

# How large energy consumers can power the Energy Transition

## Translating Demand into Additional Renewable Power Generation



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# Executive Summary

The Netherlands is lagging behind other EU Member States in the deployment of renewable energy: only 5.6 percent of final consumption was supplied from renewable sources in 2014. However, its ambition is to almost triple renewable energy supply by 2020.

Many Dutch energy consumers share the ambition for a more sustainable energy supply. They are already among the most sustainable electricity buyers in Europe – 64 percent of residential consumers already buy renewable power. However, an increasing number of consumers and businesses are conscious about where the energy they use is sourced from and prefer buying renewable power produced in the Netherlands.

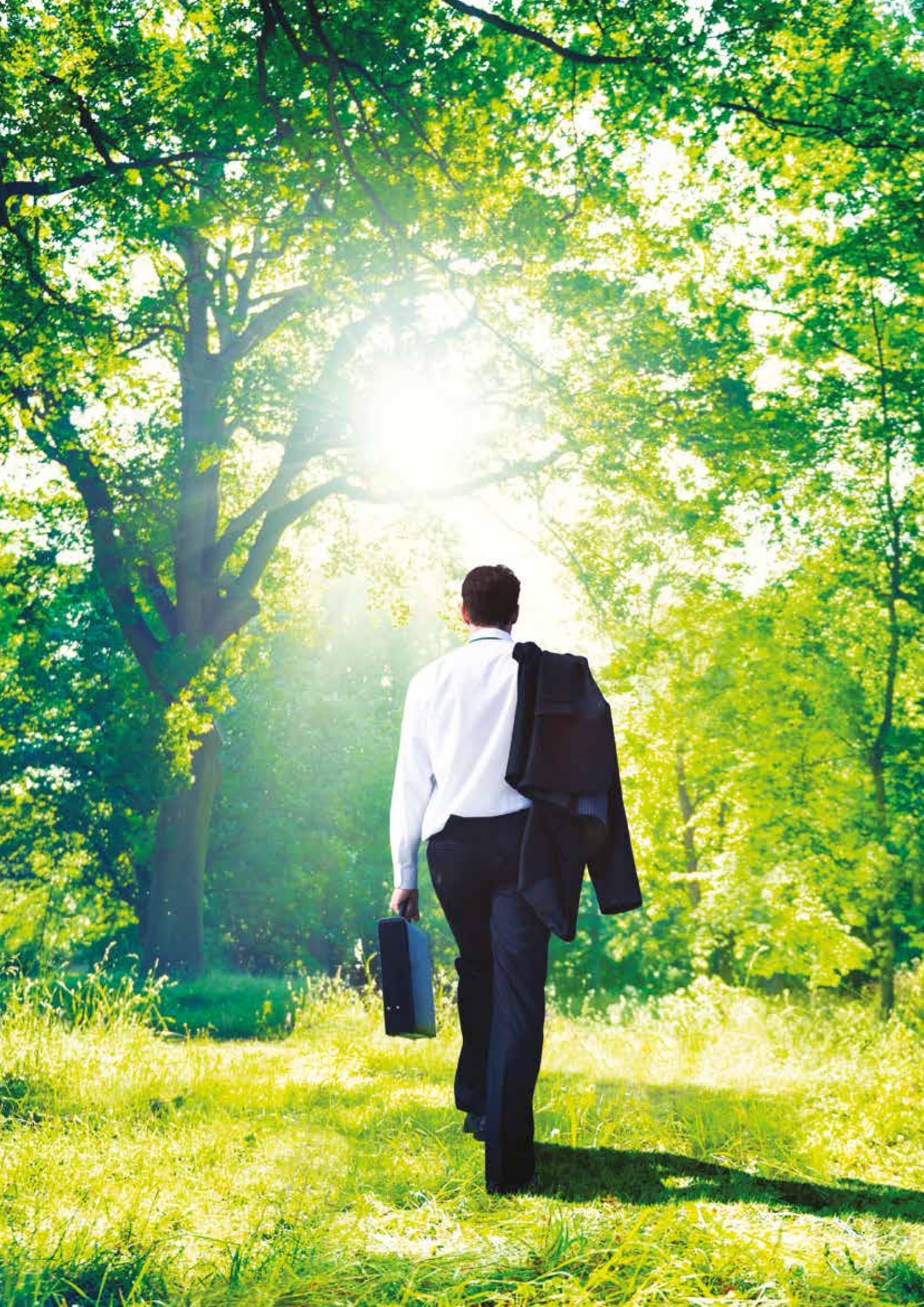
The wish to contribute to a more sustainable Dutch energy landscape is an important motivation for many consumers to buy Dutch renewable power. They expect their purchase decisions to translate into investment in additional renewable electricity generation, displacing fossil fuels. However, currently, this is often not happening, for three reasons.

