



Rabobank

Rabo on Renewables

Q2 2013—Rabobank Outlook

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What to watch?

Global

The continued slow pace of new investments in renewable energy seen in Q1 this year masks some strong signals of support. While some were quick to suggest the boom in United States' (US) shale gas production would mean the end of US support for renewable energy, this has not been the case. Although new investments have slowed, mainly as a result of adjustments in the Production Tax Credit support regime, political support for renewables is growing. US President Obama's latest budget proposal includes a marked increase in renewables support, which, if passed by Congress, is expected to result in an increase in renewables investments over the coming years.

China also continues to actively expand its renewable energy base, with solar PV and wind both expected to continue growing strongly through to 2015 and beyond. The combination of energy security, local economic development and air quality concerns are the key drivers for China's ongoing investments in renewables.

In contrast, the overall outlook for renewables in Europe is less positive. While the European Union (EU) continues to set high levels of ambition, including mapping out a route to renewables taking a 30 percent share of the energy mix by 2030, progress is currently lagging targets in many EU Member States. This has been compounded by the EU's inability to resolve the current over-supply of permits in its Emissions Trading System (ETS); this issue has become a bellwether for political support for the EU's clean energy transition. With the EU Parliament failing to support a proposal to lift the ETS carbon price in mid-April, support at the EU level appears fragmented and progress on the clean energy transition, particularly on renewables, is more likely to result from strong direction and action being set at the Member State level.

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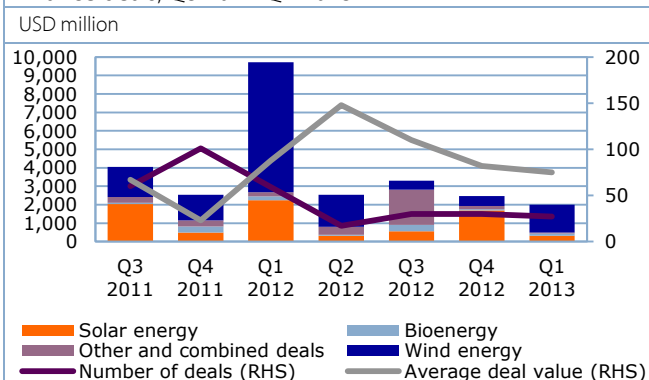
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Renewable energy asset deals

The quarterly investments in the global renewable energy industry seem to have stabilised at around USD 3 billion in the past one and a half years, with the exception of Q1 2012, when several billion dollars were spent on US wind farms (see Figure 1). A surprisingly large share of the completed financing deals in Q1 2013 involved European or North American investments (70 percent), and the share of Asian deals was expected to increase more markedly. But Chinese and Indian investors have the rest of the year to make up for their slow start. Wind farms took most of the invested capital this quarter, especially because USD 450 million was secured to finance a 300MW wind farm in Morocco, in what will be Africa's largest wind farm. A USD 15 million grant was used for another landmark renewable energy investment: a wave energy power plant of 86MW, which will be built in the United Kingdom (UK). More than half of the deals were set up using a project finance structure, while the use of grants and tax equity financing has been lower compared to previous quarters.

Figure 1: Value of completed renewable energy asset finance deals, Q3 2011–Q1 2013



Source: Rabobank, based on GlobalData, 2013

The EU

European Commission launches discussions on 2030 targets

The European Commission (EC) has officially kicked off the process to determine EU-wide energy targets for 2030. In March, it published a 'green paper' to inform a discussion among stakeholders that will run until mid-year. On the agenda is, among other things, the level of ambition that the Member States should have in 2030 and the type of targets that could be implemented.

The EC wants to make swift progress in setting new targets as the 2020 targets do not provide investors with the long-term certainty they need to stimulate renewables growth, or, in the words of the European Commissioner for Energy, Günther Oettinger, ‘2020 was yesterday for investors’.

