



20 MINUTE #COUNTRY# PRESENTATION

6Rnd Task 1 Meeting #date# [Bora Bora, French Polynesia]

What is IEA PVPS?



- The International Energy Agency (IEA), founded in 1974, is an autonomous body within the framework of the Organization for Economic Cooperation and Development (OECD).
- The Technology Collaboration Programme was created with a belief that the future of energy security and sustainability starts with global collaboration. The programme is made up of thousands of experts across government, academia, and industry dedicated to advancing common research and the application of specific energy technologies.

What is IEA PVPS?



- The IEA Photovoltaic Power Systems Programme (PVPS) is one of the Technology Collaboration Programme established within the International Energy Agency in 1993
- 32 members - 27 countries, European Commission, 4 associations
- *“To enhance the international collaborative efforts which facilitate the role of photovoltaic solar energy as a cornerstone in the transition to sustainable energy systems”*



Country – The Netherlands General Info



- Population 17.88 million
- Total electricity demand 107.684 TWh
- Share of renewables 17%, an increase of 2% compared to 2022, of which solar takes 24%, wind 31%, biomass 34% and heat pumps/geothermal 8%.
- Share of solar 16,4% total electricity production in 2023

Country – Energy Transition



- Climate action plans
- Since the 2019 Climate Agreement, the Netherlands has legally binding national climate targets for 2030 and 2050. The original target was to reduce greenhouse gas emissions 49% by 2030 compared to 1990 levels and 95% by 2050. These targets cover all greenhouse gas emissions in the country and were set as legal requirements in the Climate Act in May 2019.
- In 2021, the Netherlands increased its climate ambitions and changed the 2030 target to 55% emissions reductions in line with the EU target, with the aim to introduce policies that enable a 60% reduction.

Country – Energy Transition



- Climate action plans
- The climate targets translate to greenhouse gas emissions levels at 91 103 Mt CO₂-eq by 2030 and less than 11 Mt CO₂-eq by 2050, compared to 221 Mt CO₂ eq in 1990. In 2023, total emissions were 148 Mt CO₂-eq. Power and heat generation is the largest source of emissions, followed by industry, buildings, transport and agriculture. The power sector has decreased emissions the most in recent years, from 48 Mt CO₂ eq in 2018 to 24 Mt CO₂-eq in 2023, a reduction by half in five years.
- Data of 2022 and 2023 are from CBS: <https://www.cbs.nl/en-gb/figures/detail/84979ENG>.

Country – Energy Transition



- Climate action plans
- The first Climate Plan was based on the 2019 Climate Agreement and the second plan is scheduled for 2025. Furthermore, the Climate Act requires the Environmental Assessment Agency (PBL) to publish an annual Climate and Energy Outlook (Klimaat- en Energieverkenning, KEV).
- The KEV from 2022 showed that the Netherlands was not on track to meet its 2030 target. As a response, the government put forward the Climate Package in April 2023, with 120 measures directed to various areas in both supply and demand sectors. The total budget for implementing the Climate Package was EUR 28 billion until 2030, most of which coming from the Climate Fund. In 2023 the KEV showed the climate goals were still within reach.

