Ten Myths of Addressing Global Warming and the Green Economy

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Numerous advocacy groups, scholars, think tanks and others have proposed a variety of steps to address global warming based on a set of assumptions about the green economy. Yet, while we need to take bold action to address climate change, much of what passes for conventional wisdom in this space is in fact either wrong or significantly exaggerated.

Perhaps no social and economic issue is getting so much attention these days as the need to transition to a low-carbon economy. Most scientific evidence suggests that a 50 to 85 percent reduction in greenhouse gas emissions (GHG) must occur by 2050 to prevent global temperatures from rising more than two degrees Celsius. Toward that end, numerous advocacy groups, scholars, think tanks and others have proposed a variety of steps to take based on a set of assumptions about the green economy. Yet, while we need to take bold action to address climate change, much of what passes for conventional wisdom in this space is in fact either wrong or significantly exaggerated.

There are several key reasons why conventional wisdom is incorrect, or at best significantly overstated. One is that because the magnitude of change needed is much larger than many realize, many conventional solutions simply won't achieve the global scale needed. The simple equation below demonstrates the scale of the challenge. Growth in global GHG emissions is largely a factor of population change, per capita income change, and our "dirtiness" of every unit of consumption. The last factor describes how much less polluting (in terms of GHG emissions) our business-as-usual economy needs to become as the other two factors vary.

Greenhouse Gas Change = Population Change * Per-Capita Income Change * Dirtiness Factor

If the goal is to reduce GHG by 50 percent by 2050, it's not enough for each unit of economic activity to be 50 percent "cleaner." Global population is expected to grow by 46 percent (not a desirable goal and one we can and should take efforts to slow). Moreover, per-capita income growth is expected to increase by 129 percent (a desirable goal). Put those two factors together, and now the planet's economic activity must become 84 percent less polluting to achieve the over 50 percent reduction in GHG. That is, we need an 84 percent reduction in our "dirtiness" for every unit of energy we utilize. By any measure, this is a great hurdle given the expectations that neither population nor income growth are going to hold steady over the next four decades.

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A second factor limiting the discourse is the belief of many that innovation is "manna from heaven" that either just happens or perhaps occurs if we raise the price of carbon by some modest amount. But in fact, innovation in general, and energy innovation in particular, is a quite difficult and complex process that is dependent on much more than modest price signals. Energy innovation requires a coherent energy innovation policy.

Third, as we note in a forthcoming ITIF report, the climate change debate has to date largely been shaped by several dominant and competing economic doctrines or worldviews, each with a different approach, orientation, and bias toward certain policies and actions.

Here are ten widespread myths about how we address global warming and grow a green economy that demand our attention.

1) HIGHER PRICES ON GREENHOUSE GASES ARE ENOUGH TO DRIVE THE TRANSITION TO A CLEAN ECONOMY

Reality: Better price signals are helpful, but not sufficient in significantly reducing GHG.

The dominant policy approach to reducing GHG and boosting U.S. clean energy industrial competitiveness focuses on establishing a price on emissions of carbon dioxide and other global warming pollutants through carbon taxes or cap and trade. Proponents include economists like Greg Mankiw, Glenn Hubbard, William Nordhaus, scientists like Joe Romm and James Hansen, and virtually all of the environmental community. But it is naïve to believe that these policies can succeed on their own for several reasons.

First, for many clean energy technologies to be competitive with fossil fuels, governments would have to set very high prices for carbon pollution, and typically governments face stiff political resistance to doing so.[1] Thus, political considerations mean that any carbon price (through tax or cap and trade) established will be relatively low, as in currently pending U.S. climate and energy legislation, which would establish a price averaging roughly $15 per ton of CO2-equivalent for the first decade of the program (2012-2021) – the equivalent of a roughly 15 cent increase in the price of a gallon of gasoline.[2]

