

# The Netherlands as a partner on climate change mitigation and accelerating the energy transition

Climate change affects us all. And what affects us all, concerns us all. In order to keep global warming in check and deal with the consequences of climate change, we need more global climate ambition and action. Global warming poses particularly grave threats to our environment, health, security, economies and livelihoods. Food and water related disasters are linked to large-scale migrations and conflict. Rising CO2 levels have direct and negative consequences on our planet. In order to build and sustain peace, we look and act upon climate change as one of the root causes of conflict. Science has made clear the world must set significantly higher ambitions. The future cost of inaction is simply too high. We, the Netherlands, believe that together, we must take bolder action at the same scale as the climate crisis itself.

With our deeply rooted commitment in sharing knowledge and expertise with our partners, we believe that only together can we reach our short and long term climate and energy targets. Using the Sustainable Development Goals established by the UN as a guideline, we strive to reach our ambitions through collaborative innovation and co-creation. This has further been concretised by the Paris Agreement, which requires all parties to put forward climate policies through Nationally Determined Contributions (NDCs). Both the Paris Agreement and the UN Sustainable Development Goals (SDGs) affirmed our commitment to leave no one behind in our quest to keep global warming in check and build more climate resilience.

The Netherlands opts for what we call a quadruple helix approach. A quadruple helix approach refers to a joint collaboration in which knowledge institutes and government bodies come together with business and society to create sustainable technologies that can be locally tested and implemented, and later applied to international contexts. In close coordination with governmental officials, the Netherlands offers programmes for participatory dialogue and exchange with Dutch experts and institutes a number of themes with the aim of mitigating climate change and accelerating the energy transition.

## The Netherlands as your partner

International cooperation is a cornerstone of our climate policy. Together we can strengthen alliances, educate communities and actively reach out to governments, institutions and organisations. Together we can co-create solutions, build sustainable value chains, forge climate resilient investments deals and empower societies worldwide to protect our planet and achieve economic prosperity today and in the future. The Netherlands is actively looking to partner up to solve global challenges.

We stand ready to share knowledge, expertise and solutions that can help take global climate action. Our focus has been primarily directed at accelerating the transition to using more sustainable energy sources and decreasing greenhouse gas emissions to mitigate climate change.

The Netherlands Enterprise Agency's (RVO) latest initiative, the Climate and Energy Response Facility (CERF), aims at facilitating the dialogue and exchange of knowledge and expertise in a number of subthemes which will help accelerate the many factors that contribute to climate change mitigation. CERF is just one of the initiatives<sup>1</sup> launched by the Netherlands to contribute to climate change mitigation challenges together worldwide. More specifically, this initiative can offer support in the following fields within climate change mitigation, among others:

- [Ensuring clean and affordable energy](#)
  - [Green hydrogen](#)
  - [Offshore wind](#)
  - [Solar energy](#)
- [Circular economy](#)
- [Waste to Energy](#)
- [Uncovering the water, energy, food nexus](#)
- [E-mobility](#)

<sup>1</sup> Information regarding other initiatives and movements around climate change carried out by the Netherlands can be found on [NL Toolkit](#)

## Ensuring clean and affordable energy

Urgent and complex transitions are needed from a fossil-based, energy-intensive economy to a low-carbon and climate-resilient society. To achieve that, we harness the power of sun and wind to speed up the transition to renewable energy resources. The Dutch government is committed to the climate and energy transition, aiming at an 80-95% CO2 emission reduction by 2050. By 2030, the fossil fuel-based electricity generation will be phased out, and the Netherlands is aiming at a 70% share of wind power and solar energy in the electricity mix. The Netherlands offers extensive knowledge and experience in wind, biomass, hydrogen, and solar energy.

The Netherlands can provide assistance for the development of sustainable energy systems in other markets, such as:

- A participatory integrated energy system approach;
- Utility awareness on competitive cooperation models for electricity market mechanisms and flexible pricing, and tools for the supply and demand balancing;
- Storage technologies to overcome network overload.

