environmental reasons even without an RPS.

The federal Environmental Protection Agency has established a renewable fuel standard through 2022. The standard for advanced cellulosic biofuel was waived in 2010 and 2011 because these fuels are not yet commercially available. Looking forward, a number of uncertainties limit the economic viability of producing these advanced fuels, including (1) future oil prices, (2) feedstock costs and availability by region, (3) conversion costs and efficiencies, (4) environmental impacts of biofuel production and (5) government policy. These uncertainties make it extremely difficult for private firms to build the first few advanced biofuels plants.

Finally, one of the more promising methodologies in this arena is the combination of biomass and coal. Research has shown that CO<sub>2</sub> can be captured more cheaply in combined coal-biomass plants than in coal plants alone. Indiana is in a strong position with its rich potential for cellulosic feedstock and its coal capacity.

## Electric vehicles and battery technology

Alternative sources of energy for transportation, such as electricity, are gaining popularity. So are alternative-fuel vehicles, such as electric vehicles (EVs), as well as the batteries that power them.

With its existing prowess in the automotive and auto parts industries, and its strong university research capabilities, Indiana is well positioned for electric vehicle technology diversification. Indiana also has shown its willingness and ability to offer competitive financial incentives to attract potential EV component manufacturers. Advancing such a strategy could include not only EVs and batteries, but also natural gas vehicles, hybrid-system improvements, advanced biofuels (per above) and even more efficient internal combustion engines.

THINK City has dominated Indiana's growing electric vehicle market to date. While sales of THINK City EVs have slowed since its parent, THINK Global, entered into and emerged from bankruptcy in Norway, other passenger EVs, such as the Nissan Leaf and the Chevrolet Volt, seem poised to significantly expand the number of EVs in Indiana.

Batteries are, of course, critical components of EVs. Long after they have become ineffective for EVs, they can be reused for electric grid storage. The ability to store electricity on a large scale via batteries would make wind and solar energy more viable. In addition, it could increase the availability and reliability of electric supply (e.g., matching supply with peak demand), stabilize the cost of electricity and help reduce greenhouse gas emissions. State governments can play an important role in supporting the development and manufacture of batteries.

Indiana is already gaining national attention as a leader in battery design and manufacturing with companies such as Delphi, Altair Nano, Ener1's Indiana-based EnerDel unit, and the military's battery center of excellence at NSWC Crane, as well as initiatives such as the Energy Systems Network. These entities engage in the design, development, manufacturing and/or testing of rechargeable lithium-ion batteries and battery systems for energy storage. An attractive investment climate, strong manufacturing base and extensive scientific expertise position Indiana well for additional investment in this industry. The economic viability of designing and manufacturing batteries in the state, however, is subject to variables such as energy prices and the availability of investment capital.

## Energy efficiency

Improving energy efficiency across sectors has a number of potential benefits for Indiana, including a cleaner environment, enhanced economic competitiveness, improved energy security, and reduced exposure to high and unpredictable energy prices. Energy efficiency is attractive because improvements can be implemented quickly and at low cost compared to other energy-system options. Similarly, returns on investment can be realized relatively quickly and sustained over time.

Indiana has adopted a number of policies related to energy efficiency. The Indiana Office of Energy Development

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promotes federal and state energy-efficiency programs, including several funded by the U.S. Department of Energy. In late 2009, the Indiana Utility Regulatory Commission (IURC) set annual savings goals for each investor-owned utility. The IURC also ordered electric utilities to submit three-year demand-side management (DSM) plans, including plans for meeting these energy efficiency savings goals. Also in late 2009, the IURC ordered all jurisdictional utilities to implement five specific demand-side management programs. In May 2011, Public Law 150 (SB 251) created the Clean Energy Portfolio Standard (CEPS). The program is voluntary and sets a goal of 10 percent clean energy by 2025. Utilities must achieve specific percentages of clean energy to receive financial incentives. Demand side management and energy efficiency initiatives are included in the extensive list of eligible technologies.

In Indiana, the industrial sector (which includes aluminum, chemicals, glass, metal casting and steel) contributes to the state's relatively high energy consumption. As a result, there's significant opportunity to improve overall industrial energy efficiency. Indiana's large industrial users typically have specific contracts with utilities that establish those firms' specific loads and negotiated rates. The industrial sector also can access energy-efficiency programs offered by utilities and/or third parties. These programs are typically available to smaller firms, as well, even though they lack the ability to complete the energy-load and efficiency analyses that larger firms do.