Even if it were politically feasible to hike carbon prices radically, we still cannot assume it would induce changes in behavior. If higher carbon prices are really the key to spurring change, then more Europeans would be driving around in electric cars. Europeans (and the rest of us) will drive electric cars when we have better batteries (and the infrastructure that supports electric vehicles). In many European nations the price on carbon for transportation fuels is around $400 per ton, which is the amount reflected in their overall transportation fuel taxes. Yet, while the high tax induces Europeans to drive smaller cars and drive less than Americans, it has not induced them to switch to electric cars. In fact, there are virtually no electric cars in Europe. The reason is simple. Price signals only lead to behavior change when there is a viable substitute. If beef suddenly tripled in price this summer, Americans would be grilling a lot more chicken. Preferences aside, there is a less expensive substitute for beef – and a pretty good one at that. This is not the case when it comes to energy alternatives. Electric cars, for example, are still at the prototype stage as a practical matter and priced well out of reach for most consumers. Even those who can afford these vehicles face an inadequate infrastructure for widespread use. And as discussed below, let's not fall into the trap of thinking that if the world achieved European driving habits (smaller cars and fewer miles driven per capita) that GHG emissions would go down by 2050. In fact, with the massive expected increase in automobile ownership globally, they will go up dramatically.

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Also consequential is that an economy-wide carbon price would not overcome specific barriers to the adoption of particular technologies. While a modest carbon price may help some lower-cost and more mature clean energy technologies (e.g., wind power) become more competitive with fossil fuels, it will do little for less mature and currently more expensive technologies such as

solar energy or carbon capture and storage or needed, but not yet developed, breakthroughs (such as algae-based energy). Carbon prices alone cannot solve the many non-price barriers specific to the adoption (or development) of emerging clean technologies.[3]

Finally, a high carbon price does not solve the problem that companies who innovate aren't able to keep all of the knowledge from that innovation and the long-term risks associated with large private investments in technology development and deployment. Nor does it facilitate the establishment of critical infrastructure, such as new transmission lines, grid upgrades, or storage for intermittent sources like wind and solar.[4] In other words, we are kidding ourselves if we expect private companies to set the pace for a historic reconfiguration of how to produce and consume energy.

Only a concerted government clean energy innovation strategy that encourages private sector innovation will lead to practical, affordable alternatives in clean energy production and consumption. Carbon pricing forces people simply to accept higher prices for a good or service that has no substitute, and the private sector drags its feet in supplying that substitute until it is monetarily useful to do otherwise. (See Myths 4 and 8.)

Some left-of-center critics might respond by acknowledging that prices have limitations, but respond that regulations (e.g., the "cap" in cap and trade or tougher efficiency regulations and renewable energy standards) will get us there. But to use the example above, while a regulation reducing the amount of beef that can be produced in America would likely lead Americans to eat more chicken (and also increase beef imports), stringent regulations on carbon emissions with limited low-carbon alternatives will lead to a significant increase in the price of carbon. These prices will ultimately be difficult to support in the American political environment and even harder in low income countries. Not to mention how such regulations will also result in more "imported" carbon from a larger trade deficit in energy intensive manufacturing and its ensuing concomitant loss of jobs.

Most tax and/or cap-and-trade advocates give lip service to the need for clean energy innovation. Their major focus is clearly on increasing the price of carbon and/or regulating emissions. Just look at their nearly unanimous support for current House and Senate climate change legislation that gives short shrift to a serious clean energy strategy. For the most part, cap-and-trade advocates have done almost nothing to build political support for a clean innovation strategy to promote and support clean technology R&D, deployment, and commercialization. The reason is clear: they believe that prices and/or caps will do the job.

Yet, from development economist Jeffrey Sachs and Microsoft's Bill Gates to Energy Secretary Steven Chu and *Newsweek*'s Fareed Zakaria, there is increasingly acknowledgement that a price on carbon and a non-binding carbon cap will not be enough to result in the level of private sector investment in technology that cap-and-trade proponents have long promised. Consequently, current proposals will fail to adequately reduce U.S. emissions and ignore the global growth-energy predicament. We need a concerted clean energy innovation strategy to de-carbonize energy production that will not only address U.S. emissions but also provide viable, affordable alternatives on a global scale.

2) THE U.S. CAN MAKE MAJOR CONTRIBUTIONS TO SOLVING CLIMATE CHANGE ON ITS OWN

Reality: The energy needs of the rest of the world will result in them producing the lion's share of GHG; any solution must be one that is able to be adopted by every nation in the absence of regulation or energy taxes.

