IssuesLetter

Making Room for Renewables

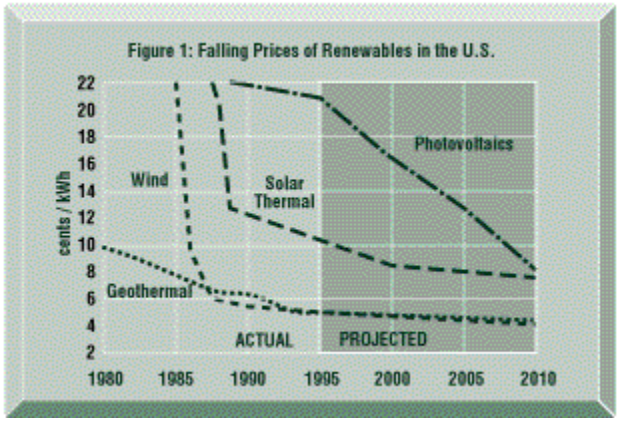
Considering the benefits and opportunities renewable energy resources offer to society and the barriers they face, it is not surprising that countries and states that have ventured most aggressively into a competitive world have included provisions for renewables. Their steps are a promising indication that when regulators are ready to take a major restructuring step, they can easily make a place for renewables.

This Issuesletter looks at actions the United Kingdom and California have taken to support development and acquisition of renewables. It then expands the discussion by exploring a number of strategies compatible with competitive electricity markets that raise either demand or funds for renewables.

Why Worry About Renewables?

Renewable resources are well-recognized as a good way to protect against price fluctuations and against future environmental costs, and widespread public support for renewables has been instrumental in pressing for the modest regulatory and policy support existing today. Over the past 15 years, state and federal support has produced dramatic improvements in the cost and performance of renewable energy technologies. (See Figure 1)

Figure 1



From Sweezy, Blair 1995.
The True Cost of Renewables.
National Renewable Energy Laboratory

Many renewable projects are now cost effective even when compared to today's lower electric power costs. In June 1995, for example, Northern State Power announced a winning levelized bid of 3¢ per kWh for the development of a 100 MW wind project, and many more projects fall in 4.5-6¢ per kWh price range.

This dramatic progress, however, is at risk. Although renewables are getting cheaper, with some even beating the lifetime costs of the cheapest gas technologies, they will be at a disadvantage in a competitive electricity market. Fossil-fueled technologies, especially gas-fired technologies, have a lower initial capital costs and higher fuel costs when compared to renewables. This fact alone means that even with equal total lifetime costs (or even a slightly lower lifetime costs), renewables will look more expensive in the near term and somewhat riskier in the long run.

Unless positive steps are taken to encourage continued development of renewables, the next few years will be difficult ones. Electric utilities are currently in a period of transition from a regulated monopoly structure to a competitive environment, but the precise nature of that

evolution, or even the pace of change, remain uncertain. In the meantime, the safest route for investors is to minimize capital outlays by deferring new, long-term investments or, if necessary, by choosing new resources with the lowest up-front costs.

Even after the transition, renewables may still be handicapped in a competitive environment. The most obvious concern is that the high discount rates of a competitive market will favor low capital/high operating cost alternatives over renewable options. The risk characteristics of competitive markets will likely reinforce this tendency. For example, investors can reduce their risk exposure by limiting investments to resources whose costs tend to move with the market price of electricity. Because the marginal generators will generally be fueled by natural gas (or perhaps oil), the market price of electricity will track gas prices. Investors can reduce their own risk by investing in gas-fired units. New renewable investments, on the other hand, will appear risky to investors since their costs are predominantly fixed and thus relatively independent of future market electricity prices.

These biases against renewable technologies have raised widespread concern. They have also spawned some promising solutions.