Requiring the most up-to-date construction standards for these firms' buildings can also easily and cost-effectively reduce energy use, save money, avoid waste and minimize pollution. The American Recovery and Reinvestment Act of 2009 (ARRA) requires states to update their building energy codes to the functional equivalent of the 2009 International Energy Conservation Code (IECC) and to achieve a 90 percent compliance rate with the new building codes within eight years in order to qualify for stimulus funding. In May 2010, the most recent amendments to the Indiana Energy Conservation Code (675 IAC 19-4) went into effect. These contain energy construction rules for commercial buildings. Similarly, the state is in the process of adopting new residential energy-efficiency requirements that are equivalent to the 2009 IECC. However, while Indiana is just now catching up to the 2009 rules, the 2012 version of the IECC was published in July 2011, and other states already are putting this improved code into effect.

## Carbon capture and storage

Indiana's economy has long been dominated by energy-intensive manufacturing and dependent on relatively low-cost, coal-generated electric power. Even with changes in manufacturing over the last 25 years, Indiana ranks among the top 10 U.S. states for its number of manufacturing jobs.

Some of the major industries within the state (e.g., steel, aluminum, automotive, refining and cement) use coal as an energy source. In addition, more than 90 percent of the electricity generated in Indiana comes from coal-burning power plants (EIA, 2011). This dependence on coal provides Indiana with relatively low-cost electricity, ranking it among the 15 lowest-cost states in the nation. The state's abundance of manufacturing and coal-based electric generation also made Indiana the second-largest coal-consuming state in the nation in 2009.

On the resource side, Indiana has a large, robust coal mining industry with large reserves of coal located in the southwestern region of the state. With about 2 percent of the nation's reserves, Indiana's mines produced approximately 35 million short tons of coal in 2010. But even at this rate of production, the state imports more than half of the coal it consumes from low-sulfur western sources.

Indiana's industries and its coal-based power generation release significant amounts of carbon dioxide (CO<sub>2</sub>). With increasing evidence of adverse environmental and climate effects, Indiana's heavy dependence on coal and other fossil fuels presents enormous challenges and opportunities. Analyses have shown that Indiana could be among the states most affected by efforts to control CO<sub>2</sub> emissions. It also has much to gain from mitigation.

For Indiana to enhance the well-being of its citizens, it must simultaneously continue to provide low-cost and reliable electricity, support manufacturing jobs that rely on coal, sustain the state's coal-mining industry, retain other industries that emit greenhouse gases, and improve on practices that affect the environment. It's no small challenge – and one huge opportunity.

## Policy options for energy and the environment

Good public policy depends on a clear understanding of the choices available and their potential consequences. The choices described below represent options for pursuing emerging technology opportunities in Indiana in four focus areas, with an eye toward enhancing the state's economy and improving the environment. Additional background information and descriptions of the pros and cons of various options appear in the full report of the Commission on Energy and the Environment. The policy options do not necessarily represent the views of any particular individual or organization who participated on the Commission. Rather, the Commission worked to provide policymakers with an understanding of key choices and the consequences of those choices in the energy and environmental field.

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## Advanced biofuels

State government has several policy options available that could support development and deployment of advanced biofuels.

### Option 1. Support university research to develop new technologies and to research the economic and policy issues associated with producing advanced biofuels in Indiana

Indiana's universities are well positioned to conduct research that improves advanced biofuel technologies, as well as providing information to policymakers on their development, deployment and impact. Research can analyze the cost-benefits of new technologies, improve those technologies and demonstrate the economic and environmental ramifications of various policy decisions and economic incentives. This research, coupled with implementation steps outlined below, can help grow businesses and create jobs in Indiana, while at the same time saving money and protecting the environment.

### Option 2. Support the development of new advanced biofuels production facilities by purchasing fuel through a reverse auction

State government has significant purchasing power for vehicles and vehicle fuel. This could help advance energy and environment policy goals. Specifically, state government could initiate a reverse auction for advanced biofuels that would guarantee future purchases. In so doing, state government would effectively underwrite part of the risk associated with early advanced fuel plants. Additional analysis would be needed to design a reverse auction appropriate for Indiana conditions and markets. The design would have to assure adequate competition in the auction so that Indiana could be assured of getting the best price possible for the biofuel. The size of the contract also would need to be matched to Indiana demand (buses, car pools, etc.) and to an economically viable scale of technology.