Many of the proponents of taking action on climate change focus narrowly on the United States, assuming that significant U.S. progress will make a major contribution to decarbonization. The problem with this assumption is that most U.S. proposals are themselves inadequate. As demonstrated in the equation above and described in Myth 1, higher carbon prices alone won't enable us to reach a 50 percent global reduction in GHG under this growth scenario. The current U.S. legislative response is to create a "price mechanism" with a "cap-and-trade" regime, and then stack regulations or incentives upon it, including subsidies for renewable energy, more stringent Energy Star or Corporate Average Fuel Economy (CAFE) standards for home appliances and automobiles, respectively, as well as designing new enforcement mechanisms. For example, the recently unveiled American Power Act by Senators John Kerry and Joe Lieberman proposes

to address "carbon leakage" with "WTO-consistent border adjustment mechanisms" like import taxes on goods from countries that have not taken action to limit emissions.

Regulation is also probable in the absence of climate change legislation. The U.S. Environmental Protection Agency is finalizing a rule on GHG emissions. As EPA administrator Lisa P. Jackson recently explained the "EPA has set common-sense thresholds for greenhouse gases that will spark clean technology innovation."[5]

But even if this mix of legislation and regulation could be achieved, it ignores the fact that world population is forecasted to increase from 6.7 billion to 9 billion by 2030, effectively doubling global energy consumption. If the United States somehow finds the political will to impose high, or even moderate prices, or limits on carbon emissions and even if those actions were to reduce carbon emissions by 85 percent (an unlikely scenario at best), this will only account for a 12 percent reduction in global GHG emissions by 2050.[6] Any solution, as described next, has to be one that is going to be adopted globally in the absence of GHG regulations or taxes. In short, climate change is a global problem that requires a global solution. But is cap-and-trade that solution?

3) CAP-AND-TRADE IS A SUSTAINABLE GLOBAL SOLUTION

Reality: As Copenhagen showed, a global agreement is not likely, and the only solution that can meet 50 the percent reduction of GHG is making non-carbon alternatives as cheap and functional as fossil fuels.

Proponents of cap and trade, like Bill Mckibben, of 350.org and Tim Flannery, chairman of the Copenhagen Climate Council, assume that a global trading regime is necessary, but Copenhagen demonstrated how difficult it is to achieve.

One reason they seek a global agreement is because GHG are not contained within country borders. Even though there are efforts to get back on track, we are unlikely to have an agreement. A major hurdle that must be overcome is the developed versus developing nations' view on emissions. Although developed nations can reasonably afford to make modest reductions in GHG emissions (even though many, like the U.S., resist paying extra to reduce GHG emissions), developing nations, like the BASIC countries (Brazil, South Africa, India, China) as well as those that are even more impoverished, cannot.

But one of the little noted assumptions upon which all of the economic cases for carbon trading or carbon taxes are based is a globally harmonized price. Without harmonization, carbon pricing doesn't work. Some places will be paying too much and others too little. But with a harmonized price the developing world pays 2/3 or more of the mitigation cost. This is not only a complete non-starter politically, it is profoundly unethical to ask nations with per-capita incomes as low as 10 to 20 percent of the levels of the developed nations to bear the lion's share of the costs of GHG reduction by paying a premium for low-carbon energy when they can barely afford the basics of food, shelter and health care. Moreover, in the name of global fairness, no agreement should limit their legitimate attempts to finally attain a higher standard of living.

A global cap-and-trade regime doesn't focus on what is really needed—the creation of affordable clean energy for not just the United States and BASIC countries, but for all.

The conventional response to this challenge, as Paul Krugman recently advocated, is to suggest that the United States (and Europe) will either bribe poor nations to buy more expensive clean energy (e.g. massive clean development aid), or we will penalize them with border adjustable carbon taxes.[7] But why would there be the political will in the United States to increase taxpayer-financed aid subsidies when most American voters resist paying higher prices for their own clean energy? Likewise, any kind of carbon tariff regime would have the same effect. Imposed taxes (after all, a tariff is a tax) on the products businesses and consumers buy from overseas would be opposed by many voters on the same basis. Moreover, even if by some miracle, Europe, Japan, the United States find the political will to come up with the billions of dollars a year needed to subsidize poor countries' clean energy, this still assumes that there are adequate low-carbon alternatives to be used in these nations (see Myth 1).

