



InnoGrid 2023

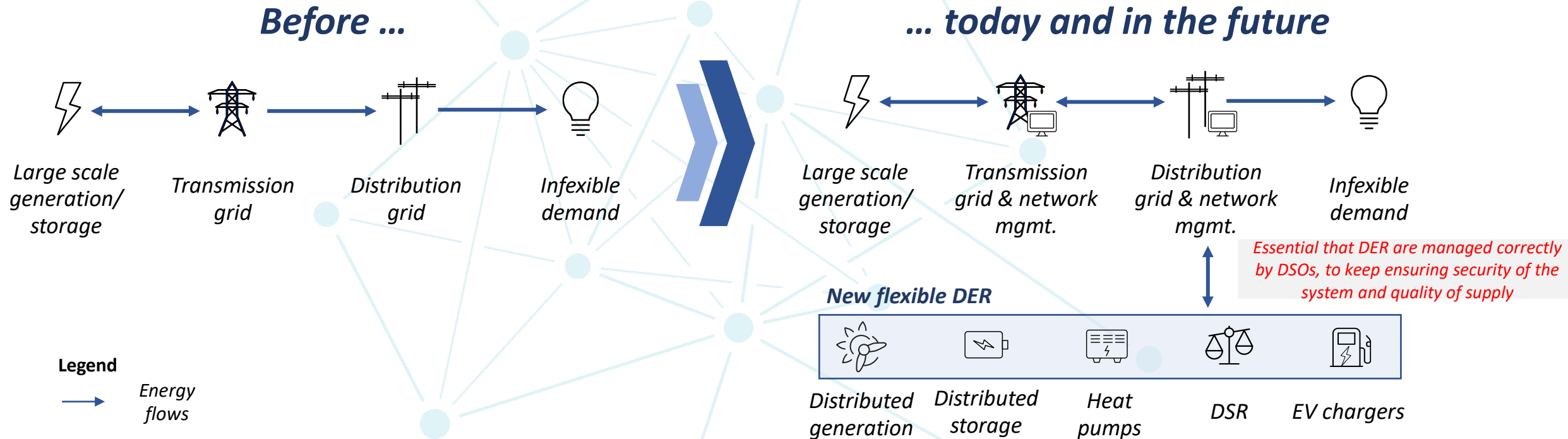
‘E.DSO view on electrification’

Tassos Manos, Member of the Board, E.DSO; CEO, HEDNO
– 14th June 2023



The set up of grids has been changing, led by the entry of new DER and the need for DSOs to manage them

HOW THE SET UP OF GRIDS HAS EVOLVED?



DSO: Distribution System Operator; DER: Distributed Energy Resources; DSR: Demand Side Response; EV: Electric Vehicle



This evolution needs to be supported by huge investments in distribution grid infrastructure, estimated at ~400 bn€ by 2030

MAIN NEEDS TOWARDS ELECTRIFICATION IN EUROPE BY 2030 ...



40-55% of LV **grids** will need to be **replaced**¹



+360 GW of **RES** need to be connected at distribution level



+415 TWh of final demand, due to **electrification of building and industry**



+80% of **smart meter** penetration



Need to enforce **resilience of distribution grids** to face extreme weather events and natural disasters²