Renewable energy developers may take confidence from the fact that the green paper still refers to the long-term energy and ‘low carbon’ roadmaps adopted by the European Parliament in 2011. The objective of these roadmaps is for the EU to reduce greenhouse gas emissions by 40 percent in 2030, in order to meet the long-term goal of reducing emissions by 80 percent to 95 percent by 2050. In addition, the roadmaps state that the EU should increase the use of renewable energy to 30 percent by 2030.

The scope of longer term ambition for renewables in Europe is being defined in this process—draft 2030 targets will be published this autumn. The renewables industry will then need to assess the extent to which these EU level targets will be taken up at the Member State level.

Chinese panels registration distorting the installation market

The EU is actively considering imposing an import duty on Chinese solar PV panels. The US imposed an import tariff on Chinese panels last year, stating that Chinese solar manufacturers are benefiting from unfair subsidies. While the EU is still investigating the case, as a precautionary measure, last month, the EU ordered its Member States to register Chinese imports. This measure implies that the implementation of an actual tariff has become more likely.

European installers and distributors of solar PV panels oppose the tariff as they expect demand will fall sharply, forcing them to buy the generally more expensive equipment alternatives, which will impact consumer demand. They argue that the proposed measure could cost the EU up to 242,000 jobs (mainly in engineering and panel installation) and that global competition is needed to ensure that the cost of solar power continues to decline, as it has over the last three years. A further decline in cost would also help the EU meet its renewable energy targets. It is unlikely that such a loss of installation jobs would be compensated by growth in the local PV manufacturing industry. Although an import tariff could help European solar PV manufacturers, in reality it would come too late for many of them.

The fact that China announced retaliation measures adds another dimension, but the Chinese government has decided to not pursue its case against polysilicon imports from Europe, the US and South Korea. This decision was most likely driven by practical reasons: China’s polysilicon manufacturing sector already experienced a shake-out in 2012, and its panel manufacturers would be hurt by higher prices.

The EC now has until December to impose definitive duties on imports from China. Over the next few months, it will become clear whether importers of Chinese PV panels succumb to doubt, and tap less of the EUR 21 billion export market that Chinese panels represented in 2011.

Dutch national energy plan expected before summer

The Social and Economic Council of the Netherlands (SER) is currently working with the energy industry and other stakeholders to develop a plan for a new sustainable energy strategy. The plan is intended to lead to new long-term goals in the areas of energy efficiency, renewable energy, climate change and job creation,

along with recommendations for an improved enabling environment to achieve the goals. Dutch policy makers tend to be influenced by the advice of the SER, often translating it into national policies, especially if agreements have already been reached with stakeholders. The national energy plan aims to set out policies that last longer than the (typical) four-year term of Dutch governments.

Recently, the industry organisations of grid operators and energy producers jointly submitted their ideas. They made a strong case for socialising the cost of the required investments. They consider this a necessary step towards developing, for instance, a smart grid, onshore and offshore wind, and the transport of green gas.

We will soon know if the SER has listened to their suggestions, as the SER’s findings are expected to be submitted in the summer. They could create a new sense of urgency to increase renewable energy investments in the Netherlands.

Merkel not yet able to cap increasing energy prices

German Chancellor, Angela Merkel, has not yet succeeded in protecting German energy consumers from increasing energy prices. In the latest discussions on the *Energiewende* [energy transformation], a measure that would soften the annual increases in energy prices was put forward, but the states and the government failed to reach an agreement. The proposed measure was to reduce subsidies by 1.5 percent for existing renewable electricity producers. The idea was heavily criticised by politicians and renewable energy plant owners.

Now, Merkel is betting on another measure to cap price rises for households, which is to increase the Renewable Energy Act (EEG) surcharge for large energy consumers. The EEG surcharge is a contribution that effectively pays for the renewable energy subsidies. At the moment, some large energy consumers have obtained a partial or full exclusion from this surcharge. In the new proposal, they would lose this privilege, and smaller consumers would be relieved from some of the pressure of contributing to the annually increasing EEG budget.