In the end, a global cap-and-trade regime doesn't focus

on what is really needed—the creation of affordable (read "grid parity") clean energy for not just the United States and BASIC countries, but for all. To do so, we need sustained investment in innovation that will drive down cost curves for next generation clean energy technologies. This is the global imperative, and the U.S. should utilize our innovation expertise to rise to the challenge. In 2007 Google called its energy initiative, "Renewable Energy Cheaper Than Coal (RE<C), and explicitly framed the climate change challenge around innovation. Google has since called for the federal government to invest $15 billion a year in energy R&D spending. A global cap-and-trade regime is not the policy vehicle for us to reach this solution. Clean energy innovation is.

4) WE DON'T NEED INNOVATION; WE HAVE ALL THE TECHNOLOGY WE NEED

Reality: Current technology is woefully inadequate in reaching the needed 85 percent carbon reduction efficiency.

Many green advocates declare that we have "all the technology we need," and it is incumbent upon us politically and economically to, as in the words of Nike, "just do it". From former vice president Al Gore to scientists like Amory Lovins and Joe Romm, these advocates suggest that today's clean energy technologies and renewable energy sources are sufficient for us to replace oil and fossil fuels.[8] Of course, if we don't really have the technology we need, there is a risk that policy makers would balk at imposing prices or regulations on GHG. It's better to advise that we can solve this problem. We just need to raise the price of coal and oil a bit and technology will fly from the shelf and into the market. But as we noted above, imposing prices or regulations on GHG are not enough to get us the technology we need.

The reality is that we don't have the technology we need to make needed reductions in global GHG emissions at a price at or below the price of fossil fuels. But this is not a cause for despair. It is a cause for hope. We can and should hope that if we put in place a real clean energy innovation system, we can rely on the creativity of scientists, engineers, and entrepreneurs from around the globe to come up with breakthrough solutions. For what we need is fundamental breakthroughs that provide us with the next generation of clean energy—generation IV nuclear reactors, radical carbon capture and storage technologies (CCS), next generation solar cells, fundamentally better energy storage technology, and new biotechnology energy breakthroughs.[9]

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These breakthroughs face daunting challenges, including lowering materials and processing costs, improving conversion efficiencies, and gaining better manufacturing yields. Moreover, innovators generally, and clean energy innovators in particular, recover only a portion of the benefits their technologies produce. Preferring to "free ride" off existing technologies, most companies make the rational business decision to under invest in fundamentally new green technologies.

Government must step in, incentivize basic R&D and propel these technologies through the "valley of death" – the phase in the development of technologies between research and commercial introduction in the marketplace. The efforts cannot stop there; the demonstrations of these technologies require scaling them up and proving commercial viability in terms of capturing significant global market share for energy.

Take the case of solar, issues like system reliability, integration with existing systems, control infrastructure, and installation economics pose key technical issues that must be addressed if we want to have greater penetration than the forecasted 5 percent to 10 percent in the next decade.[10] The integration of a high volume of inverter-based photovoltaic systems will require not only a smart grid, but also advances in present-day inverters. Sophisticated algorithms need to be designed to ensure interactive controls like passive monitoring and active control that will allow PV systems to disconnect when necessary but stay on-line when drops in utility voltage and frequency levels occur. Currently, the technology is not there to support massive movement to solar PV.

So the "it" in "just do it" should really mean "innovate," not just deploy current technology. In other words we have to recognize the importance of supporting innovation that will engender the next generation of clean energy technologies and smart grid communications infrastructure, and follow-on with modifications of the regulatory framework that will allow renewables to fully integrate into our energy supply. These steps are consequential to an innovation system.

5) "INSULATION IS ENOUGH" (E.G. ENERGY EFFICIENCY WILL SAVE US)

Reality: Even the most optimistic estimates suggest energy efficiency measures will only provide one-quarter of the levels of GHG reductions that the United States needs to effectively address climate change.