### Option 3. Make traditional and specialized economic development incentives available to firms locating new advanced biofuels facilities

Federal tax credits and loan guarantees may be available to incentivize development of new advanced biofuels plants. Indiana currently has general economic development incentives that also may be available to new businesses. In the past, Indiana has had specialized tax credits for corn and cellulosic ethanol production, biodiesel production and sales. These incentives remain in state law but are not currently funded. Indiana

could provide additional funding for these incentives for advanced biofuels development, particularly for cellulosic biofuels plants. Such incentives could be applicable to fuels made entirely from biomass and fuels made from a combination of coal and biomass.

### Option 4. Continue to promote ethanol and biodiesel production and flex fuel vehicle deployment

Indiana's government and businesses have made significant investments to encourage ethanol and biodiesel production, as well as the manufacture and purchase of flex fuel vehicles. As an additional measure, Indiana could provide production tax credits for fuel produced in Indiana that would help keep prices competitive with other fuel options. Indiana also could increase advanced biofuels consumption by augmenting the number of flex-fuel vehicles and/or educating flex-fuel owners about the option to use E85 in their vehicles. Finally, Indiana could expand consumption by developing and supporting a network of blender pumps in the state.

## Electric vehicles and battery technology

State government has several policy options that could support manufacturing and production of electric vehicles and batteries.

### Option 1. Support in-state electric vehicle supply chains through economic development incentives

With initiatives such as the Energy Systems Network, Indiana is currently a leader in EVs. Indiana government can further invigorate in-state EV and PHEV supply chains through various incentives, such as tax credits and loan guarantees. For instance, tax credits can help companies purchase electric vehicle manufacturing equipment. Currently, the Hoosier Alternative-Fuel Vehicle Manufacturer Tax Credit Program provides an income-tax credit of up to 15 percent of the qualified investment for the manufacture or assembly of alternative fuel vehicles (IC 6-3.1-31.9). Indiana could expand such funding for existing or additional economic incentives.

### Option 2. Support in-state purchase and use of electric vehicles

Several federal incentives encourage the purchase and use of EVs. Indiana could consider a variety of policy tools to incentivize even more consumer EV purchases, including:

1. Rebates
2. Feebates (rebate/fee combination that encourages a desired behavior, such as purchasing EVs, with a fee that discourages a less-desired behavior)

3. income tax credits
4. Preferential parking in such places as malls and airports
5. Sales tax exemptions
6. Reduction in license fees for EVs
7. Exemptions from insurance surcharges
8. Credits for electricity provided to the grid by car batteries

The state also could encourage lowering the cost of electricity for owners of EVs. Currently, Indianapolis Power & Light (IPL) offers special plug-in EV-charging rates for residential and fleet customers. In addition, IPL provides no-cost EV supply equipment and the associated metering equipment for the first 150 eligible customers to sign up for the special rate. IPL also covers the cost of a standard installation of the equipment. Indiana could collaborate with IPL and other utility companies to expand such programs so that more customers could participate.

### **Option 3. Support the development of an adequate recharging infrastructure**

Indiana's infrastructure can adequately support the recharging needs of existing EVs. Long term, however, the expanded availability of recharging infrastructure—both residential and public—will be critical to more widespread EV deployment. To this end, the state could provide tax credits for installing home recharging outlets. In addition, a public network of recharging stations will be important. That will require collaborations between local governments and the private sector. Incentives, in the form of grants, labor- and service-tax exemptions, and environmental regulatory exemptions could encourage investments in more extensive recharging infrastructure.

### **Option 4. Encourage off-peak charging of electric vehicles**

By incentivizing EV and PHEV owners to charge their vehicles at night via reduced rates, Indiana could encourage widespread deployment of EVs without needing additional generation capacity. The subsequent proliferation of used batteries could also enable more storage of off-peak wind energy. Thus, EV and PHEV batteries will not only be a source of off-peak electricity demand, but also a source of stored electric power for use during peak times.

### **Option 5. Encourage state and local government adoption of electric vehicles**

Because EVs are still viewed as an emerging technology, public assistance may be needed for investors to overcome early-adopter financial risks. Mandates or incentives for state- and municipal-fleet purchases could result in more initial sales and boost consumer confidence.

Already, Indiana has an Alternative Fuel Vehicle (AFV) grant program. This program provides grants to counties, cities, town, townships or school corporations that purchase new AFVs or convert existing vehicles to alternative-fuel use. However, the program applies only to dedicated and bi-fuel liquefied petroleum gas (propane) and compressed natural gas, and no funds have been appropriated since March 2011. Indiana could provide funds for this incentive and expand the definition of alternative fuel to include electricity.

### **Option 6. Support research to develop new technologies and to research the economic and policy issues associated with manufacturing electric vehicles**

Indiana's universities are well positioned to expand on current research into EV and PHEV technology, and to provide information to policymakers on the economic and policy contexts in which technologies would be deployed.