+56 million of **EV charging points**³ to be installed

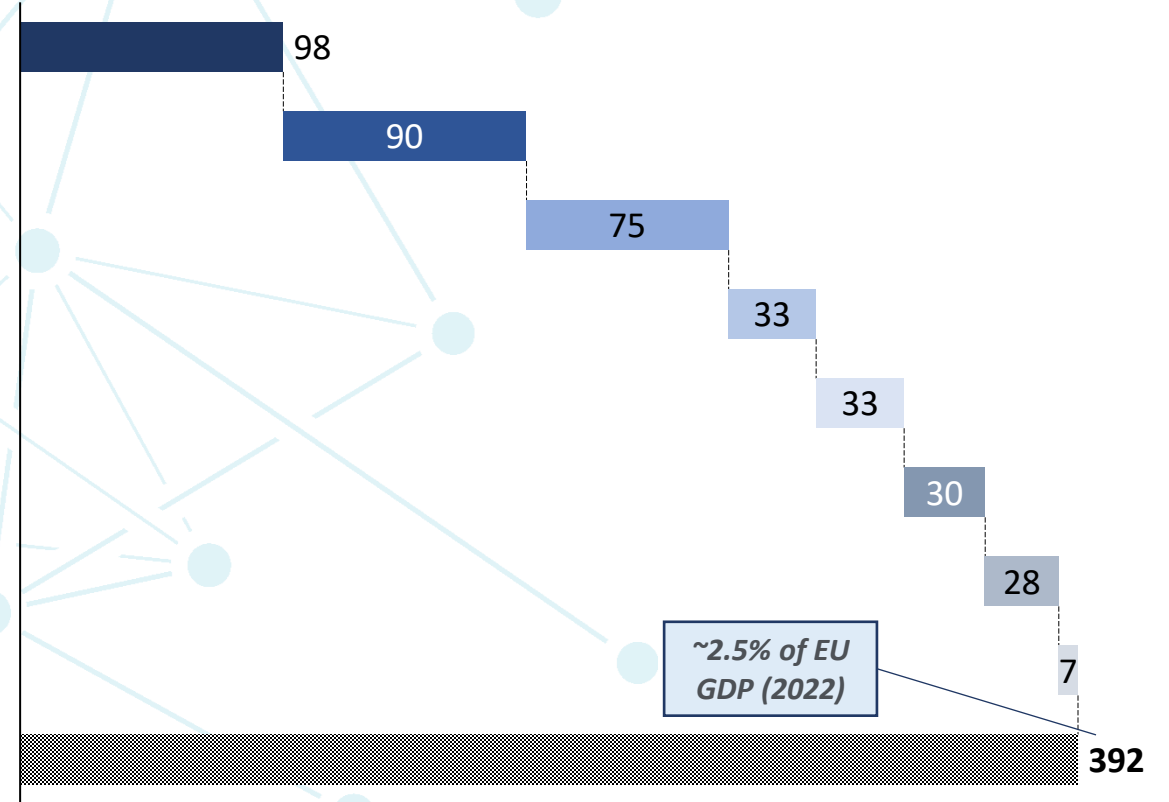


100% of LV grids to be **digitalised**⁴



+800% of **storage** capacity to be connected to transmission and distribution grids

... AND EXPECTED INVESTMENTS IN GRIDS AT DISTRIBUTION LEVEL (bn€⁵)








Source: Data of infrastructure (SX) – [Eurelectric](#), except for 'Storage' – [EASE](#); Data on investments (DX) – [Eurelectric](#); GDP EU27 – Eurostat | 1. As reaching > 40 years old age; 2. Resilience measures varies according to single country needs; 3. Both public and residential charging points; 4. through investments in e.g. automation of substations, grid monitoring, data management; 5. Nominal, over 2020-30 period | LV: Low Voltage; RES: Renewable Energy Sources; EV: Electric Vehicle; GDP: Gross Domestic Product



In addition to this, a number of new policy measures, in the changed scenario, is impacting the DSO business

MAIN EU POLICY MEASURES ON ELECTRIFICATION AND...

- **Simplification of permitting process**
Permitting processes for RES/flex sources has been simplified via temporary measures by the EC
- **Flex markets and incentive regimes**
EC pushes for creation of local flexibility markets and new incentive regimes for alternative investments
- **Targets on zero-emission buildings**
EU performance standards for buildings have been revised, to increase rooftop PV and EV charging
- **Targets on zero-emission mobility**
EU targets to increase EV and maritime charging and reduce CO2 emissions of transports have been revised
- **Smart-meter and «submeter»**
The EC has identified the smart-meter as a key enabler for DR participation in the electricity market

... POTENTIAL IMPACT ON EUROPEAN DSOS

The expected increase of requests for connection by distributed sources will **worsen** the heavy **administrative burdens of DSOs** as well as requires **additional investments** on grid reinforcements and digitalisation

Most of EU Member States **do not have flex markets** for local services. Also, most of the countries have not yet implemented **incentives regimes** (e.g. TOTEX) to stimulate alternative investments than grid reinforcements

Additional connected sources, due to firmer **obligations** for buildings to install **rooftop PV** and **EV charging station**, would affect DSOs **operations** (i.e. SoS and quality of service) and **planning** (i.e. grid reinforcements)

DSOs will have to cope with the expected increase of **demand for connections** by EV and possibly maritime charging station as well as the **increase of electric demand** due to the switch from fossil to electric fuels

There is the need to assess **regulatory measures**¹ and appropriate **funding supports** to unlock the deployment of (sub) **smart-meters**, with particular focus on those markets where the deployment is still behind

1. To encourage proactive deployment of meters by the DSOs, but also to ensure full access and use of 'meters' (and sub-meter) data by them. This to allow DSOs to keep SQSS | DER: Distributed Energy Resources; DSO: Distribution System Operator; RES: Renewable Energy Sources; EU: European Union; EC: European Commission; SoS: Security of Supply; DR: Demand Response; SQSS: Security and Quality of Supply Standard



