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# An Overview of International Compensation Mechanisms for DPV

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# Outline

- Metering and billing arrangements (California, Germany, Thailand)
  - Net metering
  - Buy all, sell all
  - Net billing
- Sell rate design
  - Static vs. dynamic
- Retail rate design

# California's experience

- Transition to Net Metering 2.0
  - Recently changed compensation to closely reflect retail rates
  - TOU rates for residential customers
  - Identify peak period beginning at 4 PM (real peak is around 6 PM)
- Grandfathering net metering scheme for 5 years for residential and 10 years for other customers in transition
- Takes advantage of TOU pricing for utilities to manage system more efficiently
  - Innovative approaches to deal with duck curve and grid flexibility
  - Surplus of daytime power
- Challenge: US states have different net metering and billing policies that vary by state and across grid balancing authorities!
- Time of use pricing helps manage utility cost recovery.

# Germany's experience

- Transition to self-consumption and net metering
  - Why? History of high FIT led to dynamic lowering of FIT
  - Self-consumption makes sense to consumer when FIT level dipped below retail rate of electricity
- Credited at retail rate
- Incentivizes owners to match generation on site
- Potential transition to renewable energy trading at block or community scale
- Multiple policies are used together and not as replacements or substitutes for each other, i.e. FIT, low interest loans, self-consumption, third-party ownership

# Thailand

- Policy objectives to support self-production and self-consumption in households, government buildings, and commercial enterprise
- Net billing with compensation less than retail rate
- Separate customer groups into different profiles
- Policy to compensate less than retail rate due to utility's concerns of lost revenue and captive consumers
- Issue: Existing grid codes cap power exported through distribution feeder
- Issue: Static versus dynamic buyback rate to lower overall costs
- Issue: Lack of clarity on compensation mechanism – if lower than retail rates, how to set appropriate rate to consumers?
- Emerging policy ideas: Peer-to-peer solar power purchases via blockchain platform; no utility purchase needed

# Brief reviews across continents

## Self-consumption in the EU

- In some European countries, NM has been chosen to follow the end of previous support schemes (FIT, Green Certificates)

## Self-consumption in the U.S.

- States with high incentives: Some states (DC & LA's grandfathered projects) authorize NM with rolling credits over an indefinite period for carrying the retail credit forward.
- States that already transitioned from NM to NB: Nevada, Louisiana, Mississippi, Hawaii
- Value of solar rate: Arizona is considering it; Minnesota and the City of Austin already implemented it
- States with several programs: Hawaii (self-supply and grid supply), NJ (net metering and real-time buyback)

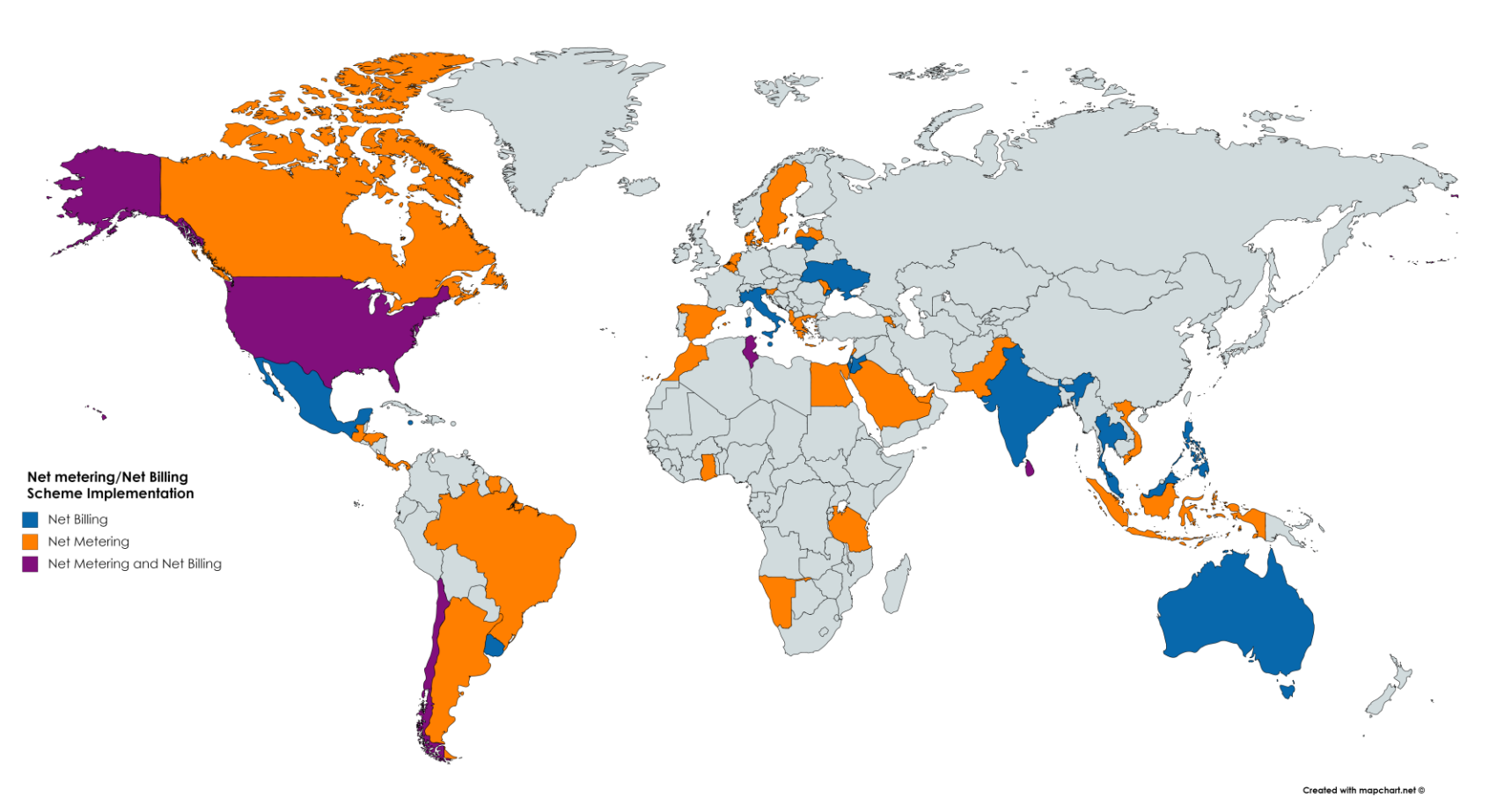
## Self-consumption in reviewed developing countries (See Appendix)

- Simple NM schemes or NB with compensation below the retail rate.
- Various reasons: Malaysia (learned of what's happening in the U.S.); Singapore (avoided cost concept); Thailand (upcoming: attractive economics in comparison to retail price)

## Take-home messages

- There is no “best model” for DPV compensation mechanism.
- Appropriate design depends on market structure, regulatory paradigm on ratemaking, stage of DPV market development, power systems impact, and available technology (e.g., energy storage, blockchain)
- Investors want stable policy for decision-making
- Flexible system should adapt to emerging trends including transition from feed-in tariff style programs to self-consumption schemes at higher penetrations of distributed renewable energy
- Systems-scale models help alleviate utility impacts and maximize benefits of DPV across stakeholders groups.

# Net metering/Net billing scheme implementation





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