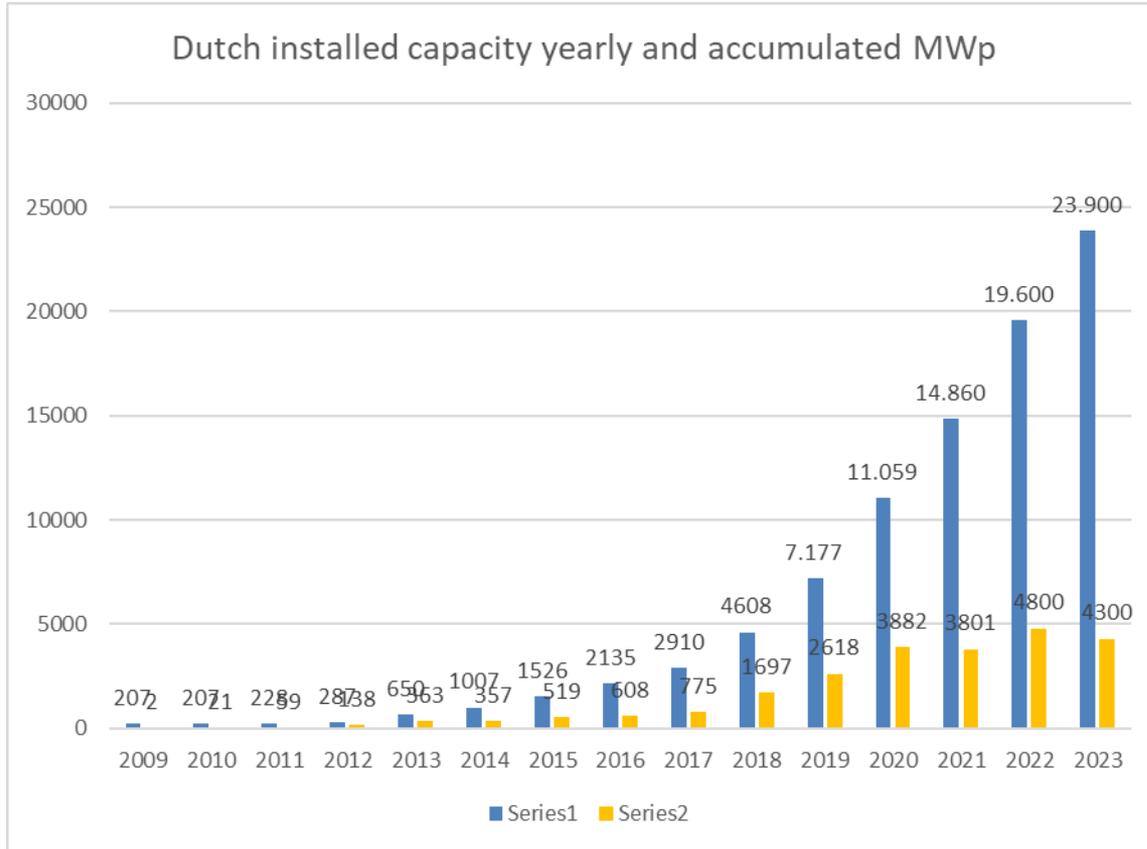
Country – Energy Transition



- Climate action plans
- There are no specific targets for solar development
- Electricity production 2023 in TWh (CBS)

Electricity production total	121,4 TWh
Fossil Fuels	58,2
Wind	29,2
Solar	20,0
Nuclear	7,6
Biomass	4,0
Other	2,4

PV Market evolution installed capacity



PV Market segments



- In 2023 the steady growth leveled off at 4.4 GWp installed
- Especially the larger centralized systems (> 15 kWp) in the SDE++ category fell behind due to grid congestion. Uncertainty about the future of net metering and involuntary curtailment may have made prosumers more wary to invest in roof top applications
- While during the energy crisis electricity prices soared the prices in 2023 fell but did not return to the pre crisis level. This stimulated a record installation in 2022 but the DNB (22-04-2024) showed that mostly house owners were able to reduce their energy bills, while tenants were not.
- Grid congestion has stimulated PPA's, cable pooling in hybrid power plants and the development of energy hubs to match local demand and supply.

PV Market segments



- Large centralized systems (ground mounted, roof top and inshore floating) and smaller systems account for roughly 50% each of the total installed capacity.
- Although several “market ready” BIPV systems are available, there is still a large amount of innovation both technical and socio-economical being sponsored by government. The national production capacity for BIPV modules in the Netherlands is currently estimated at 100 MW a year and ramping up with support of the national growth fund initiative SolarNL with two specific program lines on BIPV.
- Community solar in the Netherlands is relatively small (less than 1 percent of yearly total installed capacity) although energy communities (collectives) are present in most municipalities and expanding their activities to other renewable energy sources.