Example projects are:

- New forecasting and monitoring tools to [balance supply and demand](#);
- [Vehicle-to-Grid technology](#) (V2G) charges electric vehicles and delivers electricity back to the grid;
- [Amsterdam](#) hosts a V2G pilot as the first city in the world;
- In the city of Utrecht: [Sono Motors to Provide 100 Sion](#) to We Drive Solar for V2G Project
- [Energy storage](#) balances fluctuations

## Green Hydrogen

To successfully fight climate change, the global community needs to work together, and we need a rapid energy transition to reduce CO2 emissions. This means reducing energy consumption and shifting to renewable energy for climate-neutral systems. Hydrogen is one of the most flexible and versatile carbon-neutral fuels and its potential is huge. Yet, unlocking it requires structured efforts such as scaling up production capacity, developing infrastructure and improving global logistics.

We need to work together on the large-scale adoption of green hydrogen, from storage and transport to production and application.

### *Dutch expertise*

The Netherlands is determined to play a substantial and constructive role in building a global hydrogen-based future. The Dutch approach is explicitly driven by the climate policies and commitments from government, knowledge institutions and business. The Dutch are already at the forefront of European initiatives to kick-start a hydrogen revolution, offering expertise on a wide range of solutions, for example with the use of electrolyzers in combination with wind and solar installations to generate clean energy. Recent innovations include a wind turbine with an integrated 4 MW electrolyser and the [world's first offshore electrolyser](#) in the North Sea. [Other projects](#) aim to accelerate the development of solutions and upscaling the sector. Meanwhile, experts at the Dutch research and technology organization TNO, together with industry partners, are developing special hydrogen tanks as a means to make transport more flexible, safe and cost-effective. Embracing its geographical advantage, the Netherlands is preparing to become a major hydrogen hub for importing, storing and exporting hydrogen to neighbouring countries.

### *How can we work together?*

When building a green hydrogen value chain, countries should cooperate. The Netherlands actively seeks out cooperation with other governments at the policy level and shares expertise and learnings on hydrogen. Example themes for dialogue are:

- How to build a green hydrogen economy from a policy perspective;
- Best practices for certification, standardisation and safety;
- Best practices in setting up a regional hydrogen value chain.

### Offshore wind

Backed by a strong history of maritime oil and gas operations, an innovative roll-out policy and continuous innovation, the Dutch offshore wind market has matured rapidly. It is now among the global leaders in cost-efficient offshore wind farm development and installation.

In terms of total installed capacity, the current Dutch international position is still modest (2.9 GW), but rapidly developing. The Dutch government aims to generate 21 GW of total offshore wind capacity by 2030 to meet the European Union's (EU) current Fit-for-55 goal.

The Dutch offshore wind sector has internationally renowned market players in almost all wind farm life cycle supply chain segments. The Dutch wind sector is well organised in the worldwide-renowned wind and water works initiative, through which showcases for potential foreign business partners can be found.

#### *How can we work together?*

The Netherlands shares knowledge to aid further development of the offshore wind energy market development. Example themes for dialogues are:

- Tender procedures and the role of the government;
- System integration: the integration of offshore wind energy in the grid;
- Wind energy as part of the many uses of space.

### Solar energy

Rapid climate mitigation and energy transition from fossil fuels to renewable energy is needed to reduce CO2 emissions in the fight against climate change. The use of solar energy to produce electricity through photo voltaic systems can be key in facilitating this transition. Solar energy is projected to be the cheapest electricity and is currently already cheaper than coal and gas in most major countries (IEA, 2020) To increase the use of this technology, products and systems, quality control mechanisms, grid integration and electricity storage need to be further developed. This enables the benefits of solar electricity to spread and the roll-out of applications such as integrated PV in buildings, infrastructure and agriculture, increasing both energy security and creating jobs (IRENA 2019). Moreover, integrated solar solutions are also interesting for a densely populated country like the Netherlands.

