

A green revolution

Saving the world will not be cheap

THE best way to curb global warming would be a carbon tax. The money raised could be divided up among citizens or used to repay the national debt. A tax on carbon dioxide (CO₂) would give everyone an incentive to emit less of it. It would be simple, direct and transparent. For these reasons, it will never happen in America.

Frank talk about energy policy is rare. Politicians hate to admit that anything they plan to do will cause pain to any voter. During the election campaign, both Barack Obama and John McCain proposed a cap-and-trade system for curbing CO₂ emissions, not because it would work better than a carbon tax but because it did not have the word "tax" in its name. Both candidates also gave the impression that their green policies would yield huge benefits while imposing no costs. A shift to alternative energy, they agreed, would not only check global warming but also create millions of green jobs and help break America's dependence on foreign oil.

Neither dwelt on the fact that cap-and-trade will raise energy prices, that subsidies for renewable energy will have to be paid for, or that both policies will destroy jobs as well as creating them, while probably cutting growth. The Congressional Budget Office estimates that a 15% cut in CO₂ emissions will cost the average American household \$1,600 a year. If politicians pretend they can save the planet at no cost, they risk a backlash when people realise they were fibbing.

Greenery is both fashionable and in flux. Every business wants to boast about its efforts to avert climate change, even if those efforts, on closer inspection, amount to little. At the same time, many big investments in planet-cooling activities are on hold because no one knows what incentives the government will put in place, and when. This year's economic-stimulus package allocated \$65 billion in subsidies and tax breaks to the energy industry, most of which had at least a green veneer. But the big reforms are still to come. First and most important is cap-and-trade. The budget Mr Obama submitted to Congress in February assumes that such a system will be up and running by 2012. Tradable permits to emit an amount of CO₂ will eventually be auctioned to the highest bidders.

Mr Obama's budget assumed he would raise \$80 billion a year from cap-and-trade, of which \$15 billion would go to subsidise renewable energy, and the rest would pay for a tax credit for all but the richest 5% of Americans. For many, that would make up for higher energy bills. For those who live in states that mine or burn a lot of coal, however, it probably would not.

This is where the problems start. Mr Obama's plan must pass through Congress, which is doing its best to make it murkier, more complex and less effective. Every state, industry and special interest is clamouring for loopholes or handouts. On May 15th Henry Waxman, a Democrat who heads the House energy committee, disgorged a 932-page cap-and-trade bill that would loosen Mr Obama's emissions targets and give away 85% of the permits to pollute, while auctioning the rest.

House Democrats say this is the best possible compromise. Greens say the bill does far too little to cut emissions. Fiscal hawks fret that it would mess up Mr Obama's budget. Its micromeddling guarantees unforeseen consequences, just as biofuel subsidies seem to have encouraged the use of nitrous oxide-spewing fertiliser. No one knows how the bill will fare in the Senate. Meanwhile, many businesses say they prefer it to a mooted alternative—regulation of greenhouse gases by the Environmental Protection Agency.

Mr Obama's other big plan is to insist that 10% of electricity be generated from renewable sources by 2012 and 25% by 2025. That implies a surge in wind, solar, hydroelectric and geothermal power, and so on. If that target were rigidly enforced (for example, if firms get no credit for energy efficiency), the Boston Consulting Group reckons that 50-60 gigawatts of renewable capacity would be needed, over and above current projections, by 2012.

Clean-energy firms are salivating. Most have been hit badly by the plunge in the price of oil. And the financial crisis has curtailed, at least temporarily, new lending for investment in green technology. But many predict that, once the recession

is over, oil prices will rise again, making alternative fuels seem less expensive. Combined with the incentives being proposed, this could lead to a green-energy boom.

Wind power accounts for only 1% of electricity generation in America. It could “easily” rise to 30%, says Ditlev Engel, the boss of Vestas, a Danish firm which is the world’s largest maker of wind turbines. America has ample wind, blowing across the plains from North Dakota to Texas. Not harvesting it would be like Saudi Arabia not drilling for oil, he says. Vestas is investing \$1 billion in factories in Colorado.

Solar energy is more expensive than wind. It depends on fat subsidies, which means the biggest market is Europe and cloudy Germany is covered with solar panels whereas sunny New Mexico is not. But several firms hope to make solar technology cheaper. For example, First Solar, an Arizona-based firm, makes thin-film solar panels that are more cost-effective than most existing ones. It plans to double its production this year, to 1,000 megawatts, says its boss, Mike Ahearn.

