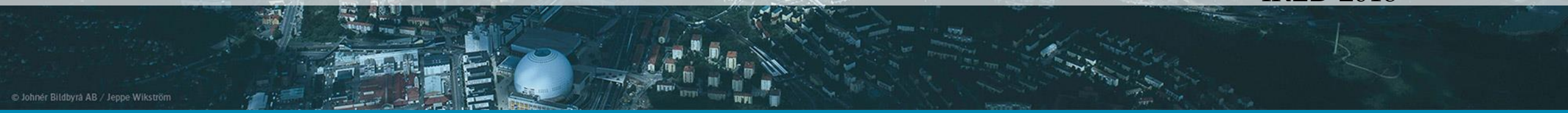
Decarbonization at least cost

How can the consumer contribute in the changing energy landscape?

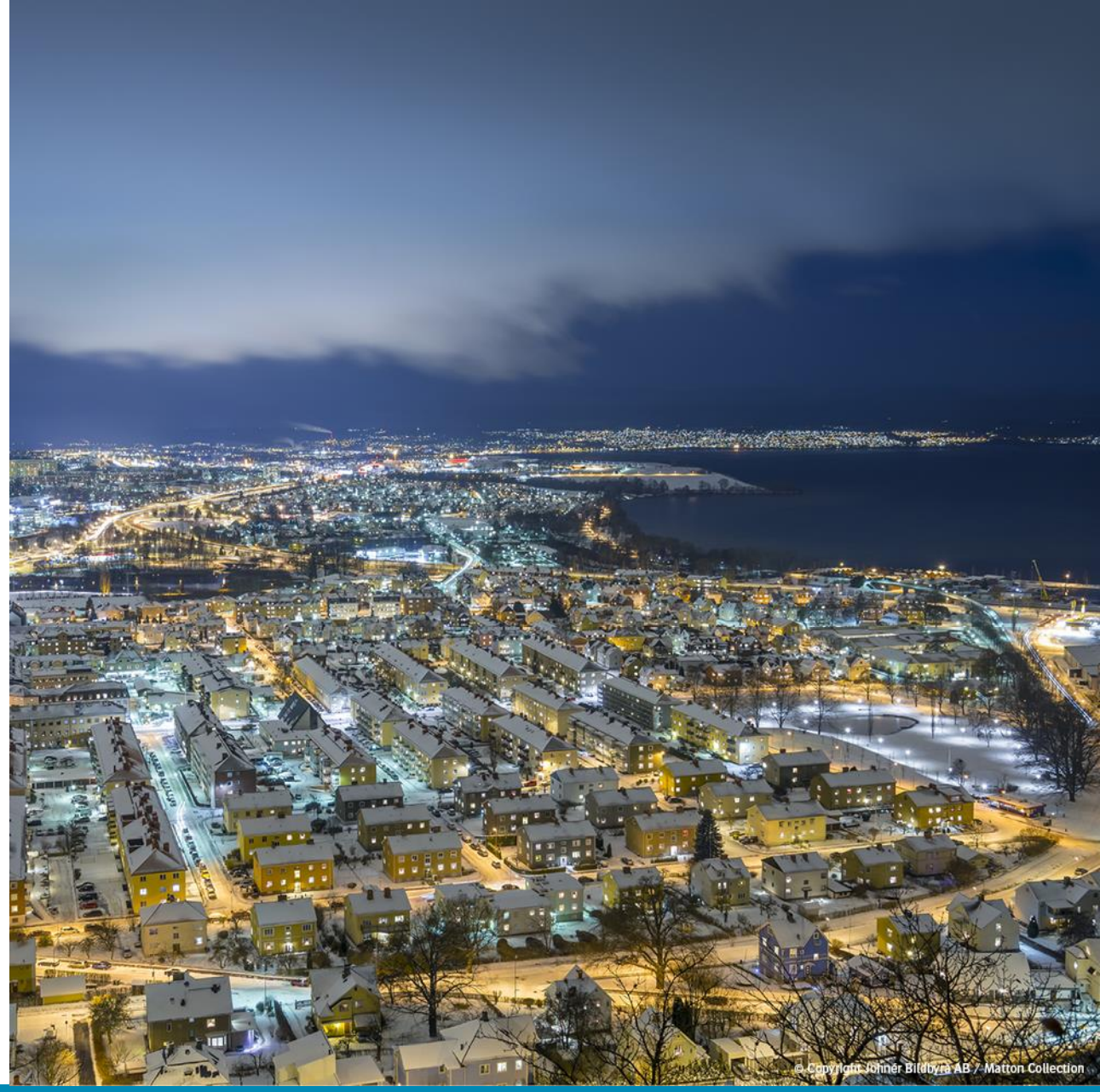
Anne Vadasz Nilsson
IRED 2018



Setting the scene…

- The transformation of our energy systems to reach energy and climate goals is one of the most challenging tasks of our time