#### *Dutch expertise*

The Dutch government is committed to the climate and energy transition and actively taps into [the potential of solar energy](#). PV systems are an important technology in this transition. The Netherlands has over 50 years of experience in PV research. Since 2018, electricity production from PV systems with an installed capacity higher than 10GWp has increased by more than 50% yearly. Recently, the Netherlands has become the country with the most installations per capita in Europe, reaching 765 W/capita, 42% up from 2020. In collaboration with FME, RVO (ICEP-programme) has an export-group on solar with proximately

30 SME companies across the value chain. Currently the focus is on applications such as BIPV and other products/services. In residential and commercial buildings and the automotive sectors, the Netherlands' [Top Sector Energy](#) programme supports innovation in the field of:

- Applications in new products with increased electricity yield and building integrated PV, such as greenhouse roofs;
- Production of solar cells and modules, including crystalline silicon wafers, thin films, efficiency enhancement, maintenance and dust prevention, recycling and testing methods for PV cells and modules.

#### *How can we work together?*

The Netherlands collaborates at the policy level and shares knowledge for PV market development. Example themes for dialogue are:

- Pilot projects and implementation of new technologies and applications;
- Off-grid solar solutions, such as solar water pumping for agriculture;
- Innovation, Research & Development in areas such as for news ways of using PV systems (including integration), the integration of PV technology into infrastructure and vehicles.

## Circular economy

### *Dutch expertise*

The Netherlands has the ambition to become a fully functioning circular economy by 2050. To do this, the government is taking various measures to encourage a social climate that's open for behavioural change, and creating an ecosystem in which all the necessary social and institutional changes are embraced. Along with 180 other Dutch parties, the government in 2017 signed [The National Raw Materials Agreement](#), containing agreements on how to accelerate towards a circular economy and includes a pledge of [cutting back the use of raw materials](#) with 50% by 2030. In February 2019, the government presented the [Implementation Programme 2019-2023](#), containing concrete actions on how to execute the five Transition Agendas, that will be monitored regularly. Within this agenda, the Netherlands focuses primarily on 1) plastics, 2) consumer products, 3) manufacturing 4) build environment, and 5) food.

In the spirit of “practice what you preach”, the Dutch government decided to encourage the circular marketplace by becoming a launching customer. To ensure companies and organisations are in a position to actually implement their circular plans, the government is prepared to remove or adjust legal and regulatory barriers. Also, so-called [Green Deals](#) were introduced, providing entrepreneurs with knowledge and expertise, access to networks, and assistance with entering markets.

By including the public in the transition towards a circular economy, you make them more open to changing their behaviour and adopting new innovations and ideas. The government wants to boost this entrepreneurial mentality, by supporting circularity-minded initiatives. An example is the [Versnellingshuis](#) (Netherlands Circular Accelerator), which boosts circular innovation at a regional and municipal level, by helping entrepreneurs to develop, launch and scale-up their circular products and services. To improve guidance on how to uniformly define and apply circular economy thinking, Dutch banks have produced the [Circular Economy Finance Guidelines](#): a set of financial ground rules designed to stimulate, develop and enable finance's key role in the transition towards a circular economy.

Creating a circular economy requires the reshaping of an entire system, both nationally as well as globally. Our private public platform on circular economy, [Holland Circular Hotspot](#), collaborates internationally by sharing best practices from businesses, knowledge institutes and (local) governments.

### *How can we work together?*

The Netherlands collaborates at policy level and shares knowledge for circular economy market development. Example themes for dialogues are:

- Implementation and enforcement of circular supporting legislation and policies through multi-level governance cooperation;
- Creating international conditions/rules for cross-border collaboration and knowledge exchange: enlarging the playing field;
- Promoting behavioural change and citizen participation through market incentives and financial stimulation;
- Contributing to an internationally inclusive circular economy without negatively impacting society, e.g. employment.

