



Trends in Buildings, Transportation & Industry

Strictly Private and Confidential

WATTCROP

SOLAR PV | WIND | ENERGY STORAGE

W. WHO WE ARE.



Wattcrop was incorporated in 2019 aiming to develop best-in-class renewable energy and energy storage projects mainly in SouthEast Europe and the UK. 2021 established a JV with CERO.



DEVELOPMENT

Greenfield development of 1.3GWp in RES generation & 1GW / 4GWh in stand-alone storage.



17 MULTI-SKILLED GREEK TEAM

Fast growing team of dedicated engineers & project managers

2 COUNTRIES

3 OFFICE LOCATIONS

Ptolemaida - Greece

Thessaloniki - Greece

London - UK



DESIGN + CONSTRUCTION MANAGEMENT

- Design Optimisation
- Management of EPCs
- Subcontractors' coordination



ETHICAL DEVELOPERS

Developing projects in harmony with the local communities and the environment

+2 COUNTRIES

+3 OFFICE LOCATIONS

Athens - Greece

Leykosia - Cyprus

Sofia - Bulgaria



ASSET MANAGEMENT – O&M SERVICES

- Remote monitoring
- Asset and site management
- Ancillary O&M services



INNOVATION IN PRACTISE

Development App in Beta Version. Made by Developers for Developers

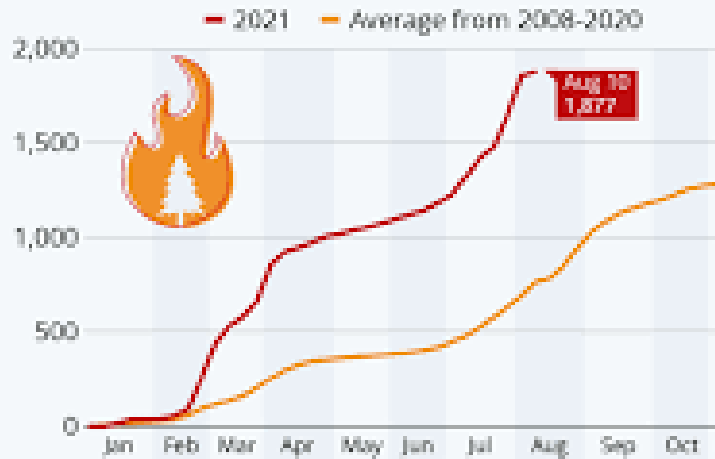
Climate Crisis – Is there a Generational Approach Gap?

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PAGE

Heat and Drought Stoke Extreme Fire Season in Europe

Number of fires of approx. 30 ha or larger registered in Europe in 2021 vs. previous years



Source: European Forest Fire Information System

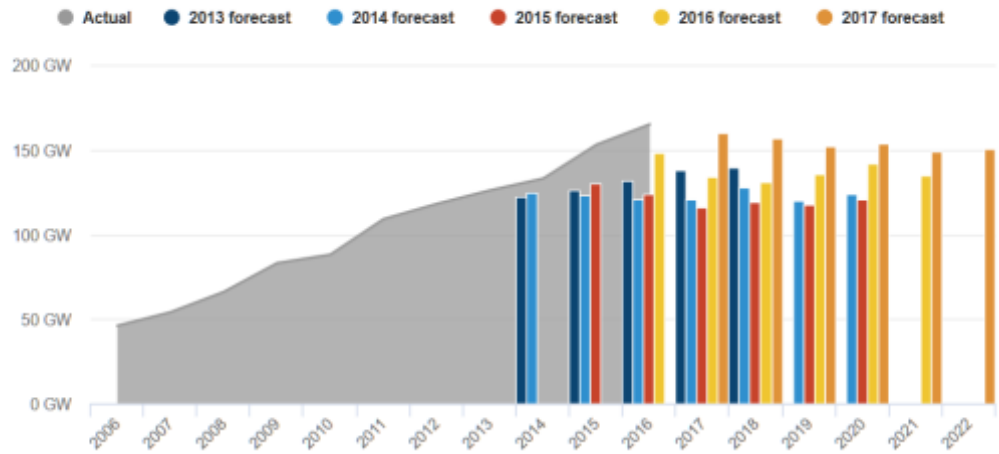


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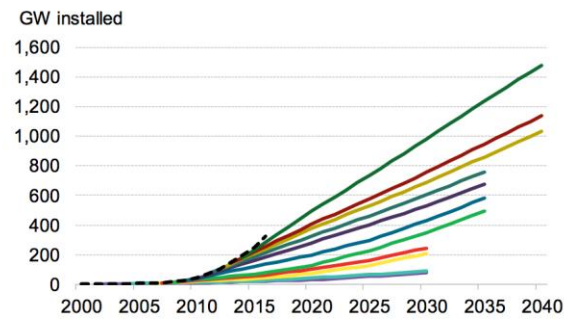
Renewable Energy has Beaten Every Prediction