Firstly, the supply of renewable electricity in the Netherlands is insufficient to meet demand; secondly, the integration of the European electricity market is incomplete; and finally, the Guarantee of Origin (GoO) system for trading renewable energy certificates does not create a transparent and effective market.

Faced with the current shortcomings of the GoO market, consumers with strong sustainability ambitions are finding solutions by bypassing the market. They are exploring new procurement strategies that are more selective on the quality of electricity, and provide more flexibility and supply security. Unlike traditional energy procurement, many of these strategies involve long-term partnerships with renewable energy producers. The new procurement strategies and business models allow consumers to contribute to deployment of additional renewable power while meeting Dutch and European energy and emissions targets.

The transformation of the Dutch energy landscape requires a fundamental shift in the way energy supply and procurement are structured. This can be broken down into three distinct aspects:

- Consumers need transparency about the origin and quality of renewable power to make informed purchase decisions;
- Long-term partnerships are important in reducing energy procurement risks for consumers and in helping renewable energy developers to secure financing;
- Platforms connecting consumers and suppliers of renewable power are required in order to facilitate the new purchasing strategies and business models.



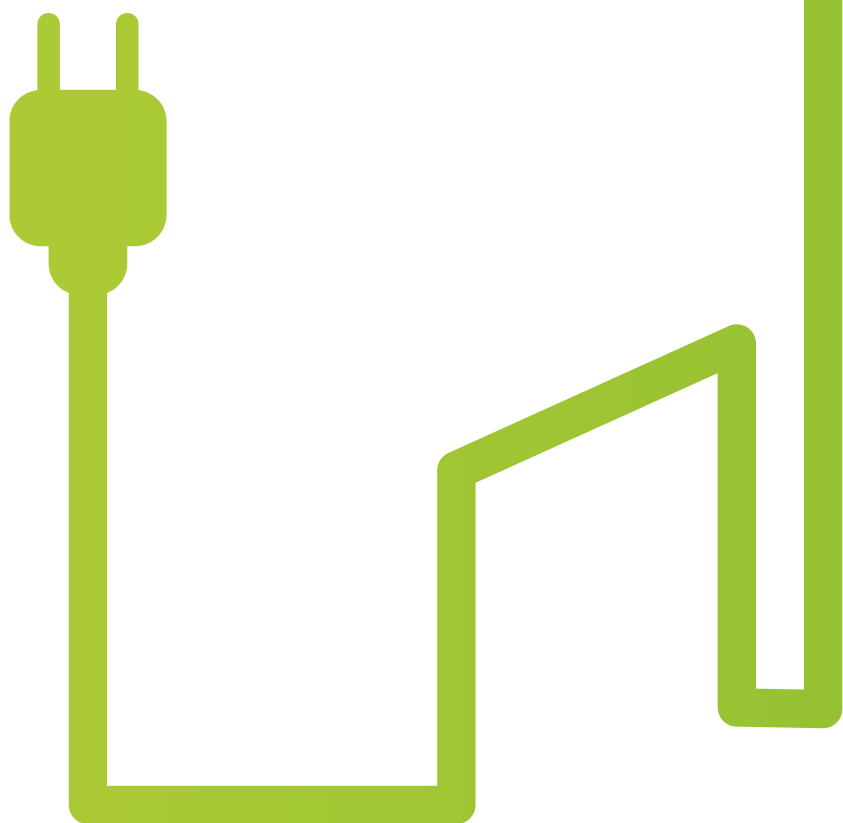
# Introduction

In September 2013, a wide range of stakeholders in the Netherlands signed up to an Energy Agreement for Sustainable Growth<sup>1</sup>, outlining Dutch energy and climate policy for the coming years. One of the main targets in the agreement is to increase the renewable share of final energy consumption (electricity production, transport and heating) to 14 percent by 2020.

