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EVs: Grid Impact and Opportunity

Anders Thulin, Siemens eMobility

usa.siemens.com/eMobility

Biggest Growth Areas
Personnel Use Electric Vehicles (EV) - New Style & Technology

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Some 2020 EV cars coming


Byton M-Byte (China)- 250miles


Volkwagon ID Cross - 220miles


BMW iX3– 220miles


Hyundai Kona – 250miles


Tesla Y - 310miles


Rivian - 400miles


Aston Martin RapidE - 200miles


Volvo XC40 - 250miles


Ford "mustang" inspired SUV - 300miles

Also… if it moves people or goods, it is electrifying

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Rivian - Amazon invests $700 Million comes out 2020 Located in Detroit

Tesla Truck & Semi-Truck

Amazon converting 100's of vehicles to EV in 2019

*Daimler Delivers Freightliner Electric Truck to **Penske** in 2019*

kW/charger Market Expansion

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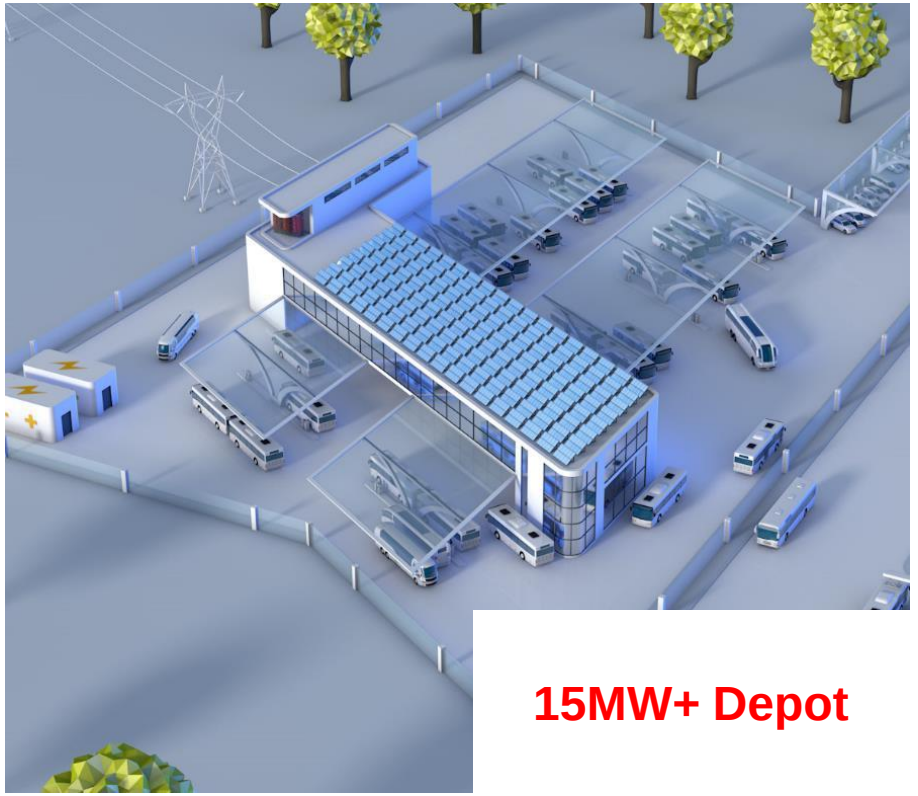
From this…

