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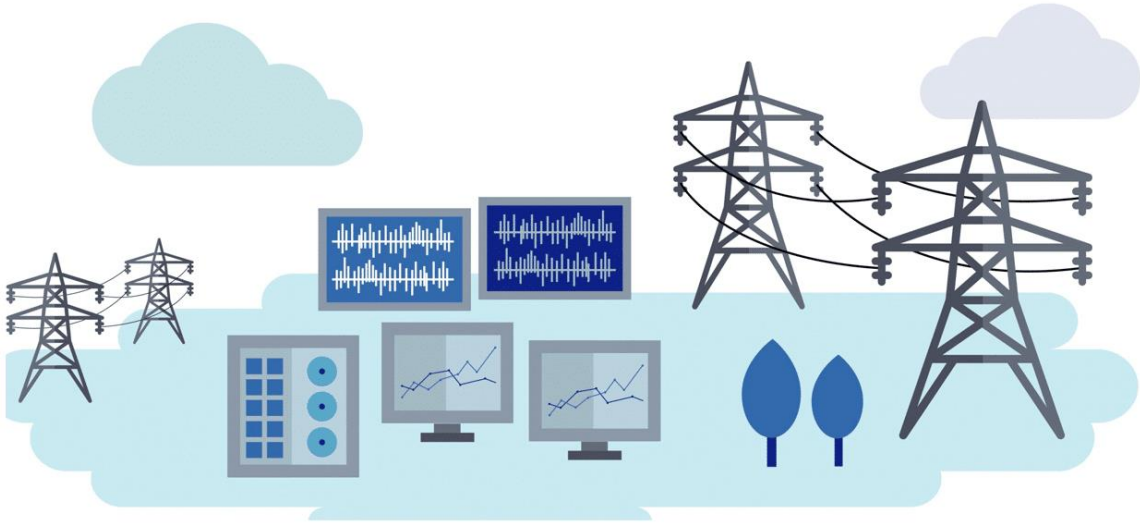
CENTRAL ELECTRICITY AUTHORITY

International best practices on Demand Response: Regulatory framework and success stories