The growth of renewable energy will need to continue beyond 2020 if the Netherlands is to make its contribution to the European target of 27 percent renewable energy by 2030, which was agreed in the 2030 Energy and Climate Package in October 2014. Although the 27 percent-target has not been translated into national targets for EU Member States, research from ECN and PBL suggests that the Dutch contribution should be in the range of 22 percent to 26 percent<sup>2</sup>. It is therefore imperative to begin preparing for this increase over the next few years.

It will be challenging to realize these levels of growth. Producing 14 percent of final energy demand from renewable sources in 2020 requires an increase in the annual renewable power production from the current 13.5 TWh to about 37.5 TWh, in addition to raising renewable supply in heating and transport. This is a tripling of the power production in a period of only four years. The estimated investments required are €60 billion to €73 billion<sup>3</sup>. Timing is another major challenge, because it can be time-consuming to get the necessary permits and secure local support. This results in long lead times of developing onshore and offshore wind farms (typically five to ten years or more)<sup>4</sup>.

Many Dutch consumers and businesses share the ambition of a more sustainable energy supply in the Netherlands, and increasing numbers have been switching to renewable power. Typically they are looking at short contracts for just a few years, but renewable power plant developers need long-term price stability to secure financing for their installations. Short-term procurement horizons often fail to provide the long-term stability required, meaning that growing demand for renewable power currently provides little stimulus to investment in new renewable electricity facilities.



Energy users have become more conscious about the origin of the renewable power that they consume and the preference for Dutch renewable power has grown. We see discerning consumers beginning to adopt new energy

procurement strategies that offer greater supply security, give more transparency and ensure that their choices contribute to the growth of renewable electricity generation in the Netherlands.

This study provides insight into the expected changes the supply of and demand for Dutch renewable power. It explains how shifting demand can result in new procurement channels, and can contribute to better business models for the growth of renewable power in the Netherlands. It concludes by describing decisions that consumers, utilities and other stakeholders can make, and how this translates to new business models that make renewable power cheaper and more reliable.