Certainly, efforts to improve our energy efficiency are an important part of attaining a lower carbon footprint, but in reality these are short-run, stop-gap solutions without radical improvements. Those who support energy efficiency measures, like professor Robert Ayers, journalist Lisa Margonelli, and the American Council for an Energy-Efficient Economy, promote it as a primary response.

To be sure, efficiency helps. Yet, if we add all of the potential savings from energy efficiency, they don't make a big enough dent in achieving the necessary reduction in GHG emissions. As a recent *McKinsey Quarterly* report indicated, improvements to energy efficiency do reduce our demand for power and present the lowest cost of abating up to one-quarter of GHG needed to meet the target of 50 percent global reduction by 2050.[11] These efficiency-enhancing measures come mainly from the building and transportation sectors and include weatherizing homes with better insulation, retrofitting buildings or utilizing LEED "green building" standards, and increasing fuel efficiency of vehicles.

While these kinds of activities do help much of this market, the "low hanging fruit," or as Secretary Chu likes to say the "fruit on the ground," is difficult to coordinate and stimulate. Residential weatherization and solar retrofitting is more like gathering potatoes under the ground for very little overall reduction in GHG. Improved industrial efficiency may be a better target given that the manufacturing industry is responsible for approximately one-third of GHG emissions, with the lion's share coming from energy-intensive sectors such as chemicals, pulp and paper, primary metals, glass, and cement. But even here, the potential of low hanging fruit is limited.

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Even though energy efficiency is actionable now, after a while, the number of retrofits will grow smaller—decreasing returns to our efforts. Given current efficiency technologies, short-term realities do not add up. In short, 25 percent improvement in "carbon efficiency" is not enough, we need 85 percent. For that we need radical innovation to provide clean energy alternatives, rather than just using carbon-based fuels a bit more efficiently. Moreover, we need to recognize that increases in efficiency also have offsetting effects. As organizations and households save money on energy because of efficiency, demand falls as prices for energy also fall (or at least don't rise as fast as they would without efficiency-induced demand reduction). As a result, lower relative prices for energy mean that people consume additional energy, at least partially offsetting the original energy savings from efficiency.

6) LOW GROWTH IS THE ANSWER…JUST LIVE SIMPLY

Reality: Neither living simply nor a massive recession will enable us to obtain the level of reductions required.

Given that GHG emissions are a function of the multiplication of population, per-capita income, and "carbon dirtiness," some environmental advocates have placed their focus on reducing the second factor (per-capita income). Rooted in the philosophy of Thomas Malthus, of "dismal science" fame, they warn that prosperity (or as they call it "wasteful consumption") is the real culprit. Only with less growth and simpler lifestyles can we address climate change.

These modern day Malthusians believe in "socially sustainable economic degrowth". Herman Daly, an ecological economist at the University of Maryland, leads the way with his "steady state economy" idea, in

which our goal would be to respect the limits of the biosphere and try to hold population and the stock of physical goods constant. Thus, Daly also promotes a "cap-auction-trade system for depletion of basic resources, especially fossil fuels" as a sort of ecological tax reform that taxes "bads", and not "goods", shifting taxes away from human capital to natural resources.[12] In other words, taxing bads means placing taxes on activities which impose costs to society beyond the benefits to individual consumers, as consumption of fossil fuels do.

A similar approach to live up to Daly's desire comes from sociologist Juliet Schor at Boston College. Schor believes that reducing the number of hours worked is the only way to balance "global justice" that enables high poverty countries to increase their resource use with "Western" desires for continued growth and progress. For her a work-time reduction can improve human well-being without intensive use of natural resources.[13]

Even if somehow the "simple living" movement became the biggest fad since Twitter, it would do little to get us to 50 percent carbon reduction.

But just like it's not fair to expect the costs of global warming mitigation to be borne on the backs of the global poor, it's not fair to expect America's working families to cut their incomes and expenditures since fewer work hours by definition leads to lower incomes. Most working Americans want to make more money, not less. And most would disagree that the bulk of their added purchases of goods and services are "wasteful." Should kids start darning their socks? Even if it were fair to ask Americans to make less (which it's not), it is completely unrealistic politically.

