



Climate and power: ending the oil age?

by Gerald Stang and Balazs Ujvari

Decarbonisation will not be easy. While necessary for the climate in the long run, working through the costs and benefits of going green now is a domestic economic challenge with strategic implications for the world's leading powers. Each country thus approaches international climate talks with the goal of ensuring that they come out as far ahead as possible. As such, the 21st Conference of Parties (COP21) in Paris is a key moment for developing an international framework for moving forward on climate issues. What factors will influence their efforts to cut out carbon and adapt to a changing planet?

Decarbonisation and competitiveness

The primary decarbonisation challenge is about overall economic competitiveness. A transition from a high- to a low-carbon fuel mix generally incurs high technology costs and, therefore, higher energy charges. However, if accompanied by smart policy choices, decarbonisation has the potential to underpin rather than undermine the competitiveness of the economy, particularly for fossil fuel importers.

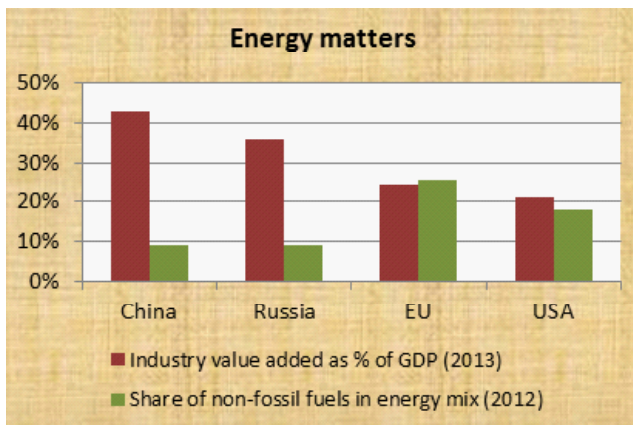
The EU has repeated its commitment to adopting a greener economic model and pledged to reduce greenhouse gas emissions by at least 40%

below 1990 levels by 2030. With emissions having dropped by 23% since 1990, the EU will be pressed to make good on this pledge while maximising economic competitiveness. Among other efforts, the EU is pursuing a €315 billion plan to increase investment and improve economic competitiveness, in part based on expanded renewable energy use and improved resource efficiency.

Translating targeted investments into improved competitiveness, while respecting environmental considerations, is a challenging project for a recovering continent that has seen decarbonisation proceed in lockstep with deindustrialisation. Moreover, since central and eastern Europe continues to depend more on coal, fulfilling the 40% reduction target will also hinge on the availability of intra-EU support for switching to cleaner energies and finding improved efficiencies.

In contrast to the EU, China's promises for 2030 – to max out its carbon emissions and have 20% non-fossil fuels in the energy mix – are seen as marginal change from a 'business-as-usual' scenario. Beijing has been improving its energy efficiency for decades, but continued rapid expansion of its energy-hungry economy has resulted in skyrocketing emissions. Industry still accounts for around 70% of final energy consumption (as





Data sources: US Energy Information Administration (EIA), European Commission, World Bank.

opposed to 26% in the EU), and 87% of the country's energy is derived from coal and oil. The recent experimentation with provincial carbon taxes, regional carbon trading schemes, and renewables investments (which surpassed both the EU and US in 2013 and 2014) shows Beijing's interest in changing its energy system. But despite increasing ambivalence towards coal, China remains hesitant to pursue rapid changes for fear of hampering its economic competitiveness or of disrupting domestic coal users or producers.

Russia, which has proposed cutting emission to 75% of 1990 levels by 2030, is in a similar situation: it is reluctant to veer from a 'business as usual' trajectory for its industry-heavy economy, which relies almost exclusively on fossil fuels (91%). Nonetheless, with an estimated 80% of the infrastructure in its carbon-intensive industries more than 20 years old, linking decarbonisation to industrial modernisation and diversification could act as an incentive. More effectively pursuing energy efficiency improvements could also result in more energy for export.

The US may be the world's second largest CO₂ emitter but has a diversified economy – with industry accounting for barely 20% of GDP – that is widely viewed as flexible enough to remain competitive through a green shift. The biggest hurdles to reaching its decarbonisation goal (CO₂ emissions at 26%-28% below 2005 levels by 2030) will be in reforming its transport sector (31% of emissions) and its coal-dominated electricity generation sector (37% of emissions).