Some action are considered primary for DSOs in order to ensure the electrification of the system in the coming years

TOP PRIORITIES FOR DSOS TOWARDS ELECTRIFICATION



Connection of incoming DER

- Long permitting processes and lead times for building new grids risk to delay DER connections and so electrification
- Regulatory frameworks needs to be revised, in order to stimulate the quick reinforcement of grid infrastructure



OPEX based incentive regime

- DSOs need to guarantee efficient expenditure of OPEX as well as traditional investments in grids (CAPEX)
- This can be achieved by developing incentive regimes which promote also the use of flexibility provided by DER1 to solve grid issues



New network codes

- Technical rules need to be revised in order cope with the new challenges brought by electrification
- This would require the definition of new network codes at European level to adapt the operations of electricity networks to the new paradigm

1. Through dedicated flexibility markets | DER: Distributed Energy Resources; DSO: Distribution System Operator

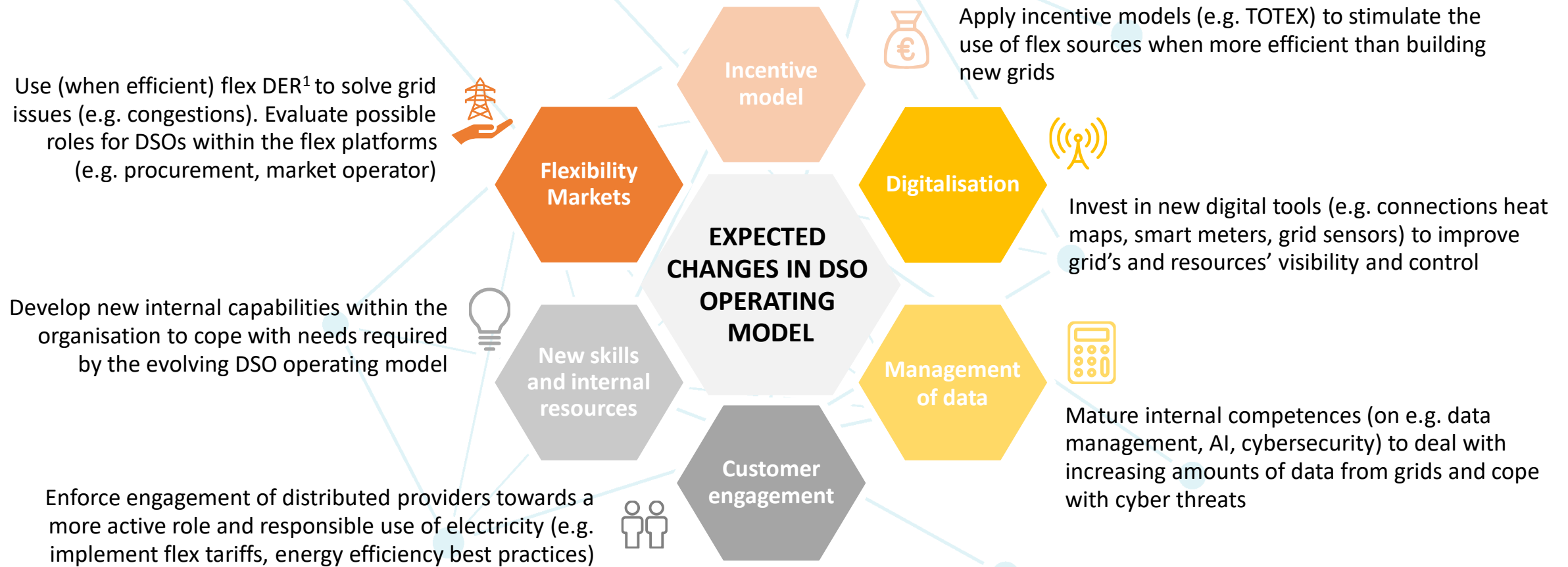


Annex





To cope with the challenges, the DSOs will need to radically change their operating model, stepping into a more active role



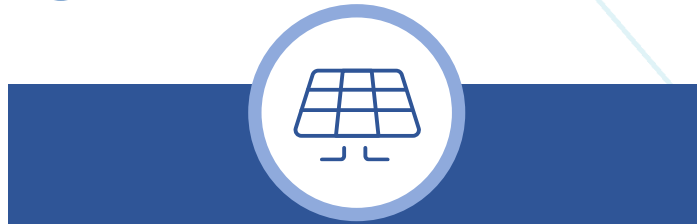
1. e.g. DR, EV charging, storage, solar PV | DSO: Distribution System Operator; DR: Demand Response; EV: Electric Vehicle; PV: Photovoltaics; AI: Artificial Intelligence; TSO: Transmission System Operator



