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The Changing Energy Landscape

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THE TRENDS AND FUTURE OF ENERGY IN AMERICA

The energy landscape in the United States is changing. Coal and nuclear energy are transitioning to oil and renewable energy of the future. How communities and economic development professionals adapt to these changes will determine their future success.

the changing energy LANDSCAPE

By David Maahs, CEcD

In economic development, energy has long been and will continue to be one of the largest factors in a community's ability to attract and retain businesses. It is critical that businesses have access to affordable energy, which is why so many economic development organizations are focused on the energy landscape and its future.

Earlier this year, Economic Development Research Partners (EDRP), the think tank component of the International Economic Development Council, put together a study called "The Changing Energy Landscape." This report looks at the trends and future of energy in America. It recognizes communities that are doing innovative things to react to changes and gives advice for economic development professionals. The report was compiled by leaders in the economic development field from across the country.

The report explores four types of energy: coal, nuclear energy, oil/natural gas and renewable energy. In many ways, this is a story of the past – coal and nuclear energy – transitioning to the future of oil, natural gas and renewable energy. The trends and data tell a story, but there is no one-size-fits-all answer. It is up to economic development professionals to work closely with other government and community leaders to make the best decisions for their cities and regions.

This article explores each type of energy and lays out the landscape as well as case studies from around the nation. It also provides economic development best practices for each type of energy. The article is adapted from the EDRP report.

COAL

The Landscape

Coal has employed generations of families and has defined communities from both an economic and cultural standpoint. Its decline has brought turbulence to many communities, and has necessitated economic diversification efforts. Coal's decline can be traced in large part to the emergence of competing resources such as natural gas and renewable energy, as well as global changes in demand and regulatory policies and concerns over climate change. Between 2000 and 2008, coal accounted for about 50 percent of U.S. electricity generation. By 2016, that proportion was just 30 percent.

Coal's decline has brought major hardship to communities that rely on it as the basis of an industry. For example, the closure of coal plants has unfortunately resulted in thousands of layoffs in Wyoming as coal mine owners have declared bankruptcy. Likewise, West Virginia, the nation's second-largest coal producer and Kentucky, the third-largest producer, have faced challenges due to a declining coal industry.

Many communities that rely on coal have been dependent on coal as a single industry and are therefore highly vulnerable to price changes, market shifts, and competing technologies. Coal's decline is felt throughout the supply chain, small businesses suffer from less spending, and there are less tax revenues for state and local governments. Fortunately, public and private sector leaders are working to revitalize many communities.

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EDRP is the think tank component of the International Economic Development Council. This article is adapted from "The Changing Energy Landscape and Its Impact on Economic Development in America," an EDRP report published by IEDC.

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A coal mine in West Virginia

Source: Michigan Radio / Creative Commons License CC BY-NC 2.0

Case Studies

Appalachian Sky

Appalachian Sky is an industrial network in a tri-state region of Ohio, Kentucky, and West Virginia, launched by American Electric Power in 2017. The program aims to develop the region into a leading aerospace hub. The region is home to more than 150 aerospace industries and service providers. Partners from across industries include the Ashland Alliance, Morehead Space Science Center, the Huntington Area Development Council, and economic development organizations, with cooperation from regional airports. The program has attracted new businesses including a $1.3 billion aluminum rolling plant being built by Braidy Industries.

SoloWorks, New Mexico

SoloWorks aims to bridge the gap between New Mexico's remote workers and national employers by identifying residents to participate in full-time remote work. The program is led by four organizations – CELab, DigitalWorks, CirclesUSA, and FatPipe ABQ – and partners with more than 70 national employers to place workers. It received funding from the New Mexico Economic Development Department.

Economic Development Best Practices

- Engage in economic development strategic planning and comprehensive economic development strategies. These efforts help communities identify regional strengths and weaknesses and create new strategies.
- Focus on workforce development and worker retraining.
- Work on neighborhood and community revitalization to make towns more attractive for businesses and existing and new workers.
- Promote entrepreneurship and small business development.
- Focus on business retention and expansion efforts and market to attract new businesses and industries.

NUCLEAR ENERGY

The Landscape

Nuclear power also faces an uncertain future amid a changing landscape. Plant construction faltered in the late 1980's due to environmental concerns, nuclear accidents, and increased regulation. Nuclear plant infrastructure is aging, with the average plant being 40 years old. Since 2012, five plants were permanently shut down with nine additional plants scheduled to be closed over the next eight years. Plants are often located in rural areas, creating a source of high-paying jobs for surrounding regions, magnifying the impact of closures.

There is good news. New reactor designs known as "small module reactors (SMRs)" are smaller and capable of being stacked for flexible and efficient operation. These are safer and reduce the impact of accidents. However, the economics of SMRs remain unproven.