- Drivers affecting change include expansion of renewables, decentralization, and digitalization



Market design is key

- Market designs differ greatly around the world and even in Europe although we have spent the last ten years implementing harmonized legislation
- Important to recognize the differences – there is no one-size fits all design to apply,
- But innovative market design is vital for developing and fast tracking clean, cost effective energy solutions – the technology is already up to speed
- Policy e.g. taxes and support schemes must be coordinated with sector regulation and be adapted to the new reality – this is a challenge

Regulators …

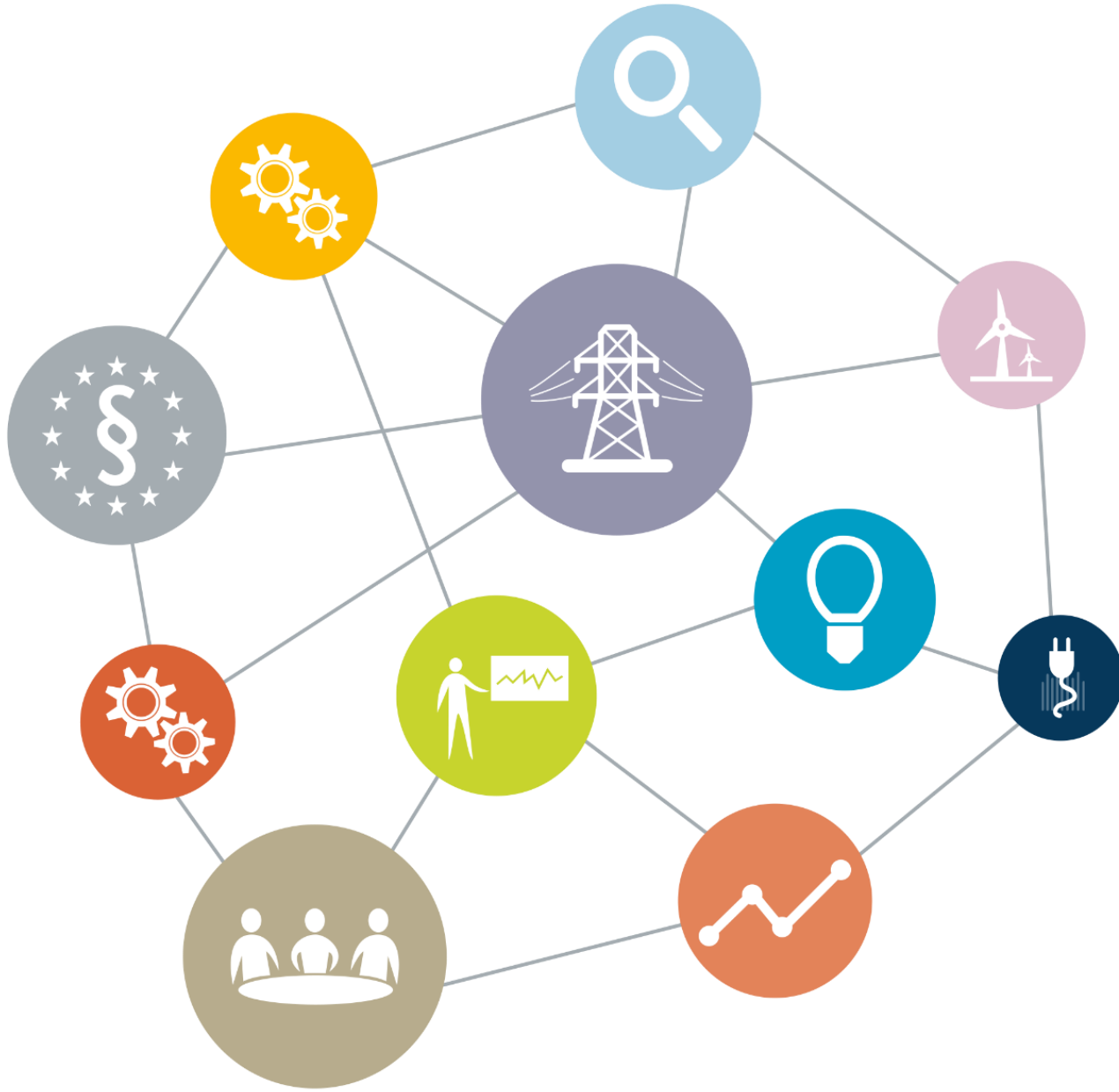
- …should seek a market design that provides reliable electricity at least cost to consumers while maximizing market efficiency – well functioning markets
- …should work towards regulations that stimulate the right investments while managing customer interests
- …need to manage trade offs between technical neutrality and the transformative acceleration of smart infrastructure
- …need to reduce regulatory uncertainty and clarify possibilities within existing frameworks
- …need to take a whole system approach