The lack of agreement means that Merkel still does not have a positive message on German energy prices, but she might not be punished for that in September’s elections. Merkel herself has said that the revision of the EEG is part of Germany’s task after the elections.

Americas

New US energy nominees will chart energy policy direction

With the nominations of Ernest Moniz to head the Department of Energy (DOE) and Gina McCarthy to lead the United States Environmental Protection Agency (EPA), the discussion on the direction of US energy policy over the next four years is starting to take shape. The central questions are how the new administration will strike a balance between capitalising on shale gas resources, cleaning or retiring old coal-fired power stations, and continuing to support renewable energy. In the short term, Moniz, who has said he is a supporter of further shale gas exploration, and McCarthy, who comes from within the ranks of the EPA, are not expected to diverge much from the course already set by their predecessors in the DOE and EPA.

Since expressing his administration’s commitment to renewable energy in his State of the Union address earlier this year, US President Obama has continued to emphasise the government’s long-term support for the country’s renewable energy ambitions. In

March 2013, as part of his second-term energy agenda, Obama proposed to increase the percentage of renewable electricity from 10 percent in 2012 to 25 percent by 2025—a CAGR of 9 percent, driven by an extension of the Production Tax Credit (PTC) for five years. In addition, a proposed economy-wide cap-and-trade programme is planned to reduce greenhouse gas emissions by 80 percent by 2050.

Renewable energy project developers can look forward to 2014, as Obama has proposed an increase in clean tech spending, including renewable energy, of 40 percent over current levels.

Asia

China sets new energy objectives

As part of its 12th Five-Year Plan, China published new energy targets in January of this year. The targets cover energy efficiency, renewable energy and conventional energy ambitions. Renewable energy and energy efficiency are to grow in an effort to help domestic equipment manufacturers as well as to limit air pollution. The target for solar PV capacity in 2015 was initially set at 21GW, but it has since been increased to 35GW. However, it is expected that local governments will stimulate capacity growth even further and that 40GW of solar capacity could be reached in China by 2015. Other renewable energy sources, such as wind and biomass, are also important targets in the five-year plan: by 2015, wind capacity is to increase to 100GW, while biomass-fired power plants should reach a capacity of 13GW in 2015 and 30GW in 2020. At the end of 2012, wind capacity stood at 75GW, while biomass power capacity was 5.7GW. The planned five-fold increase in biomass energy will require significant development of biomass companies in the coming years in China.

Bankruptcy of Suntech—A surprise to few

In March, Chinese banks lost patience when Suntech, one of China's largest solar PV manufacturers, was unable to make payments and filed for bankruptcy. Suntech had been recording losses for several years already, so its bankruptcy came as little surprise. It is possible that other big Chinese PV manufacturers will follow Suntech. Chinese solar companies have operated with high debt ratios to enable growth, and now the global PV market is faced with substantial overcapacity. Global solar PV manufacturing capacity has reached 60GW, while demand forecasts for 2013 add up to just 37GW. For the same reason, despite its relatively large size, the impact of Suntech's bankruptcy on the market is expected to be limited; its production volume represents only a small fraction of global capacity.

Oceania

Australia reconfirms 20 percent renewable target

The Australian government has endorsed the findings of the Climate Change Authority's review of the national renewable energy target; it will maintain the target of 41,000GWh of renewables generation by 2020. This would equate to renewables making up 20 percent of the country's electricity mix. In addition, the government will lengthen the time between future reviews of the renewable energy target from two to four years, and will reward small-scale renewable energy systems beyond 2030.