The rise of low-cost natural gas and flat energy demand have driven the price of electricity down in some regions, taking away the economic case for operating nuclear plants. Operation and maintenance expenses are much higher than fossil fuel plants. Local opposition due to safety concerns has also increased the cost of recertifying nuclear reactors, and state government opposition has caused premature closure of plants. The Fukushima disaster in 2011 led to increased regulation by the Nuclear Regulatory Commission. All of these factors undermine the business case for nuclear generation.

Case Studies

Vermont Yankee, Vernon, Vermont

Vermont Yankee is a defueled boiling-water reactor located in the town of Vernon in Southeastern Vermont. It was shut down after 42 years of operation in 2014. It is estimated the plant contributed $500 million to the local economy annually and created more than 1,200 jobs. Vernon's budget was severely impacted by the closures to the tune of tax receipts of $400,000 expected in 2020 as opposed to $1.1 million when the plant was operat-

Vermont Yankee. The cylindrical structures in the foreground are the cooling towers, the boxy structure in the middle is the reactor building.

Source: Wikimedia Commons / Nuclear Regulatory Commission.

ing. Communities surrounding the plant had prepared for years of the eventuality of closure, and a couple strategic plans helped the town look toward the future. Local economic development groups and governments in the multiple states surrounding the plant have banded together to identify new strategies to develop the region, including creating a small business loan fund and developing green service sectors.

Pilgrim Nuclear Power Station, Plymouth, Massachusetts

The Pilgrim Nuclear Power Station was commissioned in 1972 and was announced by operator Entergy that it would close in 2019. Pilgrim employs 2.5 percent of Plymouth's workforce representing 5.3 percent of employee income. The Old Colony Planning Council, the Plymouth planning department, and Plymouth Regional Economic Development Foundation underwent a review process to look at challenges and local strengths in responding to the coming closure. Additionally, Massachusetts passed legislation establishing a 21-member Nuclear Decommissioning Citizens Panel. Plymouth and surrounding counties believe they are in a better position because they have a diverse economy and have been planning for the closure for many years.

Economic Development Best Practices

- When a plant announces a shutdown, communities can plan accordingly to create a trust fund for economic development to help mitigate the loss of jobs. Plan ahead by evaluating the vulnerability of plants to shut down.
- Understand the different modes of decommissioning which can impact the length of time and number of employees involved.
- Anticipate the loss of tax revenue when losing high-paying jobs.
- Identify economic diversification opportunities as early as possible.
- Partner with other communities, regional economic development organizations, and state and county governments to pool resources, share data, and disseminate information.

OIL AND NATURAL GAS

The Landscape

The U.S. is both a major producer and consumer of oil and natural gas. With increased domestic production, America has become a more significant exporter of oil, now exporting up to 10 million barrels per day, feeding hope that one day America will achieve energy independence.

Oil significantly impacts four regions: Bakken (Montana, North Dakota), Eagle Ford (Texas), Permian (New Mexico, Texas), and Niobrara-Codell (Colorado, Wyoming). It is a challenge for leaders at the local, regional, and state levels to work together to determine how to collect revenues and plan for market volatility, but if done right businesses and residents benefit.

Innovation in extraction technologies such as hydraulic fracturing and horizontal drilling have helped communities enhance access to oil and natural gas reserves. Shale production added 169,000 jobs between 2010 and 2012, and employment in extraction industries grew 10 times faster than overall U.S. employment. The abundance of shale has provided the U.S. with a buffer against disruptions such as natural disasters. A glut in oil production caused a significant price drop in 2016, but the challenges of staying competitive pushed technical and productivity advancements. None the less, analysts predict an uneven future for oil prices.

Natural gas is becoming increasingly competitive, increasing its share of U.S. energy generation from 23 percent to 33 percent. Its rise can be traced largely to fracking, which has increased output from the wells by 1,472 percent since 2000.

Research shows that each additional million dollars of new oil and gas production caused an $80,000 increase in salaries income and 0.85 new jobs within a given county.

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Case Studies

Texas

Texas contained 451 oil rigs as of 2017 and produced more than one-third of U.S. crude oil. One study estimates the economic impact in the 21-county Eagle Ford shale area to be $87 billion in 2012, showing a $26 billion increase from 2008. Even during the most recent global price collapse, Texas' revenues were still strong, and production quickly recovered. However, turbulent revenues after the 2014 downturn affected oil communities and caused struggles with keeping up with infrastructure demand. The economy is greatly affected by the price of oil, causing communities to make tough decisions about how to react in poor times and how to spend money in good times.

