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Perspectives on the Development of Renewable Energy Sources in the U.S.

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The U.S. administration's policy on renewable energy sources (RES) is ambivalent. President Donald Trump says he wants to defend American innovation and jobs, but his support of fossil fuels and abandonment of ambitious climate policy hinders the development of the RES sector. The administration's higher tariffs on foreign solar panels is supposed to protect domestic producers of solar cells and panels but could put a drag on growth of the industry in the U.S. Although further development of renewable energy in the United States is inevitable, China's dominance in the sector will grow.

RES in the U.S. Economy. The development of RES accelerated in the U.S. after 2008, driven mainly by a decrease in installation costs. By 2016, the share of RES in electricity generation increased from 9% to 15%. This growth was mainly in wind (from 1% to 6%) and solar (from almost 0% to 1%). Since 2010, renewable technologies constitute most of the new investment in the energy sector, and since 2008, 7 GW of new capacity annually is coming just from wind farms. Between 2008 and 2016, these changes and the development of gas led to coal losing its top spot as the primary fuel for electrical generation, down by 18 percentage points (pp) (see Figure). As a result, U.S. CO₂ emissions in the energy sector were reduced by 23%.

This trend did not change for the first 10 months of 2017. Compared to the same period of 2016, the share of wind energy in electricity production increased by 0.8 pp and solar by 0.5 pp. There also was growth in the number of employees in the RES sector. In 2016 in the U.S., about 780,000 people worked in the industry, accounting for 38% of all employment in the energy sector. The largest number of jobs were tied to solar energy (an increase of 25% compared to 2015), reaching 374,000, although many of these jobs are connected more to the installation and maintenance of equipment than to their manufacture.

According to Bloomberg New Energy Finance, total U.S. investment in clean energy technologies in 2017 amounted to \$56.9 billion (1% more than in 2016). However, this was less than half the total Chinese investment, which reached \$132.6 billion (increasing by 24% from 2016), or 40% of global expenditures on these technologies. The U.S. total investment was higher than Germany's (\$14.6 billion, down 26% from 2016) or the British (\$10.3 billion, 56% lower than in 2016). China dominates not only in total investment but also in global manufacturing. The country accounts for about 60% of global photovoltaic-panel production while the U.S. and Canada has about 6%.

Determinants of RES Development. The most important factor supporting the development of renewable energy in the U.S. has been the decline in the cost of energy production with these technologies. In 2009–2016, the average cost of electricity generated by wind turbines dropped by 66%, and by photovoltaic panels by 85% (excluding subsidies). This has made RES competitive against conventional energy resources, mainly coal and partly also gas. The profitability has led to the spread of investment in the sector, even to

states with strong fossil-fuel sectors like Texas, which became the leader in non-hydro renewable energy generation in the U.S.

The second factor helping the development of the industry was federal and state policy. In contrast to the EU, no RES targets in the energy mix have been set at the federal level. However, after the oil crisis of 1973, green technology began to be perceived as beneficial to U.S. energy security because they reduced dependence on imported fossil fuels. Since then, and especially since the late 1970s, administrations increased financing of related R&D, including in RES and energy efficiency (in 1978–2014, this amounted to \$42 billion, of which 35% came in 2005–2014). In the last few decades, renewables could also count on federal subsidies (investment and production tax credits). Policies focused on the reduction of greenhouse gas (GHG) emissions also promoted low-carbon sources such as wind and solar.

Support is also provided at the state level through financial incentives (real estate tax credits or accelerated depreciation) and regulations, e.g., Renewable Portfolio Standards, determining the target of the share or amount of energy from renewable sources that should be sold on the market by public utilities.

Shift in Policy towards RES. The increased competitiveness of renewables started a debate on limiting subsidies for the industry. Some of the federal tax incentives are to expire by 2021. What is more, the recent tax reform in the U.S. (which also cut the corporate income tax rate from 35% to 21%) includes a measure called Base Erosion Anti-Abuse Tax (BEAT), which aims to prevent international investors from reducing taxable income by moving some of it outside the U.S. However, BEAT also makes it more difficult for large international companies to claim tax credits on renewable investments—to 2025, only 20% of the tax credits will be subject to BEAT, but after 2025 it will be 100%. In turn, international consortia investing in RES in the U.S. will benefit less from the tax breaks.

The situation for renewables is worsened by the administration's break with the GHG emissions-reduction policy at the federal level, specifically the likely repeal of the Clean Power Plan and U.S. announcement it will withdraw from the Paris Agreement. Moreover, the Trump administration has favoured the mining and extraction sector by, for example, cancelling regulations obliging gas and oil companies to report methane emissions. In the draft budget for FY2018, the White House proposed reducing funds for clean technology R&D by 70% (Congress has not approved the budget yet), and for FY2019, the presidential proposal envisions another 65% reduction.