### **Option 7. Support in-state development and manufacturing of batteries through economic development incentives**

State government can further promote battery development and manufacturing through various incentives, such as property-tax exemptions, tax credits and loan guarantees. The tax credits could be awarded to companies that purchase manufacturing equipment in Indiana or to companies based on kilowatt hours of battery capacity produced.

### **Option 8. Support research to develop new technologies and to research the economic and policy issues associated with manufacturing batteries in Indiana**

Indiana's universities and colleges have considerable expertise regarding batteries, and are well positioned to improve battery technology. In addition, Indiana scholars can provide research and analysis to state policymakers so they will better understand the economic and policy contexts in which batteries are manufactured. Such research can lead to more affordable and better performing batteries.

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## **Option 9. Support university initiatives to develop relevant curricula**

To advance technology and manufacturing, Indiana's colleges and universities must have courses that prepare Indiana workers for the state's electric-energy sector. In 2009, the Indiana Advanced Electric Vehicle Training and Education Consortium (I-AEVtec) received \$6.1 million in stimulus money from the U.S. Department of Energy. Purdue University is the project leader, and other participating institutions include Purdue Calumet, the University of Notre Dame, IU Northwest, the IUPUI Richard G. Lugar Center for Renewable Energy, and Ivy Tech Community College. I-AEVtec advances Indiana's technological edge by developing curricula that will increase the state's research and development capabilities in next-generation battery technology and fuel cells. For a similar program, Ivy Tech Community College received a \$4.7 million American Recovery and Reinvestment Act grant for its Crossroads Smart Grid Training Project. This initiative will design and deliver Smart Grid curricula including modules, full courses, certificate/training programs, and refined four-year degrees in technology and engineering. Building on these initiatives, the state of Indiana could provide additional funding to further support the development and deployment of targeted training programs.

## **Option 10. Encourage/incent utilities to utilize used electric vehicle batteries in grid storage applications**

A robust market for the secondary use of EV batteries will be critical to the viability of the industry and its technology. It is estimated that once batteries become too degraded for use in EVs, they still have 70 to 80 percent of their original energy storage capacity. At that point, the batteries can still be useful in other applications, such as providing reserves and peak-shaving for the electric grid. If broadly deployed, used EV batteries could serve as an energy storage solution for the electric grid, capable of reducing peak-generation needs, reducing transmission congestion and providing for better utilization of energy generated by renewable sources. Such measures could not only lower the overall cost of EVs, but also long-term electricity costs. To support a viable secondary market for used batteries, the state could explore and adopt a legal framework that addresses crucial technology issues, such as ownership and liability.

## **Energy efficiency**

Indiana state government has several options that could support energy efficiency through utility policies, industrial efficiency, building codes and other measures.

## **Option 1. Establish energy efficiency as a formal resource within long-term utility and energy planning**

When developing long-term utility and energy plans, policymakers should formally recognize cost-effective energy-efficiency improvements as an energy resource comparable to or even prioritized above new supply-side resources.

## **Option 2. Address Indiana's annual energy savings goals**

States use a number of mechanisms to set energy-savings targets. An Energy Efficiency Resource Standard (EERS) is a long-term energy-savings target set for utilities. An EERS requires that utilities or independent programs achieve a certain percentage of their energy needs through energy-efficiency measures. Utilities and independent organizations typically administer customer-focused efficiency programs to achieve these goals. In some cases, they also may use a market-based trading system that allows utilities to purchase energy-efficiency credits instead of overseeing energy-efficiency savings in their own service territories.

In late 2009, the Indiana Utility Regulatory Commission (IURC) set annual savings goals for each investor-owned utility. The IURC also ordered electric utilities to submit three-year, demand-side management plans, including plans for meeting these energy-savings goals. While failure to or delay in offering the required programs is considered a "service deficiency," the order did not specify consequences for noncompliance. Also in late 2009, the IURC ordered all jurisdictional utilities to implement five demand-side management programs.

Policymakers should consider three options to encourage increased energy efficiency among utilities and the customers they serve:

- Option 2a. Monitor energy savings program efficacy and enforce program goals
- Option 2b. Extend Indiana's annual savings goals to all electric and natural gas utilities, including municipal and co-op utilities
- Option 2c. Raise the goals of the program

## **Option 3. Make Indiana's Clean Energy Portfolio Standard mandatory**

Most U.S. states have adopted a policy mechanism called Renewable Portfolio Standards (RPS). These standards require that a certain percentage of total electricity must come from renewable energy by a certain year (e.g., 25 percent renewable energy by

2025). Several states with RPS policies define energy efficiency as an eligible resource to meet their RPS targets.