# Dutch consumers express a strong demand for renewable power

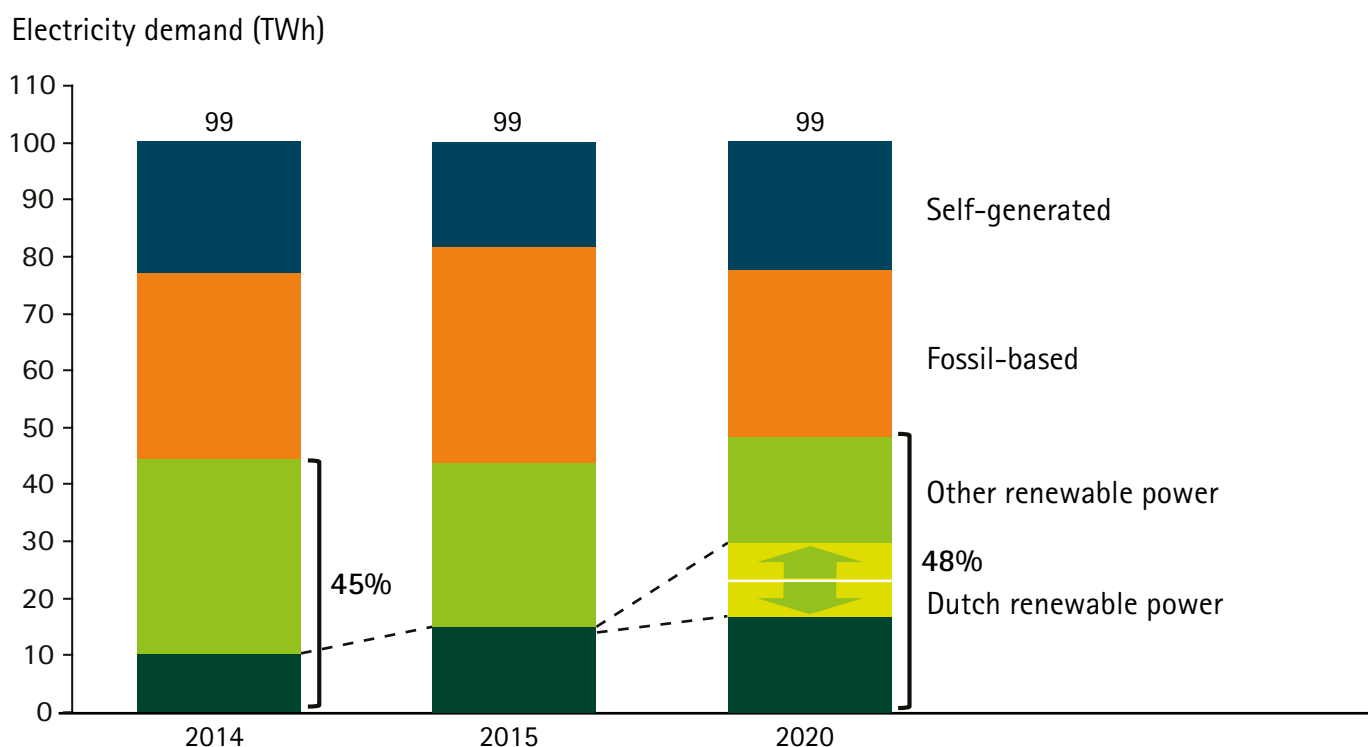
The Netherlands is lagging behind other European countries in renewable energy – or at least that is the perception. Just 5.6 percent of energy needs were met by local renewable sources in 2014, leaving the Netherlands ahead of only three other EU Member States, and still far from its 2020 target of 14 percent renewable energy in final consumption.

The flip-side to this story is that Dutch consumers are among the most sustainable electricity buyers in Europe: 64 percent of residential consumers buy renewable electricity, placing the country second among EU Member States.

## Dutch consumers are among the leading buyers of renewable electricity in Europe

About 46 percent of all electricity used in the Netherlands was supplied by renewable sources in 2014, as certified by Guarantees of Origin (GoOs, see box below). Among households, this share was significantly higher still, with 64 percent of consumers buying green power<sup>5</sup>. This makes Dutch consumers the second-most sustainable buyers of power in Europe, beaten only by Luxembourg. Large and small energy users alike have expressed the intention to follow suit meaning that demand for renewable power is expected to reach almost 50 percent by 2020 (Figure 1).

Figure 1 There is a growing market for renewable power in the Netherlands, and an increasing share of consumers buy from Dutch sources specifically





### Transparent and additional renewable power is displacing the 'anonymous kWh'

Awareness of the differences in type and origin of renewable power is fairly nascent, but energy consumers are increasingly discerning about the type of renewable power that they buy. They also want to contribute to a more sustainable energy landscape. We see growing demand among large retail services and public sector organizations in particular, reflected in ambitious targets for energy procurement as part of their sustainability agendas.

### The demand for Dutch renewable energy is set to grow in the coming years

Increasing awareness around the source of energy has created a growing market for renewable power produced by installations in the Netherlands. Currently, 10 percent to 12 percent of households, and 20 percent of large services and public sector companies choose Dutch renewable power. And considering all groups have expressed intention or interest in locally-sourced renewable energy, demand could reach 25 percent to 30 percent of final demand by 2020.



# Strong demand for renewable power does not yet result in additional renewable power generation

The desire to contribute to a more sustainable Dutch energy landscape is an important motivation for many consumers to buy Dutch renewable power. They expect their purchase decisions to translate into investments in additional renewable power generation. However, this is not happening for three reasons:

1. The supply of renewable electricity in the Netherlands is insufficient to meet demand;
2. Integration of the European electricity market is incomplete;
3. The Guarantee of Origin system for trading renewable energy certificates has not yet created a transparent and effective market.