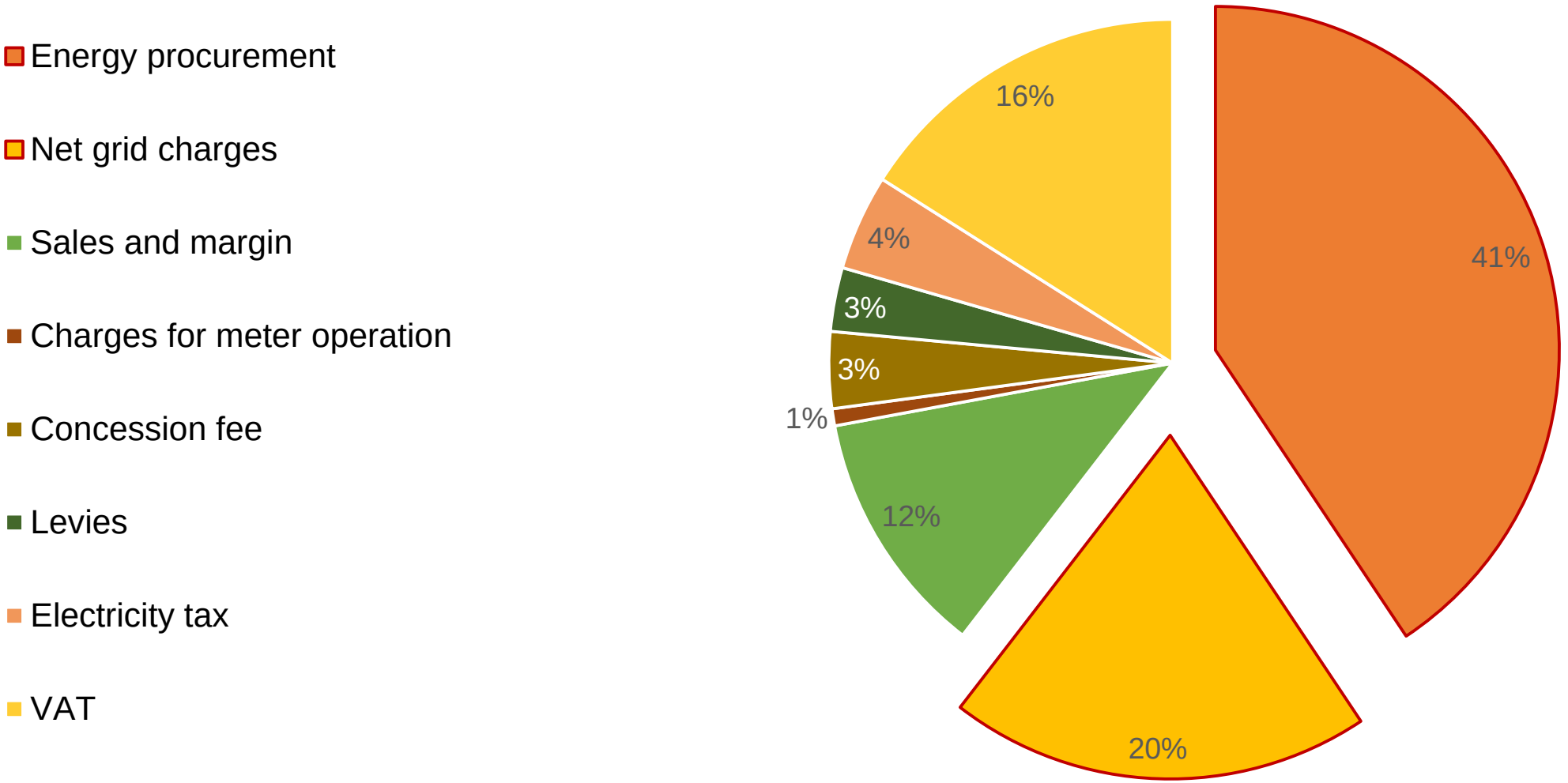
Presented by

ANTON BARCKHAUSEN, HEAD OF ENERGY PROGRAMME, adelphi

Need for DR in Germany



Composition of electricity tariff in Germany



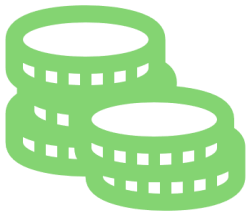
Demand response regulation

Reduction in electricity tariff

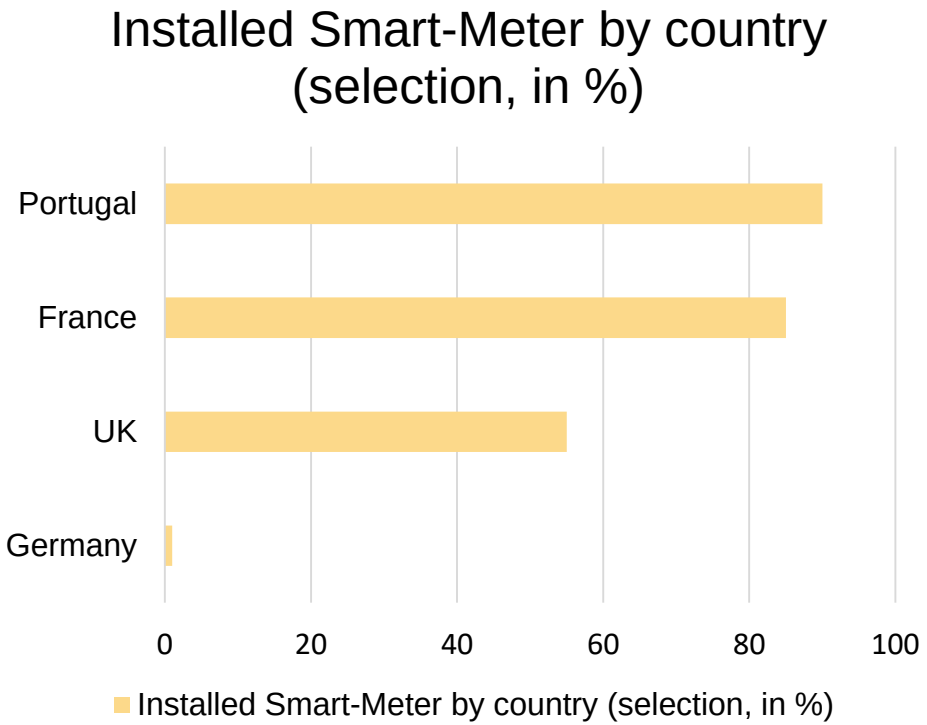
Electricity procurement costs

Net grid charges

Financial compensation



RELEVANCE



- Large fixed parts of tariff hindered reduction potential
- Few DR options in the past → decrease need for smart meters

