BEYOND BUSINESS AS USUAL

The nation stands at an energy crossroads in 2010-11. The United States is faced with compelling challenges to address energy independence and climate change.

Meaningfully addressing these challenges will require re-tooling the electric power industry. Will we make massive investments in coal and nuclear technologies going down a road to the past; or will we make strategic investments in clean renewable energy that will never run out and energy efficiency that lead us into a sustainable, healthier future?

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TIMELY REPORT POINTS WAY TO A CLEAN ENERGY FUTURE

In May, 2010, *Beyond Business as Usual* prepared by Synapse Energy Economics, Inc. was released by WORC and its partners in the Civil Society Institute. The study lines out an affordable and viable transition to a clean energy scenario by 2050. Among its findings:

- Aggressive investments in more efficient technology can reduce electricity use by 10% from today's use, or nearly 40% from the "business as usual" scenario by 2050 if we follow a "transition scenario."
- The U.S. could retire its entire current coal fleet (power plants) by 2050, rather than increasing coal-fired generation by 40% ("business as usual"scenario).
- In this transition-to-renewable energy scenario, U.S. emissions of carbon dioxide would fall 82%, rather than growing by over 30%
- Renewable energy, including wind, solar, and biomass, provides 48% of U.S. electrical needs by 2050 in the "transition scenario".
- The cost of launching this transformation amounts to about 1% of 2008 electrical system annual revenues between now and 2020, and would be more than "business as usual" will cost us in 2030. But in 2040 the costs of the transition scenario go down below "business as usual," and go lower still by 2050.

"Energy efficiency and several renewable technologies now cost less than new coal and nuclear plants in terms of direct costs—ignoring the externalized costs of coal and nuclear energy. Additionally, efficiency and renewables are already in commercial operation, so the technology development and commercialization challenge of retooling with these technologies appears smaller than the challenge of developing low-carbon coal technologies and a new fleet of nuclear plants."

—*Beyond Business As Usual*, p. 6.

Study assumptions

The study uses as its reference point the energy use and cost projections in the U.S. Department of Energy 2010 Annual Energy Outlook. The reference case—"business as usual"—would have the U.S. consuming nearly 50% more electricity in 2050 than it does today. "Business as usual" will require a significant increase in coal mining and coal power plants, as well as gas, nuclear and other generators.

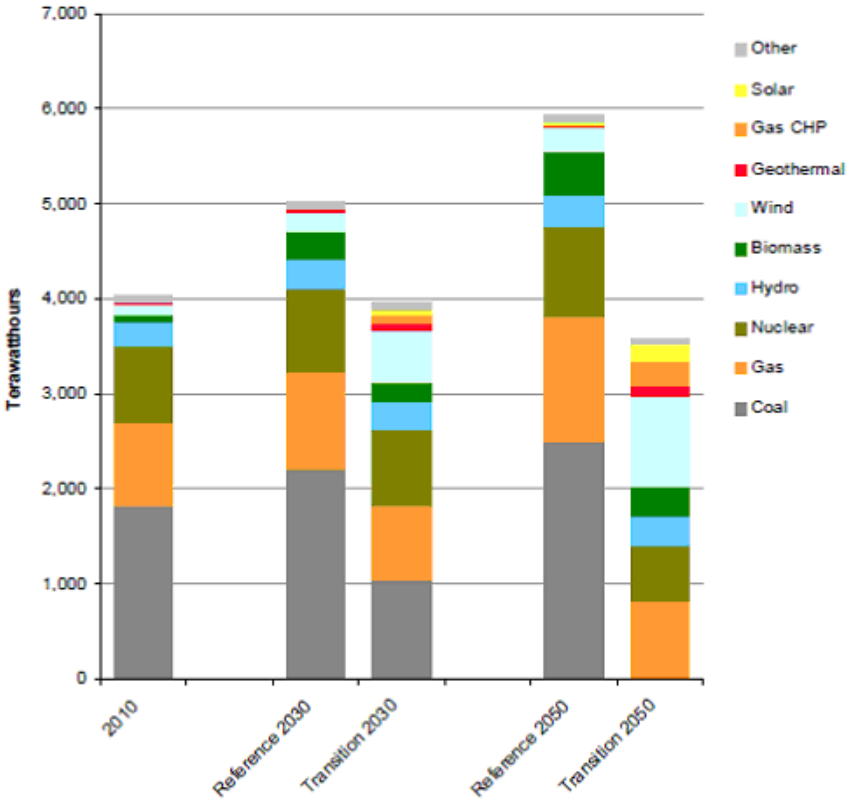
The transition scenario relies on actual, available renewable energy technologies and does not factor into its calculations the possibility of technological breakthroughs, although it takes into account the greater efficiencies of scale as photovoltaics (PV) capacity grows and the industry matures. It also accounts for the cost of integrating wind generation into regional power systems.