## Waste-to-energy

Due to urbanisation and economic development, electricity consumption will grow more and more rapidly. The rapidly increasing population will also produce more waste. We can make significant contribution to the climate and energy transition by turning waste into energy. The organic part of waste, biomass, is a renewable energy source. As well as reducing emissions from fossil fuels, waste-to-energy technology can reduce the need for landfill capacity. It can also help overcome issues such as environmental pollution, odour nuisance, waste dumping and burning in open spaces.

Waste-to-energy, when applied well, can convert non-recyclable waste into viable forms of clean energy, lower carbon emissions and reduce the need for additional landfills. Commonly used methods include anaerobic digestion, direct incineration, and enhanced landfill gas extraction. Gas extraction and digestion plants remove organic waste and use it to produce biogas. Biogas is a 100% renewable source of energy. The energy output from direct incineration waste-to-energy plants is about 50% renewable.

### *Dutch expertise*

The Netherlands recycles 80% of its waste, incinerates 17% of its waste and turns it into energy, leaving only 3% to landfill. Digestion, landfill gas extraction and incineration recover energy from waste.

#### *Digestion*

Since the 1990s, the Netherlands has been producing more biogas from waste streams. The extraction process involves anaerobic digestion. We use biogas to generate electricity and/or process heat. Organic waste is separated, pre-treated and digested in large tanks, releasing biogas. There are large biogas projects at around 250 locations in the country. In 2019, these locations accounted for almost 3% of the gross final consumption of renewable energy (CBS, 2019). National subsidy schemes fund biogas production from waste streams.

#### *Landfill gas extraction*

In the Netherlands, there is an obligation to capture landfill gas and to use or flare it. Because of this, we have a lot of experience in capturing and using methane gases from landfills. The amount of gas that can still be extracted from Dutch landfill sites is decreasing, but Dutch landfill gas extraction companies are active worldwide.

#### *Incineration*

[In 2018](#), waste incineration contributed to 10% of the renewable energy production in the Netherlands. We reuse the larger part of the domestic waste as a source of energy and raw materials. All incineration plants are subject to acceptance requirements, as stipulated in the permits issued by legal authorities. Dutch power plants rank amongst the best in the world and domestic incineration technology is applied in W2E projects in the Netherlands and abroad. The resulting fly ashes are used new innovative processes.

Waste incineration is not a goal in itself. It is an additional waste management tool. In other words, it is additional to the circular economy for residual waste that cannot be reused or recycled.

#### *How can we work together?*

The Netherlands collaborates at policy level and shares our knowledge on waste-to-energy market development globally. Example themes for dialogue are:

- Integration of waste-to-energy into a national waste policy through multi-level governance cooperation.
- Waste-to-energy technology comparison in a national context: feasibility studies or scenario modelling.
- Emission standards for direct incineration plants.
- Policies for biogas produced from organic waste streams and existing landfills
- Waste separation, recycling and its role in a sustainable waste management system.

### **Uniting water, energy, food nexus**

Climate change. Food security. Biodiversity loss. The world is facing major crises, and odds are, these will only become more pressing in the coming decades. Why? Because humanity's current way of living is very demanding for nature's capacity and vital resources such as water, energy and food. Combined with a rapidly growing population, we face a planet in distress. This is a strategy we cannot keep up. What we need is an integrated, sustainable approach that enhances the balance between maintaining resources and maximising what we take. We need system change.

Water, energy and food are inextricably linked and therefore often referred to as the Water-Energy-Food Nexus or the WEF Nexus. The Nexus approach is a crucial tool to meet this challenge as it creates synergies between policies and avoiding conflicting actions. These 3 sectors require a substantial change to meet rising demands in the future. An integrated approach benefits each resource and leads to a stronger economic and environmentally secure future. Integrated policies link water management, food production and consumption, energy supply and land use. These policies also need to contribute to resource efficiency and climate action. To achieve this, we need clear communication and collaboration between governments, industries, academia and societies. It calls for collaboration and cooperation. We must think beyond our own interests and gains and look at all systems as one.