…to this

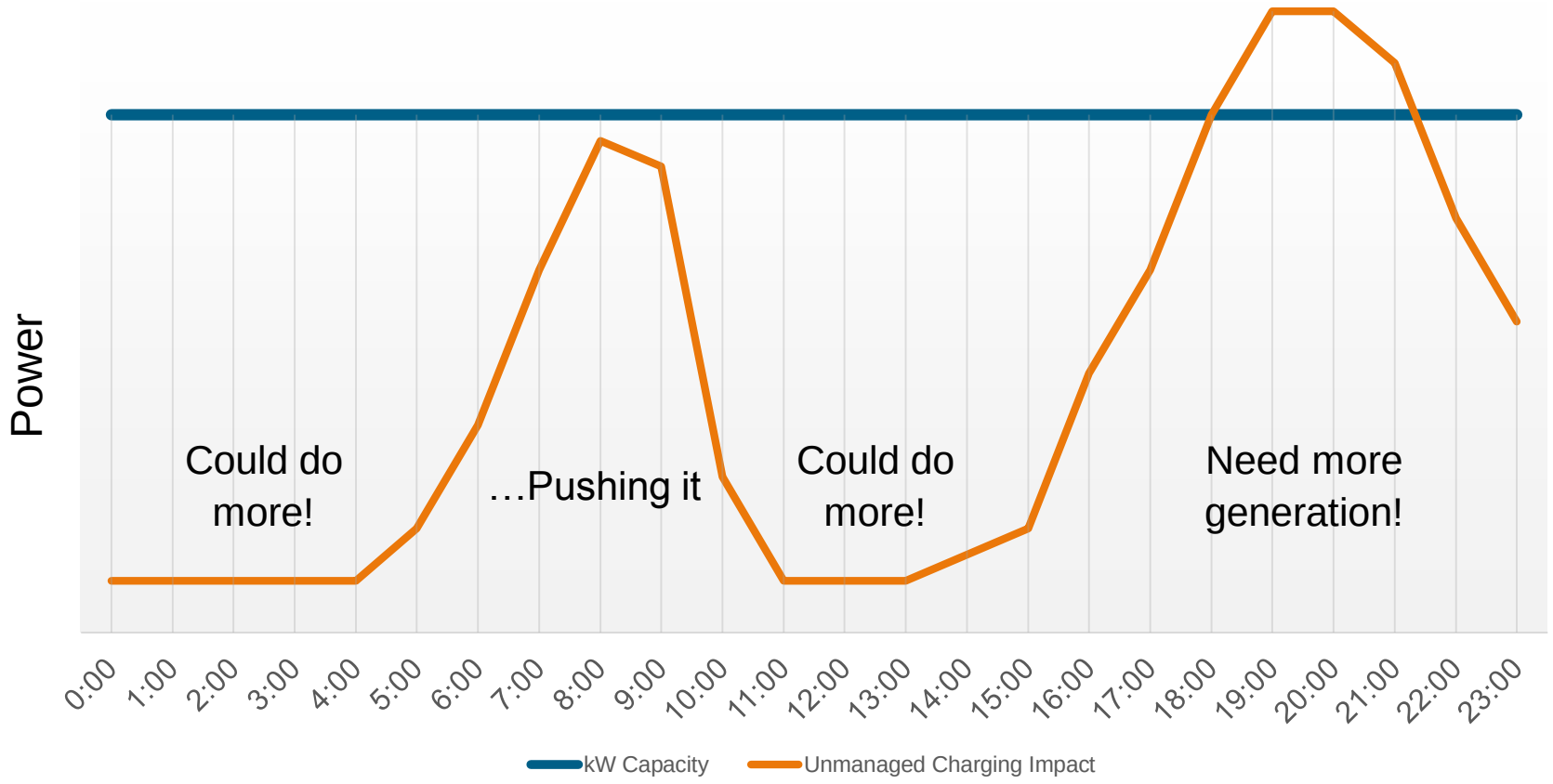
…and now this



15MW+ Depot

So what?

Simply put…



Hennepin, 2040

1.5M Cars

30% Adoption

Charger avg. 10kW

80% of charging happens in the home!