IEA forecasts of renewable capacity additions

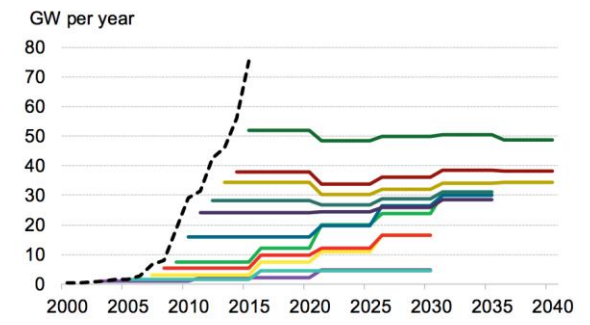


IEA solar capacity forecast evolution

Global cumulative solar installations



Annual solar additions



--- Historical 2004 2006 2008 2009 2010 2011 2012 2013 2014 2015 2016
 Note: 2004-2009 Reference, 2010-2016 New Policies Scenario Source: IEA World Energy Outlook

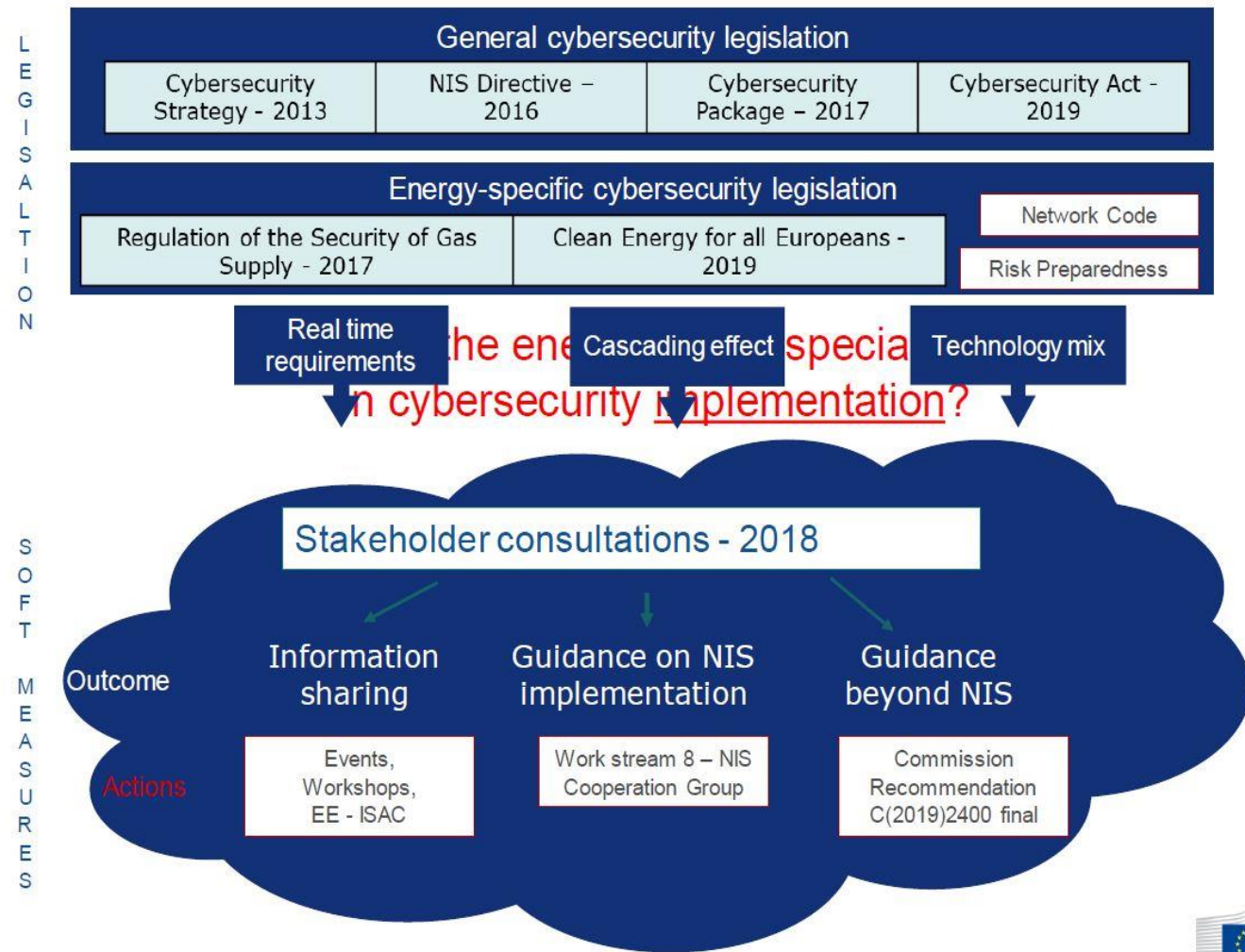
IEA forecasts of annual renewable energy capacity additions versus actual growth. Source: Carbon Brief analysis of IEA Medium Term Renewable Market Reports 2013-2017. Chart by Carbon Brief using Highcharts.