Energy efficiency is the bridge to clean energy

According to the report, a concerted nation-wide efficiency effort could boost energy savings nationwide to the level that the most aggressive states are achieving now. Innovations spurred by such investments would allow the nation to trim wasteful energy uses well into the future, flattening and even reducing our total demand. Through 2030, in the transition scenario, total demand stays flat while renewable energy penetration picks up as older coal plant retirements leave off.

In the transition scenario, power system operators are able to manage large amounts of variable generation (like wind and solar), because regional power systems become much more flexible. Today's most inflexible generators—coal and nuclear units—are gone, while gas-fired plants, robust demand response programs and larger utility balancing areas aid in managing variable generation. Although natural gas is used to generate electricity for balancing and flexibility in load management in the transition scenario, the 2050 share of natural gas in the electric mix is significantly below its projected use in the Department of Energy ("business as usual") reference case.

Figure 1: The resource mix, the reference and transition cases.



In 2050, energy efficiency reduces total generation from 2010 levels by a small amount, but the reduction relative to the Reference Case in 2050 is dramatic. Forty years of compounding underscores the importance of a more efficient electricity future.

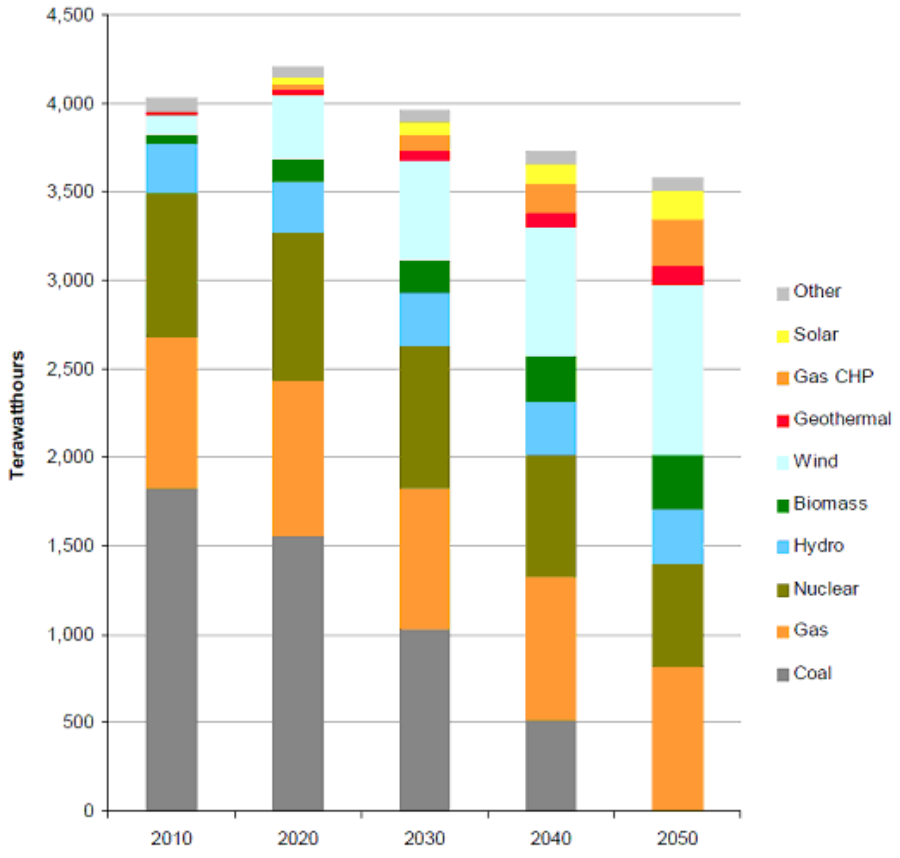
Energy efficiency keeps the cost of transition down