## Dutch renewable power production remains insufficient to match growing demand, despite implementation of the Energy Agreement

The growing demand for renewable power coincides with a rapid increase of supply. Current projections suggest that Dutch renewable power generation will double by 2020, but it could even triple, as measures of the Energy Agreement are implemented, with the aim of supplying 14 percent of final energy demand from renewable sources by 2020. Onshore wind and biomass co-firing are expected to be the most competitive production methods, and will make major contributions to meeting the target. Offshore wind is likely to remain expensive for the near future,

but installed capacity is expected to grow quickly as the government provides attractive investment conditions. Solar PV is likely to grow rapidly within the household sector, largely driven by tax benefits.

It will be challenging to achieve the levels of growth required for renewable power to achieve 14 percent renewable energy in 2020. An estimated €60 billion to €73 billion is required to finance this transition<sup>6</sup> and it remains to be seen whether sufficient capital will be available. Planning is another major challenge, due to the time required to obtain all necessary permits as lead times for developing onshore wind projects (typically five to ten years or more) and offshore wind farms (between 4.5 and 11 years)<sup>7</sup> are typically long.

Table 1: Projection of demand and supply of electricity in the Netherlands to 2020

		2013	2014	2015	2020
<b>Total final electricity demand</b>	TWh	101	99	100	99
Consumer-generated	TWh	25	22	19	22
Procured: "Grey"	TWh	33	33	36	30
Procured: Renewable	TWh	43	44	45	47
Dutch renewable power	TWh	10	11	12-15	15-30
Imported renewable power	TWh	33	33	30-33	17-32
<b>Total Dutch renewable electricity supply</b>	TWh	12,2	11,7	13,8	37,5
Onshore and offshore wind	TWh	5,6	5,8	7,4	22,8
Biomass	TWh	5,9	5,0	5,0	9,8
Solar PV	TWh	0,5	0,8	1,3	4,8
Hydropower	TWh	0,1	0,1	0,1	0,1

## Pan-European deployment of additional renewable power is held back by the absence of a single harmonized electricity market and policy across Member States

Deployment of renewables across Europe would be an efficient solution to the shortage of renewable power, but existing EU-level structures are not delivering desired outcomes. First of all, European market integration is incomplete and progressing slowly. This limits the possibilities for consumers to contract additional renewable power directly from abroad. Secondly, the EU Emissions Trading Scheme fails to create scarcity of emissions rights, and the resulting low CO<sub>2</sub> price of around €8 per EUA<sup>8</sup> provides insufficient economic motivation for investing in renewable power. Consequently, national subsidy schemes are the main instrument for stimulating new renewable power production. Energy and subsidy policies differ between countries, giving distorted incentives and leading to suboptimal investment in renewable power and higher deployment costs.

It is unlikely that these issues will be resolved fully before 2020. Creating a single European energy market remains politically challenging to achieve in the short to medium-term, and CO<sub>2</sub> permit prices are unlikely to increase significantly before 2020. The planned reform of the ETS, including a Market Stability Reserve and back-loading, aims to ensure more scarcity in the scheme, but it will only start after 2020. If these reforms are successful, it could raise prices to around €20 per EUA by 2030<sup>9</sup>.

## The Guarantees of Origin system does not lead to additional renewable power generation

Given the shortage of Dutch renewable power and the absence of an integrated European energy market, about 70 percent of all green electricity sold is in fact produced by a coal or gas power plant in combination with imported Guarantees of Origin (GoOs) from other European countries. Most of these GoOs are from large hydro installations in Scandinavia that have existed for decades and hardly contribute to the transition to a more sustainable energy landscape.

In time, the GoO system could provide a way for consumers to contribute to the growth of renewable power directly through their purchase decisions, but currently it fails to do so. This is the result of three related features of current GoO trading: transparency, price formation and time-horizon.