Moreover, even if somehow the "simple living" movement became the biggest fad since Twitter, it would do little to get us to 50 percent carbon reduction. The average Chinese makes one-seventh of what the average American makes, and the average Indian less than one-tenth. So steady state economics that relies on everyone making the same would reduce the average American's income from $48,430 to about $10,414, the global average for 2008.[14] But with population growing from 6.7 to 9 billion by 2030, steady state economics will require global income to hold steady, and reducing per capita income further to about $7,750. If we wanted to bring every global citizen to the now debunked "happiness threshold" of $15,000 in 2030, this would require, even with a massive redistribution of wealth such that everyone lived on $15,000, a tripling of global GDP and GHG emissions.[15] The reality is that to the extent that the size of the global economy (as opposed to its dirtiness factor) is part of the problem, the focus should be on limiting population growth, not income growth.

If shorter work weeks aren't the solution, maybe overall economic decline is. Thus some advocates may point to the U.S. Energy Information Administration's (EIA) recent report that "In 2009, energy-related carbon dioxide emissions in the United States saw their largest absolute and percentage decline (405 million metric tons or 7.0 percent)" since they started tracking the emissions 60 years ago.[16] Now recessions are good for fighting global warming! But to decrease GHG emissions by 50 to 85 percent, we would need a depression on steroids.

In reality though, neither living simply nor ongoing economic malaise are going to help us meet targeted reductions by 2050. The feat before us will require innovation that will need to come from a variety of sources. We need to transition to a more "digital" economy and society and a less "atom" based one. (See Myth 7.) We need to increase our innovation of new clean energy sources from solar, wind, geothermal, etc… And, finally, we need to push innovation in energy storage, including designing affordable, better, lighter batteries that quickly recharge.

7) INFORMATION TECHNOLOGY (IT) IS A SIGNIFICANT CONTRIBUTOR TO CLIMATE CHANGE

Reality: A digital world leads to less energy use, not more.

Many climate change advocates, seeing the increasing use of electronic products in their lives, have turned their focus on IT, claiming that the IT sector is a growing culprit in global warming through its energy use.

For example, in a widely-cited study by Huber and Mills (incorrectly) predicted IT would consume half of the country's electricity by 2009.[17]

Sure, electronic devices and the infrastructure that support them consume a growing share of electricity and most of that electricity is generated by burning fossil fuels. But this energy consumption is dwarfed by IT's current and growing capacity to reduce energy consumption and develop low-carbon alternatives. Think about how working from home and teleconferencing has cut down on carbon-intensive auto travel as more and more businesses and government agencies adopt these practices. Tens of millions of people are making fewer trips by car and plane every year.[18] Or consider how our ability to condense vast amounts of information into compact forms is actually helping the environment. Let's face it, it is much less carbon intensive to download a collection of songs onto your home computer than it is to drive to the mall and purchase a CD enclosed in that impossible plastic safe. In addition, as more of us become comfortable with digital formats and new formats like the Ipad emerge, we are consuming less paper.[19] And as a result, less energy since paper manufacturing requires about 3,405 kilowatt-hours of energy to produce 100 tons of paper.[20]

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Just as significant is the reduction in energy consumption that would come from adopting smart-grid technology and intelligent transportation systems. Globally, smart-grid technology would reduce $124.6 billion worth of emissions.[21] In the transportation arena, the widespread adoption of an array of IT tools to reduce traffic congestion and maximize efficiency would also reduce emissions. For example, applying real-time traffic data to signal lights could reduce stops by 40 percent. This could cut gas consumption by 10 percent and cut emissions by 22 percent—a decrease in carbon dioxide emissions by 9,600 tons. Overall, for every unit of energy used by IT, six to 14 units of energy are saved in the overall economy.[22]

8) GOING GREEN IS GREEN (E.G., IT MAKES ECONOMIC SENSE TO GO GREEN)

Reality: With current technology, it often costs money to go green.