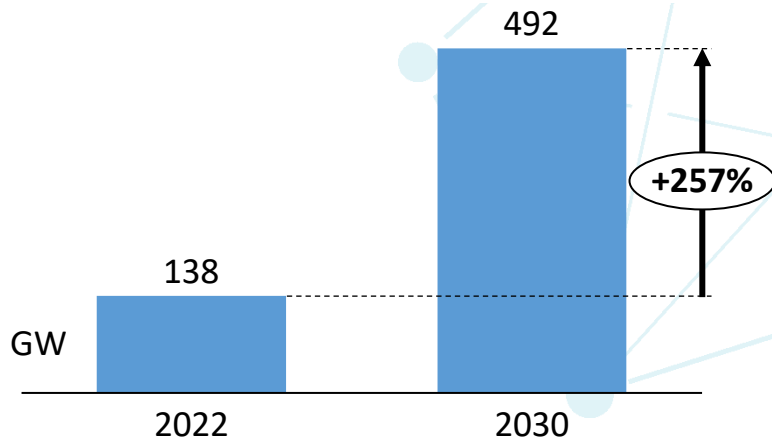
The expected boost of DER will impact the future operational scenario of DSOs in Europe



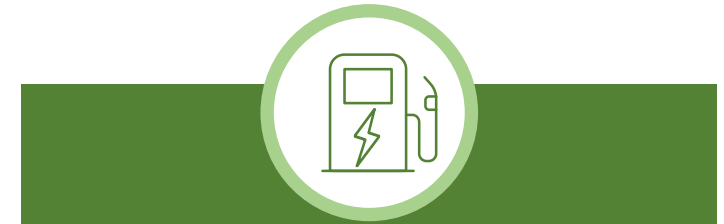
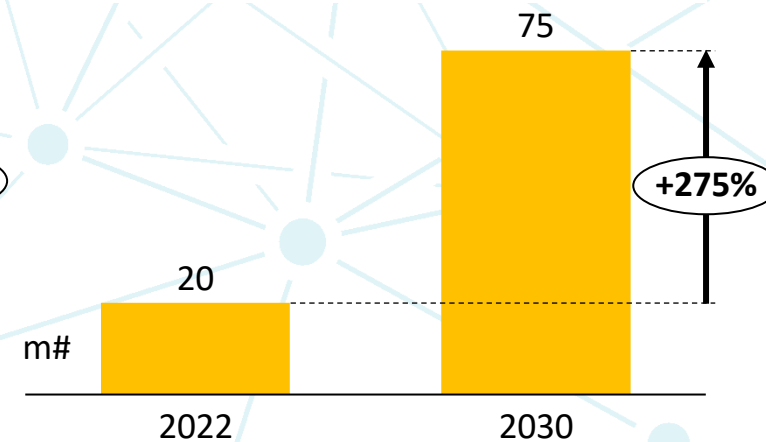
Key expected trends for DER in EU



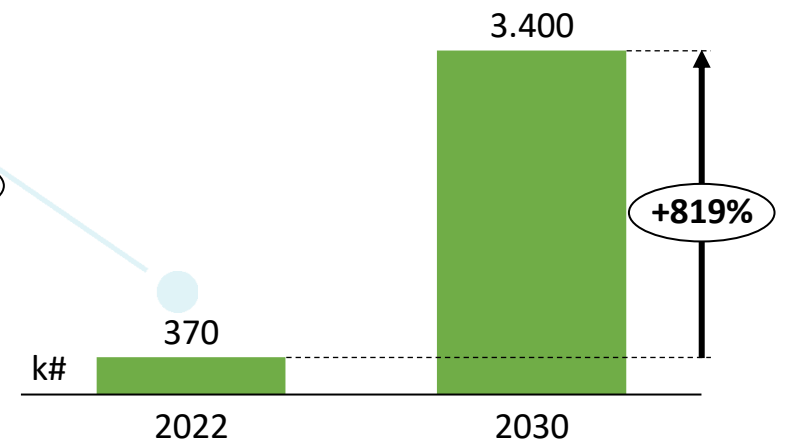
ROOFTOP SOLAR PV
(installed capacity)



HEAT PUMPS
(installed units)



PUBLIC EV CHARGING POINTS
(installed units)