### *Dutch expertise*

The Netherlands is a small, densely-populated country. It is home to 17 million people. 40% of the country lies below sea level. The obvious need to make maximum use of resources has led to a common practice of collaborative approaches

between the government, knowledge institutes, businesses and social organisations.

Renowned Dutch knowledge institutes contribute to sustainable transitions in water, energy and food production in countries all over the world. Activities vary from straightforward actions, such as the use of solar pumps in agriculture, to improving scientific insights on interlinkages between resource use, hydrological forecasting systems and circular agriculture in urban areas. The independent institute for applied research in the field of water, Deltares, provides countries with Integrated Water Management Analyses. These include agriculture, food and energy. The University of Wageningen (WUR) led the [European SIM4NEXUS project](#). In this gameplay environment, participants carry out policies and explore how policies impact different Nexus components. Research and technology organisation TNO is working on [floating solar panels](#) for food production at sea. Those are just a few examples of how the Netherlands is globally contributing to sustainable innovations relating to the WEF Nexus.

#### *How can we work together?*

The Netherlands collaborates with policymakers to address the vast challenges related to the WEF Nexus. Possible themes for dialogue are:

- Joint research on interlinkages between water, energy and food, and climate ;
- Multi-land use by combining solar energy with strip cropping;
- Urban farming using WEF Nexus principles.

#### **e-mobility**

The transportation sector runs mainly on fossil fuels, resulting in CO2 emissions and air pollution. The introduction of e-mobility can change this. Creating a new market sector means new businesses and job opportunities. E-mobility also provides a solution to balance renewable energy loads on the grid. Developments in the e-mobility sector are a great opportunity to make a change. According to the International Energy Agency, there will be 220 million electric vehicles worldwide by 2030. Charging and maintenance infrastructure are expected to further boost in the e-mobility market. The roll out of charging stations is ongoing, and so is integration in public transport. A new economic sector is emerging thanks to e-mobility, including the development of charging stations, the development of smart charging service and manufacturing. A comprehensive mobility strategy is required to make the most of this market development. This is something the Netherlands can support in.

#### *The Dutch expertise*

The Dutch has ample experience, having developed a National Charging Infrastructure Agenda together with local and regional governments, grid operators and relevant stakeholders – promoting e-mobility with financial incentives and working with private-public partnerships.

Examples of Dutch partnerships and market initiatives are:

- The [Formula E-Team](#) is a public-private platform for governments, knowledge institutions and organisations in the car, leasing, energy, consumer and business sectors. It aims to develop e-mobility in the Netherlands and abroad.
- [Green Deals](#) and administrative agreements: paving the way for the roll-out of e-mobility;
- The E-mobility Innovation and Acceleration Programme: research and innovation for e-mobility;
- [ElaadNL](#) is the Innovation and knowledge centre of the Dutch grid operators focusing on e-mobility aspects. In cooperation with the business sector it works on: the Open Charge Point Protocol, smart charging and smart grid innovation;
- [eViolin](#): the Dutch association of charge point operators and service providers working on national accessibility based on open standards to improve access to charging systems;
- [The Netherlands Knowledge Platform for Charging Infrastructure](#) aims to reduce costs for public charging infrastructure. Online platforms have been developed for citizens to request charging points in public spaces. Municipalities can find information and Uniform Standards for Charging Points. These standards help with equal tendering conditions and permits for public charging infrastructure.

#### *How can we work together?*

the Netherlands would like to collaborate at the policy level and provide assistance for developments related to e-mobility. Example themes are:

- Integration concepts: methods and technologies on the governance, architecture, modelling, standards and interfaces to have an integrated set of tools for e-mobility;
- Grid coordination between utilities, distribution and charging companies;
- Charging and de-charging protocols for grid load balancing and the optimisation of battery life;
- Energy supply services for electric vehicles;
- Tools and standards for the optimisation of building energy supply and electric vehicle charging, such as the Vehicle-to-Grid (V2G) and Vehicle-to-everything (V2X) technology.