Disintegration of Energy Generation & Cyber Security



DR-401-2020
Why DER cybersecurity is critical and how to protect DER systems

Version 0.1
 25 June 2020



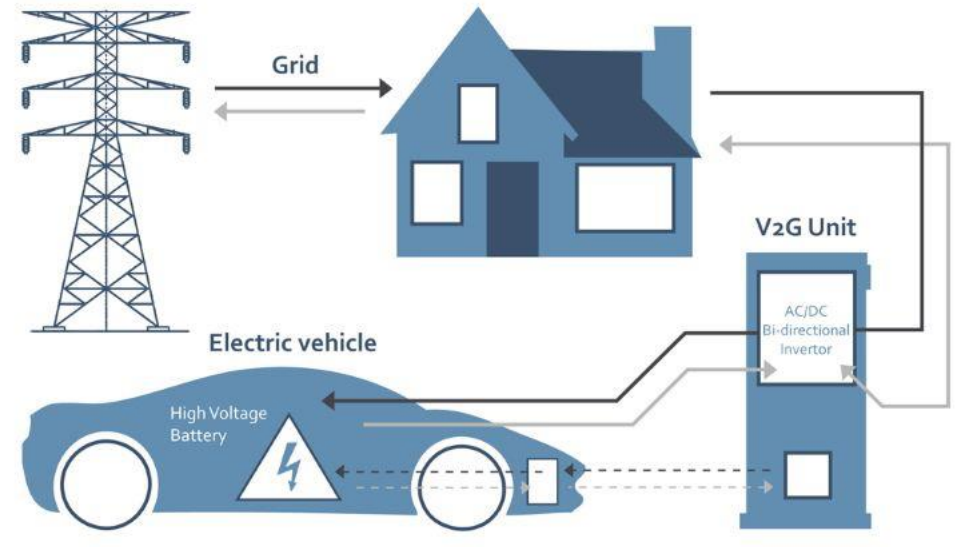
Buildings with Emphasis on C&I

ENERGY EFFICIENCY IN BUILDINGS

EE Measures for Buildings

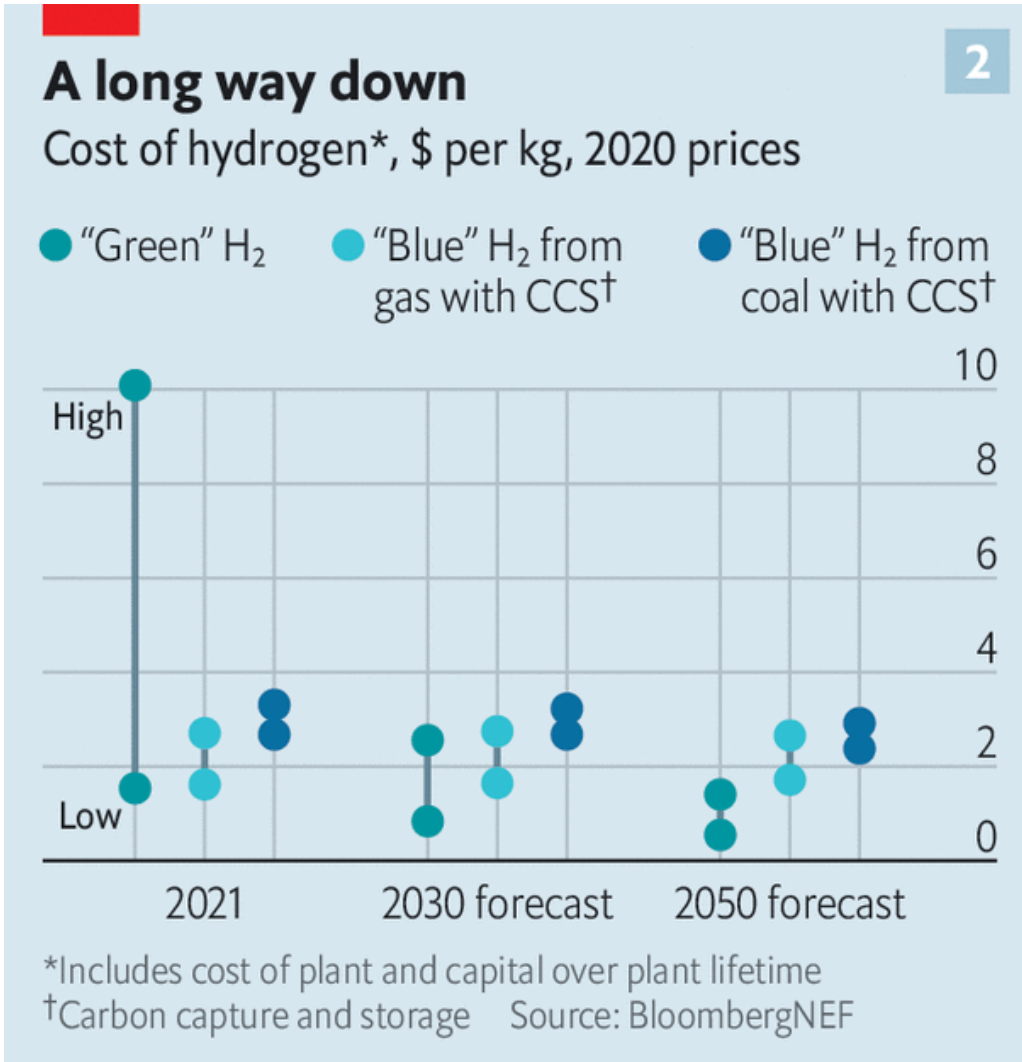


Source: UNIDO, renewable energy & energy efficiency partnership



- Energy Efficiency
- Energy Generation & Storage
- New Solutions like Carports to be allowed in the legislation