Elements in market design to accelerate:

- Review and possibly adjust concession and license frameworks to avoid unnecessary barriers to e.g. new initiatives and local energy communities
- Reduce or remove incentive distortions,
- Review and implement regulatory sandboxes, continue to stimulate research and development
- Increase customer awareness and knowledge on their role as active partcipants (incl. DSF and as procumers)

DSF in Sweden

- Sweden has a target model of 100 % RES by 2040
- Demand side flexibility is a cost-efficient way to deal with higher integration of RES (potential in load control of heat pumps)
- Ei has proposed measures on how to increase demand side flexibility in Sweden (≈20 measures)

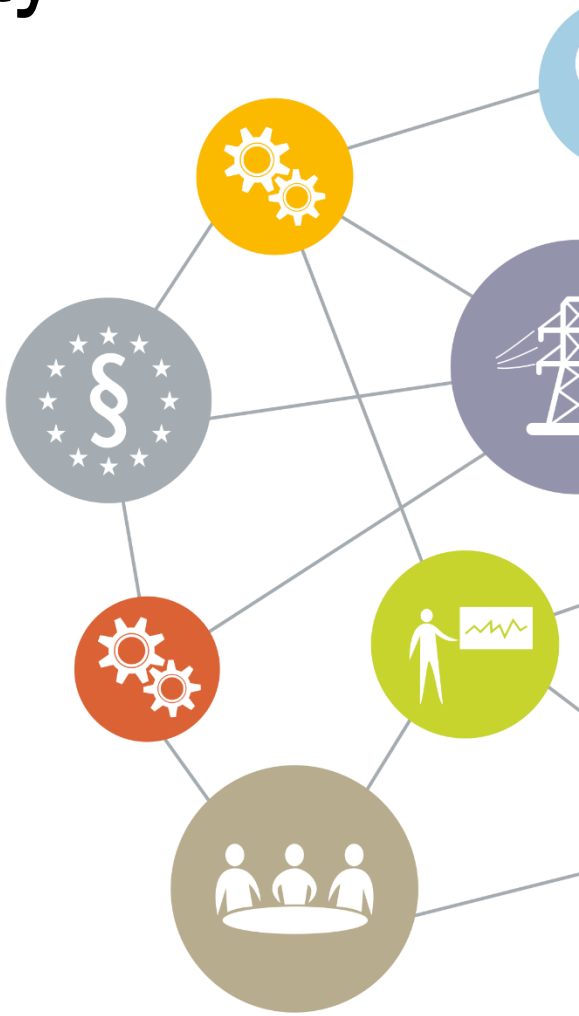


Summary of some measures in the proposed package

- **Customer:** Better information about DSF, use information channels already in use for energy efficiency, hourly measurements (or the 15 min) and availability of hourly data for all customers, develop the independent comparison tool
- **Market players:** hourly settlement on a daily basis, products on day-ahead market that enable DSF to enter the market, remove barriers for DSF to enter the balancing market, aggregator model
- **DSO:** Evaluation of incentive regulation for smart grid, general principles for tariffs (time-based tariffs), better information to customers on tariffs
- **Decision makers**: Investigate subsides for load control of heating, investigate the design of the energy tax

Cost-benefit analysis of demand side flexibility

- The horizon for implementation is between 2017 to 2025
- To estimate the benefits we assumed the conditions on the electricity market in 2030 (scenario analysis)
- The benefits have been estimated for two levels of realized flexibility.
  - Lower level – 50 % of the households in houses with electricity heating accept *load control of their heating* and 100 % of the potential in the industrial sector
  - Higher level – 100 % of the households in houses with electricity heating accept load control of the heating + the potential in the industrial sector is realized (for electricity prices above 200 EUR per MWh)

