



**BEFORE THE SUBCOMMITTEE
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AFFAIRS, INTERNATIONAL ENVIRONMENTAL PROTECTION, AND PEACE CORPS**

COMMITTEE ON FOREIGN RELATIONS

**HEARING ON U.S. SECURITY IMPLICATIONS OF INTERNATIONAL ENERGY AND
CLIMATE POLICIES AND ISSUES**

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TESTIMONY OF MARY J. HUTZLER

THE INSTITUTE FOR ENERGY RESEARCH

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The United States is in the midst of a domestic energy renaissance that has lowered our import dependency and increased our security. However, there are many policy makers that seek to restrict the availability of our natural resources and make energy less affordable for Americans. Lessons can be learned from many of our allies that have tried carbon restriction policies and have had poor results.

Europe, for example, has pursued some of the most aggressive "green" energy policies in the world. Countries across the European Union have passed laws to promote renewable energy technologies, curb greenhouse gas (GHG) emissions, and decrease energy consumption. To achieve these goals, European governments have imposed various schemes, taxes, subsidies, and mandates, including cap and trade,

feed-in tariffs and surcharges that force consumers to foot the bill for expensive green energy technologies.

Carbon restriction and other “green” policies have slowed the economies of these allies, moved industries offshore, made jobs more difficult to obtain, and lowered the income power of their citizens. While each country has had a somewhat unique experience, all follow a similar pattern: the government passes ambitious green energy laws; electricity prices rise as subsidies increase; and then the government considers amending or repealing its misguided policies.

Australia, for example, having imposed a carbon tax, has now approved legislation to remove it. And, other countries that have subsidized renewable energy are slashing those subsidies due to the impact on their economies, electricity rates, and energy poverty levels. This testimony will highlight carbon restriction policies in the European Union (EU) and Australia and their resulting impact.

European Union Emissions Trading Scheme

The Emissions Trading Scheme (ETS) was launched by the EU in January 2005 as an attempt to comply with the 1997 Kyoto Protocol. It was the world's first cross-border greenhouse gas emissions (GHG) trading program, regulating more than 11,500 installations and about 45 percent of total EU carbon dioxide emissions. Under the ETS, European companies must hold permits to allow them to emit carbon dioxide. A certain number of those permits were distributed at no cost to the industries that must reduce their output of carbon dioxide emissions. If businesses emit less carbon dioxide than the permits they hold, they can either keep the excess permits for future use or sell the excess permits and make a profit on them.

The early results of the program were that EU emissions were not significantly lowered until the global recession hit in 2008, which lowered emissions for all countries. There were also misuses and abuses in the system because of its complexity, politicized decision-making, and the incentive to manipulate it.

Before the global recession hit, some EU countries saw faster carbon dioxide emissions growth than the United States which was not subject to the policy. From 2000 to 2006, the rate of growth of European emissions under the cap-and-trade policy was almost 5 times higher than the rate of growth in emissions in the United States.ⁱ After the global recession, however, EU carbon dioxide emissions in 2009 were almost 8 percent below 2008 levels.ⁱⁱ Due to the global recession, carbon dioxide emissions, in many cases, were lowered below the targets set by the cap and trade policy, so companies did not have to take further actions to reduce their emissions.ⁱⁱⁱ Severe downturns in economic activity result in significant reductions in emissions. Because the free allocation of permits was based on future estimates of higher emissions levels, which did not materialize, there were too many free government-issued permits. As a result, companies hit hard by the recession were able to make profits by selling the excess permits but chose not to pass those savings onto their customers. Consumers ended up paying higher energy and commodity costs; taxpayers paid for the program's implementation; and a new middleman was created to run the carbon permit trading program.^{iv}

Europe found the costs of the program to be large. In 2006, individual business and sectors had to pay €24.9 billion for permits totaling over one billion tons. In 2011, the global carbon markets were valued at US \$176 billion, with 10.3 billion carbon credits traded.^v The World Watch Institute estimated the

costs of running a trading system designed to meet the EU's Kyoto obligations at about \$5 billion. The costs of a trading system to meet the EU's commitments of a 20 percent reduction by 2020 (against a 1990 baseline) were estimated to be about \$80 billion annually.^{vi}

Unlike traditional commodities, which at some time during the course of their market exchange must be physically delivered to someone, carbon credits do not represent a physical commodity, which makes them particularly vulnerable to fraud and other illegal activity. Carbon markets, like other financial markets, are at risk of exploitation by criminals due to the large amount of money invested, the immaturity of the regulations and lack of oversight and transparency. The illegal activities identified include^{vii}:

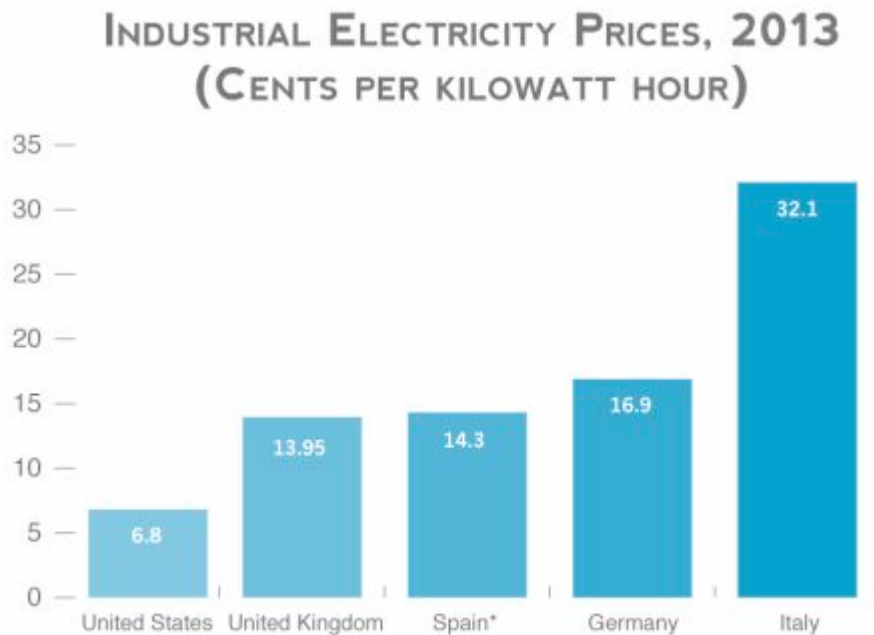
- Fraudulent manipulation of measurements to claim more carbon credits from a project than were actually obtained;
- Sale of carbon credits that either do not exist or belong to someone else;
- False or misleading claims with respect to the environmental or financial benefits of carbon market investments;
- Exploitation of weak regulations in the carbon market to commit financial crimes, such as money laundering, securities fraud or tax fraud; and
- Computer hacking/ phishing to steal carbon credits and theft of personal information.