Questions over the target level may come to the foreground again at the national election in September. The opposition, which currently leads in the polls, has argued that a reduction in energy demand in recent years means the fixed renewable energy target

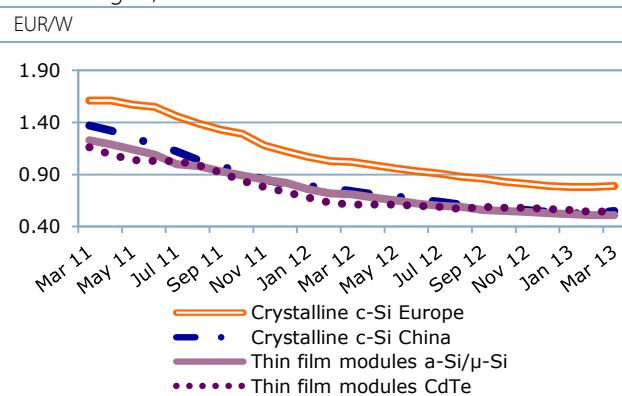
could overshoot the 20 percent ambition level. Australian power suppliers claim that shares of 25 percent of renewables in the electricity mix would lead to higher costs, greater transmission investment needs and reduced system reliability. The opposition also favours biennial reviews of the renewables target scheme.

Cost developments of renewable energy technologies

Solar PV module price decreases take a rest

Clearly, solar price decreases are stalling at the moment (see Figure 2). We see several contributors to this trend. Firstly, an end to the steep fall in polysilicon prices, which started in the last quarter of 2012. In addition, the solar trade wars—with import barriers on Chinese solar panels imported into the US and EU—are distorting markets and thus likely affecting pricing. Furthermore, it might be that the increasingly restricted capital investment capacity of the major module manufacturers—as price declines are biting—is starting to play a role. These price declines are not yet reflected in a compensating demand increase, as the markets are driven by policies, not by price elasticity. Adapting renewable energy policies to gain a bigger share of less expensive solar takes time. Industry forecasts are generally for another year of growth in global installations in 2013, with Bloomberg New Energy Finance (BNEF) projecting over 20 percent growth in new installations, claiming its past 'optimistic scenario' has consistently come out as the realistic scenario. With prices likely to continue their downward trend, albeit at a slower rate, total market size in value terms is expected to show little upside in 2013. However, we do expect market volume as well as sales growth to increase again in 2014.

Figure 2: Average spot price for solar modules, selected technologies, Mar 2011-Mar 2013



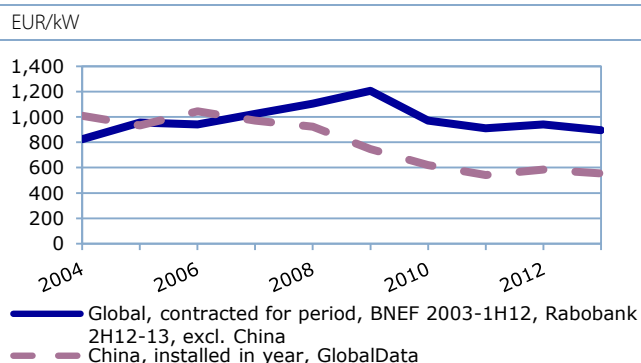
Source: Rabobank, sologico.com, 2013

Wind turbines: Old stock weighs on prices

Wind turbine prices, as polled by BNEF (excluding China), have declined 6 percent YOY for contracts scheduled for delivery in 2H 2013 (see Figure 3). The considerable stock of older models with rapidly declining prices is weighing on the market. Rabobank expects the current significant turbine supply overcapacity to remain in place for the next few years as market characteristics have been altered. Annual global new installations increased from 12GW in 2005 to 46GW in 2012, but the market is expected to remain more or less flat between 2013 and 2015, hovering around 45GW, with offshore wind the only area of growth. This will likely be caused by a less favourable financing environment, subsidy cutbacks in Europe and a shift in focus from wind to solar in China and other markets. We continue to expect a further decline in the

health of the wind turbine manufacturing industry, unless substantial capacity exits materialise in the coming two years.

