

Natural Gas and International Relations: How Renewable Energy Creates Discord

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Introduction

The general public looks at renewable energy, and maybe even natural gas energy as green, as benevolent and tenably as peaceful resources. However, a high reliance on renewables typically creates a high reliance on natural gas as one of the few energy resources that can provide effective and reasonably priced backup power when needed, and indeed natural gas is one of the few fossil fuel sources for electric power that is tolerable to the general public in a green sense. Oil would be tolerable if it weren't so valuable for transportation. Nuclear power would be tolerable if it were not considered so dangerous. Wood and bio-fuels would be tolerable if the world's food supplies were not a concern. Coal is not tolerable although it is a cheap and reliable source of energy. The net result is that the world's energy portfolio is ever more dependent on natural gas which has international relations implications almost as powerful as oil has had in the past.

Energy Sources

Energy markets are dynamic. Energy supplies and energy customers are always changing, growing, or sometimes waxing and so you need a dynamic energy/ infrastructure system to be able to match the market players. Throughout most of the 20th century energy markets had a number energy sources available such as wood, wind, coal, hydropower, oil, natural gas and then later on nuclear and solar power. Most of these were flexible, dynamic and competitive sources of energy. Even when coal, nuclear and hydropower plants took years to build and payoff, and so were inflexible as far as dynamic energy markets were concerned, nevertheless they were still supplied by reliable, competitive or storable feedstocks and the power plant itself merged the production of power with the consumption of power into one regulated utility all of which reduced the energy security concerns. However, upon close inspection of the natural gas part of the market there was a slight problem in bringing together the energy producer with the energy consumer as the two parts of the supply puzzle were not only distant from each other but they required a dedicated connection not unlike an electric power grid.

Therefore, with natural gas there has always been a challenge of getting the gas from the numerous producers to the numerous consumers because of the need for a long pipeline or, in the later part of the century, a large liquefied natural gas (LNG) facility. The pipelines and LNG facilities, though, have natural economies of scale and so have always been natural monopolies. Well, the world already learned with

John D. Rockefeller that such natural monopolies can be bought out by one or another entity and made into a carrier monopoly, or at least a set of carrier oligopolies, which can force producers to sell at a low price even as customers at the other end pay a high price, and therefore most countries either own or control (regulate) natural gas infrastructure to reduce that kind of hostage taking.

Well, the words "dynamic market" and "government control" don't always go hand in hand and so natural gas, even as valuable as it has been, was not always available when and where it was needed. However, for much of the 20th century that was not a concern as coal, oil and oil's components of propane and butane as well as uranium were widely available. Plus, these energy sources were dense enough to be transportable by rail, truck or ship without the need of a lengthy pipeline, although pipelines did add alternative transport options, and the densities made them storable to some degree so that power plants could wait out many market disruptions and therefore they were dynamically competitive. So, the energy sources were mostly competitive, even with OPEC, and the transportation was competitive which meant that energy markets could stay fairly dynamic throughout the 20th century no matter how slow or how fast natural gas supplies could be brought in. As such, even if governments were slow to react on the natural gas side of the energy markets, by taking a long time to approve and permit pipelines and LNG facilities, well, no problem you could just use coal, oil or other energy sources.

In the 21st century, though, things have changed. While there is a high demand for electricity to power the new information technology age, nevertheless, concerns for global warming have made coal into a non-option. New nuclear power generation is all but shut down due to the Fukushima disaster, although nuclear should be considered more seriously. Oil, and even propane and butane are becoming too valuable to be used for electric power, although they are still used to fill in some gaps. All of which leaves unreliable wind power, solar power and even hydropower, where the Colorado river is in an 18 year drought, to fill the void, oh, and natural gas. Still, on a winter's day in the north, solar power is all but unobtainable at 5:00 pm, even as electric demand is at its highest, and on hot summers after dark air conditioning is going full blast again creating a renewable supply deficiency. Wind is useful if you are willing to work during the time it

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blows and rest when it doesn't. Storing the electric power is costly, and indeed renewable backup systems such as batteries can require dumping the complexity of the electric power engineering from the utility onto the consumer, an implicit cost of customer self management time and money that may or may not be adequately identified in backup cost analyses. Plus, long distant power connections can actually exasperate volatility by over supplying too much or undersupplying too little electric power at a given time, rather than diversifying the volatility. This leaves natural gas as one of the most important backup power sources and heating sources available and which is still tolerable to the general public's intensifying greenness. Mighty natural gas.

The Peculiarities of Natural Gas

On the surface relying on natural gas to fill the renewable void should not be a problem as natural gas sources look to be plentiful and natural gas pipelines and LNG facilities are relatively cheap as are combined cycle gas power plants. But it takes only a small perturbation to a given system to suddenly see bottlenecks and sinister supply plots as the 2000/2001 California energy crisis shows. Nevertheless, relying on natural gas is still a good option and backup systems can reduce such California style crises, plus regulators such as the U.S. Federal Energy Regulatory Commission (FERC) and other governments are doing their best to keep the natural gas markets competitive. Still, there is a kind of oligopoly of natural gas that is emerging and that threatens to undo this peaceful state of affairs. First, consider what a hard job the regulators have.

Typically, when governments regulate pipelines, they approve the fee structure which must be high enough to pay for the pipeline, but as low as possible so that more suppliers and consumers can hook up, i.e., they separate the transmission of the gas from the production and purchase of it. But if the pipeline's fee structure is too low, the pipeline could conceivably go broke and then another natural gas pipeline owner could buy that pipeline and soon, have market power over regional suppliers or regional customers. Even if the regulator caps tariffs, pipeline owners can show high costs and ratchet up the tariffs to make normal profits. So, to stop that from happening, regulators attempt to make sure there are ample supplies of natural gas at one end of the pipeline and ample demand for natural gas at the other end to ensure high throughputs so that the pipeline can keep tariffs low. Considering the complexities of planning, building and then running a pipeline, and considering the fact that you have to forecast supply and demand a decade or two into the future before you approve a project, and considering that it is difficult or expensive to have natural gas storage near the customer to mitigate variability, then regulating such an entity is no easy task where even a small change in tariffs creates a lot of

political turmoil.