- Inshore floating systems are usually accounted for in the larger SDE++ scheme while offshore floating systems are still under development and not online yet
- The government has set goals for achieving 3 GWp offshore floating systems on the North Sea in 2030
- AgriPV is usually included in the larger systems SDE++ category and not distinguished as such
- The Ministry of Transport & Infrastructure stimulates solar PV on government land and along highways (OER program)
- Off-grid systems in the Netherlands are rare and mostly restricted to the transport infrastructure, weather stations, etc.

Overview of market drivers



- Key drivers for decentralized PV deployment include the higher electricity demand caused by home charged electrical vehicles, heat pumps, increasingly air conditioning in the summer and the rising energy prices caused by not only the energy crisis but also higher transportation fees by grid operators.
- Electric cars (excluding fuel cell vehicles) estimated total 543.300 and new in 2023 around 100.000 (source IEA TCP HEV Annual Report). In 2023 a new collaboration agreement on a regional approach to national coverage of charging infrastructure was presented in October 2023.
- The installation of heat pumps in the Netherlands accelerates after 2016 to a total of estimated 550.000 in 2022 and 100.000 installed yearly. (source IEA TCP HTP Annual Report 2023).

Overview of market drivers



- Grid congestion stimulates developments like hybrid solar/wind parks and so called energy hubs which match local demand with supply.
- Figures for Battery capacity over 1 MWh are collected by the CBS since 2022. The total of this category amount to an estimated 1000 MWh in 2023.
- Data for smaller battery storage systems including home battery systems are not collected yet.

Showcase system



- Please share 1 photo of a recent system that strikes you as important for your country (or you), and explain why

PV Industry (if relevant)



- In 2023 a national grow fund proposal was granted SOLARNL with 300 Million government support
- It contains three program lines
 - High efficiency hetero junction cells
 - Flexible solar foils and perovskites
 - Custom made light weight applications (BIPV and VIPV)
- In addition circular solar panel design is being stimulated and new ways for recycling panels that have reached end of life.
- Competition between the continents is fierce with Europe lacking an integrated value chain.

Key subjects of the past 6 to 12 months



- Growth in electricity demand and in distributed renewable electricity generation puts the electricity grid under great pressure. The Netherlands has relied mainly on natural gas for heating and other applications, and the electricity grid was not built for the type of consumption and production now coming in.
- Grid congestion has become a major societal challenge to the clean energy transition and overall economic development, delaying the connection of new industries, housing projects and other components in the energy system.
- Short term solutions like frequency management, cable pooling and voluntary curtailment are stimulated by the government and grid operators.
- The overall lack of anticipating the future, also in the solar sector, is under scrutiny and new activities are developed such as offshore, renovation of the building stock and adapting the gas infrastructure for (green) hydrogen.

Social acceptance in your country



- In the above the economic and social aspects were already mentioned.
- The esthetical aspects of solar in the landscape and built environment are addressed with technology and design innovations.
- Spatial Integration of solar PV is high on the agenda of local governments.
- Legal constraints however prove to be the hardest issues to solve as inherent trade-offs have to be addressed and political consensus reached.

Grid costs (connection & annual) in your country



- Anything new/recent on this subject in your country?
- Any new actions / tools / events ?

NSR – for information from BI team



- We use your Trends data collection file (super simplified excel) to write the Trends
- We need the data by end of July to publish in late September
- What was missing this year that we (BI team) struggled with finding alternatives:
 - system prices and price decomposition;
 - in-country interest rates
 - in-country module prices
 - clear information categorising legacy/ongoing/closed support mechanisms (data collection method to be improved on our side)
 - Market segmentation residential / C&I / utility / other

NSR – what, who, why !



- Will you do a NSR this year? YES
- Use: Who do you disseminate it to? How many readers? What do they use it for? Just PVPS since nationally there are other publications.
- Content: What sections are hardest / impossible for you to fill? What sections are easiest? What sections are most useful? System components by year are often not available for all market segments. Market segments are national specific.
- Timeline: Could you do it earlier in the year? No since the CBS publishes in October.
- What format would you prefer? Less text more tables? More graphs? More consistency and less repetition.