In May 2011, Indiana's Public Law 150 (SB 251) established a Clean Energy Portfolio Standard (CEPS) for our state. The program is voluntary and sets incremental goals that must be met to receive financial incentives. Demand-side management and energy-efficiency initiatives are included in the extensive list of eligible technologies. As a practical matter, the IURC must harmonize the standard with energy-efficiency targets established for utilities. Once completed, the state could monitor the effectiveness of the CEPS in achieving demand-side management and energy-efficiency goals and adjust the policy as needed to ensure maximum effectiveness.

#### **Option 4. Adopt decoupling or some other form of lost revenue adjustment for Indiana's electric utilities**

Common regulatory structures do not provide economic incentives for utilities to help their customers advance energy efficiency. Typically, maximizing energy sales and profits are linked. States can adopt fixed-cost recovery measure (referred to as a "lost-revenue adjustment mechanisms") to remove the disincentive inherent in the regulatory system. Decoupling is one lost-revenue adjustment mechanism that severs the link between a utility's revenues and sales. In addition, many states have moved to a revenue-stabilization model that increases regulatory transparency and promotes efficiency.

Decoupling has been authorized in Indiana for natural gas utilities and has saved significant consumer dollars. To reap additional consumer benefits, Indiana could make decoupling universally available to electric utilities.

The IURC also has statutory authority to allow electric utilities to collect lost revenues and has done so in a number of specific cases. Indiana could extend other revenue-adjustment mechanisms universally to electric utilities.

#### **Option 5. Adopt utility performance incentives for achieving energy efficiency goals**

In addition to fixed-cost recovery, states can adopt performance incentives that reward utilities for reaching energy saving goals. While the former serves to mitigate utilities' disincentive to invest in energy efficiency, it does not necessarily provide an incentive for making actual investments in energy efficiency measures. Thus, to encourage energy efficiency investments, many states have allowed utilities to earn a return on such investments

on par with those in supply-side resources (e.g., new generating capacity). As of late 2010, Indiana had authorized performance incentives for a few electric utilities (Molina et al., 2010). This practice could be expanded.

#### **Option 6. Adopt time-based pricing for electricity**

Time-based pricing (TBP) reflects the idea that the cost of generating and delivering electricity can vary depending on the time of day and level of demand. TBP allows utilities to employ block or real-time pricing. With TBP, customers would see prices as often as hourly and could use that information to adjust their electricity use resulting costs.

TBP promotes wise use of electric energy. If customers see the actual cost of electricity, they often change their behavior. Shifting electricity use from periods of heavy demand to periods of lower demand also allows power plants to run at a steadier rate. Furthermore, it can reduce or delay the need for additional power plants. To reap these benefits, Indiana policymakers could adopt TBP.

#### **Option 7. Provide incentives for combined heat and power**

Combined heat and power (CHP) is an industrial energy efficiency measure. It involves the generation of power and thermal energy from a single fuel source. In some situations, CHP can increase a facility's operational efficiency and/or decrease its energy costs. In addition, CHP can improve the reliability of a facility's electrical supply.

Indiana indirectly supports CHP in several ways. But the state could do even more to directly support and encourage CHP, including waiving electric utility standby fees.

#### **Option 8. Provide incentives for other industrial energy efficiency programs**

The Indiana Office of Energy Development (OED) promotes federal and state energy efficiency programs. The state of Indiana (and localities) could provide further financial and non-financial incentives to support energy efficiency at the industry level. In particular, tax incentives would encourage larger capital investments—such as retrofitting projects or development of new technologies—that might otherwise not be pursued. In their quest to maximize profitability, industrial customers often will not replace a functional piece of equipment with a more energy efficient one unless there's a strong immediate and long-term return on investment. Incentives, such as loans or grants for investments in specific types of energy efficient equipment can make improvements more immediately affordable. So can reduced interest rate loans that defray initial capital costs. Non-financial incentives also

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could provide bonuses or technical assistance for new or retrofitted green buildings.

## **Option 9. Improve the process of adopting new building energy codes to allow the state to benefit quickly from advances in efficiency**

Model energy codes for the residential market are updated on three-year cycles. Because of the substantial energy savings achieved by each revision, Indiana could benefit greatly from quicker adoption of new standards. To do this, state policymakers may want to remove the current energy section from the residential code and place it in the Indiana Energy Conservation Code along with the commercial standard. This would enable the building commission to establish a combined residential and commercial energy code review committee that could speed the process and savings.