Possible bottlenecks in the distribution grid

→ Grid expansion

→ More flexibility → § 14a EnWG

Comprehensive system approach required to integrate controllable consumption devices. Previous regulations have hardly led to the use of intelligent grid control.

Electricity supply contracts with dynamic electricity tariffs (§41a EnWG)

- The integration of customers into the day-ahead and intraday market
- Regulation applies to companies >100.000 customers from 01. 01.2022 and to those with >50.000 customers from 01.01.2025 onwards.
- Dynamic supply contracts mirror the tariff prices on spot markets

→Adapt electricity purchasing behavior to market situation because of potential savings

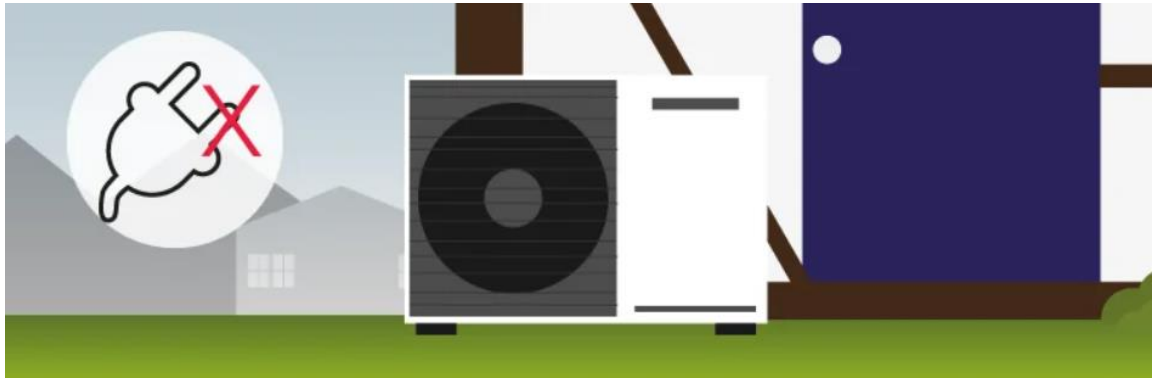
→Encourages expansion of smart meters

Starting 2025 all electricity suppliers need to offer dynamic tariffs → Smart Meter Act