### Curious to learn more?

Interested in learning more about what the Netherlands has to offer in climate change mitigation and the energy transition? Contact the local Dutch Diplomatic mission (embassies and consulates) to discuss possibilities. Together, we can set up roundtable country discussions, identify opportunities per theme, and develop roadmaps. Together, we can co-create solutions that accelerate the climate and energy transition for a sustainable society for everyone.

# CERF Message house

<p><b>Overarching narrative</b> <i>This set of programmes is launched as a result of...</i></p>	<p>Climate change affects us all- our environment, health, security, economies and livelihoods. And what affects us all, concerns us all. In order to keep global warming in check and deal with the consequences of climate change, we need more global climate ambition and action. We strive to reach our ambitions through collaborative innovation and co-creation.</p>		
<p><b>Key message</b> <i>We, the Netherlands have the following to offer...</i></p>	<p>In close coordination with governmental officials, the Netherlands offers programmes for participatory dialogue and exchange with Dutch experts and institutes a number of themes with the aim of mitigating climate change and accelerating the energy transition.</p> <p>How? By co-creating solutions, building sustainable value chains, forging climate resilient investment deals and empowering societies worldwide in the fields of clean and affordable energy, circular economy, waste to energy, the water, energy, food nexus and e-mobility. <i>*See breakdown of messaging per theme on p.2</i></p>		
<p><b>Foundation/ building blocks</b> <i>This initiative is grounded on the following building blocks...</i></p>	<p style="text-align: center;"><b>Knowledge sharing</b></p> <p>We stand ready to share knowledge, expertise and solutions that can help take global climate action. Our focus has been primarily directed at accelerating the transition to use more sustainable energy sources and decreasing greenhouse gas emissions to mitigate climate change.</p> <p><i>*See subsection with value proposition per theme</i></p>	<p style="text-align: center;"><b>Quadruple helix approach</b></p> <p>The Netherlands opts for what we call a quadruple helix approach- a joint collaboration in which knowledge institutes and government bodies come together with business and society to create sustainable technologies that can be locally tested and implemented, and later applied to international contexts.</p> <p><i>Add why – example: success rate of collaborations between institutions is higher than top-down approaches.</i></p>	<p style="text-align: center;"><b>International collaboration</b></p> <p>Climate change crosses borders and therefore requires international cooperation. The Netherlands is actively looking to partner up to solve global challenges.</p>