North Dakota

The Bakken shale region in North Dakota grew from 2 percent to 15 percent of state gross domestic product from 2005 to 2015. However, a lack of adequate infrastructure made it difficult to keep up with a growing population, as did a lack of housing and workforce. The state government passed legislation to help with funding for communities to keep up with industrial development, reallocating $1.1 billion for local and state infrastructure needs after gaining significant state revenues between 2004 and 2014.

Economic Development Best Practices

- Use revenues to finance long-term investments that strengthen the community post-drilling.
- Avoid long-run financial commitments such as infrastructure, but rather focus on pay-as-you-go models.
- Focus on diversifying the economy so as not to focus too much on oil revenue.
- Use short-term financial boosts to help with long-term diversification.

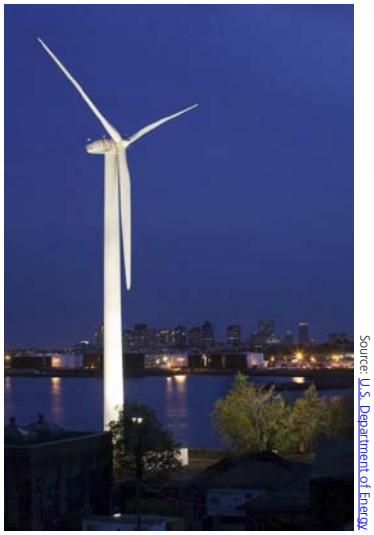
RENEWABLE ENERGY

The Landscape

How economic developers manage the transition from fossil fuels to renewable energy will determine whether communities thrive or not in the future. Renewable energy accounts for 10 percent of U.S. energy consumption and represents more than half of capacity additions. Half of the world's electricity could come from renewable sources by 2040. Wind power is expected to contribute to $85 billion in economic activity between 2017 and 2020. The solar photovoltaic cell installation industry is expected to triple in size by 2020 compared to 2016.

Source: U.S. Department of Energy

The rise of renewable energy is having an impact on job creation directly in manufacturing and also throughout supply chains. Solar industry employment grew by 25 percent in 2016, and wind power employment grew by 32 percent. Wind turbine technicians and solar cell installers are among America's fastest-growing jobs.



Source: U.S. Department of Energy

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The growth in renewable energy has been driven in large part by technological advances, increased supply, and government incentives. The price of solar modules fell between 65 and 70 percent in recent years, and wind turbine costs fell by 30 percent. In 2017, 13 percent of Fortune 100 companies had renewable power purchase agreements and 63 percent had sustainability targets, showing that major corporations are putting an emphasis on renewable energy. There is also widespread public support for renewable energy, though that support decreases when prices increase, something policymakers will have to watch.

Case Studies

Iowa

Iowa is a leader in renewable energy, deriving more than 30 percent of its power from wind sources. The wind sector employs about 6,500 people. Iowa's leadership in renewable energy has given the state an advantage in data center investment as tech giants Apple, Facebook, Microsoft, and Google have chosen to build data centers in the state. The low power cost helps the state provide a supportive environment for companies with high energy needs. MidAmerican Energy is investing $3.6 billion towards its goal to provide 100 percent renewable energy to customers. Iowa was ready to capitalize on renewable energy needs because leaders had identified it as an opportunity by the early 1980s. Early adoption has benefited the state and has given it a head start on others that are looking to do more to adopt wind energy.

Prioritize accessible financial mechanisms to allow communities to fully unlock their region's renewable energy potential.

Fort Collins, Colorado

Fort Collins, driven by an environmental focus as a community, adopted a city-driven 2014 Climate Action Plan with a goal of reducing greenhouse emissions 100 percent by 2050. This goal is in line with the overall progressive values of Fort Collins residents, helping the city attract talent. Companies are investing in the city and using sustainability as a marketing tool. This includes major companies like Anheuser-Busch and technology firms such as Numerica. A program called ClimateWise plays a role in the city's success. The program provides free advisory services and assessments to businesses on how to reduce their environmental impact. The state of Colorado aims to create 62,000 green jobs and 2,000 cleantech businesses, and wind energy is projected to become the state's primary energy source by 2021. Fort Collins is well-positioned to be a leader in this trend.

Economic Development Best Practices

- Consult communities that will house projects during the initial stages of planning. Communities that are not consulted may put up more opposition.
- Prioritize accessible financial mechanisms to allow communities to fully unlock their region's renewable energy potential.
- Ensure improved economic inclusiveness among all groups including disadvantaged minority groups, and find workers within the community to train.
- Understand that after the initial manufacturing boom, jobs are likely to be susceptible to automation. The most stable job creation is in middle management, engineering and other technical roles, meaning that long-term investments in education and training will be necessary.

CONCLUSION

As energy trends play out in the future, the communities that best prepare for the changes will be better off. Economic developers can play a major leadership role in their communities to ensure that all the right partners are on board to react to changing trends in the energy landscape.