German prosecutors, for example, searched 230 offices and homes of Deutsche Bank, Germany's largest bank, and RWE, Germany's second-biggest utility, to investigate 180 million Euros (\$238 million U.S.) of tax evasion linked to emissions trading. The U.K., France and the Netherlands also investigated carbon traders, who committed fraud by collecting the tax, and disappearing without returning the tax funds. According to estimates from Bloomberg New Energy Finance, about 400 million metric tons of emission trades may have been fraudulent in 2009, or about 7 percent of the total market.^{viii} Tax evasion linked to emissions trading is still a problem. This year, for example, Frankfurt prosecutors sought the arrest of a British national in connection with suspected tax fraud worth 58 million Euros (\$80 million).^{ix}

Another problem is with the lack of predictability regarding the emissions permit price. Companies need to know the price for long-term planning to decide on what actions they should take. The EU permit price ranged by a factor of 3, but even at the higher price range, it was insufficient to meet the emission reduction targets before the global recession hit.^x A cap and trade policy is a highly complex system to implement because there are a large number of participants and the components of the system are difficult to get right as EU's experience has shown.

Last year, the EU commenced phase three of the ETS toward meeting their target of a 40 percent reduction in greenhouse gas emissions below 1990 levels by 2030.^{xi} Phase 3, which has a number of significant rule changes, will continue until 2020. As of 2011, carbon dioxide emissions of the original 27 member EU were just 8 percent below 1990 levels, and the majority of the reduction was achieved by the global recession. That means the EU has a long way to go to meet its target. In the meantime, energy prices have increased and more and more Europeans are facing fuel poverty, meaning they pay more than 10 percent of their household income for energy.

For example, industrial electricity prices are two to five times higher in the EU than in the United States and are expected to increase more.



*Data is for 2011

Source: International Industrial Electricity Prices, <https://www.gov.uk/government/statistical-data-sets/international-industrial-electricity-prices>

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Source: *International Industrial Electricity Prices*, <https://www.gov.uk/government/statistical-data-sets/international-industrial-energy-prices>

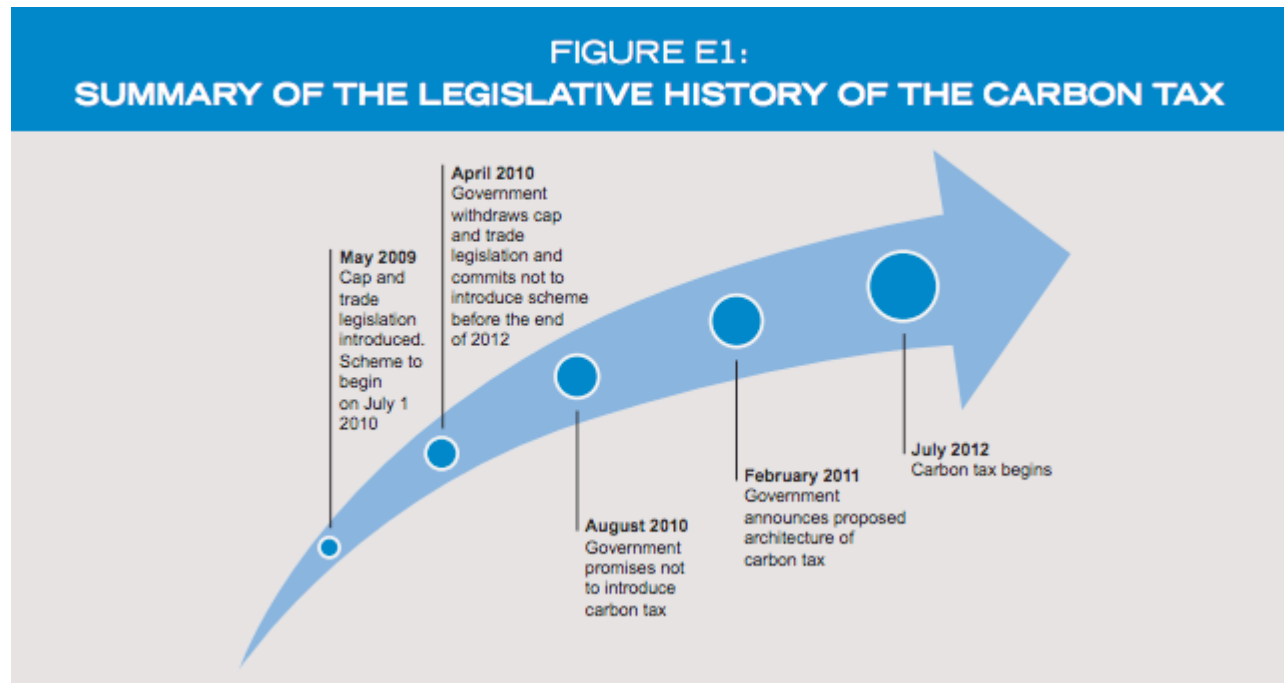
Europe's once comfortable middle class is being pushed into energy poverty as a result of the carbon reduction measures and EU's renewable programs (discussed later). According to the European Commission, electricity prices in the Organization for Economic Cooperation (OECD) Europe have risen 37 percent more than those in the United States when indexed against 2005 prices. By 2020, at least 1.4 million additional European households are expected to be in energy poverty.

EU's ETS and clean energy programs have not significantly reduced emissions, but rather have dramatically raised energy prices, increased national debt, driven businesses out of Europe, led to massive job losses and unemployment, greatly increased energy poverty, and have been plagued by fraud and corruption. This economic malaise, in turn, has made Europe less capable of expending funds for their national defense needs and has contributed to the weakening of multilateral defense organizations like NATO. The European members of NATO are now spending less than 2 percent of their GDP on defense spending, which is below NATO guidance.^{xii}

Australia's Carbon Tax

Australia implemented a carbon tax in 2012. Below is a schematic of Australia's plans, beginning in 2009, for a cap and trade program and carbon tax. The carbon tax, which is currently set at \$24.15 Australian

currency (\$22.70 U.S.) per metric ton, was initially implemented in July 2012 and was designed as a precursor to a cap and trade scheme, with the transition to a flexible carbon price as part of the trading program beginning in 2015. The tax applies directly to around 370 Australian businesses. But the September 7, 2013 election put a damper on the program.