Theme	Clean energy	Circular Economy	Waste2Energy	WEF-nexus	E-mobility
Why	Urgent and complex transitions are needed from a fossil-based, energy-intensive economy to a low-carbon and climate-resilient society.	Due to urbanisation and economic development, consumption will grow more and more rapidly and the increasing population will also produce more waste. By going circular, we can limit waste and relieve pressure on our strained resources.	Waste-to-energy, when applied well, can convert non-recyclable waste into viable forms of clean energy, lower carbon emissions and reduce the need for additional landfills.	Water, energy and food are inextricably linked and therefore often referred to as the Water-Energy-Food Nexus or the WEF Nexus. These 3 sectors require a substantial change to meet rising demands in the future. An integrated approach benefits each resource and leads to a stronger economic and environmentally secure future	The transportation sector runs mainly on fossil fuels, resulting in CO2 emissions and air pollution. E-mobility lowers emission and pollution, creates new business and job opportunities, and balances renewable energy loads on the grid.
How	<p>To achieve that, we harness the power of sun and wind to speed up the transition to renewable energy resources. The Netherlands can provide assistance for the development of sustainable energy systems in other markets, such as:</p> <ul style="list-style-type: none"> <li>• A participatory integrated energy system approach;</li> <li>• Utility awareness on competitive cooperation models for electricity market mechanisms and flexible pricing, and tools for the supply and demand balancing;</li> <li>• Storage technologies to overcome network overload.</li> </ul> <p><i>*see extra subsection on our offerings per renewable energy source</i></p>	<p>The Netherlands collaborates at policy level and shares knowledge for circular economy market development. Example themes for dialogues are:</p> <ul style="list-style-type: none"> <li>• Implementation and enforcement of circular supporting legislation and policies through multi-level governance cooperation;</li> <li>• Creating international conditions/rules for cross-border collaboration and knowledge exchange: enlarging the playing field;</li> <li>• Promoting behavioural change and citizen participation through market incentives and financial stimulation;</li> <li>• Contributing to an internationally inclusive circular economy without negatively impacting society, e.g. employment.</li> </ul>	<p>The Netherlands collaborates at policy level and shares our knowledge on waste-to-energy market development globally. Example themes for dialogue are:</p> <ul style="list-style-type: none"> <li>• Integration of waste-to-energy into a national waste policy through multi-level governance cooperation.</li> <li>• Waste-to-energy technology comparison in a national context: feasibility studies or scenario modelling.</li> <li>• Emission standards for direct incineration plants.</li> <li>• Policies for biogas produced from organic waste streams and existing landfills.</li> <li>• Waste separation, recycling and its role in a sustainable waste management system.</li> </ul>	<p>The Netherlands collaborates with policymakers to address the vast challenges related to the WEF Nexus. Possible themes for dialogue are:</p> <ul style="list-style-type: none"> <li>• Joint research on interlinkages between water, energy and food, and climate ;</li> <li>• Multi-land use by combining solar energy with strip cropping;</li> <li>• Urban farming using WEF Nexus principles.</li> </ul>	<p>The Netherlands would like to collaborate at the policy level and provide assistance for developments related to e-mobility. Example themes are:</p> <ul style="list-style-type: none"> <li>• Integration concepts: methods and technologies on the governance, architecture, modelling, standards and interfaces for integrated tools for e-mobility;</li> <li>• Grid coordination between utilities, distribution and charging companies;</li> <li>• Charging and de-charging protocols for grid load balancing and the optimisation of battery life;</li> <li>• Energy supply services for electric vehicles;</li> <li>• Tools and standards for the optimisation of building energy supply and electric vehicle charging, such as the Vehicle-to-Grid (V2G) and Vehicle-to-everything (V2X) technology.</li> </ul>

<b>Proof points</b>	<ul style="list-style-type: none"> <li>• New forecasting and monitoring tools to <a href="#">balance supply and demand</a>;</li> <li>• <a href="#">Vehicle-to-Grid technology</a> (V2G) charges electric vehicles and delivers electricity back to the grid;</li> <li>• <a href="#">Amsterdam</a> hosts a V2G pilot as the first city in the world;</li> <li>• In the city of Utrecht: <a href="#">Sono Motors to Provide 100 Sion</a> to We Drive Solar for V2G Project</li> <li>• <a href="#">Energy storage</a> balances fluctuations</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">The National Raw Materials Agreement</a>,</li> <li>• <a href="#">Implementation Programme 2019-2023</a>,</li> <li>• <a href="#">Green Deals</a></li> <li>• <a href="#">Versnellingshuis</a></li> <li>• <a href="#">Circular Economy Finance Guidelines</a>;</li> <li>• <a href="#">Holland Circular Hotspot</a>,</li> </ul>	<ul style="list-style-type: none"> <li>• The Netherlands recycles 80% of its waste, incinerates 17% of its waste and turns it into energy, leaving only 3% to landfill.</li> <li>• <i>Digestion</i>: 250 biogas projects in NL accounting for almost 3% of gross final consumption of renewable energy.</li> <li>• <i>Landfill gas extraction</i>: obligatory to capture landfill gas and to use or flare it. NL companies are active worldwide.</li> <li>• <i>Waste incineration</i>: In 2018, waste incineration contributed to 10% of the renewable energy production in the Netherlands.</li> </ul>	<ul style="list-style-type: none"> <li>• The University of Wageningen (WUR) led the <a href="#">European SIM4NEXUS project</a>.</li> <li>• Research and technology organisation TNO is working on <a href="#">floating solar panels</a> for food production at sea.</li> </ul>	<ul style="list-style-type: none"> <li>• <a href="#">Formula E-Team</a></li> <li>• <a href="#">Green Deals</a></li> <li>• The E-mobility Innovation and Acceleration Programme</li> <li>• <a href="#">eViolin</a></li> <li>• <a href="#">The Netherlands Knowledge Platform for Charging Infrastructure</a></li> </ul>
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## Clean energy

