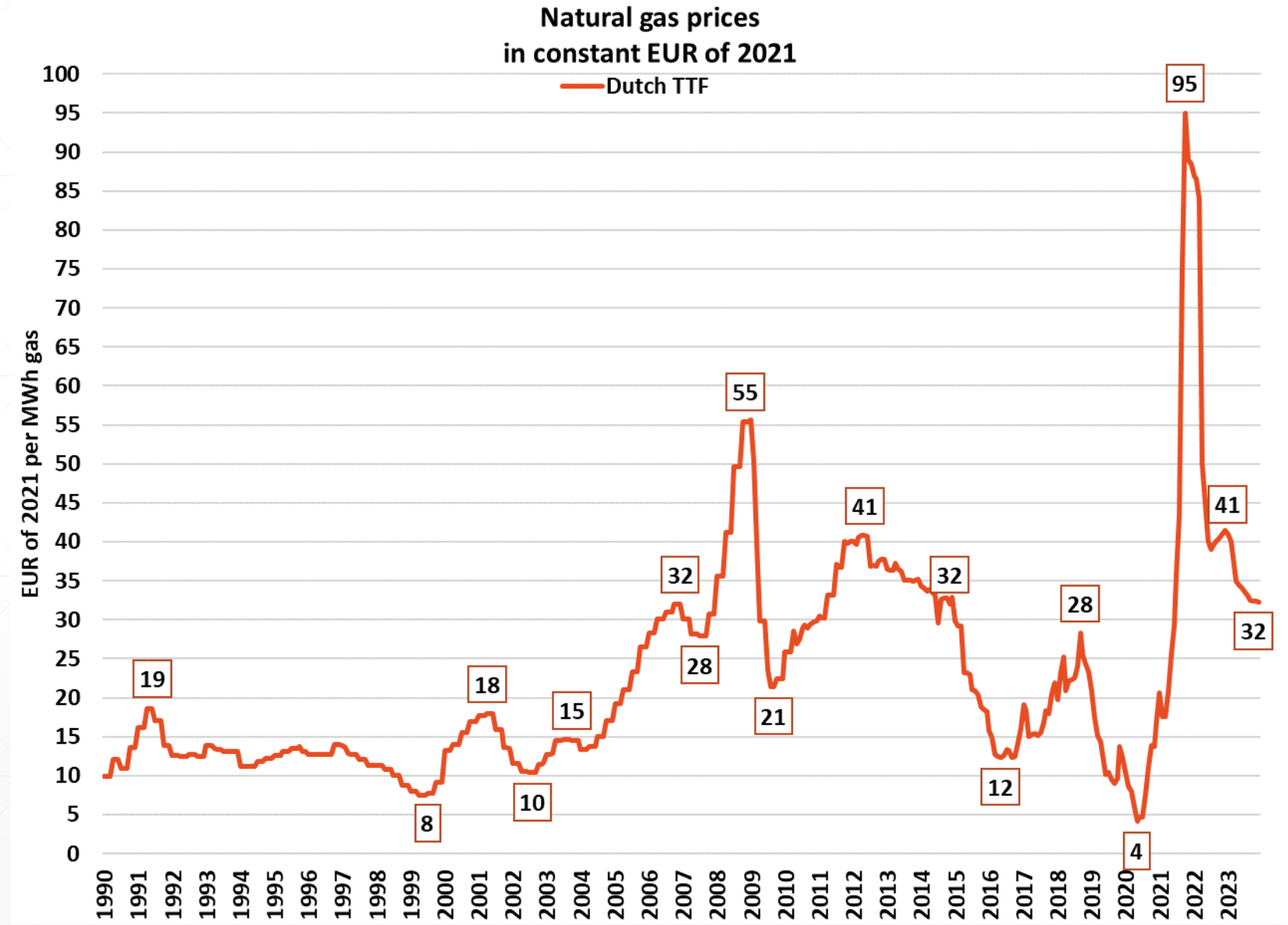


Lessons from the energy price crisis

Pantelis Capros – Prof. NTUA – October 13/14, 2021