## **Option 10. Educate builders and building officials on new building codes and track compliance**

The American Recovery and Reinvestment Act requires that states achieve a 90 percent compliance rate with new building codes within eight years. Indiana has begun to meet this requirement. But to meet the deadline and ensure compliance, state officials will need to do far more to educate and train builders and building officials. Policymakers may want to assign that the energy code review committee noted above assume responsibility for education and training, as well as determining compliance rates.

## **Option 11. Expand state financial and information incentives to consumers for energy efficient improvements**

To encourage more energy-efficient consumer purchases, states employ rebates, loans, bonds, income tax credits, tax deductions and sales tax breaks. Indiana currently uses financial incentives and educational efforts. It could sustain and expand upon these initiatives.

## **Option 12. Facilitate financing for energy efficiency retrofits to buildings**

While better codes will make new buildings more energy efficient, even greater gains – in terms of energy savings and job creation – can be achieved by retrofitting existing structures. Building owners often do not make these improvements because they lack the capital or credit to secure financing at reasonable interest rates. Indiana policymakers may want to consider financing programs that have been successful in other states.

## **Option 13. Fully implement energy efficient design standards for new state-owned buildings and retrofits of existing buildings**

State governments can demonstrate leadership and save money by incorporating energy efficiency measures into state facilities. The most commonly adopted measure is energy savings targets for new and existing state facilities. Another measure is a benchmarking requirement. States often undertake retrofits through energy savings performance contracts through which work is funded with savings from the resulting energy savings.

In 2008, Governor Mitch Daniels established an energy efficient state buildings initiative by executive order. The order required the Indiana Department of Administration to develop design standards for all new state buildings that include a cost-effectiveness analysis for energy efficiency. The standards apply to all state agencies, departments, boards, offices, commissions and public universities.

State policymakers can ensure that these measures remain in place, that they are implemented fully and that results and best practices are promoted broadly so that others in the public and private sectors might follow.

## **Option 14. Expand incentives for public university energy efficiency improvements**

In Indiana, public universities may undertake qualified energy savings projects without General Assembly approval so long as the anticipated savings are equal to the annual debt payments incurred, and so long as the projects fall within certain bond limits. Unfortunately, current bond limits are quite low given the magnitude of university facilities. Such low levels can impede larger projects that would save considerable energy and money. To remedy the situation, policymakers should consider two options:

- Option 14a. Remove bonding limits for public universities for energy efficiency improvements
- Option 14b. Establish mechanisms to allow the reinvestment of energy efficiency savings in additional improvements

## **Option 15. Encourage energy efficiency for local public buildings**

Local governments could save money through energy-efficiency improvements to public buildings. Unfortunately, such projects often require significant upfront investment. Indiana currently offers a number of assistance programs to local governments, but

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policymakers should consider additional tools to incentivize energy efficiency investments by local government for new and remodeled buildings.

## **Option 16. Support research, development and demonstration**

State universities and other research institutions can help develop and advance many kinds of energy efficiency measures. Research could focus on energy consumption patterns in local industries, development of new technologies and demonstrations of new technologies.

## **Option 17. Support university initiatives to develop relevant curricula**

One way to achieve economic growth is to develop and deliver college courses that result in more energy efficiency understanding and implementation. This policy option would help Indiana workers keep pace with emerging technologies, thereby retaining and growing Indiana jobs.

## **Option 18. Track and evaluate the efficacy of energy efficiency programs; strengthen programming if necessary**

The options noted above outline many ways to achieve energy efficiency. The state could monitor the results of these programs and adjust programs accordingly. A number of private firms, not-for-profit organizations and universities could help develop an appropriate and wide-ranging evaluation effort – one that would complement and incorporate existing evaluation measures for individual initiatives.

## **Carbon capture and storage**

Though federal-level decisions will greatly influence carbon capture and storage initiatives (CCS), state policymakers can have a significant impact. If policymakers choose to develop and deploy large-scale, safe, effective and economic CCS, Indiana could secure first-mover advantages ranging from job creation to energy savings. Options include such issues as pore space ownership, carbon dioxide pipelines and long-term liability of carbon storage.