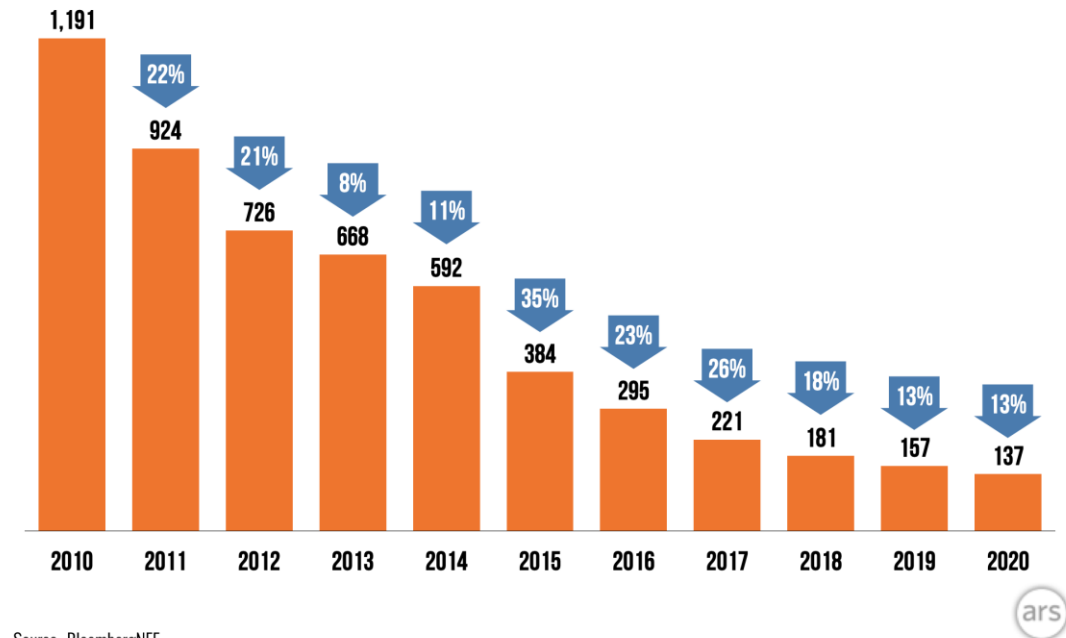
Transportation – Current Trends



The Economist

PRICE OF A LI-ION BATTERY PACK, VOLUME-WEIGHTED AVERAGE

Real 2020 dollars per kilowatt hour



Battery Prices DOWN by 80%

Energy Density is UP by 80%

Capacity Degradation DOWN by 80%

INDUSTRY – Electrification of Heat

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DEEP ELECTRIFICATION OF MANUFACTURING INDUSTRIES



Over **50%** of final energy demand globally is for heating. Around half of that is for heating demands in the industry sector.



Even if we electrify the heat demand for the entire **TRANSPORTATION** sector and **BUILDING** sector in the world, that only covers **30%** and **25%** of world's final energy use, respectively.

Generally speaking, we should not be aggressive in electrification if electricity is not generated from clean/carbon free sources. However, **WE NEED TO START NOW** and **DEVELOP THE TECHNOLOGIES** needed in the future **FOR DEEP ELECTRIFICATION** once the grid is mostly carbon-free.



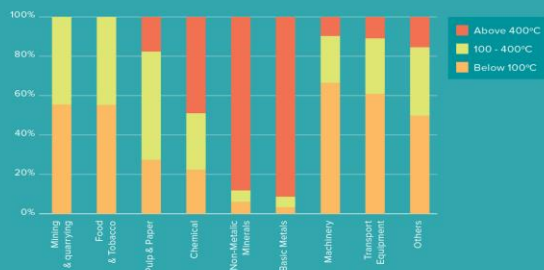
Around **30%** of the total industrial heat demand is required at temperatures below **100°C** and **57%** at temperatures below **400°C**.



In food and beverage, transport equipment, machinery, textile, and pulp and paper industry, the share of heat demand at low and medium temperature (**BELOW 250°C**) is about or even above, **60%** of the total heat demand.

FIGURE

Estimated share of industrial heat demand by temperature level and industrial subsector



With a few exceptions, it is easier to electrify manufacturing processes that require low temperature heat.



In **BASIC METAL** (mainly **IRON AND STEEL**) industry, despite the high temperature requirement, the electric arc furnace (EAF) technology is fully commercialized and accounts for around 30% of world steel production.