In the transition scenario, the combination of 2% annual savings from energy efficiency and the effects of strengthening building codes and standards provide significant savings, at a cost of just 4.5 cents/kWh. Getting more work out of the electric energy we produce helps make the transition to clean and renewable technologies affordable. Assumptions on energy efficiency savings are based on that currently achieved by the best utility programs, 2.0% per year.

Cost

- The report does not attempt to account for the "externalized" costs of fossil fuels, such as the health effects of pollution from power generation or the environmental impacts of coal mining. Factoring such costs would add significantly to the price tag in the "busness as usual" case.
- The costs of tax incentives and public subsidies are included in comparing different generating energy alternatives.
- The report does not attempt to put a value on the reduction in CO2 emissions, which could dramatically change the net cost estimates. If society establishes some system-wide costs on carbon emissions, which seems likely, energy efficiency transitioning to an increasing share of renewable generation would look even better from a cost perspective.

Figure 2: The resource mix in the transition scenario



Renewables in 2050

- On-shore wind accounts for 26% of the national mix of electrical generation in the "transition scenario".
- Biomass produces 9% of the nation's electricity, based on conservative assumptions of sustainability and feedstock.
- Solar PV would produce 3.3% of the total electricity and solar thermal would add 1.5%.
- Combined heat and power (CHP) accounts for 9% of the national total, providing significant savings from process and space heating demands.

Key aspects of the "transition scenario"

- All coal-fired plants are retired. In the "business as usual" case, 22,000 megawatts (MW) of new coal capacity are added and coal-fired generation increases by 37% over the study period.
- Nearly 30,000 MW of nuclear capacity is retired, and nuclear generation falls by 30%.
- Gas-fired generation at central-station plants falls, and production at gas-fired combined heat and power plants rises. In 2050, overall gas-fired generation is up 26% relative to 2010, but it is 18% below "business as usual".
- The nation taps its massive wind energy resource with 220,000 MW of onshore wind capacity in 2050 (26% of the mix, nationally) and 27,000 MW of off-shore capacity off the nation's east coast.
- The country's biomass resource is used conservatively with 34,000 MW of biomass capacity added, roughly a quarter of the capacity added in the Business As Usual case, producing 9% of the nation's electricity by 2050.
- New Combined Heat and Power (CHP) plants (both gas- and biomass-fired) save combustion of 3.6 quadrillion Btu for process and space heating. The cost savings of this doubly efficient technology in 2050 would total nearly $50 billion.

> "There is no rush to build additional capacity. Surplus generating capacity in every region of the country provides us the time to carefully and systematically increase investment in renewables and energy efficiency while we reduce investment in coal-fired and nuclear power."
>
> —*Beyond Business As Usual*, p. 6.

Links

To view the full report go to:

Beyond Business as Usual, Synapse Energy Economics, Inc., May, 2010. http://www.worc.org/BeyondBusiness.

To see other recent reports arriving at similar conclusions:

Mark Jacobson and Mark A. Delucci, "A plan for a sustainable future: How to get all energy from wind, water and solar power by 2030" Scientific American, November 2009. http://www.stanford.edu/group/efmh/jacobson/sad1109Jaco5p.indd.pdf

David B. Goldstein, "Invisible Energy: Strategies to Rescue the Economy and Save the Planet" BayTree Publishing. http://www.baytreepublish.com/invisible-energy-fr.html. ©2010.