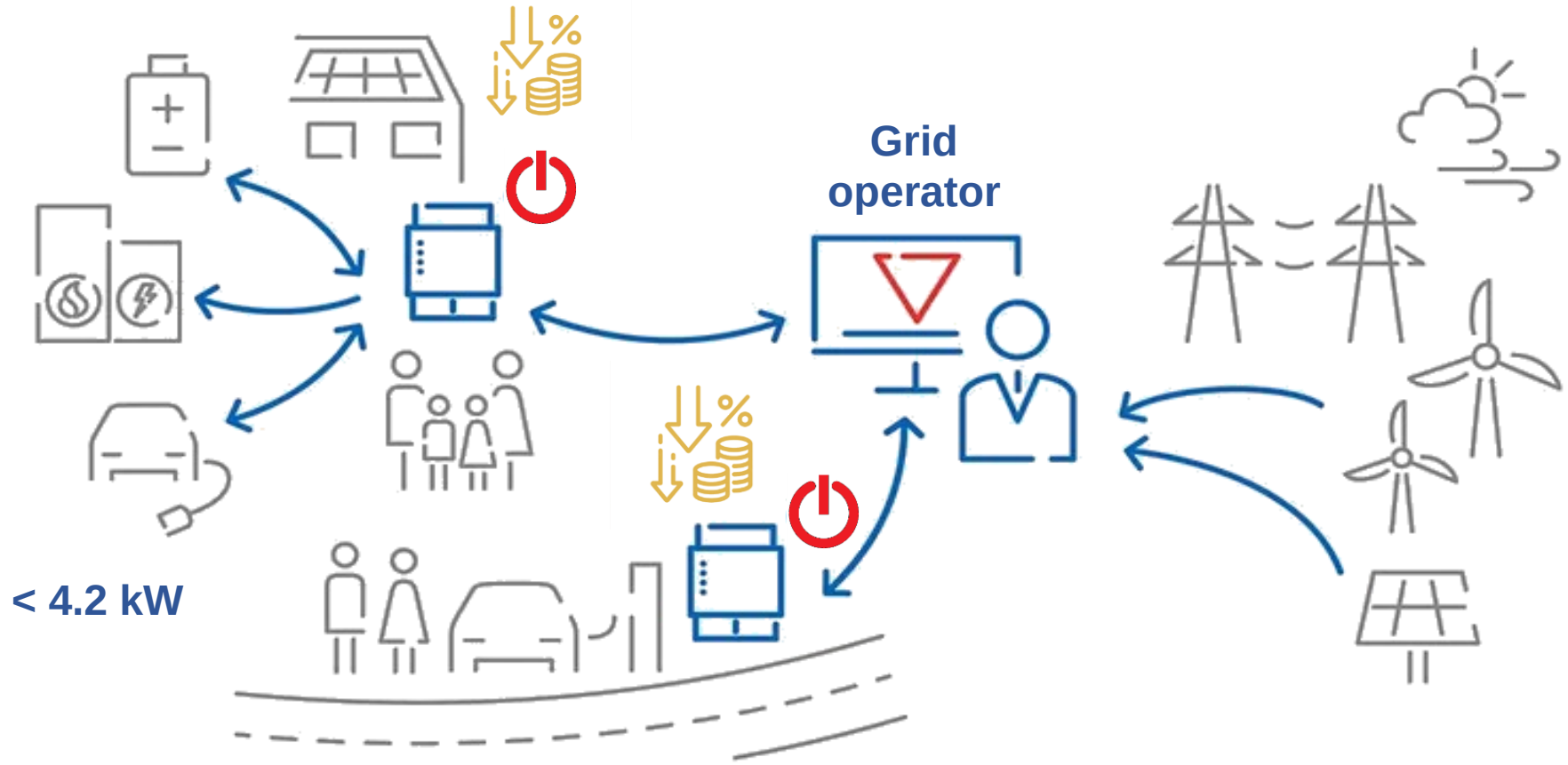
Suspension by ESC

Energy supply companies reserve the right to disconnect heat pumps from the grid in order to better regulate electricity consumption at peak times and stabilise the grid.

In the past, customers were free to choose whether to authorise blocking times for their heat pump's electricity. In return, consumers received a discounted electricity tariff.



§ 14a EnWG (Energy Industry Act since 1.1.2024)



Reduction in grid charges accord. to §14a EnWG

Module 1

- Flat-rate reduction of grid charges between 110 and 190 €/year.

Module 2

- 60% reduction on the respective grid fee.

Starting April 2025

Module 3

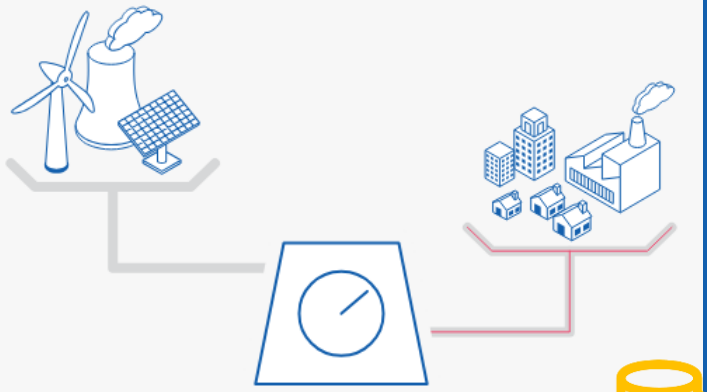
(in combination with module 1)

- Time-variable grid charge to reduce peak loads.
- Different price levels throughout the day, to incentivize consumers to shift consumption to times when grid utilisation is low.