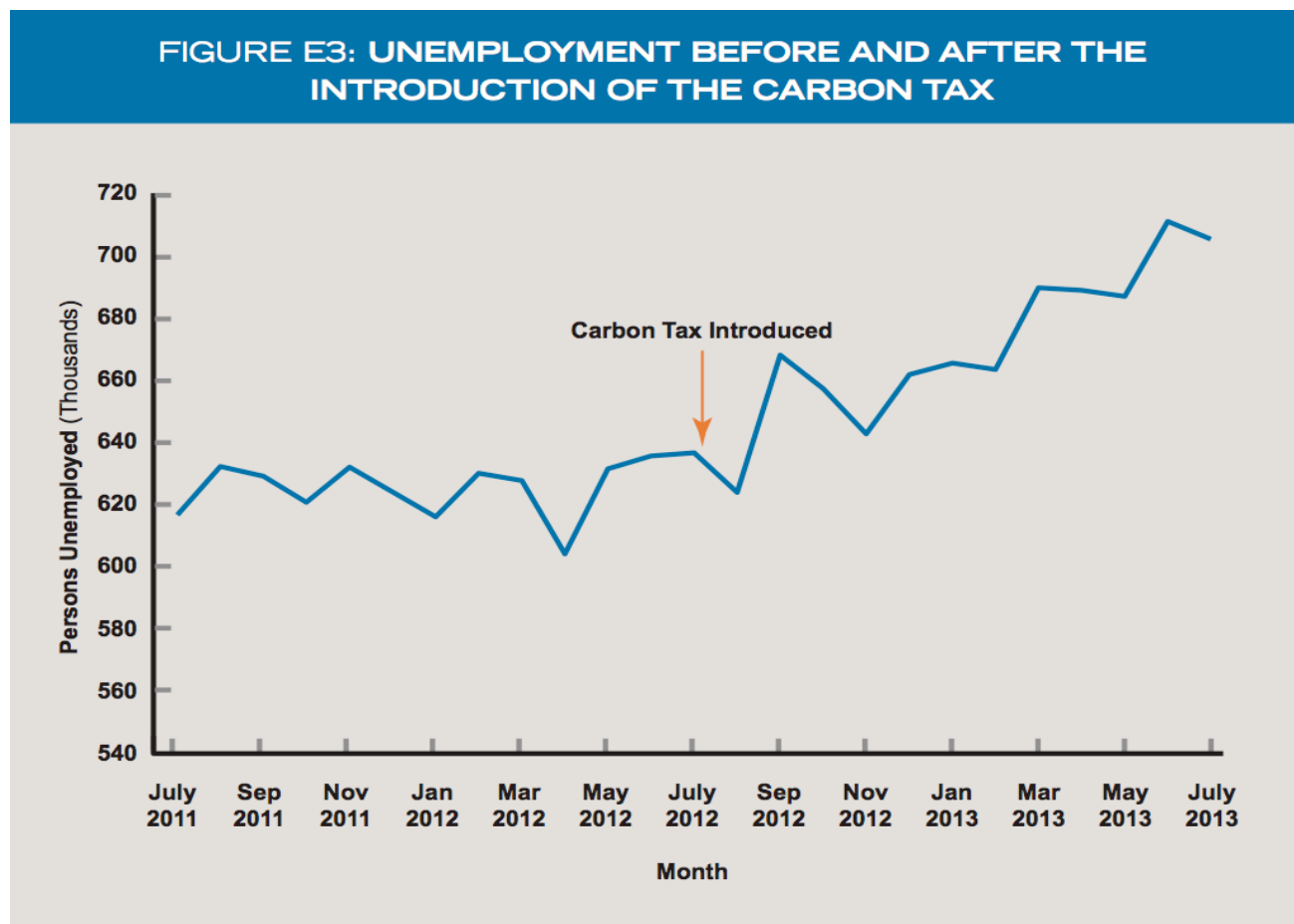
Source: *Australia's Carbon Tax: An Economic Evaluation*, September 2013, http://instituteforenergyresearch.org/wp-content/uploads/2013/09/IER_AustraliaCarbonTaxStudy.pdf

Australia's new government wants to dismantle the legislation that levies fees on carbon emissions and replace it with taxpayer funded grants to companies and projects that reduce emissions. The Emissions Reduction Fund would be funded at A\$2.55 billion (\$2.4 billion U.S.)^{xiii}. Repealing Australia's carbon tax on July 1, 2014 is estimated to^{xiv}:

- Reduce the cost of living of its citizens – the Australian Treasury estimates that removing the carbon tax in 2014 to 2015 will reduce the average costs of living across all households by about \$550 more than they would otherwise be in 2014 to 2015.
- Lower the cost of retail electricity by around 9 percent and retail gas prices by around 7 percent than they would otherwise be in 2014 to 2015.
- Boost Australia's economic growth, increase jobs and enhance Australia's international competitiveness by removing an unnecessary tax, which hurts businesses and families.
- Reduce annual ongoing compliance costs for around 370 entities by almost \$90 million per annum.
- Remove over 1,000 pages of primary and subordinate legislation.

Australia's lower house of parliament voted to scrap the carbon tax on July 14, and the Australian Senate voted in favor on July 17, 2014.^{xv} According to Tony Abbott, Australian prime minister speaking at a news conference, "Today the tax that you voted to get rid of is finally gone, a useless destructive tax which damaged jobs, which hurt families' cost of living and which didn't actually help the environment is finally gone." The repeal will save Australian voters and business around A\$9 billion (\$8.4 billion U.S.) a year.^{xvi}

Australia's residents found the carbon tax experience to include soaring electricity prices, rising unemployment, income tax hikes, and additional command-and-control regulations. Electricity prices increased 15 percent over the course of a year (which included the highest quarterly increase on record), and companies laid off workers because of the tax.



Source: Australia's Carbon Tax: An Economic Evaluation, September 2013, http://instituteenergyresearch.org/wp-content/uploads/2013/09/IER_AustraliaCarbonTaxStudy.pdf

Further, government data shows that the tax had not reduced the level of Australia's domestically produced carbon dioxide emissions, which is not surprising, since under the carbon tax Australia's domestic emissions were not expected to fall below current levels until 2045.^{xvii}

Renewable Subsidies in Europe

As part of Europe's effort to reduce greenhouse gas emissions to comply with the Kyoto Protocol, EU set mandates for renewable generation (20 percent of its electricity to be generated by renewable energy by 2020) coupled with hefty renewable subsidies as enticements. The Europeans have found that these subsidies have grown too large, are hurting their economies, and as a result, they are now slashing the subsidies. In fact, the costs have become so enormous that governments in European countries are unilaterally rewriting their contracts with renewable generating firms and renege on the generous deals they initially provided. Spain, for example, ended its feed-in-tariff, which guaranteed an extremely high price for renewable power, replacing it with either a much lower subsidy or no subsidy, depending on the circumstance.