Firstly, the low level of open trading reduces the transparency that consumers need to make informed buying decisions. Only 10 percent to 30 percent of all GoOs are being freely traded<sup>10</sup>. Most GoOs are used by electricity producers to enable them to sell green energy directly to consumers. These GoOs are not sold separately and therefore do not have a true market price. End consumers usually do not receive the certificates that prove that the power supplied is from renewable sources, so the real additional value of renewable power, the economic market valuation of the GoOs, is not explicit or transparent. In absence of transparency, the large supply of GoOs from existing international installations creates little need to build additional capacity to meet demand, raising questions about the amount of 'additional' renewable electricity generation that can be attributed to the scheme.

### Guarantees of Origins (GoOs)

Guarantees of Origin (GoOs) are certificates that certify the (renewable) origin of energy. For each MWh of renewable energy generated, the producer receives one GoO which can be traded separately from the energy produced, for instance via the Climex market place. Consumers can buy GoOs with the specifications they prefer (type, location, etc.). Increasingly, high volume consumers buy electricity first and then procure GoOs separately via a market place from specific renewable energy projects.

The GoO system aims to facilitate trading of renewable energy, creating a market that helps EU Member States achieve their renewable targets effectively. Utilities are major buyers of GoOs, as they have to submit GoOs for the amount of energy that they sell to clients as renewable. Large consumers also buy GoOs directly on the market as an assurance for delivered renewable electricity. Small businesses and residential consumers, however, rarely receive GoOs for the renewable electricity that they buy, reducing transparency about its origin.

Secondly, limited transparency can be a barrier to price formation. Currently, imported GoO prices vary from €0.05 to €0.20 per MWh. This is marginal compared to wholesale electricity prices, currently around €40 per MWh<sup>11</sup>. The premium value of GoOs is therefore rarely a decisive factor in decisions about investing in renewable power production in the Netherlands.

Pricing that more accurately reflects the value of renewable power is not the only requirement for consumers to drive growth in renewable power production. The time-horizon of the commitment should reflect the investment cycle of renewable power. Currently, large energy users typically buy electricity and GoOs looking only a few years ahead, while renewable power installations are built for 10 years or more. The short-term nature of the revenues from GoOs fails to provide the long-term revenue stability needed for the financing of renewable power capacity.



# Discerning consumers are finding new solutions for procuring renewable power to contribute to sustainability ambitions

Faced with the current shortcomings of the GoO market, consumers driven by robust sustainability convictions are finding solutions by bypassing the market. They are exploring new procurement strategies that are more selective on the quality of electricity; that provide more flexibility and supply security; and that establish long-term partnerships. Adding this new type of demand to the energy landscape brings new opportunities for stronger business models supporting the growth of Dutch renewable power generation.

## Procuring 'sustainability' separately from electricity and directly from the renewable energy producer

These companies support new renewable electricity installations by procuring 'sustainability' separately from electricity. They first procure electricity against the best conditions (lowest price), usually from fossil-fuel installations. Subsequently, they source GoOs for the quality (type or location of the installation) that they prefer, often directly from renewable energy producers or through intermediary platforms for energy and environmental commodities trading, such as Climex. The Dutch Government, for example, first contracts energy suppliers and then buys GoOs in the market from renewable power projects of choice, independently from the energy supplier. This way, they add value directly to the renewable power projects and keep full flexibility in the way 'sustainability' is procured. Depending on what meets their sustainability goals and financial budgets best, a single type or a mix of different types of GoOs can be procured, either annually or for a longer period.

## Creating long-term partnerships with developers and operators and supporting additional renewable power production

These new strategies also differ from traditional procurement in terms of the time horizon. Some organizations that have adopted this new way of procuring energy and 'quality' separately still source GoOs annually, while others enter into agreements to acquire GoOs for multiple years.

The Dutch railways, for example, will switch fully to wind-generated electricity by 2018, provided by new wind farms. Half of the electricity will be produced in the Dutch Noordoostpolder, and the other half will come from new wind farms in neighboring countries<sup>12</sup>.