The U.S. tariffs imposed in January on foreign-produced photovoltaic panels and cells may have a significant, negative impact on the development of solar energy in the country. The tariffs range from 30% of the value of the equipment in the first year to 15% in the fourth year (the first 2.5 GW produced by the devices will be exempt from duty), which will reduce the profitability of installations using these panels or cells. Although the tariffs were intended to protect domestic producers, it seems that this action alone is not enough to effectively support them in global competition.

Opportunities for Renewables. The declarations by the Trump administration of an end to what it calls “the war on coal” are a sign of the small lobbying power of the RES sector in comparison to fossil fuels. However, given the growing importance of the RES industry, Trump is not completely negative with respect to it. In highlighting job creation in the industry and in announcing the withdrawal from the Paris Accord, he has talked about U.S. leadership on environmental issues. The administration also has proposed facilitation of offshore wind farms (the possibility for an investor to delay the choice of technology).

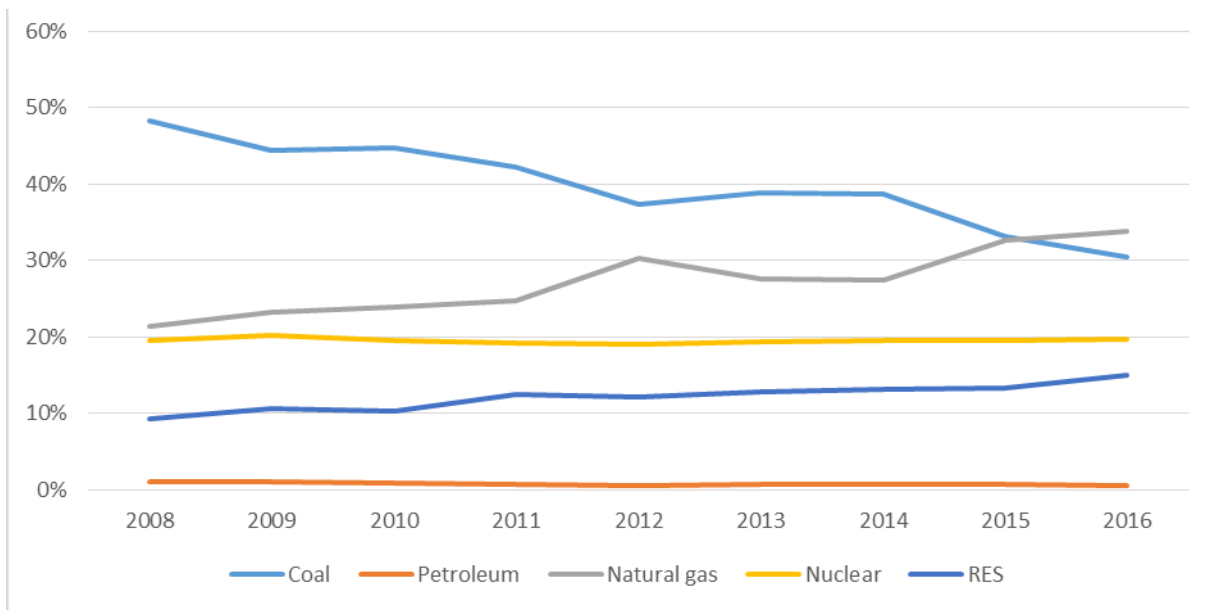
At the same time, as the federal authorities act unfavourably toward the RES sector, that has stimulated a reaction at state and local levels, where the emphasis is put on clean technologies. Initiatives that unite states and cities to cooperate on climate policy have emerged, including the United States Climate Alliance. States like California and Washington promote investment in technology research and renewable energy installations and have set emissions reduction targets. This means policy shifts at the federal level are partially offset by decisions at lower levels.

Decisions taken within the energy sector itself will be crucial. The split between Republican and Democrat politicians, as well as global trends, will make businesses unwilling to take risky long-term decisions, such as investment in coal, with price the most important decision-making factor.

Conclusions. The Trump administration's ambivalence towards the RES sector means its actions may not lead to a distinct change to the industry; however, they will hamper the development of clean-energy technologies. The states instead will play a more important role in creating favourable conditions for investment in low-emission technologies. With the divergence on climate policy between state and federal authorities, the U.S. will be unable to develop long-term emissions reduction plans that would put pressure on the faster development of RES. The lower predictability of pricing for businesses, resulting from the lack of coherence in economic, climate and energy policies, will make it more difficult for American companies to compete on global markets, thus further increasing the gap between the U.S. and the manufacturing and investment leader in the clean technology sector, China.

Figure

Electricity Net Generation in the U.S., 2008–2016 (%)



Source: U.S. Energy Information Agency.