Spain

In order to enhance renewable energy sources in Spain, the Government enacted legislation to reach 20 percent of electric production from qualified renewable energy by 2010. To meet this target, the government found it needed to provide incentives to ensure the market penetration of renewable energy, including providing above market rates for renewable-generated electricity and requiring that electric utility companies purchase all renewable energy produced.

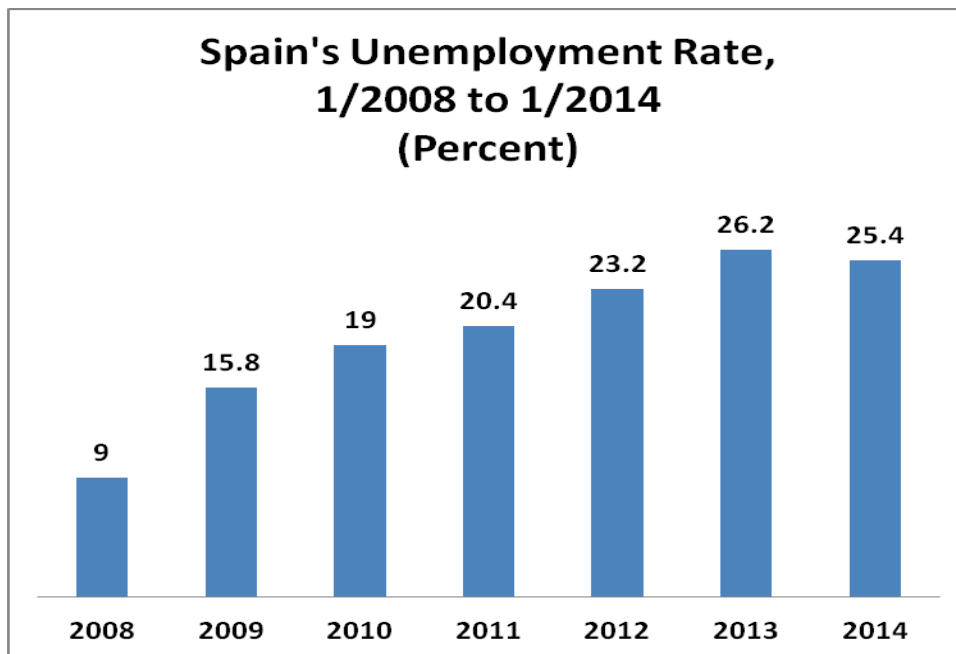
In 1994, Spain implemented feed-in-tariffs to jump start its renewable industry by providing long-term contracts that pay the owners of renewable projects above-market rates for the electricity produced.^{xviii} Because renewable technologies generally cost more than conventional fossil fuel technologies, the government guaranteed that renewable firms would get a higher cost for their technologies. But, because the true costs of renewable energy were never passed on to the consumers of electricity in Spain, the government needed to find a way to make renewable power payments and electricity revenues meet.

Since 2000, Spain provided renewable producers \$41 billion more for their power than it received from its consumers.^{xix} (For reference, Spain's economy is about 1/12th the size of the U.S. economy.) In 2012, the discrepancy between utility payments to renewable power producers and the revenue they collected from customers was 5.6 billion Euros (\$7.3 billion), despite the introduction of a 7 percent tax on generation.^{xx} The 2012 gap represented a 46 percent increase over the previous year's shortfall.

This massive rate deficit should not come as a surprise. For five years, IER has warned of this problem beginning when Dr. Gabriel Calzada released his paper on the situation in Spain and testified before Congress.^{xxi} He found that Spain's "green jobs" agenda resulted in job losses elsewhere in the country's economy. For each "green" megawatt installed, 5.28 jobs on average were lost in the Spanish economy; for each megawatt of wind energy installed, 4.27 jobs were lost; and for each megawatt of

solar installed, 12.7 jobs were lost. Although solar energy may appear to employ many workers in the plant's construction, in reality it consumes a large amount of capital that would have created many more jobs in other parts of the economy. The study also found that 9 out of 10 jobs in the renewable industry were temporary.^{xxii xxiii}

Spain's unemployment rate has more than doubled between 2008 and 2013. In January 2013, Spain's unemployment rate was 26 percent, the highest among EU member states.^{xxiv} Spain's youth unemployment (under the age of 25) reached 57.7 percent in November 2013, surpassing Greece's youth unemployment rate of 54.8 percent in September 2013.^{xxv}



Source: Eurostat

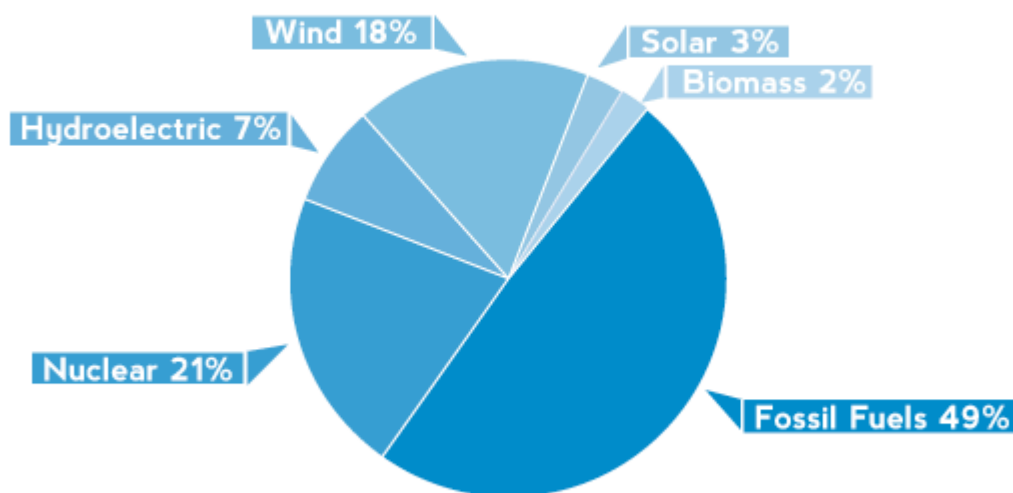
The Spanish government did not believe Dr. Calzada 5 years ago, but they have now been hit in the face with reality. To recover the lost revenues from the extravagant subsidies, the Spanish government ended its feed-in-tariff program for renewables, which paid the renewable owners an extremely high guaranteed price for their power as can be seen by the deficit. Currently, renewable power in Spain gets the market price plus a subsidy which the country deems more "reasonable." Companies' profits are capped at a 7.4 percent return, after which renewable owners must sell their power at market rates. The measure is retroactive to when the renewable plant was first built.^{xxvi} Therefore, some renewable plants, if they have already received the 7.4 percent return, are receiving only the market price for their electricity.