4-5GW @ 6PM
(if unmanaged)

The World, 2040

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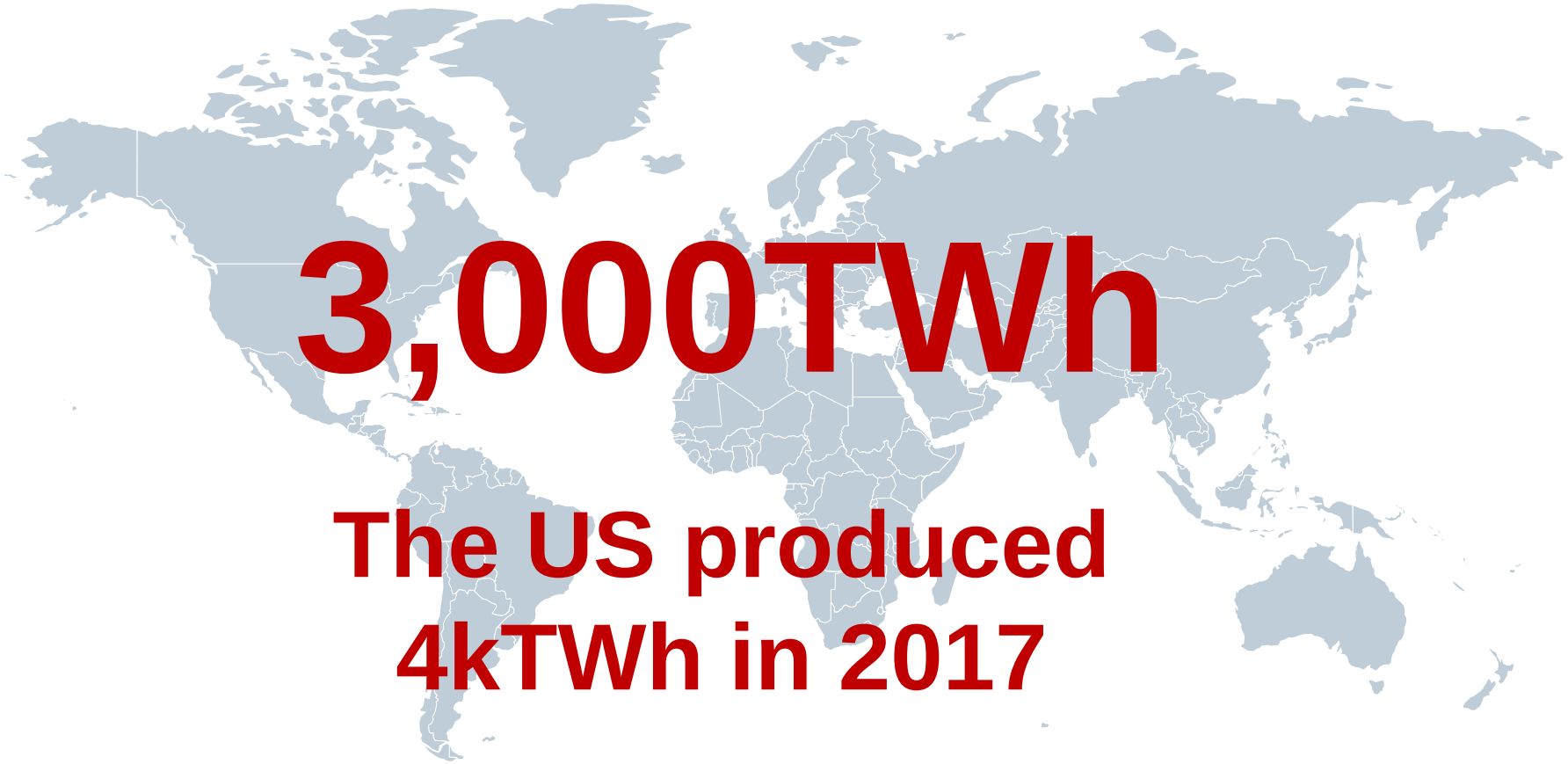

3,000TWh

The US produced 4kTWh in 2017

…but we can do this without just “ADD MORE CAPACITY”