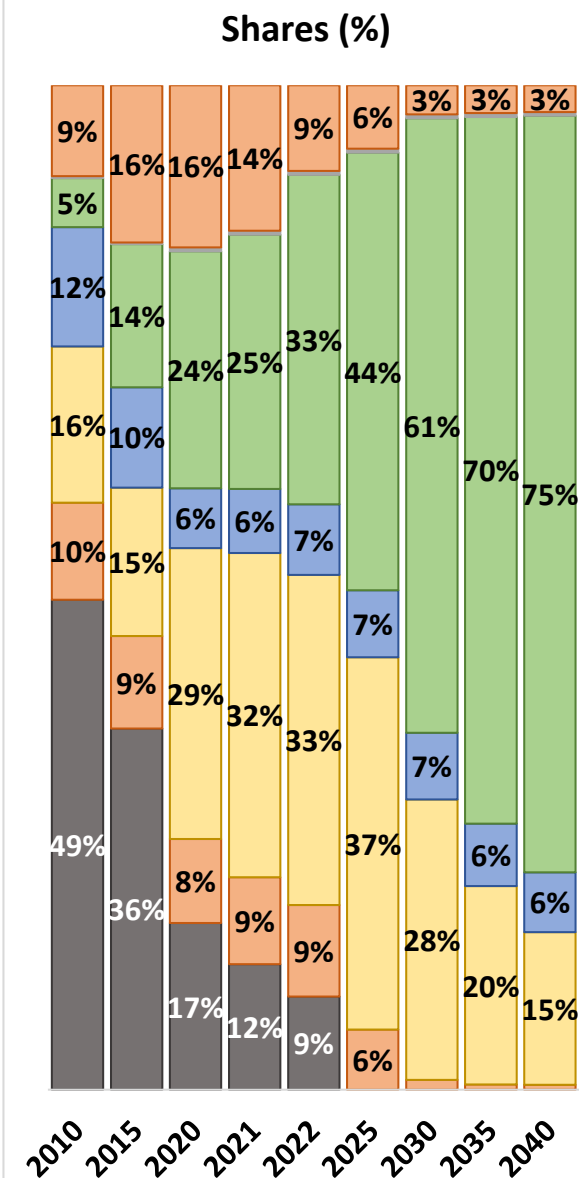
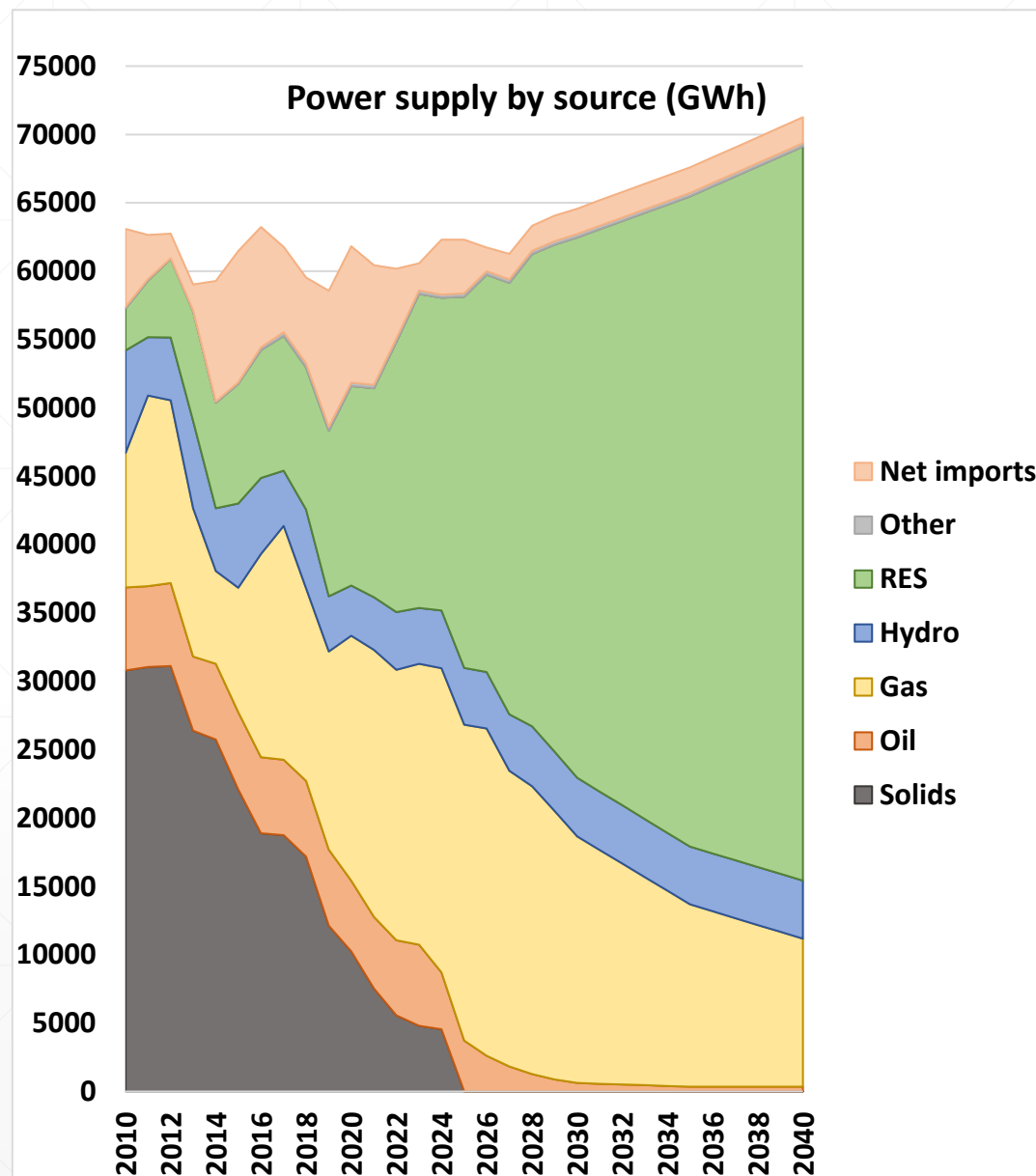
Extraordinary circumstances