Further, wind projects built before 2005 will no longer receive any form of subsidy, which affects more than a third of Spain's wind projects. As a consequence of the government's actions to rein in their subsidies and supports, Spain's wind sector is estimated to have laid off 20,000 workers.

The Spanish Government also slashed subsidies to solar power, subsidizing just 500 megawatts of new solar projects, down from 2,400 megawatts in 2008.^{xxvii} Its solar sector, which once employed 60,000 workers, now employs just 5,000. In 2013, solar investment in Spain dropped by 90 percent from its 2011 level of \$10 billion.

Spain's 20 percent renewable energy share of generation from wind and solar power has come at a very high cost to the nation.

SPAIN NET GENERATION SHARES BY FUEL TYPE, 2012



Source: Energy Information Administration, International Data Base



Germany

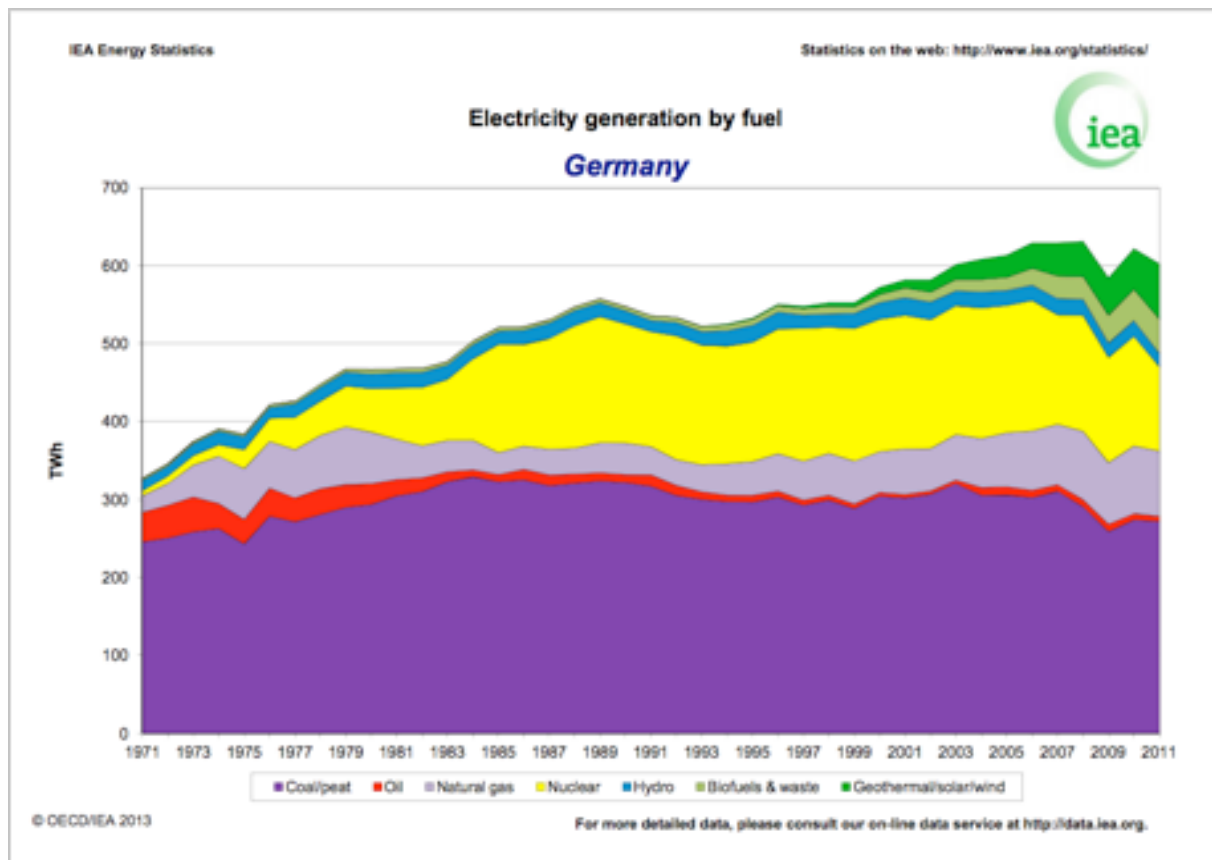
In Germany, as part of the country's "Energiewende", or "energy transformation," electric utilities have been ordered to generate 35 percent of their electricity from renewable sources by 2020, 50 percent by 2030, 65 percent by 2040, and 80 percent by 2050. To encourage production of renewable energy, the German government instituted a feed-in-tariff early, even before Spain.

In 1991, Germany established the Electricity Feed-in Act, which mandated that renewables "have priority on the grid and that investors in renewables must receive sufficient compensation to provide a return on their investment irrespective of electricity prices on the power exchange."^{xxviii} In other words, utilities are required to purchase electricity from renewable sources they may not want or need at above-market rates. For example, solar photovoltaics had a feed-in tariff of 43 euro cents per kilowatt-hour (\$0.59 U.S. per kilowatt-hour), over 8 times the wholesale price of electricity and over four times

the feed-in tariff for onshore wind power. A subsequent law passed in 2000, the Renewable Energy Act (EEG), extended feed-in tariffs for 20 years.^{xxix}

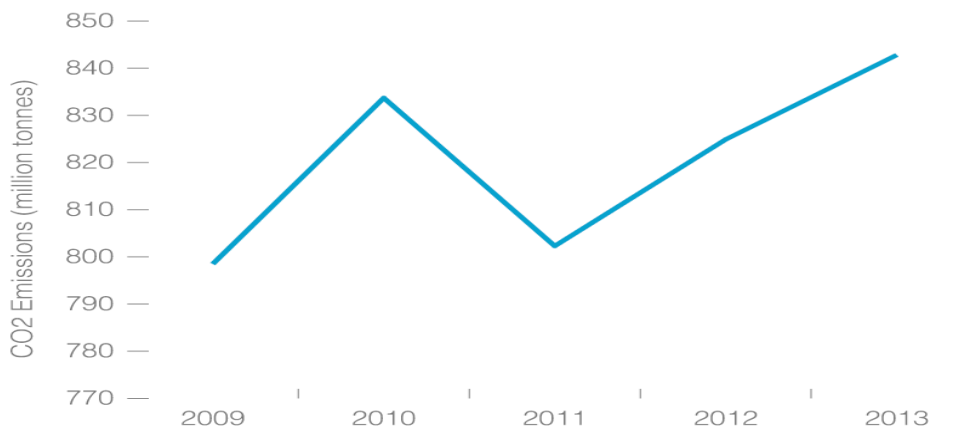
Originally, to allow for wind and solar generation technologies to mature into competitive industries, Germany planned to extend the operating lives of its existing nuclear fleet by an average of 12 years. But, the Fukushima nuclear accident in Japan caused by a tsunami changed Germany's plans and the country quickly shuttered 8 nuclear reactors and is phasing out its other 9 reactors by 2022, leaving the country's future electricity production mostly to renewable energy and coal.^{xxx}