Figure 3: Average global and Chinese wind turbine prices, 2004-2013



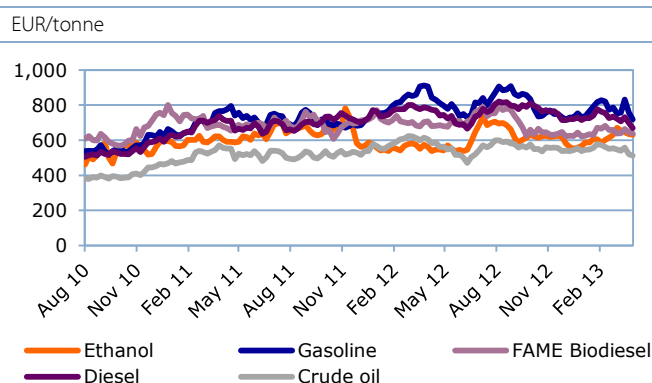
Source: BNEF, GlobalData, Rabobank, 2013

Steady biofuel prices in EU, RINs rising in US

Biodiesel and ethanol prices remained flat in Europe in the past quarter (see Figure 4). The reduced feedstock costs for biodiesel producers were not large enough to create a profitable margin for the average producer. In addition, revenues from glycerine sales were also lower because of weaker demand for the by-product. The good news for European fatty acid methyl ester (FAME) producers comes from the extension of the registration period for biodiesel imported from Argentina and Indonesia. An update on whether duties will be levied on imports retroactively is expected in May this year. Currently, the Argentinean biodiesel sector is suffering from this measure as traders are hesitant to import biodiesel from the South American country, which is the world's third largest producer.

In the US, the Renewable Identification Numbers (RINs) are attracting all of the industry's attention. Buying RINs, which are effectively ethanol credits, is a way for refiners to meet mandated ethanol blending levels, without physically blending ethanol in their transport fuels. Blending sufficient ethanol has become more challenging as demand for gasoline declines and there is a maximum percentage of ethanol in gasoline that gas stations can handle. As a consequence, credit prices have increased nearly tenfold since January.

Figure 4: Prices of selected fuel commodities, Aug 2010-Mar 2013



Source: Bloomberg, Rabobank, 2013

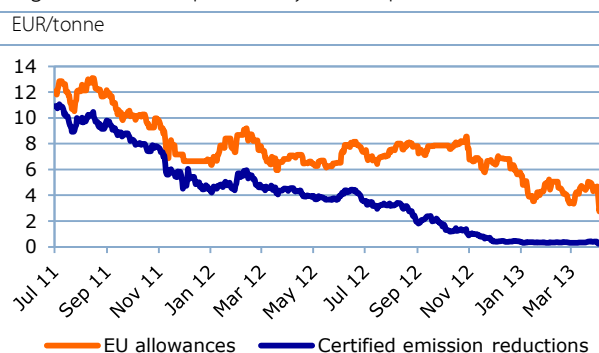
Principle over pragmatism keeps carbon down

Carbon prices continued their lull during Q1 2013, a trend that looks set to stay, with the EU Parliament failing to support the EC's back-loading proposal in mid-April. This proposal would have reduced permit supply in coming years as a way of pushing up the carbon price, which has fallen to levels below EUR 5 per tonne CO₂-equivalent, where it is unlikely to influence investment decisions. Global carbon offset permits under the Clean Development Mechanism are also expected to remain close to zero (see Figure 5).

The outcome of the EU Parliament's vote surprised most analysts; while the result was expected to be close, few had predicted defeat for a proposal that was heavily backed by the EC, the relevant Parliamentary Committee, and some Member States. The outcome can be seen as a victory for the principle that governments should not intervene in markets, over the more pragmatic stance that governments should intervene to adjust market settings where they have become separated from market reality.

Carbon prices were quite volatile in the run up to the EU Parliament's vote and slumped afterwards. The outcome is expected to see ongoing volatility, as market participants react to political announcements about future reform of the EU ETS, with a bias towards prices drifting even lower.

