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German example: Rules on EV & heat pumps integration at the DSO level

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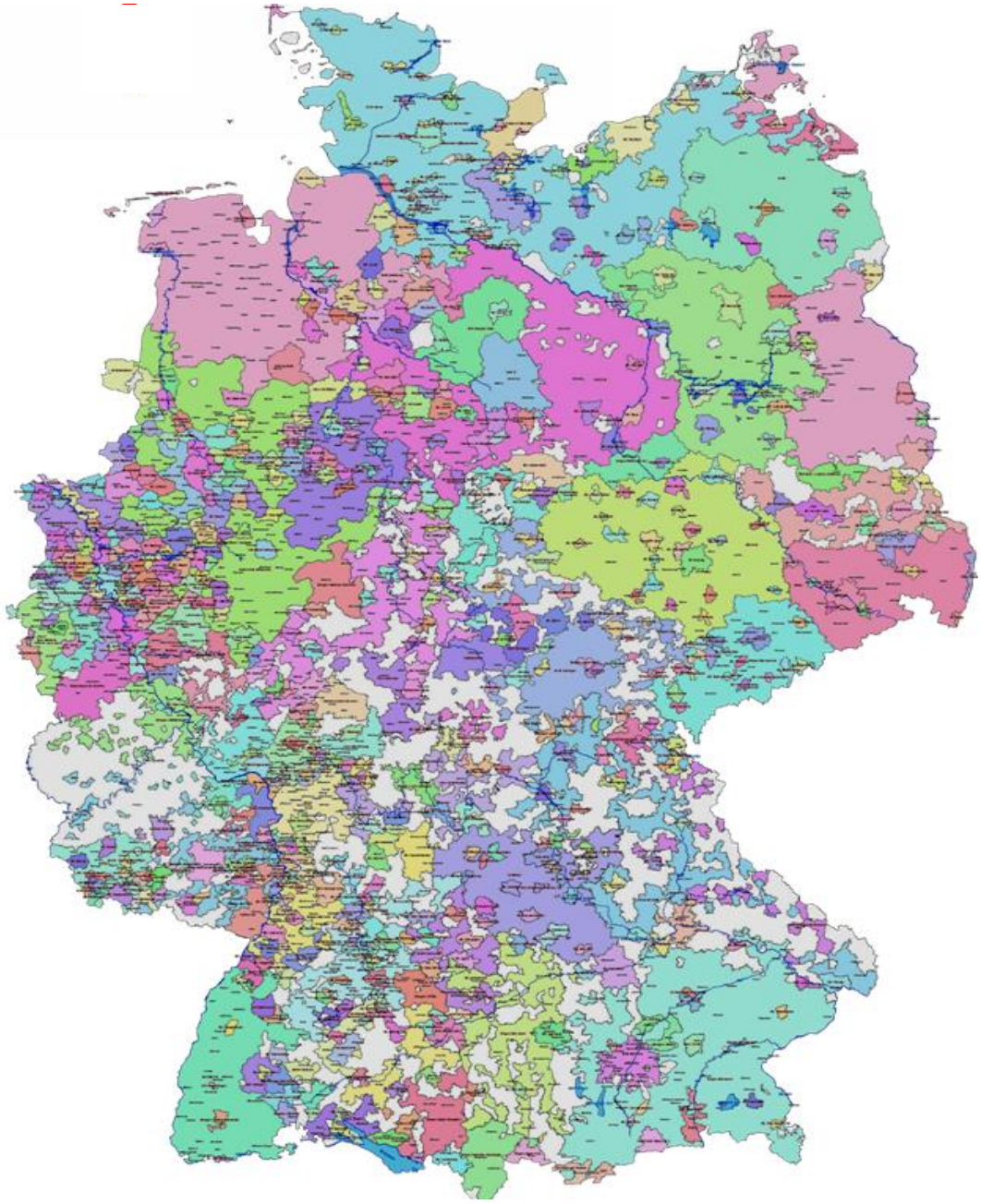
Distribution System Operators in Germany



DSOs:

865 (782*) electricity (for 2022)

702 (674*) gas DSOs (for 2022)