Coal consumption in Germany in 2012 was the highest it has been since 2008, and electricity from brown coal (lignite) in 2013 reached the highest level since 1990 when East Germany's Soviet-era coal plants began to be shut down. German electricity generation from coal increased to compensate for the loss of the hastily shuttered nuclear facilities. Germany is now building new coal capacity at a rapid rate, approving 10 new coal plants to come on line within the next 2 years to deal with expensive natural gas generation and the high costs and unreliability of renewable energy.^{xxxi} As a result, carbon dioxide emissions are increasing.



In 2013, Germany's carbon dioxide emissions increased by 2.4 percent over 2012 levels.^{xxxii}

GERMANY CO2 EMISSIONS, 2009-2013



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Source: BP, *Statistical Review 2014 workbook*, *Statistical Review 2014*, <http://www.bp.com/en/global/corporate/about-bp/energy-economics/statistical-review-of-world-energy/statistical-review-downloads.html>

While the United States is using low cost domestic natural gas to lower coal-fired generation, in Germany, the cost of natural gas is high since it is purchased at rates competitive with oil. Also, Germany is worried about its natural gas supplies since it gets a sizable amount from Russia. While domestic shale gas resources are an alternative, particularly since the Germans are hydraulic fracturing pioneers and have used the technology to extract tight gas since the 1960s, Germany's Environment Minister has proposed a prohibition on hydraulic fracturing until 2021 in response to opposition from the Green Party.^{xxxiii} According to the Energy Information Administration, Germany has 17 trillion cubic feet of technically recoverable shale gas resources.^{xxxiv}

Germany has some of the highest costs of electricity in Europe and its consumers are becoming energy poor. In 2012, the average price of electricity in Germany was 36.25 cents per kilowatt-hour,^{xxxv} compared to just 11.88 cents for U.S. households, triple the U.S. average residential price.^{xxxvi} These prices led Germany's Energy Minister to recently caution that they risk the "deindustrialization" of the economy.

In addition to high electricity prices, Germans are paying higher taxes to subsidize expensive green energy. The surcharge for Germany's Renewable Energy Levy that taxes households to subsidize renewable energy production increased by 50 percent between 2012 and 2013 – from €3.6 cents (4.97 U.S. cents) to €5.28 cents (6.7 cents) per kilowatt hour, costing a German family of four about €250 (\$324) per year, including sales tax.^{xxxvii} The German government raised the surcharge again at the start of this year by 18 percent to €6.24 cents per kilowatt hour (8.61 U.S. cents) representing about a fifth of residential utility bills,^{xxxviii} making the total feed-in tariff support for 2014 equal to €21.5 billion (\$29.6 billion).^{xxxix} As a result, 80 German utilities had to raise electricity rates by 4 percent, on average, in February, March, and April of this year.

The poor suffer disproportionately from higher energy costs because they spend a higher percentage of their income on energy. As many as 800,000 Germans have had their power cut off because of an inability to pay for rising energy costs, including 200,000 of Germany's long-term unemployed.^{xi}

Adding to this is a further disaster. Large offshore wind farms have been built in Germany's less populated north and the electricity must be transported to consumers in the south. But, 30 wind turbines off the North Sea island of Borkum are operating without being connected to the grid because the connection cable is not expected to be completed until sometime later this year. Further, the seafloor must be swept for abandoned World War II ordnance before a cable can be run to shore. The delay will add \$27 million to the \$608 million cost of the wind park. And, in order to keep the turbines from rusting, the turbines are being run with diesel.^{xli xlii}

Germany's power grid has been strained by new wind and solar projects both on and offshore, making the government invest up to \$27 billion over the next decade to build about 1,700 miles of high-capacity power lines and to upgrade existing lines. The reality is that not only is renewable energy more expensive, but it also requires expensive transmission investments that existing sources do not, thus compounding the impact on consumers and businesses.

Germany knows reforms are necessary. On January 29, the German Cabinet backed a plan for new commercial and industrial renewable power generators to pay a charge on the electricity they consume. As part of the reform of the Renewable Energy Sources Act, the proposal would charge self generators 70 percent of the renewable subsidy surcharge, (i.e. the €6.24 cents per kilowatt hour). Under the proposal, the first 10 megawatt hours would be exempt for owners of solar photovoltaic projects that are less than 10 kilowatts. According to the German Solar Energy Industry Association, about 83 percent of solar self generators would be subject to the new charge. Another reform being considered is a reduction in the feed-in tariff from the current average of €17 cents (23.47 U.S. cents) per kilowatt hour to €12 cents (16.56 U.S. cents) per kilowatt hour.^{xliii}

On July 11, Germany's upper house of parliament passed changes to the Renewable Energy Sources Act, which will take effect as planned on August 1. The law lowers subsidies for new green power plants and spreads the power-price surcharge more equally among businesses.^{xliv}

United Kingdom

Unlike Spain and Germany, the United Kingdom (UK) started its feed-in-tariff program to incentivize renewable energy relatively late, in 2010.^{xlv} Hydroelectric, solar, and wind units all have specified tariffs that electric utilities must pay for their energy, which are above market rates. Like the other countries, the UK has a mandate for renewable energy. The United Kingdom is targeting a 15 percent share of energy generated from renewable sources in gross final energy consumption and a 31 percent share of electricity demand from electricity generated from renewable sources by 2020.^{xlvi} The UK generates about 12 percent of its electricity from renewable energy today. The increased renewable power will cost consumers 120 pounds a year (about \$200) above their current average energy bill of 1,420 pounds (\$2,362).^{xlvii}