The nuclear option, again

In his election campaign Mr Obama dodged the subject of nuclear power. “New Energy for America”, his eight-page energy manifesto, mentioned it briefly, without enthusiasm. But it is hard to imagine halting climate change without it. Windmills and solar panels provide power only intermittently. To avoid blackouts an energy source that keeps flowing in any weather is needed. Nuclear power, whose CO2 emissions are tiny, fits the bill. But no new nuclear plant has been built in America for 35 years. Mr Obama is now mulling loans to restart the industry. Given the huge upfront costs and the certainty of resistance from environmentalists, firms will have to know the government is serious about curbing CO2 before they commit themselves to building nuclear plants.

Oil and natural-gas firms are in no immediate danger. ExxonMobil earned \$45 billion in profits last year, making it the most profitable firm in America. With oil prices barely a third of their peak, that will not happen again this year. But oil is too useful to become obsolete any time soon, and gas is relatively clean. Coal faces a greater threat, and not only because Al Gore is calling for protests against coal-fired power plants. Since coal is the dirtiest of the main fuels used to generate electricity, cap-and-trade could lead such plants to shut or switch to gas. Efforts to make coal cleaner by injecting its CO2 emissions into the ground show little sign of becoming cost-effective, despite subsidies. Only the fact that coal is plentiful in swing states gives the industry hope.

If a price is imposed on CO2 the next big obstacle to renewable energy will be the electricity grid, which is antiquated and sclerotic. Regulations vary from state to state, making it hard to transmit energy across state borders. There are not enough lines to send power from, for example, windy states to populous ones. New construction is stymied by an attitude among regulators and environmentalists colloquially known as BANANA (Build Absolutely Nothing Anywhere Near Anyone).

And the commonsense notion that consumers should be able to sell energy back to the grid as well as buy it has barely taken root, except in California. Lynn Orr, a professor at Stanford University, has solar panels on his home. During the day he sells power to the local utility at 29 cents a kilowatt-hour. At night he buys it back for 9 cents. The system is not perfectly flexible. He can reduce his bill to zero but no further. “So I need an electric car,” he muses.

Mr Obama included incentives for building a smart grid in his stimulus package. Businesses are queuing to build one. “This is the most sexy industry to work in,” says Guido Bartels, who leads the energy team at IBM. A smart grid would involve sensors to monitor power flow in both directions, and software to help crunch all the data thus generated. If you plug in your electric car at a friend’s house, you will want an easy way to be billed, says Mr Bartels. And information can be used in myriad ways to make the system more efficient, for example by imposing variable prices to discourage power use during periods of peak demand. Energy is one of the fastest-growing parts of IBM’s business. Manufacturers such as GE and ABB build the physical infrastructure, while IBM vies with such firms as Accenture to supply the information technology and integrate it all.

If the government introduces carbon-curbing incentives, there will be rich pickings for firms that uncork the remaining technological bottlenecks. For example, whoever makes a cheap, powerful and efficient battery for an electric car will be well rewarded. Firms like A123Systems of Massachusetts are working on it, but electric cars are still too costly for most people.

Saving the planet with old tyres

Since nearly every activity requires energy, there are limitless angles from which to address the problem. Lehigh Technologies of Tucker, Georgia, uses cryogenic technology to create a recyclable powder from old tyres. Because the process saves oil, customers will one day claim it as a CO2 offset. Modestly, Lehigh calls its product "The Powder to Save The World".

Many Americans fret that if cap-and-trade raises domestic energy prices, industries will migrate to China. Stefan Heck of McKinsey thinks that unlikely. Firms outsource labour-intensive jobs to China because there is a huge difference in labour costs even after accounting for productivity differences. Cap-and-trade might add 20-30% to energy costs. That is a lot, but not enough to spark a mass exodus.

Although the shift to a low-carbon economy will reduce economic growth overall, there are plenty of ideas that pay for themselves. Making buildings more energy-efficient is an example. Companies such as Ameresco offer to do this in return for a share of the savings. Firms such as Serious Materials of California provide energy-saving windows and environmentally friendly plasterboard. Wal-Mart plans to reduce its packaging, thereby cutting hundreds of thousands of truck trips and saving both emissions and cash.

In Europe, whose cap-and-trade system is already in force, CO2 prices are routinely factored in to business decisions. In America, they are not—yet. Forest Reinhardt, an environmental specialist at Harvard Business School, argues that consumers of fossil fuels should pay for all the externalities: not only emissions, but also the cost of policing the Middle East.

But he concedes that the shift will be extremely hard. The location of everything in America assumes that petrol will cost about \$1 a gallon, he says. Commutes are too long. Cars and lorries are too big. Cities are much greener than rural areas: apartments and public transport are more energy-efficient than big houses and pickup trucks. But not everyone can move to a city centre. People in Montana need a car to get around. They are not rich, they spend a big chunk of their disposable income on petrol, and they do not want to move to Massachusetts. The government has to get the incentives right, says Mr Reinhardt, but it is hard for it to make commitments that will bind its successors in, say, 2017.
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