## Entering into long-term Power Purchase Agreements

Leading consumers could also enter into long-term Power Purchase Agreements (PPAs) instead of buying GoOs from a renewable electricity installation. Both consumers and renewable electricity projects benefit from longer-term relationships. Long-term PPAs can provide project developers more income security, reducing financing costs of renewable power projects. Consumers with strong credit ratings can provide credit comfort on future cash-flows, bringing down financing costs. And consumers know that they are making a genuine contribution to a more sustainable energy landscape. Moreover, buying local renewable power means less exposure to the geopolitical tensions surrounding energy supply and price volatility.

## Portfolio procurement models suit the sustainability ambitions of discerning consumers and stimulate renewable energy development

Examples from the Dutch Government and the Dutch railways show the contours of a new business model for energy procurement. Consumers may switch to a portfolio of longer term contracted renewable energy generators, rather than having short-term contracts with a single supplier. This 'portfolio model' can

be managed actively, meaning that companies optimize the portfolio of PPAs continuously in terms of price, type of project, location, sustainability and other criteria. The frontrunners in the use of Dutch renewable electricity can choose to refresh their supply portfolio with innovative Dutch renewable energy projects on an ongoing basis. Other consumers can use the portfolio model to diversify their energy supply, ensuring long-term cost price stability through PPAs at a fixed price. The role of the energy supplier would change to an intermediary between the end consumer and the renewable power installations of choice.

Interest in portfolio models and other new approaches is building in the Netherlands, for instance from the companies in the Grid Losses network, as well as internationally. Companies like Microsoft and IKEA, but also other multinationals like Dow Chemicals, Facebook, Apple and Google are investing in renewable energy (see box). Typically they use their own wind and solar energy farms to meet their energy needs. Universities and governmental agencies are also starting to take part, illustrating the wide array of organizations increasingly recognizing the added value of investing in renewable energy<sup>13</sup>.

The changing role of the consumer, the switch from short-term, single supplier contracts to long-term commitments with multiple renewable energy installations, could result in fundamental new business models leading to further cost efficiencies and higher security of supply.

## Grid Losses Network aims to reduce the carbon impact of network infrastructure

The Dutch Grid Losses Network brings together a group of infrastructure companies, including energy network operators, water utilities, rail infrastructure operators and data network providers. The electricity use of this group represents just over 10 TWh per year, or ca. 10% of final demand in the Netherlands. Jointly, they invest €6 billion in their network assets every year.

The Grid Losses Network aims to define joint ambitious targets around reducing the energy use and losses in infrastructure, sourcing renewable energy to cover remaining energy use, and adopt circular economy procurement strategies.

### Microsoft

Microsoft has signed several 20-year Power Purchase Agreements, including a 175 megawatt Pilot Hill Wind Project in Illinois and a 110 megawatt Keechi Wind Project in Texas. This reduces the emissions associated with running the company's facilities, contributing to its sustainability goals. Moreover, Microsoft's long-term commitment to wind energy projects stimulates investment in renewable energy<sup>14</sup>. The 20-year agreements provide long-term security for investors and developers, making it easier to reach a financial close for these projects that are 'additional' and bring new renewable power onto the electricity grid.

### IKEA

IKEA is striving to be fully energy independent by 2020, producing renewable energy equivalent to its total energy use. To achieve this, the company has committed to investing 1.5 billion euros in renewable energy projects in 2015, mainly in wind energy and solar-PV on its buildings<sup>15</sup>. In 2014, IKEA purchased a 165 megawatt wind farm in Texas and a 98 megawatt wind farm in Illinois, which will generate about 1,000 GWh of electricity per annum<sup>16</sup>. The Illinois project alone already outweighs the retailer's total energy demand from electricity and heat in the United States. IKEA's investments in renewable energy are not limited to the United States; amongst others Canada, Germany, Sweden and the United Kingdom have IKEA wind farms too<sup>17</sup>.





# Consumers and electricity suppliers should work together to grow renewable power production

**New procurement strategies and business models allow consumers to contribute to deployment of additional renewable power and help meet Dutch and European energy and emissions targets. These innovative models fundamentally change the roles of consumers, producers and energy suppliers.**

Three aspects are essential for realizing this change.