* With less than 100 000 connected customers

Challenges

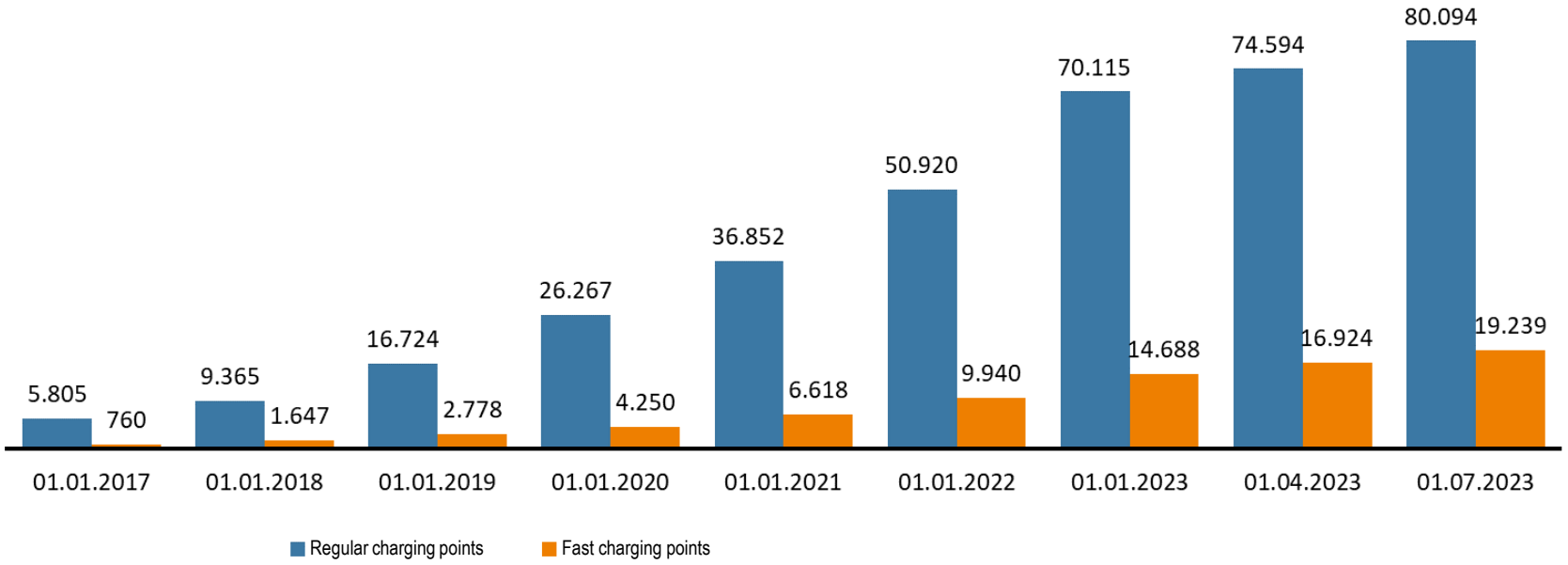
- The energy transition is taking place in the distribution grid!
- New connections of renewable plants in 2023: 1.5m
  (in 2022: 600.000)
- Goal 2030: 15 Mio. Electric vehicles, 6 Mio. Heat pumps
- Need for DSO grid expansion is huge
- Currently: expansion of renewables is faster then grid expansion
  → DSO have to manage grid bottlenecks
- Level of digitalization low

EV Charging / Heat pumps

Challenge:

- Integration of millions of new devices in low-voltage level
- High simultaneousness in grid use
- No visibility and controllability

Development of charging points in Germany 01.01.2017 – 01.07.2023



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Long run solution:

- Grid expansion

Short run solution:

- Load control rules → All flexible devices must be controllable by DSO in extreme situations:
  - DSOs to conclude agreements with final customers with **controllable devices** (EV-chargers & heat pumps)
  - DSOs to control the consumption of intensive devices (reduction up to 4.2 KW):
    - Option 1: systems controlled directly by DSO
    - Option 2: customer receives a max permissible value of electricity from DSO, which may not be exceeded.
      - Incentive → a reduced network tariff for the customers.
  - DSOs ensure a swift connection of new consumer devices

    → DSOs will not be able to refuse to connect new devices on the grounds that there is not enough network capacity