It is the same idea for LNG facilities, that is the regulator does not want any individual LNG facility to have long periods of low capacity which could require high tariffs and as such make the LNG facility become uncompetitive on the world market or cause regional producers to receive reduced revenue. Therefore, each LNG facility needs ample throughput to pay for it and that means you need an assured demand such as a decades long contract or political assurances that consumer countries will buy your country's LNG. And, *voilà*, suddenly natural gas supplies are not market oriented at all, but politically oriented even if its private companies supplying, transporting and consuming the gas.

International Tensions

Most major natural gas producer states have either a strong national regulator, like the U.S.'s FERC, or a strong national natural gas company like Russia's Gazprom. Some say that FERC is nothing at all like Gazprom, but in reality it is all about government control and governments in competition with each other. Even if FERC does not propose, build or run new natural gas pipelines or LNG facilities, they end up being forced to advocate for them which means the U.S. government like Russia's government, like Australia's government, like Qatar's government, like Iran's government, like Turkmenistan's government, like Norway's government, like the Dutch government, etc. all push their pet projects at the expense of other producers. Furthermore, each of these governments gets pushed very hard by public opinion in their own countries where one LNG project or one pipeline project can make a huge economic boom for a small local economy and where that local region then has outsized leverage on the national government's international relations. So, even though the natural gas business can be a small percent of a country's overall GDP, nevertheless it can have outsized political leverage. If one small region tells its government to push for a natural gas project, and that government does not push hard for it, whether it's a liberal, conservative or single party government, that government then is criticized loudly; newspapers carry stories about it all over the globe, letters and tweets and on-line discussions proliferate and the government and its agencies and diplomats suddenly feel the intense pressure from their constituents.

Each government, then, is determined to obtain market share for its own natural gas industry which makes this the one commodity in the world that has governments competing against governments for being first to market. The governments that buy natural gas are interested in diversifying supplies but also in cheap supplies. So, they are also competing and negotiating. So it becomes government against government in the buying and selling of natural gas rather like 18th century mercantilism. Indeed, it is ironic

that the push to have consuming countries diversify their supply for political reasons actually increases their supply costs and reduces the feasibility of increasing the use of renewables for climate change mitigation, i.e., supply diversification for political reasons adds to global warming problems. Plus this government against government competition for LNG and natural gas pipelines seems to be intensifying as oil prices go up and global warming concerns for coal heat up.

Unfortunately, government against government competition leads more readily to conflict, threats of cut offs, embargoes and accusations of unfair competition leading to increased international tensions. So instead of possible war over oil in the future, we could see war over natural gas, and indeed may have already seen such with the Ukrainian crisis where one of the factors in that crisis was Ukraine not paying Russia for Ukraine's consumption of Russia's natural gas.

Alaska versus India

As an interesting example of counter political cultures of how natural gas can create international tensions look at Alaska and India. Alaska is a small state of less than 1 million people, but has nevertheless put a lot of pressure on the U.S. government into pursuing an Alaskan LNG project that would be less competitively priced than say a Russian far eastern project for supplying Pacific Rim gas. While most Americans are not concerned with the issue, such an LNG project is a boom to the local economy. And while such a project represents less than a hundredth of a percent of the U.S. GDP, nonetheless it induces a powerful country like the U.S. to spend at least some political capital pushing such a project.

By contrast, India is a huge country of over one billion people and yet they are mostly not in the natural gas competitive game. They tend to use coal and, even if they didn't have enough of their own coal, it is so competitive world wide that they could buy it from many sources with little if any government to government interactions, other than government to government concern for global warming. However, if India were to use renewables for a high percentage of their power, then they would need natural gas for backup power in which case they would join the government to government competition for natural

gas. So, India as a huge country tends to reduce international tensions by not using a lot of natural gas whereas Alaska, as a small producer, adds outsized tensions to international relations.

Interestingly, India's use of coal also takes advantage of the sunk value of its entire coal energy system that already has in existence coal mines, coal trains, coal trucks, coal fired power plants, and, what is often missed in energy discussions, a labor force already trained in how to use the coal infrastructure. Thus, if India were to change quickly to renewables and natural gas it would not only require a lot of costly energy investments, but it would also force India to give up its sunk value of existing coal infrastructure and coal related human capital and force India to change now when maybe a better more reliable power source, such as better nuclear power, could be right around the corner. That sunk value is an opportunity cost of immense importance, that many economists do not properly account for. For an emerging economy like India, that sunk value allows it to have more money for health care, education and infrastructure that can help India to grow economically, although India may benefit using more clean coal technologies.

Conclusion

Global warming issues are important, there is no doubt about it. Nevertheless, the challenges of using renewables are under appreciated. Most renewable advocates emphasize how cheap and easy it is to use renewables, never mind the incredibly complex engineering, economic and political challenges of integrating renewable systems into our existing industrial society. Solutions to energy challenges need to be realistic and less one sided rather like Shell Oil's World Energy Expo 2017 exhibit "Energy Lab" in Astana, Kazakhstan where there was a discussion of having a diversity of energy solutions, as opposed to most of the country exhibits that emphasized renewables. If anything can create conflict between countries, energy can, and now that oil is becoming expensive, and may soon become more expensive, then natural gas could be the next center of conflict. However, because natural gas supplies are lumpier than oil, coal or at times even uranium, then the national security implications of natural gas could strain international relations.



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