One way proponents of tough action on global warming have made their case is by arguing that "going green" provides us with a free lunch. In other words, companies and consumers can significantly cut carbon emissions and make money at the same time. There is no need to suffer a decline in competitiveness or productivity loss! Indeed, this has become a common mantra, from environmental leaders like David Gottfried of the U.S. Green Building Council (USGBC) to Forbes magazine.[23] What's not to like?

This feel-good mantra can be traced back to Harvard business professor Michael Porter's argument that compliance with environmental regulation could actually cut costs and improve competitiveness.[24] But if so much below cost efficiency exists, why don't organizations and households take advantage of it? To be sure, part of the answer is market imperfections that limit organizations from taking advantage of savings, but mostly it's because these win-win opportunities, at least with existing technologies, are rarer than the advocates would like us to believe. As an Office of Technology Assessment report explained, although some actions to meet environmental regulations could save industry money, the lion's share costs industry money.[25] This is not to suggest that such actions should or shouldn't be taken. But we shouldn't fool ourselves into thinking that we'd save money by doing it.

Let's be clear, certainly, some steps to save energy have very short paybacks and make economic sense. (See Myth 5.) For example, many IT data centers could reduce costs by a factor of five if they were to take advantage of real time energy pricing, "sleep modes" on servers, and other innovations. And as the McKinsey report argued, other energy efficiency measures also promise short paybacks. But such quick ROI projects, especially in renewable energy, are the exception. Until reliable and affordable options exist, going green will still cost money. Take solar photovoltaic power for example. Currently, large PV systems can be built for about $3 a watt. However, to reach grid parity in the U.S., the price would need to be $1.5 a watt. In

the developing world, affordable green energy needs to come in less than $1 a watt to compete.[26] Plug-in hybrids can save money, but only if the vehicle is driven a considerable number of miles every year. As such, at this time many green alternatives are better seen as luxury goods, something that is useful to have and can provide additional value (reduced carbon emissions), but something for which you have to pay a price premium. In a nutshell, we should expect many businesses (or consumers) to not jump on the "green makes economic sense" bandwagon. Going green will be "green" for the overall economy only when innovation drives down costs and simultaneously improves performance of clean energy technologies.

9) WE ARE WORLD LEADERS ON THE GREEN ECONOMY, AND IT'S OURS FOR THE TAKING

Reality: Other countries got in on the ground floor and are already out pacing us.

When it became clear that it would be tough to convince American voters to drink their cap-and-trade "castor oil", many advocates of the conventional approaches to climate change decided to tell Americans that cap and trade was not castor oil, it was a chocolate sundae. Going green would not only save them money, it would create millions of good, high paying green jobs, revitalize U.S. manufacturing and lower the U.S. trade deficit. Heck, we're the biggest and richest country, so let's start cranking out those wind turbines.

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To be sure, the clean energy industry can be a source of jobs, as we and the Breakthrough Institute have documented in a report "Rising Tigers, Sleeping Giants."[27] And these jobs can pay more than the average job in the economy if they are focused on more than simply caulking windows and blowing insulation into walls.[28]

But these jobs represent net gains to the economy only if the United States runs a trade surplus in clean energy, which currently we are not. And why would the United States be a clean energy innovation leader if it is no longer a leader in innovation generally. As ITIF has documented in its frequently quoted report "The Atlantic Century," the U.S. is no longer number 1 in the world in innovation-based competitiveness; in fact, among 40 nations we are now 6th.[29] And even more disturbing is that we made the least amount of progress in the last decade of any of the 40 nations examined.

One reason for our dismal last place showing is that other nations have put in place aggressive policies to be competitive, from lowering corporate taxes and boosting R&D tax credits to increasing government R&D. And many of these nations are doing the same in clean energy. That's why many other nations, including China, Germany, Japan, South Korea and Spain, are poised to overtake us in this sector or have already. They are not just promoting the "demand" for clean energy technology; they are supporting the "supply" of it in their nations, including making large government investments in clean energy technology research and production. For example, China, South Korea, and Japan will invest a total of $509 billion in clean technology from 2009-2013. In contrast, the United States will invest $172 billion, and that sum assumes passage of the American Clean Energy and Security Act, which seems less and less likely this year.[30]

Just as important as the dollar value of these investments is that they are being undertaken in a coordinated manner aimed at building competitive new sectors. These countries are backing these emerging sectors with low-interest loans, industry-wide R&D, government procurement, and subsidizing private firms to encourage the purchase of these nascent technologies. In addition, these efforts are coupled with aggressive targets to deploy new technologies. For example, by 2012 China, Japan, and South Korea plan to produce 1.6 million hybrid gas-electric or electric cars while North America has deployed about one-fifth of that number.