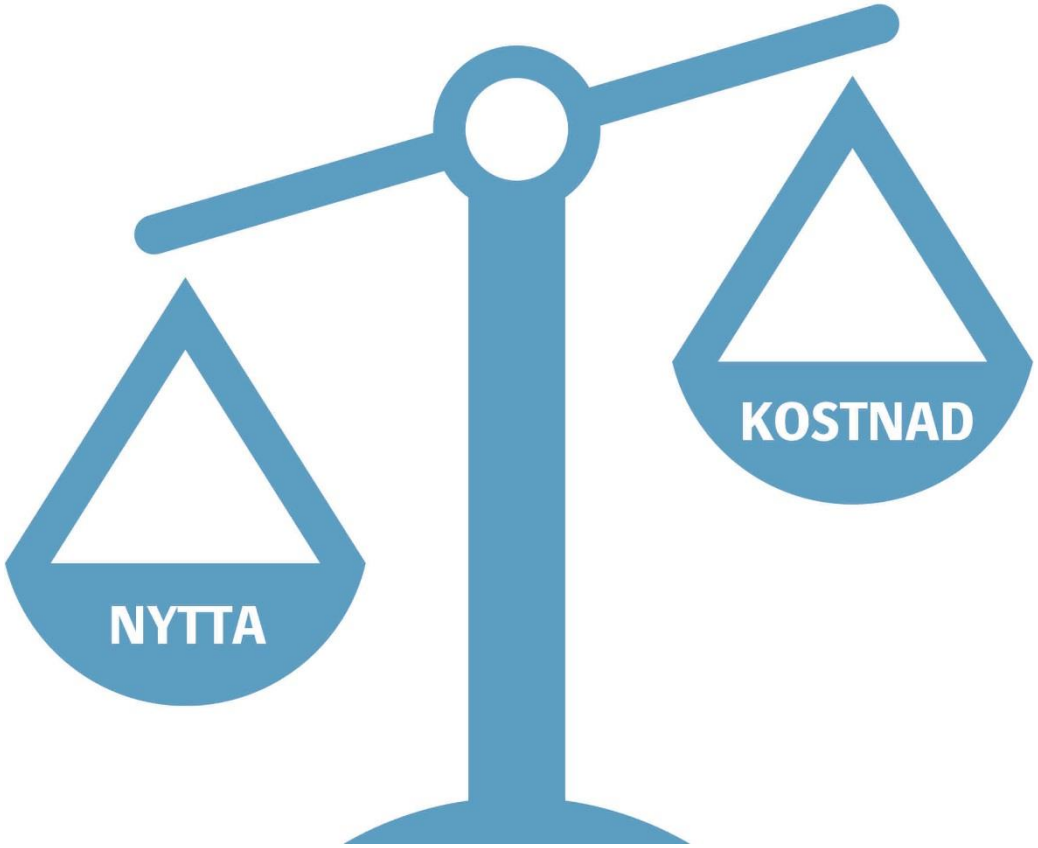


Estimated benefits

Challenges	Upper level of DSF (MEUR/a)	Lower level of DSF (MEUR/a)
Frequency control (50 Hz)	37	37
Generation adequacy	12,8	12,8
Inefficient resource allocation in the day-ahead market	67,5	38,1
Local grid congestion	58,7	29,4

Benefits greater than costs

- Results from the analysis show that the annual benefits of demand side flexibility are greater than the annual costs for the measures
- This result hold also if the lower level of demand side flexibility is being realized.

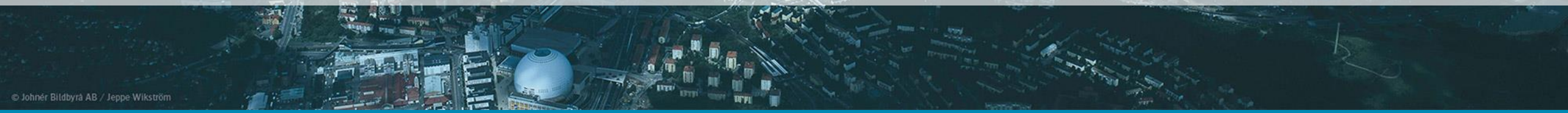


Conclusions

- Intelligent market design is key to achieve decarbonization at least cost and regulators play an important role
- A potential for DSF in Sweden esp. in relation to heating
- Getting the consumers on board is the greatest challange along side with loosing sight on the whole system approach

Energy markets require rules to provide a level playing field.

We ensure that the rules are followed.



Energimarknadsinspektionen
Swedish Energy Markets Inspectorate