In **NON-METALLIC MINERALS** (mainly **CEMENT AND GLASS**) industry, it is more challenging to electrify high temperature kilns or melters, as there are no commercial electrified technologies yet. Significant R&D is needed for these sectors.



The **CHEMICAL INDUSTRY** is a very complex sector. However, over 50% of the fuel use in this sector is consumed in boilers. Electric boilers or electrification of end-use processes that need steam could be the best viable option for this sector.



Some of the suitable industrial processes for **ELECTRIFICATION** include cleaning, drying, evaporation and distillation, washing, pasteurization, sterilization, cooking, melting, painting, surface treatment, and space heating.



Some of the **ELECTRIC END-USE TECHNOLOGIES THAT CAN PROVIDE HEAT** to manufacturing processes are electric boilers, heat pumps, induction heating, Radio frequency heating, microwave heating, electric infrared heating, UV heating, Electric arc furnace, electric induction melting, plasma melting, and Electrolytic reduction.

While some of the electric end-use technologies needed for electrification in industry are fully commercialized, many are at the development or pilot stage, especially for high temperature processes. Therefore, **FURTHER INVESTMENT IN R&D IS NEEDED** for electrification technologies.

GLOBAL EFFICIENCY INTELLIGENCE, LLC has been investigating the deep electrification potential and technologies for manufacturing industries. We invite other interested parties to join us in this effort.

REFERENCES

Global Efficiency Intelligence, LLC analyses.
 Colvins, V., Batschi, R., & Drigo, S. 2008. Potential for solar heat in industrial processes.
 IEA. 2014. Heating without global warming: market developments and policy considerations for renewable heat.
 IEA. 2011. Co-generation and Renewables: solutions for a low-carbon energy future.