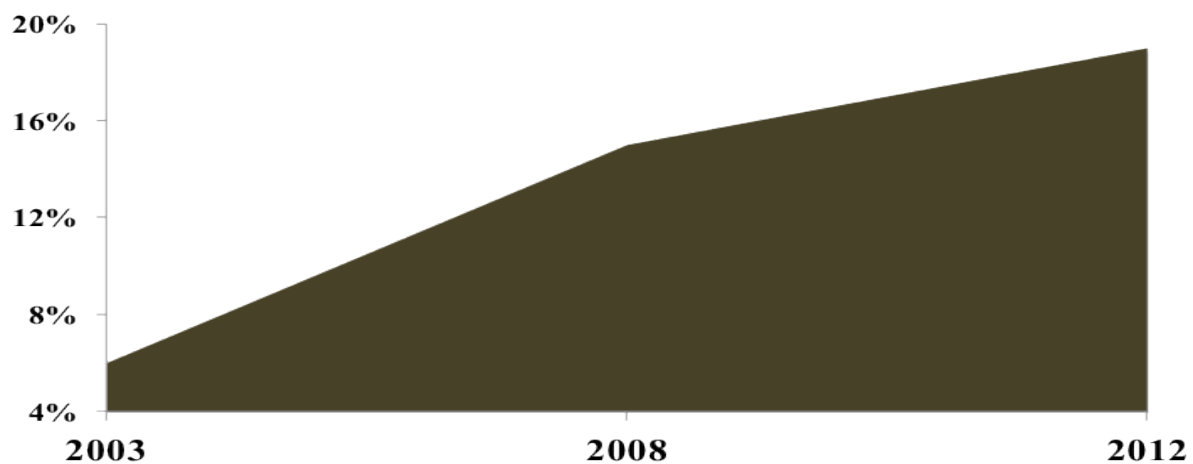
The UK is closing coal-fired power plants to reduce carbon dioxide emissions in favor of renewable energy. In the UK, 8,200 megawatts of coal-fired power plants have been shuttered, with an additional 13,000 megawatts at risk over the next 5 years, according to the Confederation of U.K. Coal Producers.^{xlviii} The UK's energy regulator is worried that the amount of capacity over peak demand this winter will be under 2 percent—a very low, scary amount for those charged with keeping the lights on—and the lowest in Western Europe.

Beginning in January 2016, the European Union will require electric utilities to add further emission reduction equipment to plants or close them by either 2023 or when they have run for 17,500 hours. Because the equipment is expensive, costing over 100 million pounds (\$167 million) per gigawatt of capacity, only one UK electricity producer has chosen to install the required technology. Most of the existing coal-fired plants are expected to be shuttered since only one coal-fired power plant has been built in the UK since the early 1970s.

To deal with the reliability issue, the UK government is hosting an auction for backup power, but it is unclear how it will work. According to the Department for Energy and Climate Change, electricity producers will be able to bid in an auction to take place this December to provide backup power for 2018. The program, called a capacity market, is expected to ensure sufficient capacity and security of supply. The Department estimates that the UK power industry needs around 110 billion pounds (\$184 billion) of investment over the next 10 years.

The Renewable Energy Foundation (REF) estimates that consumers currently pay more than £1 billion (\$1.66 billion) a year in subsidies to renewable energy producers—twice the wholesale cost of electricity. Those subsidies are expected to increase to £6 billion (\$10 billion) a year by 2020 to meet a 30 percent target of providing electricity from renewable energy.^{xlix} As a result, a growing number of UK households are in energy poverty. In 2003, roughly six percent of the United Kingdom's population was in energy poverty; a decade later, nearly one-fifth of the nation's population is in energy poverty.

Percent of UK Households in Energy Poverty



Source: *The Failure of Global Carbon Policies*, June 11, 2014, <http://acclive.com/article/the-failure-of-global-carbon-policies.html>

As a result, the government has proposed that renewable companies sell their electricity to the national grid under a competitive bidding system. The new proposal limits the total amount of subsidies available for green energy, which were previously effectively limitless. The reduction in subsidies has led to renewable developers scrapping plans amid claims that the proposal will make future renewable development unprofitable.ⁱ

The UK is both cutting the level of their feed-in-tariffs and the length of time they are available. Effective July 1, 2013, the feed-in-tariff for solar generated electricity was reduced from 15.44 pence (24 cents U.S.) to 14.90 pence per kilowatt hour. In October 2011, it was 43.3 pence (67.5 cents U.S.) per kilowatt hour--almost three times the reduced level.ⁱⁱ Also, the length of time for the subsidy entitlement is being reduced--for example, it will be 15 years instead of 20 years for wind farms built after 2017. The reductions indicate that the original subsidies were overgenerous and that wind turbines are unlikely to have an economic life of 20 years.ⁱⁱⁱ

But, according to the Climate Change Committee (CCC), without tougher action, Britain will miss its 31 percent target of cutting emissions, managing only a 21 percent reduction instead, which will hinder meeting its commitment to cut greenhouse gas emissions by 80 percent of 1990 levels by 2050. The CCC called for more progress on insulating homes, promoting the uptake of ground source and air source heat pumps, and investment in support for electric vehicles. It also urged the UK to end the “high degree of uncertainty” about its support for renewable energy and provide funding for commercializing offshore wind.^{liii}

Italy

Similar to Germany and Spain, Italy also used feed-in-tariffs to spur renewable development, and found it too costly. In 2005, Italy introduced its solar subsidy plan, providing solar power with premiums ranging from Euro 0.445 (\$0.60 U.S.) per kilowatt hour to Euro 0.490 (\$0.66 U.S.) per kilowatt hour.^{liv} That subsidy resulted in the construction of more than 17,000 megawatts of solar capacity. In 2011, Italy's solar market was the world's largest, but that market has slowed due to the removal of subsidies.

Italy ceased granting feed-in tariffs for new installations after July 6, 2013, because its subsidy program had reached its budget cap--a limit of 6.7 billion Euros (\$8.9 billion) as of June 6, 2013. The law restricts above-market rates for solar energy a month after the threshold is reached. Without tariffs, the Italian solar market will need to depend on net metering (where consumers can sell the power they generate themselves to the grid) and income tax deductions for support.^{lv}

Italy also undertook other measures. In 2012, the government charged all solar producers a five cent tax per kilowatt hour on all self-consumed energy. The government also curtailed purchasing power from solar self generators when their output exceeded the amount the system needed. Those provisions were followed in 2013 by the government instituting a “Robin Hood tax” of 10.5 percent to renewable energy producers with more than €3 million (\$4.14 million) in revenue and income greater than €300,000 (\$414,000).^{lvi}

According to Italy's solar industry, the result of these and other changes has been a surge in bankruptcies and a massive decrease in solar investment.