The consumer can chose between the modules
Billed through the exisiting electricity supply contract.

Balancing energy market

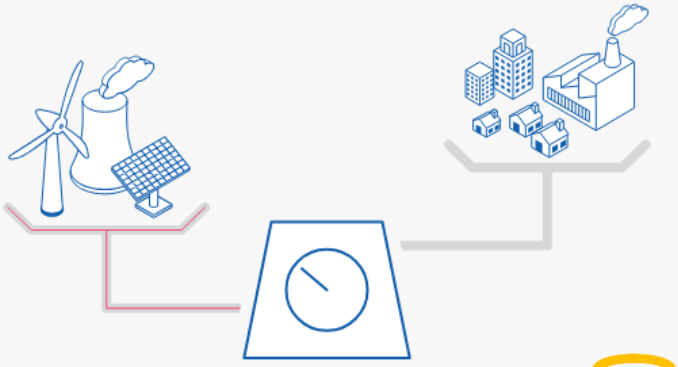
Consumption exceeds generation in the short term



Positive balancing energy

- Feed-in
- Increase in generation
- Reduction of consumption

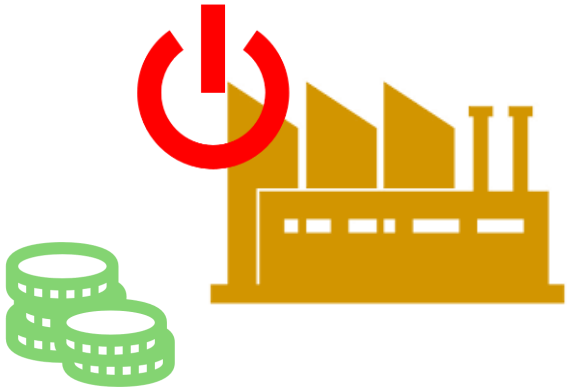
Generation exceeds consumption in the short term



Negative balancing energy

- Storage
- Reduction of generation
- Increase of consumption

USE CASE - INDUSTRIAL CONSUMERS



Switchable loads:

- Industrial companies offer flexible loads that can be disconnected quickly to ensure grid stability (min. 5MW).
- In return they receive a remuneration.
- Regulation by Ordinance on Disconnectable Loads between 01.01.2013 and 30.06.2022 issued on §13i EnWG.
- Similar prequalification required as for the balancing energy market.

Spot market:

- Companies with flexible electricity loads can sell them on the spot market.
- Utilization to exploit price fluctuations and shift electricity procurement to hours with low electricity prices.

2022 Load Management Standards – CA/USA

In 2022 adopted amendments to increase state-wide demand flexibility. Largest utility providers need to:

- Develop and offer at least one retail electricity rate to customers that changes at least hourly.
- Provide and update hourly and time-varying rates via accessible online database.
- Provide information to a central repository for rate information.
- Integrate information about time-dependent rates and automation technologies into existing customer education and outreach programmes.

Benefits:

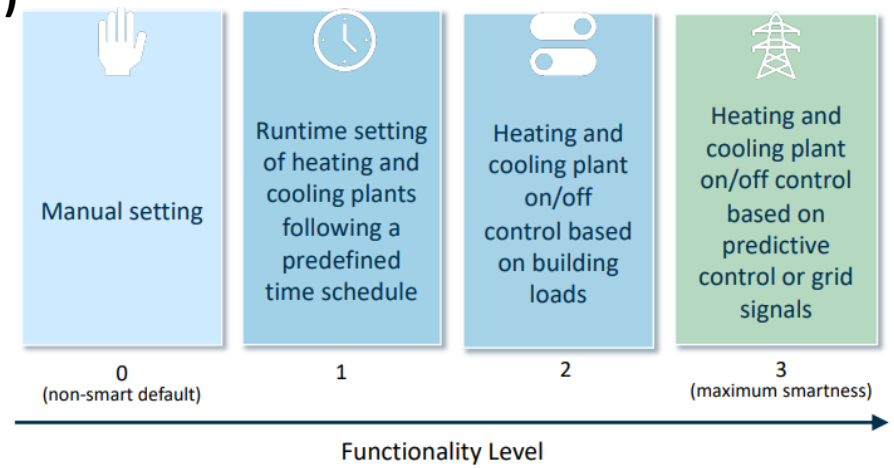
- Increase grid reliability by facilitating automated load shift during emergencies such as wildfires, extreme heat, or earthquakes.
- Reduce summer peak hour energy use by as much as 120 GWh.
- Save consumers a total of $267 million over 15 years, at a cost of $24 million by reducing expensive peak energy demand through automated shifting or reduction.