Figure 5: Carbon prices, July 2011-Apr 2013



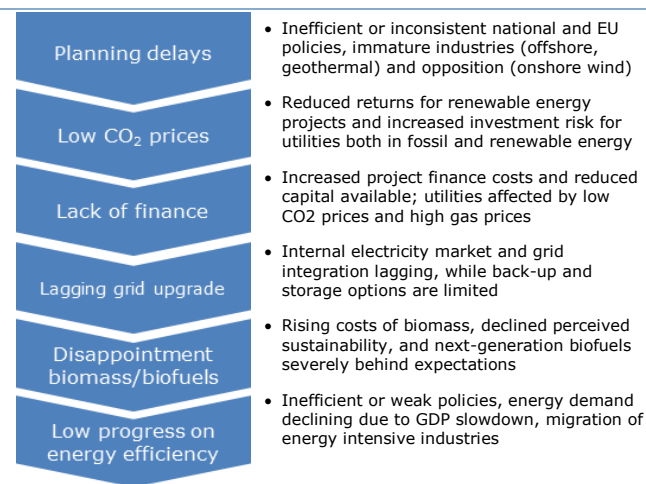
Source: Bloomberg, Rabobank, 2013

Feature article: Renewable energy growth forecasts for northwestern Europe—some unexpected outcomes

EU 2020 target for 20 percent renewables not likely to be achieved

In April, the EU published a report acknowledging for the first time that the 20 percent renewable energy target may not be reached by 2020. According to the EU, growth rates achieved in 2009 and 2010 are now slowing due to increasing costs of capital, delayed infrastructure investments and disruptive policy adjustments. However, the EU believes that even if the 2009/10 growth rates were maintained to 2020, the targets would not be achieved. In our view, this list is not exhaustive; the broken CO₂ system and the severely reduced profitability of utilities are major impediments as well (see Figure 6).

Figure 6: Current barriers for renewable energy in the EU



Source: Rabobank, 2013

Step-up in Germany, the Netherlands and the UK

So what will happen by 2020, given these roadblocks? For more insight into the future growth of renewable energy in northwestern Europe, we have developed a 2020 outlook for Germany, the Netherlands and the UK. The 2010 renewable electricity shares of these three countries must be increased if they are to meet their 2020 targets. Renewables contributed 7 percent, 4 percent and 10 percent, respectively, in Germany, the Netherlands and the UK in 2010, and will need to reach 31 percent, 37 percent and 40 percent by 2020. They will need to substitute about an additional quarter of electricity generation.

Interestingly, all three countries have set out on this course relying on one of the three main types of subsidy schemes used to support renewables. Germany has a fixed feed-in tariff, with a varying top-up per technology to cover above market costs. In the UK, a market for tradable green electricity certificates is currently in use, with varying numbers of certificates accredited per technology. The Netherlands devised a reverse auction scheme for subsidy budgets, whereby the cheapest technologies and projects are supported.

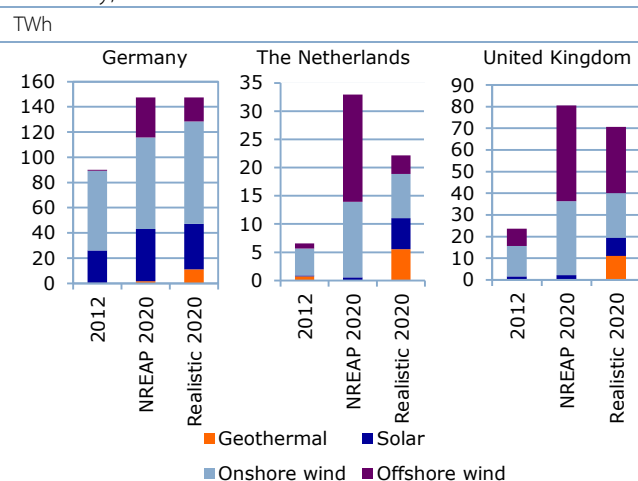
Another important factor is the respective fossil energy strategies of these countries: Germany and the UK need to replace substantial existing fossil capacity. Germany's nuclear retreat, and the UK's ageing coal assets and dwindling gas reserves, are additional factors driving a new energy mix. The Netherlands significantly expanded fossil generation capacity—both coal and gas—in recent years.

