Designing retail electricity tariffs smart

Strommarkttreffen

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The networks we already have
Trigger for our analysis

- Often hear grids will explode with EV adoption and massive investments needed in grids
- But what *about the use of existing distribution networks*?
- Making best use of networks → minimise costs
Utilisation rate for networks

- Similar to load factor for power plants
- Maximum capacity unknown – maximum flow used as a proxy – conservative assumption
  - Rates calculated an overestimation of real rates

- Very important: Regulators do not oblige DSOs to monitor and report this at the moment!
Significant spare capacity even on the peakiest of days
Why smart charging is crucial

Source: own compilation based on Westnetz, peak day 2017; red/green curves illustrative
2 Smart tariff design - principles
Smart tariff design can’t wait

Important to start implementing appropriate network tariffs where they’re not already in place

- Regulatory cycles last for 4-5 years
- Foundation for retailers and aggregators to introduce smart tariff products
- Educate consumers and gain experience
What can we achieve with smart tariff design?

- Maximise utilisation of existing grid and minimise future investment
- Empower consumers to make good decisions
- Ensure that everyone pays their fair share
High-level principles for smart network tariffs

1. A consumer should be able to connect to the grid for no more than the cost of connecting to the grid
2. Consumers should pay for grid services in proportion to how much and when they use the grid
3. Consumers who generate electricity should cover their fair share of grid costs
3 Smart tariff design - examples
Smart tariff design

- Recognises how much, when, and where consumers use the grid
- Vary from time-of-use to real-time pricing
Smart tariff design can deliver demand response, downwards and upwards.

Tempo tariff in France

EDF's Tempo Tariff has Both Time-varying and Critical Peak Components

Note: HC refers to the night period (10pm - 6am), and HP to the day period (6am - 10pm).
More dynamic tariffs

Electric vehicle owners’ charging habits on dynamic tariff

Tinted areas show the range of variation of usage.

TOU-based network tariffs

Source: Denmark (Radius), TOU network tariff for households (winter season)

Source: Based on Radius. *Tariffer og netabonnement* [Tariffs and network subscriptions].
4 Network charges - State of play in Europe
Recent trends are troubling

• Many MS are shifting toward fixed charges:
  • Germany: increased much over last years
  • Spain: doubled within two years
  • Netherlands: only fixed charges since 2009

• Policy-driven changes
Problem: the fixed fees in network charges
5 Fixed tariffs impede the energy transition
Fixed fees take the power out of consumers’ hands
Fixed fees do **not** promote efficiency or equity

- Consumers who use grid efficiently pay the same as those that who do not
- Consumers who use the grid during hours of low demand pay the same as those who use the grid at peak system demand
Fixed fees shift costs from high- to low-usage consumers

Low-usage consumers pay disproportionately more

Source: German distribution system operator, network fees in 2018
Germany: Historical development of network fees for households

Network bill for low-usage consumers almost doubled

Source: Distribution network operator EWE
What about other industries?

We pay for other “grids” in volumetric prices
Network companies can easily recover costs without fixed charges

- Ensure financial stability through economically efficient prices and appropriate regulatory frameworks
  - These include revenue regulation and decoupling, and performance-based regulation
  - Break the link between sales and profits
Recomendations for different consumer classes

- Residential consumers: volumetric charges as default; ToU tariffs optional
- New, large, controllable loads (e.g., EVs), small industrial consumers: ToU tariffs as default, CPP if smart technology is in place

⇒ Important to link tariff choice with its likely impact
Conclusions

• Tariff design is an integral part of public policy goals that should support, and not impede, the energy transition
• Smart tariffs empower consumers to take right action
• Help to optimize use of existing network assets and minimise future investments
About RAP

The Regulatory Assistance Project (RAP)® is an independent, non-partisan, non-governmental organization dedicated to accelerating the transition to a clean, reliable, and efficient energy future.

Learn more about our work at raponline.org

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Resources from RAP

- Cleaner, Smarter, Cheaper: Network tariff design for a smart future
- Designing Tariffs for Distributed Generation Customers
- Smart Rate Design for a Smart Future
- Designing Distributed Generation Tariffs Well
- Rate Design Where Advanced Metering Infrastructure Has Not Been Fully Deployed
- Revenue Regulation and Decoupling: A Guide to Theory and Application
- Time-Varying and Dynamic Rate Design
Why are network charges important?

Network charges constitute a quarter of the bill

Structure of network tariffs

• Fixed component: usually defined by number of consumers, size of connection with grid or peak demand of consumer
• Volumetric component: reflects how much the consumer used