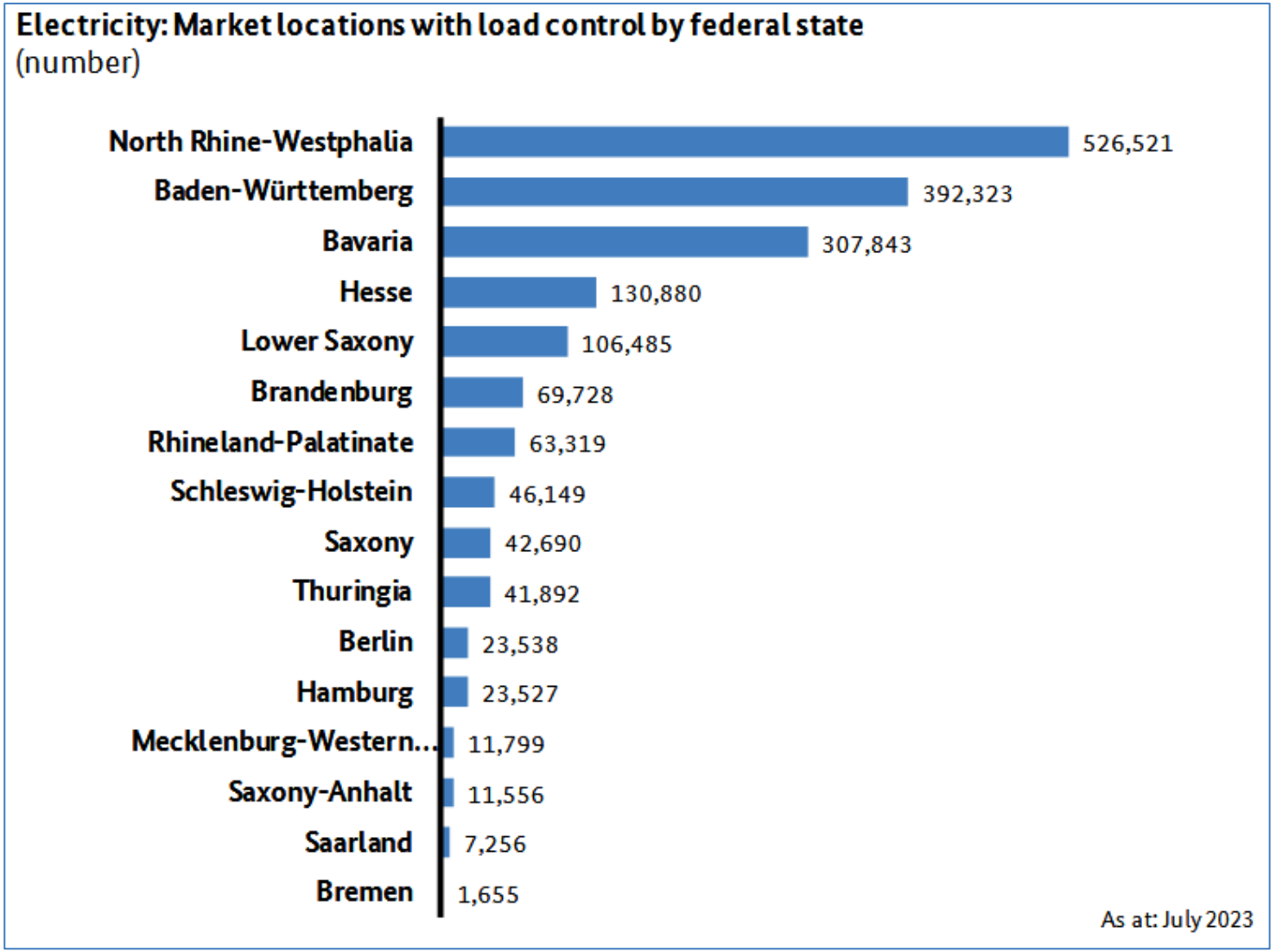
Modules for reduced network tariffs

Choice for consumer between modules

Module 1	Module 2	Module 3
A global (general) reduction. Determined according to a nationwide rule applicable to each DSO. Depending on the network area, it can be between 110 and 190 EUR per year (as of 2023). *The **additional** annual network charge for an electric vehicle, i.e. for around 2,500 kWh , can be reduced by 50 to 95 %.*	A percentage reduction of the operational price of the respective network tariff by 60 %. Technical requirement: separate meter for the controllable consumption device. *This module can be particularly suitable for heat pumps (due to combination with other applicable discounts on various surcharges).*	A combination of Module 1 with time-variable network tariff. Smart meter is needed. Possible from April 2025.
A change between modules 1 and 2 is possible, but not retroactively.		A combination with Module 2 is not possible.

- The billing of the reduced charges is proceeded via the electricity supplier.
- The supplier is obliged to transparently show the modules used on the consumer bill.
- No new billing relationship is created between the end consumer and the network operator.

Load control rules



New grid planning approach for DSO

Legal changes:

- Network development plans (NDP) by all DSOs with > 100.000 customers every two years
- Based on "regional scenarios" in six "planning regions"
- New DSO NDPs on April 30th 2024

A regional scenario considers

- Federal climate and energy policy goals for 2045
- Probable developments for the next five and ten years
- Future generators and loads, expected connections, network feed-ins and withdrawals, developments in other sectors - especially transportation and building.

→ Foresighted and coordinated planning

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Thank you for your attention!

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