Although some in the United States might reject this level of government coordination as unwarranted "industrial policy," we cannot ignore that this is the clean energy competitiveness and innovation strategy of our most formidable competitors. The investments these "rising tigers" are making give them a "first mover advantage" and set the stage for them to attract a larger share of future international investment in clean en-

ergy technologies.[31] (See Myth 10.) The bottom line is that it is presumptuous to think we can dominate in new clean energy technologies without taking stock of our weaknesses and our competitors' strengths.

10) FOREIGN GREEN MERCANTILISM IS GOOD FOR SOLVING CLIMATE CHANGE (AND GOOD FOR THE U.S.)

Reality: Foreign mercantilism reduces needed clean energy innovation and hurts U.S. industry and jobs.

In response to foreign clean energy policies, many of which are mercantilist and protectionist in nature, some in the United States say, "if these countries want to subsidize our clean energy consumption, more power to them." Besides, by lowering the price of clean energy technologies, they are helping solve global warming. Both views are wrong. The reality is that although other countries like China are massively subsidizing the manufacturing of clean technologies (and using protectionist policies like VAT rebates and "buy China" provisions[32]), their actions and our inaction have great long-term consequences. (See Myth 9.) The truth is that while this might help U.S. consumers, it hurts U.S. workers. And most consumers are also workers. So an unemployed or underpaid worker will be in no position to put Chinese solar panels on their house, no matter how cheap they are.

Green mercantilist policies not only threaten U.S. jobs, they threaten progress on solving climate change.

In short, what the Chinese are doing with their clean energy industry (and for that matter, with most of their manufacturing sectors) is to engage in what antitrust experts would call predatory pricing – pricing something below cost now to gain market share and pricing power later. Thus, when the Chinese have a large share of the clean energy industry (and we have a small share), they are in the driver's seat.

But foreign green mercantilist policies not only threaten U.S. jobs, they threaten progress on solving climate change. If China continues to use mercantilist policies, it not only makes it extremely difficult for U.S. renewable energy firms to sell in China, but it also weakens our competitive position in other nations due to unfairly protected Chinese clean energy firms. This progression of events will weaken the ability of U.S. clean energy firms to innovate. The Chinese have created industrial supply chains and driven prices so low that the incentive to compete is significantly reduced. In solar alone, subsidies worth 50 percent of the investment cost have allowed China to become the largest global producer of solar panels and account for one-third of global shipments.

Beyond the serious trade imbalances, the moving of clean-tech manufacturing offshore negatively impacts not only our present technology competitiveness but future innovation, according to professors Erica Fuchs and Randolph Kirchain of Carnegie Mellon and Massachusetts Institute of Technology, respectively. They found that if companies shift production of current "prevailing" technologies offshore to countries in developing East Asia, the innovative "emerging designs" developed in the U.S. are no longer profitable due the change in the relative production economics of the two competing technologies.[33]

Different production characteristics abroad make the offshored prevailing technology more cost-effective to produce in developing countries. And the emerging technology is not able to cost-compete when the prevailing technology is being manufactured offshore, even when the performance characteristics of the emerging technology make it valuable in the long term. Thus, U.S. innovation becomes stymied, and as we lose the innovation, we lose the high-wage, high value-added, innovation-based jobs that accompany it.

Buying subsidized cheap green technologies of today won't allow us to meet the massive global reduction in carbon emissions needed. For that we need next-generation technologies, not cheaper current generation ones. And this will require the United States, as the most likely source for next generation technologies in the world, to focus on a green innovation strategy that generates the innovations and value added here, not offshore, and fights green mercantilist policies abroad.

ENDNOTES

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