- Consumers need transparency about the origin and quality of renewable power to make informed purchase decisions;
- Long-term partnerships are important in reducing energy procurement risks for consumers and in helping renewable energy developers to secure financing;
- Platforms connecting consumers and suppliers of renewable power are required in order to facilitate the new purchasing strategies and business models.

**The transformation of the Dutch energy landscape requires a fundamental shift in the way energy supply and procurement are structured today**

Energy consumers – particularly large companies, can and do play an essential part in driving the energy transition. A growing group of large consumers, who are increasingly discerning about the quality and sustainability of power, have a number

of options open to them. They can select specific Dutch renewable power products by demanding transparency about the origin from their supplier. They can move to a supply portfolio that meets their needs for price, quality and sustainability. Or, to go one step further, they can decide to stimulate additional renewable power production by engaging in long-term relationships with their supplier and renewable power producers, either through long-term PPAs or by co-investing. This way, consumers adopt a different role in the energy system, in which procuring electricity is no longer merely a cost-optimization exercise, but an integral strategic choice also encompassing considerations of sustainability and security of supply.

Electricity suppliers should anticipate the new types of power procurement and adopt a new role in the changing ecosystem. They can engage existing and new clients by moving from one-way supplier-consumer relationships to partnership models, in which they help their customers to find a long-term reliable and affordable energy supply strategy, which contributes to a sustainable way of doing business. Extending their renewable power portfolio and increasing transparency are essential elements of this approach. Additionally, suppliers can act as brokers between their clients and Dutch renewable power developers to facilitate long-term procurement relationships and peer-to-peer solutions.

The premium value of Dutch renewable power needs to be made more transparent to coordinate and stimulate the players in this new ecosystem of supplier-consumer partnerships. **Organizations involved in trading GoOs and in financing renewable energy** should strengthen the GoO system to create a more liquid market that gives better insight into supply, demand and pricing.

A central market place could help build a more efficient market and give insight into the true value of renewable power. Such a platform would provide owners of GoOs (renewable power producers such as farmers and project developers) better value through direct access to end consumers. And consumers would have better options to buy the types of GoOs they prefer. In turn, this transparency could ensure that GoO prices are a better representation of consumer buying decisions, thereby reflecting the value they attach to renewable power that is truly additional. This would lead to an increase in the price of Dutch GoOs as demand grows.

**Discerning consumers are leading the way, but further development of the new procurement and business models is needed to support a successful energy transition**

The energy landscape is transforming from fossil fuel-based to renewable-based system, but enormous investments are necessary in the coming years to make this transition a reality. New business models need to be designed also to make renewable power cheaper. We see an important role for large energy consumers in particular to driving such models by shifting the procurement from short-term to long-term. If large energy consumers provided long-term energy off-take guarantees, this could help achieve cash flow stability, resulting in lower project financing costs. We also see new opportunities for utility companies to contribute to the new renewable energy landscape.

The leaders have established the outlines of the new business models, to be developed and consolidated over time. But it is vital more large and small consumers join them. Climex and Accenture invite large consumers and utility companies to take part in the development of new business models to drive the energy transition.



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## About Accenture

Accenture is a global management consulting, technology services and outsourcing company, with more than 358,000 people serving clients in more than 120 countries. Combining unparalleled experience, comprehensive capabilities across all industries and business functions, and extensive research on the world's most successful companies, Accenture collaborates with clients to help them become high-performance businesses and governments. The company generated net revenues of US\$31.0 billion for the fiscal year ended Aug. 31, 2015. Its home page is [www.accenture.com](http://www.accenture.com).

## About Climex

Climex is a market place for environmental commodity trading and a consultant for procurement and management of energy to large consumers in the Netherlands.

Climex facilitates transactions for large energy contracts, guarantees of origin and emission certificates via brokerage and via Climex online auction platforms. Climex has customers in the services sector and public sector. A network of suppliers including energy companies, project developers and brokers across the globe, provide products of choice at most competitive price.

Climex is involved in the realization of different renewable energy projects and is a strategic advisor to organizations that are in transition to more sustainable energy procurement. For more information please contact us via: +31 20 305 6200 or visit our website [www.climex.com](http://www.climex.com).