Different approaches, different outcomes

The results to date in increasing the share of renewable energy, and the outlook to 2020, are dramatically different per country. Rabobank believes Germany will come close to reaching its 2020 target for renewable energy generation, while the Netherlands will fall well short of its target, and the UK will be somewhat in the middle (see Figure 7). In all three countries, there will be a shift in the technology mix, with more solar and geothermal (because these are low-cost technologies), and less offshore wind. There will be different outcomes with onshore wind, reflecting technical challenges and community pressure.

The realistic scenarios developed by Rabobank reflect the range of barriers to renewables development, the success of policy support programmes, the strength of government support for renewables and developments in technology costs.

Figure 7: Forecasts for renewable energy generation in Germany, the Netherlands and the UK



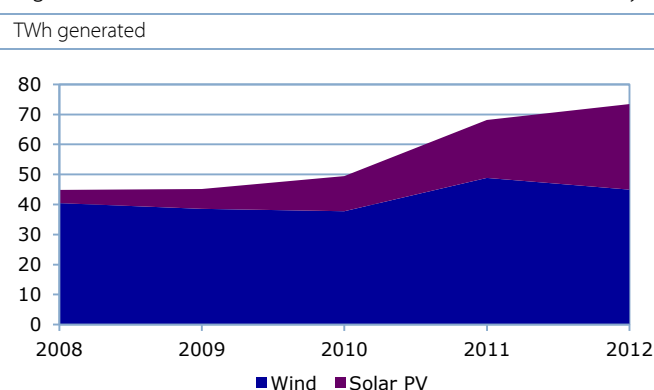
Source: Rabobank, 2013

Germany has a clear direction on energy policy, driven by its *Energiewende*, but the rate of change is likely to slow down. The UK's pace was driven by a national goal to transition to a low-carbon economy and a stable policy framework offering an adequate level of subsidy, but the planned reform of its energy policy has been bogged down by a less favourable political climate. In the Netherlands, with future subsidies already budgeted, we see a willingness to fix the problems. However, time is running out to take action and the delays already incurred mean the 2020 targets are not expected to be reached.

Germany bites the bullet

In the past few years, Germany has made big advances, doubling renewable electricity from 10 percent in 2005 to 20 percent in 2011. As Germany's policy was skewed favourably towards solar PV to support the local solar industry, solar PV accounted for most of the progress (see Figure 8). The German solar expansion contributed significantly to lower global costs for the technology through scale and technology advances: solar PV panels now cost only a third of the price paid just three years ago.

Figure 8: Solar PV has driven recent renewables in Germany



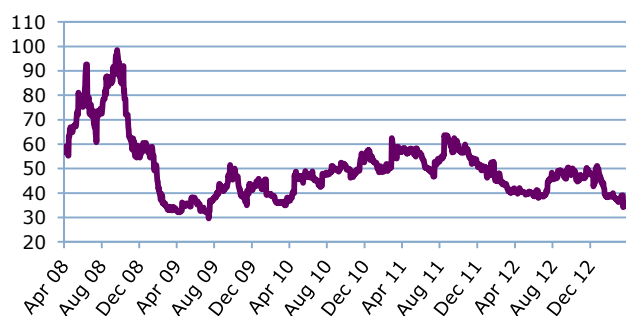
Source: destatis.de, 2012

But the price for more renewables is paid by German electricity consumers: a hefty electricity surcharge of EUR 5/kWh. Including other renewable energy driven charges, this now amounts to a third of the electricity bill before VAT. Another major side effect of the increased share of renewables is the decrease in the wholesale electricity spot price, driven by the near zero marginal costs of wind and solar electricity, which has not yet translated into lower retail

prices (see Figure 9). Rabobank expects this important development to be drawn into the discussion, as lower electricity prices would benefit the consumer.