System Benefits Charge and Competitive Bidding

The United Kingdom privatized its formerly government-owned electric utility industry via the Electricity Act of 1989. The restructuring included establishing the Non-Fossil Fuel Obligation (NFFO). NFFO was created to assure that at least 20 percent of the country's electricity comes from non-fossil sources. To fund this goal, money is collected via a ten percent electricity bill surcharge levied on all customers. Since all customers are assessed this surcharge (the fossil fuel levy), it is non-bypassable and competitively neutral. A further step that assures a non-bypassable charge is a requirement that a license be obtained to construct a plant that has the potential of self generating.

The ten percent surcharge primarily supports the U.K.'s existing nuclear power facilities. A small but growing share, however, supports the development of renewables resources. In just five years, the U.K. has had remarkable success in renewables development, using only a small portion of the NFFO surcharge. The NFFO subsidizes the difference between the bid and market price of electricity and guarantees buyers for the power.

The Government set a target that 1500 MW of electricity generating capacity -- representing three percent of current capacity -- come from renewables by 2000.The target was set to

- meet, in part, the U.K.'s CO_2 and global climate change reduction targets
- offer diverse, secure and sustainable energy supplies
- reduce emission of pollutants
- increase the number of independent power producers -- an aim of privatization
- place the U.K. in an internationally-competitive position with regards to renewable technologies.

In implementing the Obligation, the U.K. has successfully developed environmentally-acceptable renewable energy technologies, at near-market prices.

Renewable capacity is acquired through a competitive bidding process, using a selection criteria that considers site availability and prospects for planning permission; prospects for transmission

and distribution; technical viability; timing; capital and operating costs; and, where relevant, secure arrangements for fuel and disposal of waste products.

Three rounds of bidding, each with a large pool of applicants, have taken place, and two more are planned by 1998. Winning bids include solar, onshore wind, waste, hydro, energy crops, photovoltaics and fuel cell technologies. The NFFO and the bidding process have been instrumental in lowering the price of renewables. Over the course of the three bid rounds, prices have fallen consistently for every source of renewable energy. Lower technology and project development costs are cited as among the major reasons for the decline. Longer contract periods are also a factor.

Figure 2
Renewable Prices in the U.K. 1991 and 1994

	1991 Bids		1994 Bids	
	pence/kWh	**cents/kWh**	**pence/kWh**	**cents/kWh**
TECHNOLOGY				
Wind	16.5	7.3	6.48	2.9
			(>16 MW)	(>16 MW)
			5.29	3.5
			(<16 MW)	(<16 MW)
Hydro	6.0	4.0	4.46	2.9
Landfill gas	5.7	3.8	3.76	2.5
Waste combustion	6.55	4.4	3.84	2.6
Other combustion	5.9	3.9	5.07	3.4
Sewage gas	5.9	3.9	----	----
Average	6.84	4.6	4.45	3.0

From Mitchell, Catherine 1995. Renewable Energy in the U.K. for the Council for the Protection of Rural England. Pence were converted to cents using a rate of 1.5 U.S. dollars to 1 British pound.

NFFO, together with the surcharge, is scheduled for elimination when 20 percent of the country's energy is produced using non-fossil fuels.

Tradeable Renewable Credits

California has taken a leading role in electric industry restructuring in the United States. The California PUC's January 1996 restructuring proposal includes a commitment to maintain the current level of diversity as well as to encourage development of new renewable resources. California describes its commitment to diversity as a hedge against future risks of fuel price increases.

To support renewable acquisition and development, California regulators have proposed a portfolio requirement to assure continued renewable generation. The requirement is placed on retail providers of electricity or on generators, at the point of retail sale. It is this point where state jurisdiction is the strongest.

The portfolio requirement makes clear that as a condition of doing business in the state, a percentage of the energy needs must come from renewable resources. Setting a target for each provider (or generator) does not mean, however, that each must become a developer of renewable resources. Instead, the California PUC has opted for a policy framework that allows trading of renewable credits much as the CAAA of 1990 handles SO_2 and the South Coast Air Quality Management District's Regional Clean Air Incentive Market handles NO_X. While the details are still being finalized, this framework will provide flexibility and allow the target to be met in the most cost-effective way. A few renewables companies, for example, could end up meeting the bulk of the state's renewable targets. Alternatively, a number of small renewable projects could meet a single company's requirement. Allowing providers to trade to meet the renewables requirement also helps create markets for existing qualifying facilities when their original contracts expire.

