By Richard Heinberg / Independent Media Institute
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Is the Energy Transition Taking Off—or Hitting a Wall?

With the Inflation Reduction Act, the federal government is illogically encouraging the increasing use of fossil fuels—in order to reduce our reliance on fossil fuels.

The passage of the Inflation Reduction Act (IRA) constitutes the boldest climate action so far by the American federal government. It offers tax rebates to buyers of electric cars, solar panels, heat pumps, and other renewable-energy and energy-efficiency equipment. It encourages the development of carbon-capture technology and promotes environmental justice by cleaning up pollution and providing renewable energy in disadvantaged communities. Does this political achievement mean that the energy transition, in the U.S. if not the world as a whole, is finally on track to achieving the goal of net zero emissions by 2050?

If only it were so.

Emissions modelers have estimated that the IRA will reduce U.S. emissions by 40 percent by 2030. But, as Benjamin Storrow at Scientific American has pointed out, the modelers fail to take real-world constraints into account. For one thing, building out massive new renewable energy infrastructure will require new long-distance transmission lines, and entirely foreseeable problems with permitting, materials, and local politics cast doubt on whether those lines can be built.

But perhaps the most frustrating barriers to grid modernization are the political ones. While Texas produces a significant amount of wind and solar electricity, it is unable to share that bounty with neighboring states because it has a stand-alone grid. And that's unlikely to change because Texas politicians fear that connecting their grid with a larger region would open the state's electricity system to federal regulation. Similar state-based regulatory heel-dragging is pervasive elsewhere. In a report posted in July, the North Carolina Clean Energy Technology Center noted that, so far this year, Texas regulators have approved only $478.7 million out of the $12.86 billion (3.7 percent) in grid modernization investment under consideration, due to fears of raising utility bills for local residents.

But grid modernization is only one area in which the energy transition is confronting roadblocks in the U.S.

Certainly, as a result of the IRA, more electric vehicles (EVs) will be purchased. California's recent ruling to phase out new gas-powered cars by 2035 will buttress that trend. Currently, just under 5 percent of cars sold in the U.S. are EVs. By 2030, some projections suggest the proportion will be half, and by 2050 the great majority of light-duty vehicles on the road should be electric. However, those estimates assume that enough vehicles can be manufactured: Supply-chain issues for electronics and for battery materials have slowed deliveries of EVs in recent months, and those issues could worsen. Further, the IRA electric-vehicle tax credits will go only to buyers of cars whose materials are sourced in the U.S. That's probably good in the long run, as it will reduce reliance on long supply chains for materials. But it raises questions about localized environmental and human impacts of increased mining.

Many environmentalists are thrilled with the IRA; others less so. Those in the more critical camp have pointed disapprovingly to the bill's promotion of nuclear, and note that, in order to gain Senator Joe Manchin's vote, Democrats agreed to streamline oil and gas pipeline approvals in a separate bill. In effect, the government will be encouraging the increasing use of fossil fuels… in order to reduce our reliance on fossil fuels.

Despite the flaws of the Inflation Reduction Act, it is likely the best that the federal government can accomplish in terms of climate progress for the foreseeable future. The U.S. is a country mired in institutional gridlock, its politics trapped in endless culture wars, with a durable Supreme Court majority intent on hampering the government's ability to regulate carbon emissions.

Climate leadership is needed in the U.S., the country responsible for the largest share of historic emissions and is the second-biggest emitter (on a per-capita basis, the U.S. ranks far ahead of China, the top emitter). Without the U.S., global progress in reducing greenhouse gas emissions will be difficult. But the American political system, pivotal as it is in the project, is only the tip of the proverbial iceberg of problems with the shift from fossil fuels to renewables. The barriers to meeting climate goals are global and pervasive.

Global Inertia and Roadblocks

Consider Germany, which has been working on energy transition longer and harder than any other large industrial nation. Now, as Russia is withholding natural gas supplies following its invasion of Ukraine and NATO's hostile reaction, German electricity supplies are tight and about to get tighter. In response, Germany's Green Party is leading the push to restart coal power plants rather than halting the planned shuttering of nuclear power plants. And it's splitting environmentalists. Further, the country's electricity problems have been exacerbated by a lack of, well, wind.

Unless Russia increases natural gas supplies headed west, European manufacturing could largely shut down this winter—including the manufacturing of renewable energy and related technologies. UK day-ahead wholesale electricity prices have hit 10 times the last decade's average price, and Europe faces energy scarcity this winter. French President Emmanuel Macron recently warned that his people face the "end of abundance." Inadequate spending is also inhibiting a renewables takeoff. Last year, EU member states spent over $150 billion on the energy transition, compared to about $120 billion by the U.S. Meanwhile, China spent nearly $300 billion on renewable energy and related technologies. According to the China Renewable Energy Engineering Institute, the country will install 156 gigawatts of wind turbines and solar panels this year. In comparison, the U.S., under the Inflation Reduction Act, would grow renewable energy annual additions from the current rate of about 25 GW per year to roughly 90 GW per year by 2025, with growth rates increasing thereafter, according to an analysis by researchers at Princeton University.

The recent remarkable increase in spending is far from sufficient. Last year, the world spent a total of about $530 billion on the energy transition (for comparison's sake, the world spent $700 billion on fossil fuel subsidies in 2021). However, to bring worldwide energy-related carbon dioxide emissions to be net zero by 2050, annual capital investment in the transition would need to grow by over 900 percent, reaching nearly $5 trillion by 2030, according to the International Energy Agency. Bloomberg writer Aaron Clark notes, "The one thing public climate spending plans in the U.S., China, and the EU all have in common is that the investments aren't enough."

There's one other hurdle to addressing climate change that goes almost entirely unnoticed. Most cost estimates for the transition are in terms of money. What about the energy costs? It will take a tremendous amount of energy to mine materials; transport and transform them through industrial processes like smelting; turn them into solar panels, wind turbines, batteries, vehicles, infrastructure, and industrial machinery; install all of the above; and do this at a sufficient scale to replace our current fossil-fuel-based industrial system. In the early stages of the process, this energy will have to come mostly from fossil fuels, since they supply about 83 percent of current global energy. The result will surely be a pulse of emissions; however, as far as I know, nobody has tried to calculate its magnitude.

The requirement to reduce our reliance on fossil fuels represents the biggest technical challenge humanity has ever faced. To avoid the emissions pulse just mentioned, we must reduce energy usage in non-essential applications (such as for tourism or the manufacture of optional consumer goods). But such reductions will provoke social and political pushback, given that economies are structured to require continual growth, and citizens are conditioned to expect ever-higher levels of consumption. If the energy transition is the biggest technical challenge ever, it is also the biggest social, economic, and political challenge in human history. It may also turn out to be an enormous geopolitical challenge, if nations end up fighting over access to the minerals and metals that will be the enablers of the energy transition.

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