Green growth

Smart decarbonisation can also generate green growth. Intelligent investment in energy efficiency, green energy generation and grid infrastructure

will eventually generate fuel costs savings, and potentially generate jobs. Maximising the benefits from the transition, while minimising the costs, requires a well-timed and well-distributed balance of taxes, subsidies, regulations, public investments and industrial exemptions. Considering, however, the world's wide range of capacities and interests in pursuing industrial policies (ranging from laissez-faire to centrally planned), going green will be a highly uneven process.

In recent years, Europe has taken the lead in renewable energy investment with \$436 billion (including R&D) invested between 2010 and 2014. It is followed by China which has allocated some \$297 billion and the US with \$238 billion. In fact, the EU plans to spend 20% of its 2014-2020 budget on climate-related issues. Green industries can benefit from government support and take a lead in domestic markets, endowing a few first movers with technical expertise and cost advantages, and boosting technology exports.

Competitive advantages can dissolve quickly, however, as rapid changes in technology, costs and regulatory environments cause uneven shifts in market fundamentals. Germany's market share in the global solar photovoltaics (PV) industry, for instance, fell sharply from a peak of 22% in 2007 to just 2% in 2013 due to China's rapid expansion into the market. From less than 10% of global PV cell production in 2005 to 63% of a much bigger market by 2013, China claimed to have created nearly a million jobs in the sector, while Germany lost tens of thousands.

Decarbonisation efforts even have their own built-in braking system, with each demand-driven drop in fossil fuel prices making it relatively more expensive, and less easy politically, to decarbonise further. This adds uncertainty to decarbonisation timeframes and highlights the need for smart planning and flexibility in managing a green shift.

The geopolitics of decarbonisation

The world has a carbon budget. Proven global fossil fuel reserves contain two to three times more carbon than the world can burn and still have even chances of keeping global warming below 2°C by 2100. Most fossil fuels are used where they are produced, with only 25% of the world's oil and gas and 15% of its coal crossing national borders. Thus, phasing out coal – the dirtiest fuel with the largest reserves – will involve domestic economic change in many countries. For even

the largest exporters, however, coal rents do not drive the economy. Similarly, most gas exporters (bar Qatar) earn far more from oil exports than from gas. Thus, it is the ending of oil, in particular, which will have the largest geopolitical impacts.

Today's low oil prices may hint at who will struggle as the world decarbonises this century. Saudi Arabia weathered the latest plunge in prices by opening its taps in 2014, aiming to simultaneously squeeze out high-cost producers, hit the pocketbooks of competitors such as Iran and Russia, and extend the oil age by exacerbating the cost differential for investing in greener options. Saudi Arabia is losing more income than any other exporter, but with deep pockets and low production costs, it can ride out a few years of low prices.

Others with shallower pockets and shakier regimes – countries such as Libya, Iraq, Algeria, Oman and Venezuela – are already struggling. Russia and Iran both suffer from international sanctions as well as low oil prices, but despite being highly reliant on oil income, have sufficiently diverse natural resources, as well as human and industrial capital, to diversify significantly when pressured over the long term.

The global economy will be a winner from lower fossil fuel prices, as evidenced by past price cycles. Decarbonisation will also prove a boon for the energy security and pocketbooks of oil importers (the EU, China, India, Japan and most of the developing world). Countries that switch to renewable and nuclear energy, invest in energy efficiency, diversify their fuel mixes and reduce dependence on imports will improve their balance of payments and decrease their vulnerability to price shocks and geopolitical risks.

For the US, its gas independence and declining oil import dependence will grant it increased freedom of manoeuvre on the international stage (oil increasingly comes from domestic sources or immediate neighbours). In the second half of this century, this freedom from expensive ties to exporters will extend to other states and regions, including the EU and China.

Finally, as oil and gas gradually become less attractive in the decades ahead, the problematic aspects of global resource competition – from propping up unsavoury oil regimes to spats over oil-rich territory – may also diminish. In the South China Sea, for example, the rivalry over disputed islands and reefs may play out quite differently if the oil and gas predicted to lie under the sea bed is less attractive.

Climate finance – a big deal?