### **Option 1. Clarify pore space ownership**

In Indiana, it is currently unclear who owns various underground areas – called pore spaces – considered most promising for carbon storage. Without guidance from the legislature and the courts, this presents tremendous uncertainty for surface estate owners,

mineral estate owners and CCS operators. That, in turn, will increase transaction costs, preclude first-mover advantages or prevent deployment altogether. Without legislative guidance, property rights clarification will likely fall to the courts. Policymakers could, instead, enhance job creation, energy savings and environmental benefits by adopting one of the four options:

- Option 1a. Assign pore space property rights to surface estate owners
- Option 1b. Aggregate property rights using eminent domain with or without unitization and/or quick take provisions
- Option 1c. Declare pore space as public domain
- Option 1d. Make proximity payments to surface estate owners

### **Option 2. Develop a regulatory framework for carbon dioxide pipelines**

Large-scale CCS will require a system for transporting CO<sub>2</sub> from capture sites, such as power plants, to storage sites. This likely will involve a series of pipelines.

There is still much uncertainty about the location and suitability of various geological formations to store CO<sub>2</sub>. The suitability of centralized versus decentralized pipeline networks depends on the distance to, and the geological compatibility of, potential sites. The cost of transporting CO<sub>2</sub> could vary significantly depending on the selection of storage sites and other factors. Some experts believe that a significant proportion of CO<sub>2</sub> can be stored near emitting facilities.

The lack of a workable regulatory framework is a hurdle to CCS deployment using pipelines. Policymakers may want to choose one or more options, all of which would involve extensive regulatory coordination with federal agencies and other states.

- Option 2a. Establish an intrastate pipeline regulatory framework
- Option 2b. Advocate for a federal interstate framework similar to oil pipelines
- Option 2c. Advocate for a federal interstate framework similar to natural gas pipelines
- Option 2d. Advocate for a hybrid regulatory framework that combines elements of the current frameworks for oil and natural gas pipelines
- Option 2e. State government facilitation of development of pipeline network

## Option 3. Address the long-term liability of carbon storage

Before carbon storage can occur on a large scale, issues of operational (short-term) and post-injection (long-term) liability must be addressed.

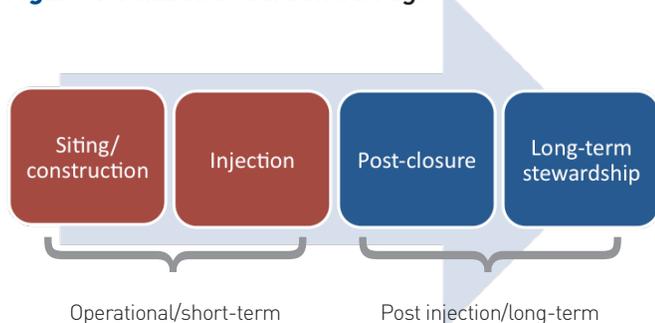
Operational liability refers to various risks (e.g., environmental, health and safety) related to CO<sub>2</sub> capture, transport and subsurface geological storage in the short-term (see Figure 1). These risks can be managed via policies for site permits, monitoring, mitigation and verification, as well as human health and environmental protection.

Post-injection refers to an indefinite time period, short-term and long-term, following a storage site's closure. Associated risks could involve the environment, health, safety and climate considerations. There is also liability potential long after the initial injection, possibly even after a private operator has gone out of business. This type of liability may best be borne by the public and could be managed, at least in part, through state policy. What's more, some liability issues may cross state lines, so policymakers will need to consider interstate ramifications. Finally, climate liability involves the control of greenhouse gas emissions associated with CO<sub>2</sub> leakage, and is, perhaps, more appropriately addressed at the federal level.

Three policy sub-options address long-term liability:

- Option 3a. Advocate for expansion of federal Underground Injection Control (UIC) Program
- Option 3b. Use current state tort and contract laws
- Option 3c. Establish a specific state regulatory framework for liability

Figure 1. Phases of Carbon Storage



## Option 4. Facilitate research to establish additional carbon capture technologies

Several of the state's research universities could investigate aspects of CO<sub>2</sub> capture technologies.

Specifically, before moving ahead, it's important to determine the efficiency and practicality of the capture process and associated costs. While others are, to be sure, researching various aspects of CCS, Indiana's unique strengths in science, engineering and applied technology could help address the challenges of, and enhance the state's leadership on, this issue. Such expertise would be a boon to local industries, as well as providing policymakers with expert information and resources. Such research could also potentially bolster the potential for new facilities and new jobs.

## Option 5. Facilitate investigation and evaluation of Indiana's deep subsurface geology for CO<sub>2</sub> storage

To determine Indiana's potential for deployment of CCS, we'd need to evaluate the state's subsurface carbon-storage potential. Research could also address the potential for enhanced oil or gas recovery aided by the injection of CO<sub>2</sub>. These evaluations could be carried out by the state's research universities, in cooperation with the state's regulatory agencies, to create a solid technical basis for permitting and operational oversight.