- A business cycle of huge amplitude amid the post-COVID recovery
- Slow down of upstream investment driven by negative expectations and poor financing
- Natural gas operating as a global commodity thanks to LNG and gas-hubs, decoupled from oil
- Natural gas acting as a unique price-setter of electricity in power exchanges
- RES portfolios mitigating price impacts not yet sufficiently developed



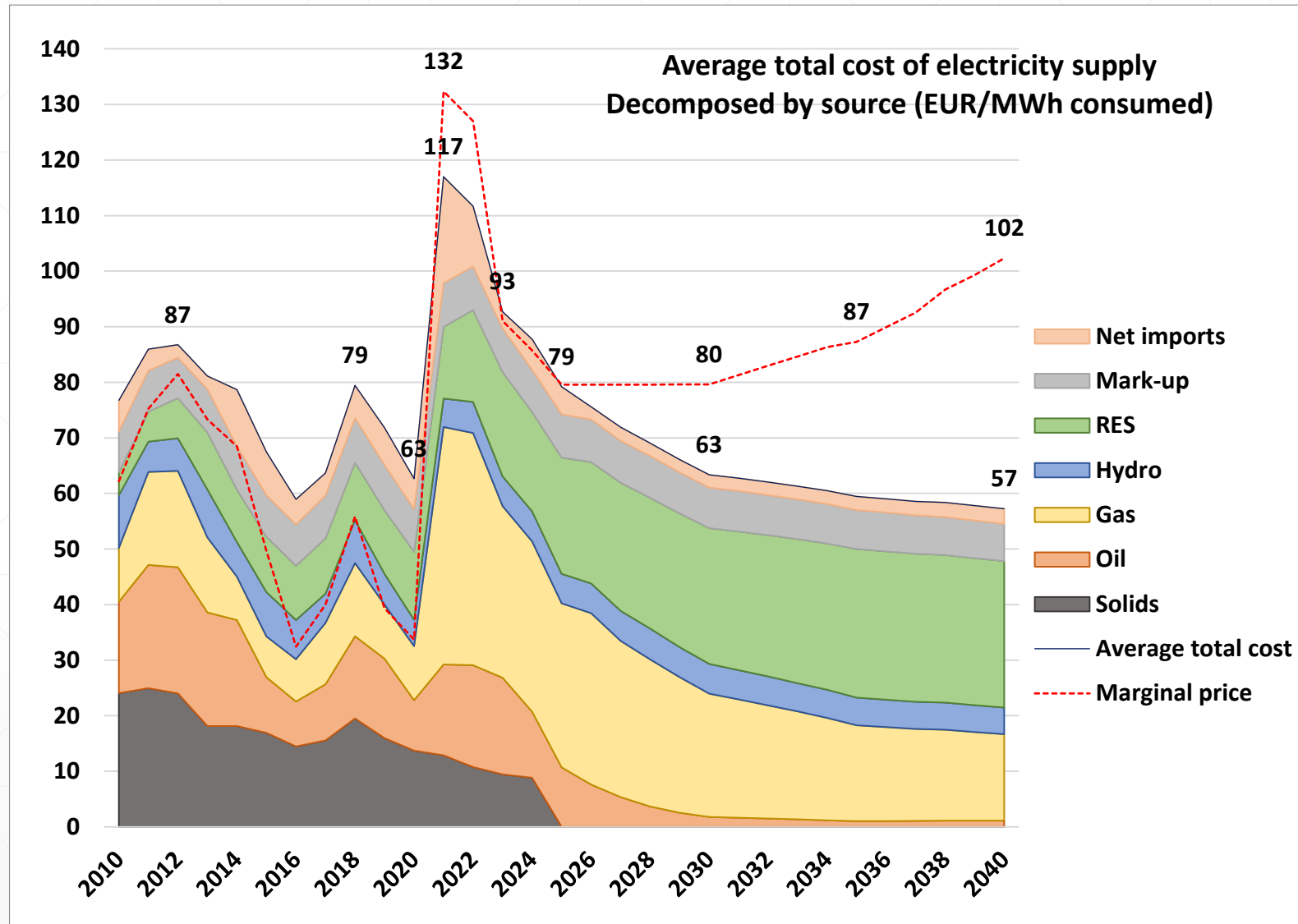
Greece: Power mix restructuring trend

- The decline of lignite has started post-2012, driven by increasing mining costs and escalated after 2018 due to high ETS prices.
- Delaying lignite phase-out has no technical and economic logic
- Natural gas as a bridge is peaking in the mix during the first stages of the green transition but declines later
- The RES dominate the mix, but the development pace is slower than needed to reduce natural gas; however, gas independence takes place close to 2030 and onwards