Global Efficiency Intelligence, LLC
www.globalefficiencyintel.com

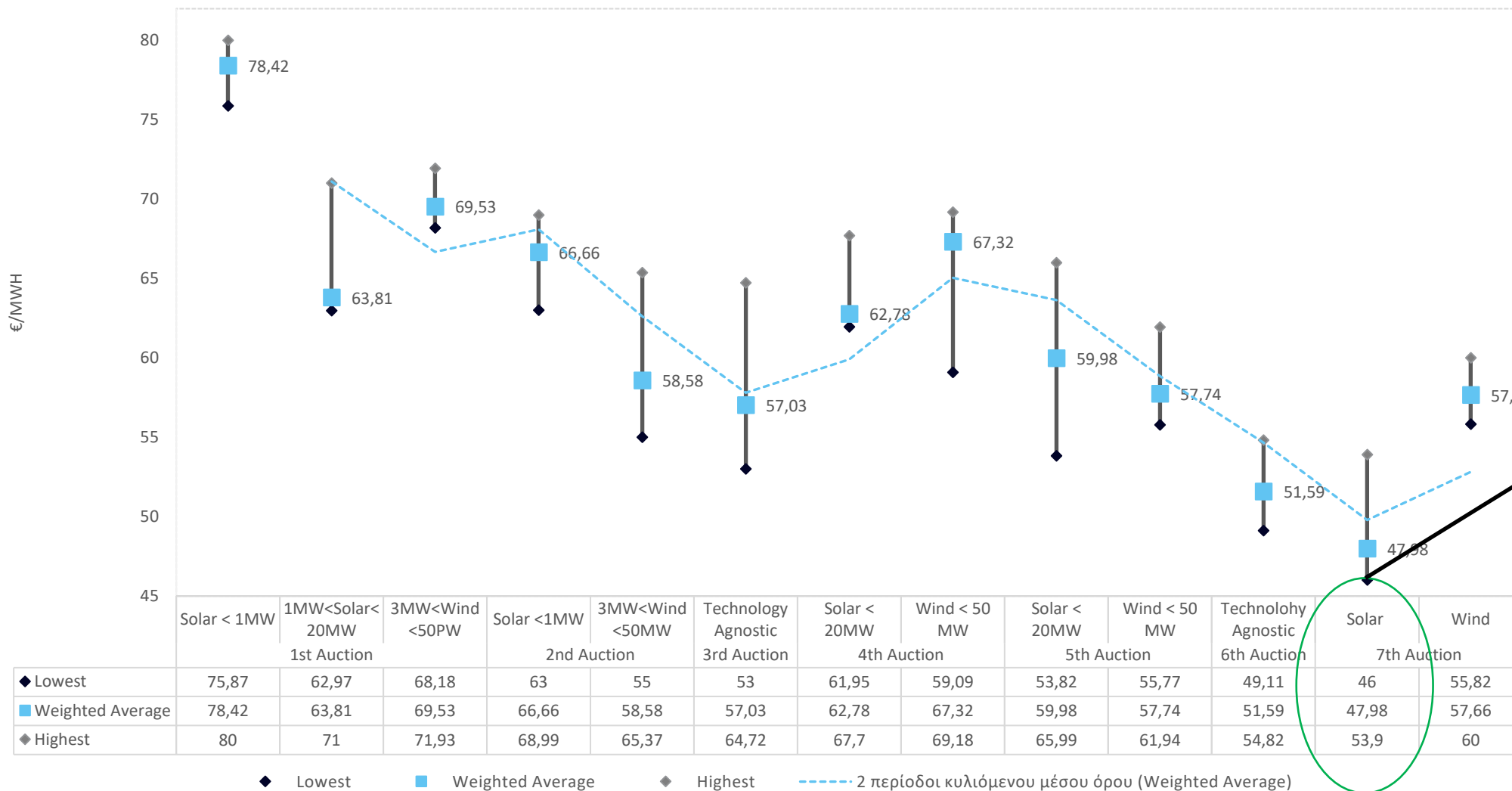
50% of Total Energy demand is allocated to Heating

Electrification of Transportation and Buildings will count for only 55% of final energy use

Easier to Electrify Industries that require low temperature heat (below 100 degrees Celcius)

INDUSTRY - Greek Auction Prices & PPAs

Weighted Average Auction Prices Jul 2018 - Sep 2022 (Including High-Low by category)



PPA as Produced Prices post COD

HOWEVER, PPA range between 40€ to 50€ per MWh on CAPEX variable consideration

THANK YOU!

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