## Option 6. Evaluate the enhanced oil recovery opportunities located within and outside of the state

A possible CO<sub>2</sub> reuse or value-added aspect of CCS is to use captured CO<sub>2</sub> for enhanced oil recovery. Research can determine the potential for producing such incremental oil and gas from reservoirs located in Indiana. Such an assessment could be carried out by the Indiana Geological Survey in conjunction with oil- and gas-producing industries, the state's utilities and appropriate regulatory entities.

## Option 7. Provide economic development incentives to private sector CCS implementers

Significant financial uncertainties are likely to remain even if Indiana is able to address many of the regulatory and technical uncertainties of CCS. Indiana can potentially address these fiscal uncertainties with tax and other economic development incentives, including income tax credits, tax deductions, price guarantees or grant funding. Indiana could use traditional or specialized income tax credits to reduce the cost of the capital investment needed to operationalize carbon capture and/or to transport the captured CO<sub>2</sub> to storage sites. In addition, the state could offer price guarantees for products produced from facilities with carbon-capture technology. The state also could provide grant funding to offset the costs associated with pilot or demonstration projects.

# POLICY CHOICES *for Indiana's Future*

## Option 8. Create a state utility to develop CO2 pipelines and/or storage facilities

State government has the option of participating directly in the development of CCS by creating a state utility. Recommendations from the Indiana CCS Summit in 2008 suggest that such a utility could help with installing and/or operating CO2 pipelines and/or CO2 storage. In so doing, state government could help overcome impediments that may hinder private sector investments in these activities.

## Implications of these policy choices

As noted often, many energy and environment issues are governed by federal policy and action. The policy choices in this brief are those that Indiana policymakers can address at a state level. These options also address areas in which Indiana already has strong advantages, areas critical to Indiana's economy and areas in which substantial change could dramatically enhance the state's economy. Many of Indiana's strongest opportunities involve development and commercialization of emerging technologies. These, in particular, offer significant first-mover advantages and the potential for long-lasting economic impact.

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## About Policy Choices

The Indiana University Public Policy Institute, part of the IU School of Public and Environmental Affairs, developed Policy Choices for Indiana's Future to identify critical issues facing Indiana in the long run. For elected officials, candidates for public office, their policy advisors and those who seek to inform their decisions, Policy Choices provides objective, nonpartisan analysis and recommendations of policy options to address these key issues.

Any objective look at a state's future could cover a wide range of issues – from homeland security to arts and culture, entitlement programs to economic development, pre-school education to eldercare. But everything we do or hope to do – everything – depends on the future of our state's economy.

For that reason, Policy Choices for Indiana's Future chose to focus its research and recommendations on three areas that will have major impact on the collective well-being of our state and the people who live and work here:

### Education and workforce:

Develop the highly skilled workforce necessary for economic growth in a knowledge economy.

### Energy and the environment:

Leverage the state's energy assets in an environmentally responsible, productive manner.

## Tax policy:

Create a balanced tax environment that:

- 1) Enables growth
- 2) Generates the revenue required to efficiently deliver essential services and make the infrastructure investments that will keep Indiana competitive.

Because the issues involved in these three areas are large and complex, Policy Choices relied on the work of three commissions:

- Commission on Education and Workforce Development
- Commission on Energy and the Environment
- Commission on State and Local Tax Policy

Each commission included members of the Public Policy Institute's Board of Advisors, plus additional members from around the state selected because of their subject-matter expertise. Randall Shepard, Chief Justice of the Indiana Supreme Court and Mark Miles, President and CEO of the Central Indiana Corporate Partnership, led the overall project. Staff leadership was provided by the IU Public Policy Institute. You may find Policy Choices work products at [www.policyinstitute.iu.edu/PolicyChoices](http://www.policyinstitute.iu.edu/PolicyChoices).

The three commissions worked for 18 months to conduct research, prepare analysis and develop options for effective public policy. The three commission reports were then presented to and accepted by the IU Public Policy Institute's Board of Advisors, which now presents these findings, recommendations and choices to Indiana policymakers. The board hopes that policy choices resulting from this report will help Indiana secure a bright economic future.

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The IU Public Policy Institute (PPI) is a collaborative, multidisciplinary research institute within the IU School of Public and Environmental Affairs (SPEA). PPI serves as an umbrella organization for research centers affiliated with SPEA, including the Center for Urban Policy and the Environment and the Center for Criminal Justice Research. PPI also supports the Indiana Advisory Commission on Intergovernmental Relations (IACIR).

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