Type	Green hydrogen	Offshore wind	Solar energy
Why	Hydrogen is one of the most flexible and versatile carbon-neutral fuels and its potential is huge. Yet, unlocking it requires structured efforts such as scaling up production capacity, developing infrastructure and improving global logistics. We need to work together on the large-scale adoption of green hydrogen, from storage and transport to production and application.	Backed by a strong history of maritime oil and gas operations, an innovative roll-out policy and continuous innovation, the Dutch offshore wind market has matured rapidly. It is now among the global leaders in cost-efficient offshore wind farm development and installation.	The use of solar energy to produce electricity through photo voltaic systems can be key in facilitating this transition. Solar energy is projected to be the cheapest electricity and is currently already cheaper than coal and gas in most major countries (IEA, 2020).

<p><b>How</b></p>	<p>The Netherlands actively seeks out cooperation with other governments at the policy level and shares expertise and learnings on hydrogen. Example themes for dialogue are:</p> <ul style="list-style-type: none"> <li>• How to build a clean hydrogen economy from a policy perspective;</li> <li>• Best practices for certification, standardisation and safety;</li> <li>• Best practices in setting up a regional hydrogen value chain.</li> </ul>	<p>The Netherlands shares knowledge to aid further development of the offshore wind energy market development. Example themes for dialogues are:</p> <ul style="list-style-type: none"> <li>• Tender procedures and the role of the government;</li> <li>• System integration: the integration of offshore wind energy in the grid;</li> <li>• Wind energy as part of the many uses of space.</li> </ul>	<p>The Netherlands collaborates at the policy level and shares knowledge for PV market development. Example themes for dialogue are:</p> <ul style="list-style-type: none"> <li>• Pilot projects and implementation of new technologies and applications;</li> <li>• Off-grid solar solutions, such as solar water pumping for agriculture;</li> <li>• Innovation, Research &amp; Development in areas such as for news ways of using PV systems (including integration), the integration of PV technology into infrastructure and vehicles.</li> </ul>
<p><b>Proof points</b></p>	<ul style="list-style-type: none"> <li>• A wind turbine with an integrated 4 MW electrolyser</li> <li>• The <a href="#">world's first offshore electrolyser</a> in the North Sea.</li> <li>• <a href="#">Other projects</a></li> </ul>	<p>The Dutch offshore wind sector</p> <ul style="list-style-type: none"> <li>• has internationally renowned market players in almost all wind farm cycle supply chain segments;</li> <li>• is well organised in the worldwide-renowned wind and water works initiative.</li> </ul>	<ul style="list-style-type: none"> <li>• The Dutch government is committed to the climate and energy transition and actively taps into <a href="#">the potential of solar energy</a>.</li> <li>• the Netherlands' <a href="#">Top Sector Energy</a> programme supports innovation in the field of: <ul style="list-style-type: none"> <li>○ Applications in new products with increased electricity yield and building integrated PV, such as greenhouse roofs;</li> <li>○ Production of solar cells and modules, including crystalline silicon wafers, thin films, efficiency enhancement, maintenance and dust prevention, recycling and testing methods for PV cells and modules.</li> </ul> </li> </ul>