Sources: Rooftop Solar PV – calculated from data by [SolarPower Europe](#); Heat Pumps – combined data from [EHPA](#) and [REpowerEU](#); Public EV Charging Points: [McKinsey](#) | EU: European Union; DER: Distributed Energy Resources; EV: Electric Vehicle; PV: Photovoltaics; DSO: Distribution System Operator



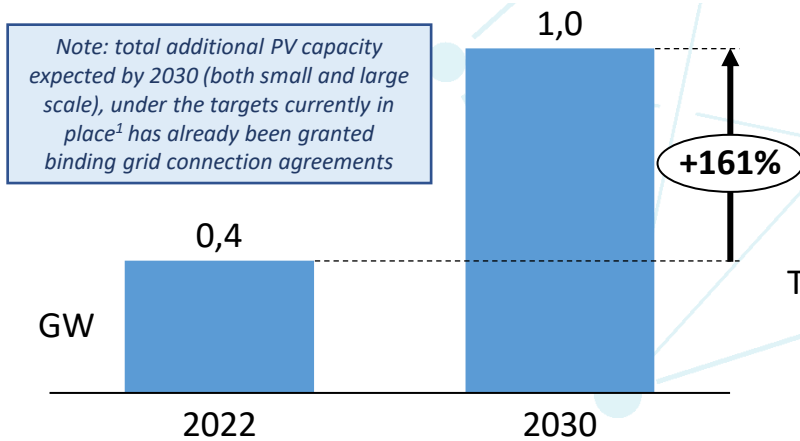
DER are expected to grow also in Greece considering current targets, and further more when these will be reinforced



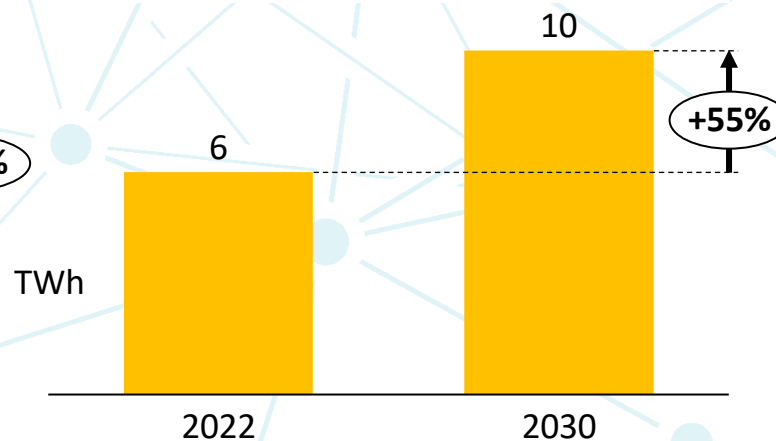
Key expected trends for DER in Greece

Note: trends reflect NECP 2019 strategy, which is currently under revision and expected to reinforce decarbonisation targets further

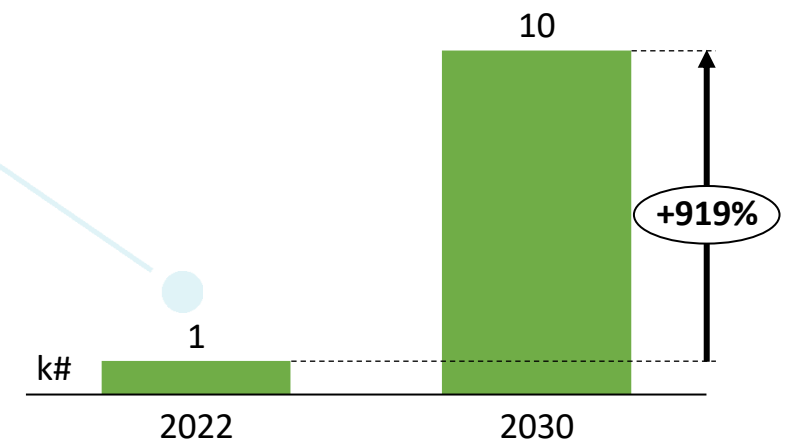
ROOFTOP SOLAR PV (installed capacity)



HEAT PUMPS (electricity consumptions)



PUBLIC EV CHARGING POINTS (installed units)



Sources: Rooftop Solar PV – Historical: [HELAPCO](#); 2030 target: [NECP 2019](#); Heat Pumps – [NECP 2019](#); Public EV Charging Points: [NECP 2019](#) | 1. NECP 2019, currently under revision | DER: Distributed Energy Resources; EV: Electric Vehicle; PV: Photovoltaics; DSO: Distribution System Operator; NECP: National Energy and Climate Plan