Average vs. Marginal total costs

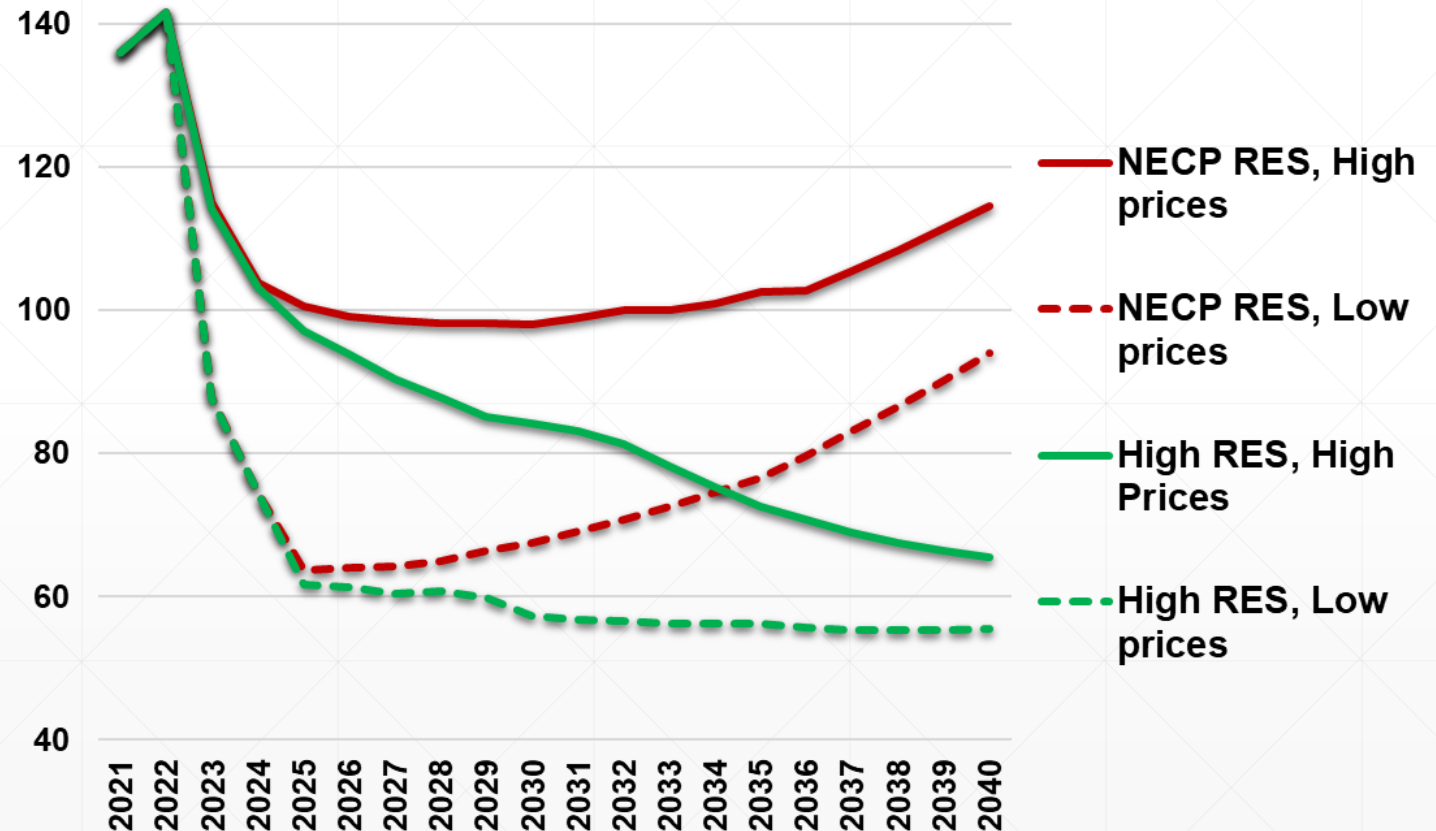
- In a welfare-maximizing market, consumer tariffs exactly recoup the average total costs of the power system
- Average costs reflect the unit cost of each power source weighted by its share in the mix
- This is different from spot market marginal prices
- During the crisis, marginal prices exceed average costs (windfall profits)
- Marginal prices can be lower than average costs in periods of excess capacity (as in the past, when CRM emerged)
- In the RES-dominant system of the future, marginal prices will certainly be higher than average costs
- Therefore, consumer pricing deserves a policy focus



Forecast of Wholesale market prices

- The development of RES can offset market price impacts of rising gas prices
- The high-RES scenario (reflecting Fit-for-55), despite being influenced by high gas prices, leads to lower wholesale market prices compared to the NECP with lower RES and lower gas prices
- Still, the wholesale market prices matter for retail prices in proportion to the share of wholesale in the total energy supply
- Consumer prices hedge against price spikes when the spot market covers for example 15% of the total, the rest based on bilateral contracts reflecting average costs

Market price of electricity incl. balancing and reserves EUR/MWh of electricity consumption



Example: Wholesale market marginal versus average costs and windfall profits

- Based on observed data during two months of very high gas prices
- High marginal prices imply significant windfall profits for resources independent from gas
- Total average cost per unit of generation (including fixed and capital costs) is 39% below unit wholesale and balancing market cost
- It is therefore of crucial importance: are consumers paying total average costs or wholesale/balancing marginal market costs?

Summary of observed data in the wholesale and balancing market during August and September 2021

	Unit Revenue (EUR/MWh)	Unit total cost (EUR/MWh)	% of windfall profit	Supply share (%)
Lignite	143	115	25%	10%
Gas	134	134	0%	37%
Hydro	170	80	112%	10%
RES	135	55	145%	32%
Imports	130	130	0%	11%
Total	140	101	39%	

Conclusions

- The impacts of the current price crisis are considerable because the market does not use hedging instruments, as for example forward and bilateral contracts
- The temporary exposure to gas dependence was known in the European Union policy-making; however, the policy package has not included hedging mechanisms
- The stable response to surging gas prices is to accelerate RES and storage – No option to return to coal
- RES and potentially storage are able to form portfolios that ensure low and stable prices to consumers
- The current structure of the Greek market competition has not favoured the development of bilateral contracting, has favoured collection of windfall profits and has failed to reflect the low costs of RES onto consumer tariffs.
- Blame the structure of competition not the green transition