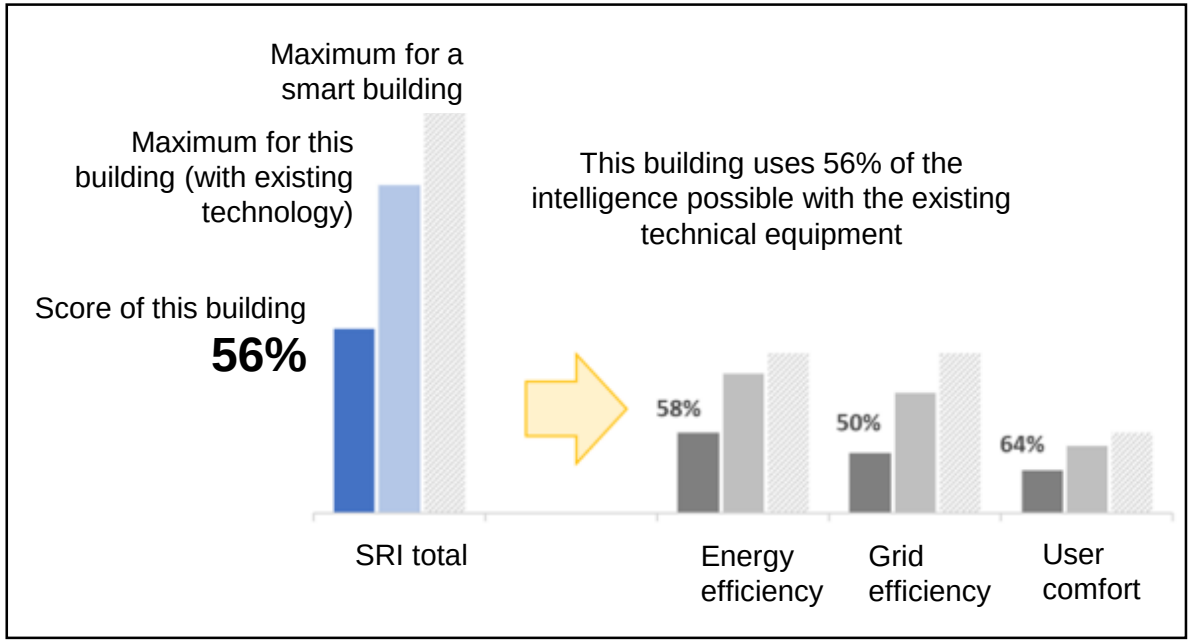
Smart readiness indicator for buildings– SRI

Ability to detect, interpret, communicate and respond actively and effectively to changing conditions related to the operation of the building's technical systems, the external environment (including energy networks) and the requirements of the building's users.

The SRI assesses the smart readiness of buildings over nine categories - to fulfil 3 key functions:

- Optimization of energy efficiency and overall usage performance
- Adapt their operation to the needs of the resident
- **Adaptation to signals from the grid (e.g. energy flexibility)**