Europe's Wood Consumption

Besides incentivizing wind and solar generation, EU is also consuming wood to satisfy its renewable mandate of 20 percent of generation from renewable energy by 2020. According to the Economist, wood, the fuel of preindustrial societies, represents about half of all renewable energy consumed in the European Union in some form or another—sticks, pellets, sawdust.^{lvii} In Poland and Finland, for example, wood supplies more than 80 percent of renewable energy demand. In Germany, despite its push and subsidization of wind and solar power, 38 percent of non-fossil fuel consumption comes from wood.

According to the International Wood Markets Group, Europe consumed 13 million metric tons of wood pellets in 2012 and its demand is expected to increase to 25 to 30 million tons a year by 2020. According to the National Firewood Association, the 2012 European consumption of wood pellets is equivalent to over 4 million cords of wood, which equates to over 4 million 'big' trees and over 8 million 'average size' trees.^{lviii}

Because Europe does not produce enough timber to meet this demand, imports of wood pellets are increasing. They increased by 50 percent in 2010. According to the European Pellet Council, global trade in wood pellets is expected to increase five- or six-fold to 60 million metric tons by 2020. Much of that will come from new wood-exporting businesses that are booming in western Canada and the southern United States. According to a report by Wood Resources International, the southern United States surpassed Canada last year as the leading exporter of wood pellets to Europe, exporting in excess of 1.5 million tons. Those exports are expected to reach 5.7 million tons in 2015. During the third quarter of 2012, three companies announced plans for new pellet plants in Georgia and six others were under construction in the south, together adding as much as 4.2 million tons of capacity by 2015.^{lix}

The increase in wood consumption has caused an escalation in prices. According to data published by *Argus Biomass Markets*, an index of wood-pellet prices increased by 11 percent, from 116 Euros (\$152) a metric ton in August 2010 to 129 Euros (\$169) a metric ton at the end of 2012. Since the end of 2011, prices for hardwood from western Canada increased by about 60 percent.^{lx}

Wood use in Europe, however, is not carbon neutral. In theory, if the biomass used to power electricity comes from energy crops, the carbon generated from combustion would be offset by the carbon that is captured and stored in the newly planted crops, making the process carbon-neutral. The wood that Europe is using produces carbon through combustion at the power station and in the manufacture of the pellets that includes grinding the wood up, turning it into dough and submitting it under pressure. The process of producing the pellets, combusting them, and transporting them produces carbon—about 200 kilograms of carbon dioxide for each megawatt hour of electricity generated.

A researcher at Princeton University calculated that if whole trees are used to produce energy, they would increase carbon emissions compared with coal by 79 percent over 20 years and 49 percent over

40 years and that there would be no carbon reduction for 100 years until the replacement trees have matured.

Europe's Natural Gas Supplies

Europe is worried about continually receiving the 30 percent of its natural gas supplies that it receives from Russia, but instead of embracing hydraulic fracturing and horizontal drilling on domestic soil, it is looking toward the United States to export LNG to them. According to a leaked document, the European Union is making its desire to import more oil and natural gas from the United States very clear in the discussions over the Transatlantic Trade and Investment Partnership (TTIP) trade deal. The EU is pressuring the United States to lift its ban on crude oil exports and make it easier to export natural gas to Europe. The EU emphasizes the TTIP's role in "reinforcing the security of supply" of energy for the member countries, pointing to the political situation in the Ukraine as a key reason to relax rules against U.S. exports. "The current crisis in Ukraine confirms the delicate situation faced by the EU with regard to energy dependence," the document states. "Of course the EU will continue working on its own energy security and broaden its strategy of diversification. But such an effort begins with its closest allies."^{lxix}

EU could start by developing its shale gas resources throughout its member countries. According to the Energy Information Administration, Europe has an estimated 470 trillion cubic feet of technically recoverable shale gas resources, around 80 percent of the U.S. estimated endowment of 567 trillion cubic feet.^{lxxii} As previously mentioned, Germany has proposed a prohibition against hydraulic fracturing through 2021. France, which has the second largest estimated shale gas resources in Europe, has a hydraulic fracturing ban through at least 2017 and Bulgaria also forbids hydraulic fracturing. Poland, which has Europe's largest technically recoverable shale gas resources at 148 trillion cubic feet, is interested in developing those resources, but has geology problems demonstrated by poor results from exploratory drilling. Several other European countries are now interested in developing their shale gas resources, such as the UK, the Netherlands, Denmark, and Romania, but none of the European shale-gas exploration efforts are close to being ready for commercial development.^{lxxiii}

Conclusion

As the Washington Post indicated:

"Cap-and-trade regimes have advantages, notably the ability to set a limit on emissions and to integrate with other countries. But they are complex and vulnerable to lobbying and special pleading, and they do not guarantee success."^{lxxiv}

The European Union has found this to be the case, for their cap-and-trade program did not achieve the intended targets, but made many companies wealthier which in turn resulted in higher energy prices for consumers. Other "green" energy programs have had similar results in producing higher electricity prices and large subsidies for technologies that contribute only small amounts to their countries' electricity needs. Countries that have enacted these programs have found them to be very costly and are now slashing those subsidies because the governments and the consumers cannot afford them.

It is unclear what benefit the EU and Australia's climate and "green" energy policies have achieved. Any reduction in carbon dioxide emissions that developed countries make will just be a "drop in the bucket" because total global greenhouse gas emissions will increase as China, the world's largest emitter of carbon dioxide emissions, and other developing countries continue to improve their economies by using fossil fuels. These developing countries believe it is their turn to develop their economies and to provide energy to their citizens, many of which do not even have electricity. As a result, they either refuse to participate in global climate change programs or have track records of not enforcing such programs.

The climate policies of both Europe and Australia have not only driven up their energy prices, but have also harmed their economies and reduced their security capabilities. Because Europe is dependent on natural gas from Russia, it has secretly asked the United States to speed up its review of LNG applications. Europe is clearly worried about further Russian aggression and availability of its natural gas supplies.

Australia has learned and repealed its carbon tax with Senate approval on July 17. According to Tony Abbott, Australia's prime minister, in releasing the news of the passage of the repeal legislation to Australia's citizens, "We are honoring our commitments to you and building a strong and prosperous economy for a safe and secure Australia."^{ixv}

Europe and the United States need to learn that energy security requires energy diversity. For example, during the cold spell in the U.S. Northeast this past winter, natural gas prices spiked because of lack of infrastructure. Lights were kept on due to the availability of coal and nuclear units. But many of those units are now being shuttered, which means that during next winter, the lights may go out in the Northeast.

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