Figure 9: German spot wholesale electricity prices

EUR/MWh for spot, baseload prices



Source: Bloomberg, 2013

Not surprisingly, German politicians are becoming wary of the effect of higher prices on voters and the industry. But the closure of nuclear plants forces Germany to continue with its energy transition. However, Germany's rapid growth of renewables could be slowed, either by some form of cap on renewable subsidies or by the practical reality of delivering offshore wind projects.

Offshore wind remains important because it can supply the high voltage power needed for Germany's industry in the south. Rabobank believes offshore wind installations will continue to grow in Germany, even though solar PV is now cheaper. However, unlike solar PV, offshore wind installation costs are not likely to decrease in Germany, as growing environmental demands, increasing distance to shore and water depth make new projects more costly.

Rabobank's forecast is for between 4GW to 6GW of offshore wind capacity to be installed by 2020. This is less than the German target of 10GW, reflecting the cost issues as well as the delays already experienced in installing the required electricity network, both offshore and onshore, which cannot be built quickly.

This expected slowdown in offshore wind provides the German government with time to adjust support policies and dampen the rate of subsidy increases. Grid operators would also have time to catch up on required connections, and the utilities, which are required to finance these projects, would have time to strengthen their balance sheets. Despite this slowdown in offshore wind, Germany's 2020 target is expected to be met.

More political support is needed in the UK

The UK's rate of progress on renewables is comparable to Germany's, with the country almost tripling renewable electricity's share between 2005 (4 percent) and 2012 (11.3 percent), largely driven by offshore wind expansion. What is similar between Germany and the UK is that both have a strong driver to grow renewables: Germany's nuclear retreat is mirrored in the UK by the scheduled phase-out of a substantial number of outdated coal plants, and the country's dwindling natural gas reserves.

The difference is that the UK has not already committed to an expensive solar PV roll-out. This low installed base—meaning that subsidies are not hurting yet—and a separate CO₂ system (with a floor price for carbon set well above current market prices) are positive for ongoing renewables development. We therefore view the UK as likely to continue expanding offshore wind, even though utilities are cautious and will need to be encouraged to keep investing. For this to happen, we believe political support for renewables would need to increase from current levels.

The UK is in the middle of redrawing its energy subsidy policy. Within this process, political support is also growing for the development of shale gas. It remains to be seen if this will divert future attention from renewables, but the policy uncertainty is already affecting investment levels.

The Netherlands is furthest behind

The Netherlands has barely started on its transition to renewable electricity, despite strong signals of political support. Within the EU, it is now the furthest behind on its 2020 electricity target. Renewables contributed 6 percent of the mix in 2005 and generated 10 percent in 2011, but the share barely increased in 2012 and could well decrease in 2013 due to a decline in biomass co-firing as CO₂ prices fell. The Netherlands is not making progress on renewables for a number of reasons. The design and execution of the renewable energy support schemes, the SDE (2008-2010) and its successor the SDE+ (*Stimulerende Duurzame Energieproductie*), have skewed support towards biomass projects with unrealistic feedstock cost assumptions; many of these projects have been cancelled or are yet to be built. Furthermore, the Netherlands dropped its 5GW target for offshore wind almost immediately after launch. Finally, the high population density also creates delays in onshore wind development.

The current government has stepped up commitments to renewable energy. For example, its main advisory body will deliver a comprehensive energy plan in the summer of 2013, and the policy support budget, the SDE+, has been doubled from below EUR 1.5 billion in recent years to EUR 3 billion in 2013. However, the long lead times of both onshore and particularly offshore wind imply that policy changes need to be implemented soon in order to enable more renewables investment by 2020. Up to 2020, a shift to technologies with a short lead time, such as solar PV and co-fired biomass, will become more likely in our view. At the same time, to achieve the 16 percent target, and to allow a good fit with the electricity supply profile, the Netherlands will need to add onshore and offshore wind at higher rates than in previous years.



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