This market-based approach operates without a surcharge. Because the operational details must still be flushed out, it is not yet known whether it will set targets for specific renewable technologies, as the U.K. has done. The tradeable credit approach is not designed to cover R&D of renewable technologies. R&D is expected to be funded separately through a wires charge.

Learning to Work with the Market

California and the U.K. realized the competitive markets they created were less than perfect, and if left alone might not produce a desired level of renewable investment. At the same time, both wanted to take advantage of the efficiency and innovation a market-based system could unleash. To accomplish this, each has adopted a market-based approach that assures delivery of a minimum level of renewables in as least costly a manner as possible.

The U.K. has decided some explicit price support, together with targeted competitive bidding, is an efficient and appropriate means to boost renewable technologies into a competitive position. The result has been very positive. The U.K. has been quite successful in bringing on large amounts of diverse renewables at a relatively low cost. The U.K. has also gained enough experience to date to evaluate the strengths and weaknesses of their program and make adjustments. Accordingly, they have lengthened the financing period and recommended ways to improve coordination of project siting by dealing better with permitting and local concerns.

The California approach, which is still in a development stage, will also rely on the marketplace for renewables acquisition. State regulators are pursuing this route because they believe it will support the development of new renewable resources with less government involvement than the U.K. approach. Raising Money and Demand

The U.K. and California are good examples of the two general approaches to support renewables in a competitive industry structure that includes retail access. These approaches, raising money and raising demand, are not mutually exclusive.

One path begins with an equitable and non-bypassable mechanism -- the system benefits charge -- to collect funds from all customers. Once collected, several alternatives have been presented to distribute and spend monies in a manner that promotes acquisition and development of a diverse set of renewable resources. In the case of the U.K., these collected monies are allocated to generators via a competitive bidding process. Other ways to distribute funds are through standard contracts and production credits. Standard contracts specify the general terms and conditions under which power is to be purchased. They can be effective in reducing the time and transaction

costs spent in the competitive bidding process. Standard contracts can accommodate unique characteristics and costs of renewable projects by including provisions that pay a price premium for different renewable technologies. Denmark, for instance, sets a standard price for a number of selected renewable technologies. Developers know at any point in time the price they will be paid for electricity from a given renewable resource.

Production credits are an approach the United States Congress included (but never funded) in the Energy Policy Act of 1992. This strategy would have paid generators a technology-specific premium of 1.5¢ per kWh for electricity produced from a renewable resource.

The other path attempts to increase the demand (and hence the price paid) for renewables. California's portfolio standard is the best example. There are other approaches as well.

Emission caps and trades of fossil-fuel related air pollutants would internalize at least some environmental costs making renewables a more attractive generating option. The pollutants capped and the level at which they are capped would dictate how much this approach would increase the demand for renewables.

Net metering can encourage customers to install renewable technologies on their own initiative. Residential or commercial rooftop photovoltaics or farm windmills are examples of what some customers may be motivated to invest in. With net metering, the electric meter runs backwards when power is produced from an on-site renewable in excess of the customer's consumption and forward when the customer consumes power through the grid. When customers produce more than they consume, the utility purchases the excess at the retail rate.

Conclusion

Policy makers have a choice between taking an active role now, as the U.K. and California have, or simply hoping market will somehow support continued development of renewable resources. The latter path is risky. While there has been some limited experience with marketing "green" electricity to customers, it is difficult to conclude that it will be successful on a large scale. Relying solely on this approach would be analogous to hoping customer preference for recycled paper products would be strong enough to solve the country's need for solid waste disposal and forest sustainability.

Renewable energy resources have had some promising break-throughs in recent years. They are, however, likely to have a tough time in increasingly competitive electric markets. In fact without policy support, it is possible the U.S. renewable industry may become moribund. With modest policy support, state com-missions can assure an important role for renewable resources.

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