Will the costs of slowing and adapting to climate change be geopolitically important? The answer depends on what it will cost to cut emissions, how much investment is required to adapt to climactic changes, and who is going to pay for it all.

The International Energy Agency (IEA) has estimated that \$44 trillion in additional low-carbon investments will be required by 2050 to keep global warming below 2°C by 2100, but with fuel savings more than offsetting these additional costs. No decent estimates for climate adaptation are available, with much investment and effort closely tied to basic economic development. Global adaptation costs are likely to far exceed

the mitigation costs, but will depend on the severity of impacts and the vulnerability of populations for decades ahead – both still highly uncertain.

Private sources constitute the majority of climate finance and this dominance is expected to grow as governments seek to incentivise invest-

ment from markets rather than rely on stretched public budgets. Climate finance is estimated to amount to around \$350 billion per year (half from OECD countries), though with major data gaps and definitional uncertainties.

Most funding goes to mitigation, particularly to renewables, with considerably less to climate adaptation. An estimated three-quarters of this money is invested domestically, leaving less than \$100 billion per year in international climate finance. This sum is dwarfed by total global foreign direct investment (varying between 1.3 and 1.9 trillion since 2007), so cross-border com-

petition for climate investment is still relatively limited.

But as efforts to green the global economy ramp up, there will be increasing interest in getting a slice of the climate finance pie, with competition between recipient countries, between companies, and even between international finance institutions anxious to be the decision centres for new spending.

The hot challenges of a warming planet

While modelling of future regional and national climate impacts is difficult, a few key trends can be discerned, with serious consequences for agriculture, economies and national security. Temperatures will continue increasing in all regions, causing longer and more frequent heat waves. Low-lying coastal regions will increasingly be threatened with flooding, erosion and loss of wetlands later this century. While Europe and North America will be affected, impacts are predicted to be more severe in parts of Africa, the Middle East, Central Asia, South Asia, and China, with potentially significant changes in rainfall, agricultural production, and the frequency of extreme weather events. Hence, considerable challenges are expected for many of the parts of the globe that already struggle with poverty, instability and limited resilience to handle disruptive change.

India and China are the global powers predicted to face the most significant impacts, at home and in their neighbourhood, which may be exacerbated by their poor water management at home and uneasy relations with their neighbours. While Europe has clearly been affected by the troubles in Syria and the Sahel, both partially influenced by local droughts, the Mediterranean Sea and the EU's immediate neighbours to the east and southeast are still buffers from areas expected to be hardest hit.

Russia has multiple neighbours in the Caucasus and Central Asia with brittle politics and history of conflict that are expected to struggle with climate change impacts. The US, shielded by two oceans, is less likely to be impacted by regional climate-related migration, instability or security challenges, though its global military footprint and security alliances ensures that it will still be affected and called to play a role.

That said, this brief mapping of potential sources of instability in the decades ahead must be taken with a pinch of salt – so much is uncertain,

including the pace of human adaptation relative to the pace of climate change – but it is very likely that climate risks will play a growing role in economic and security planning for many states.

Environment, energy and economy

Climate change is not yet a transformative issue for great power politics. It remains an issue of commons management, with responses driven primarily by domestic considerations. Apart from the clear split between fossil fuel exporters and importers, there is no answer for the question of which countries are positioned best to manage decarbonisation. The COP21 process, with its nationally determined contributions, is explicitly designed to allow countries to manage decarbonisation in a way that works best for them, intentionally seeking to avoid having losers from the process.

As the move toward flexible bottom-up approaches in international climate negotiations incite more countries to take climate change seriously, the EU can play a key role in helping them connect their energy, climate and development strategies. This can also serve to counteract the expansion of unsustainable development models promoted by Moscow and Beijing. China will be a particular challenge: if it is to develop a better model for the rest of the developing world to emulate, the right mix of pressures, incentives and engagement will need to be employed.

Europe will be best equipped to face the climate challenge and convince its global partners if its climate action goes well beyond the realm of environmental policy and mobilises the full support of the energy, trade and industrial sectors. Despite several years of economic troubles, the EU is still the leading model for how to create wealth while protecting its environment and the health of its citizens. The challenge for the Union will reside in understanding better how to incentivise its partners and competitors to follow suit.

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