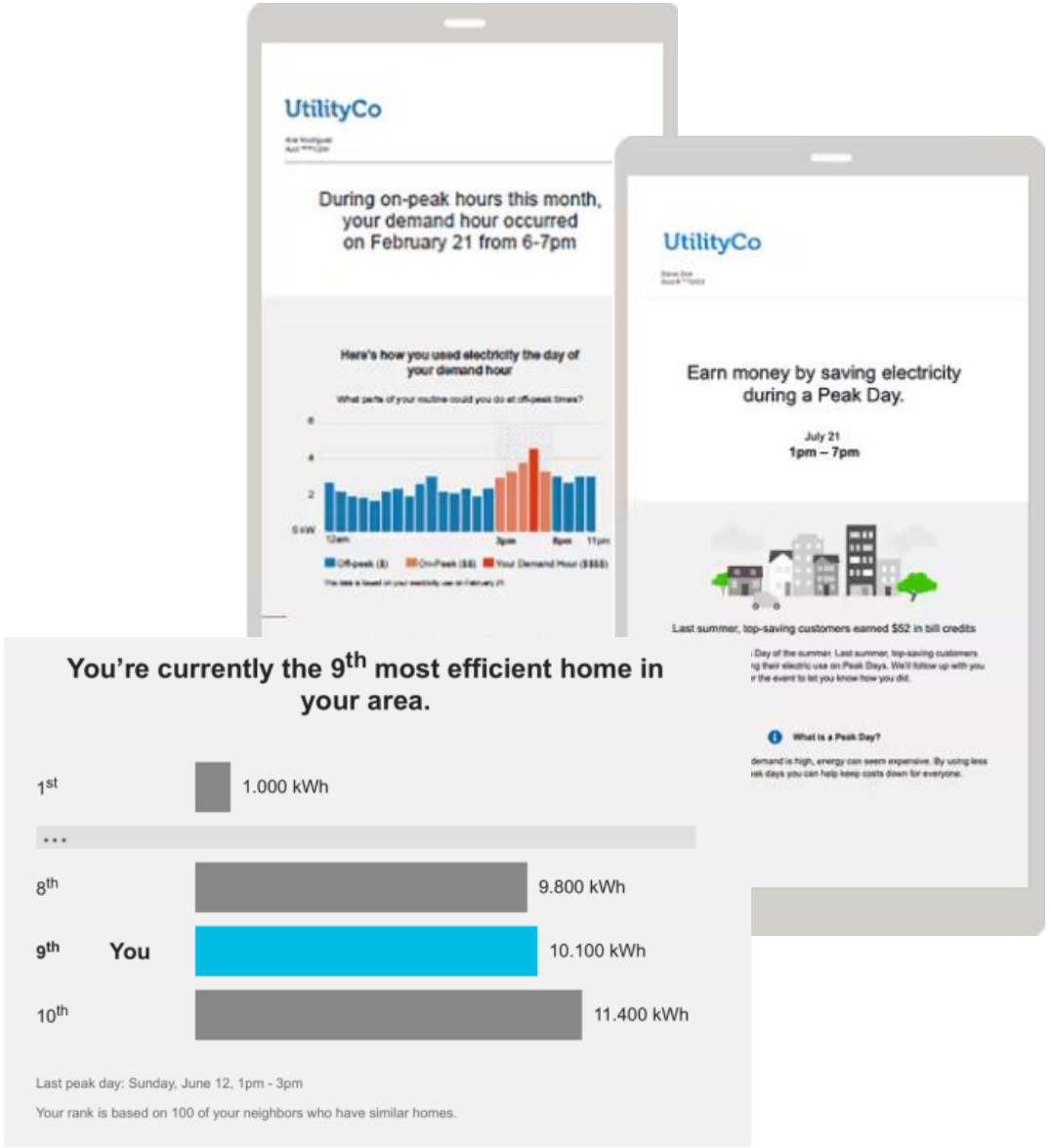
Opower Behavioral Demand Response programmes across US

- Engaged more than 3.3 mil. customers across the US in 2021 through behavioral load shaping communications (how to avoid peak times, time-of-use tariffs, high energy-use appliances)

→ 25 MW demand reduction

- Peak time rebate programmes shift electricity usage during high energy prices and reduce customers energy bills through educational emails and notifications and gamified personalised post-event feedback to celebrate performance

→ More than 100 MW demand reduction



KEY TAKEAWAYS / RECOMMENDATIONS

- Smart meters are key components to drive demand reductions
- Market-based approaches ensure use of most economic potentials
- Large spread in dynamic tariffs necessary to engage customers
- Voluntary approaches, communication campaigns and engaging consumers as allies increase motivation in participation in programmes and improve overall consumers' satisfaction.
- Regular evaluation of electricity tariffs is necessary to account for changing patterns in electricity generation and consumption.

THANK YOU

For discussions/suggestions/queries email: ***isuw@isuw.in***

visit: www.isuw.in

Links/References (If any)