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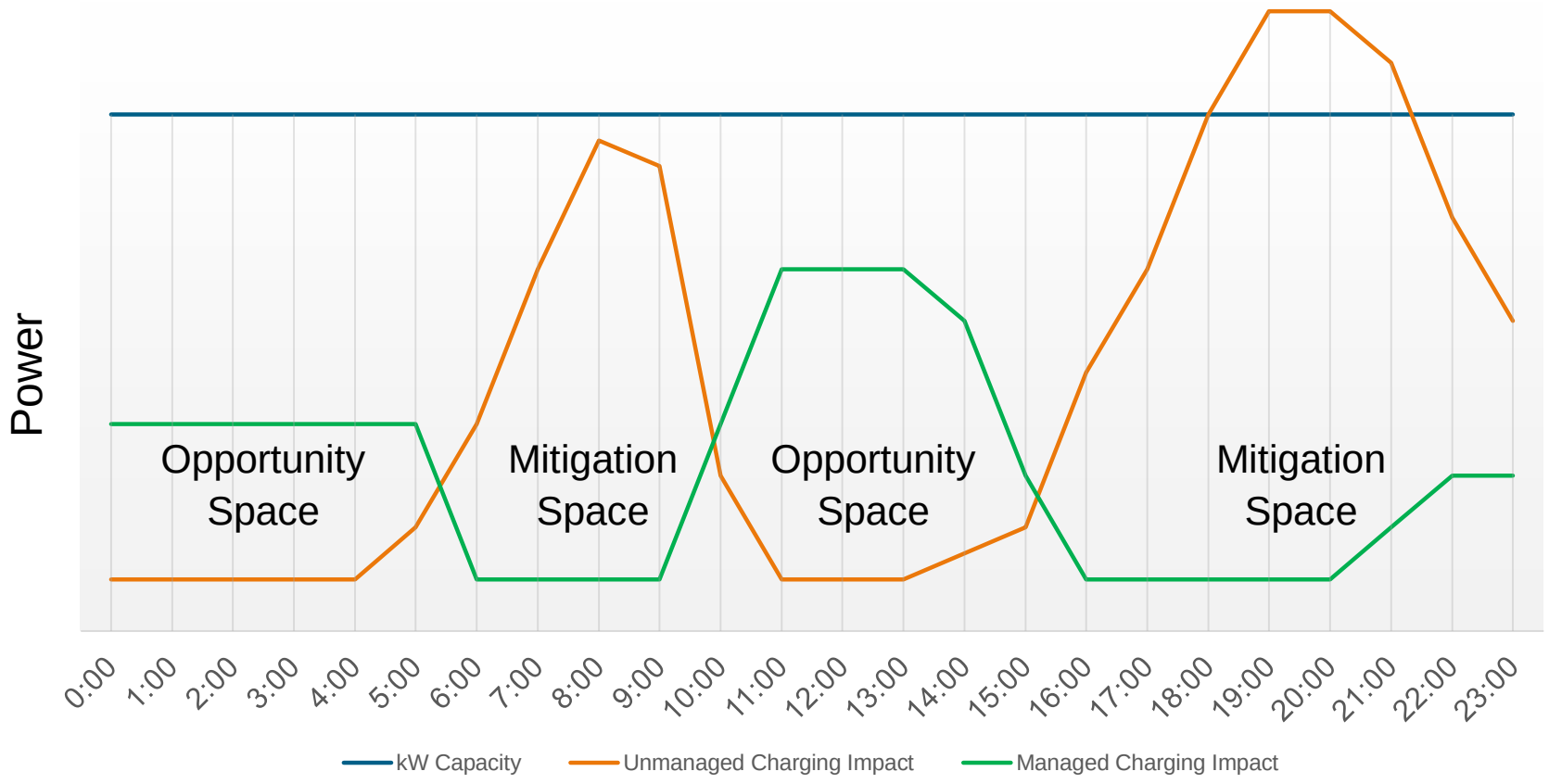

…and we can help Renewables in the process!

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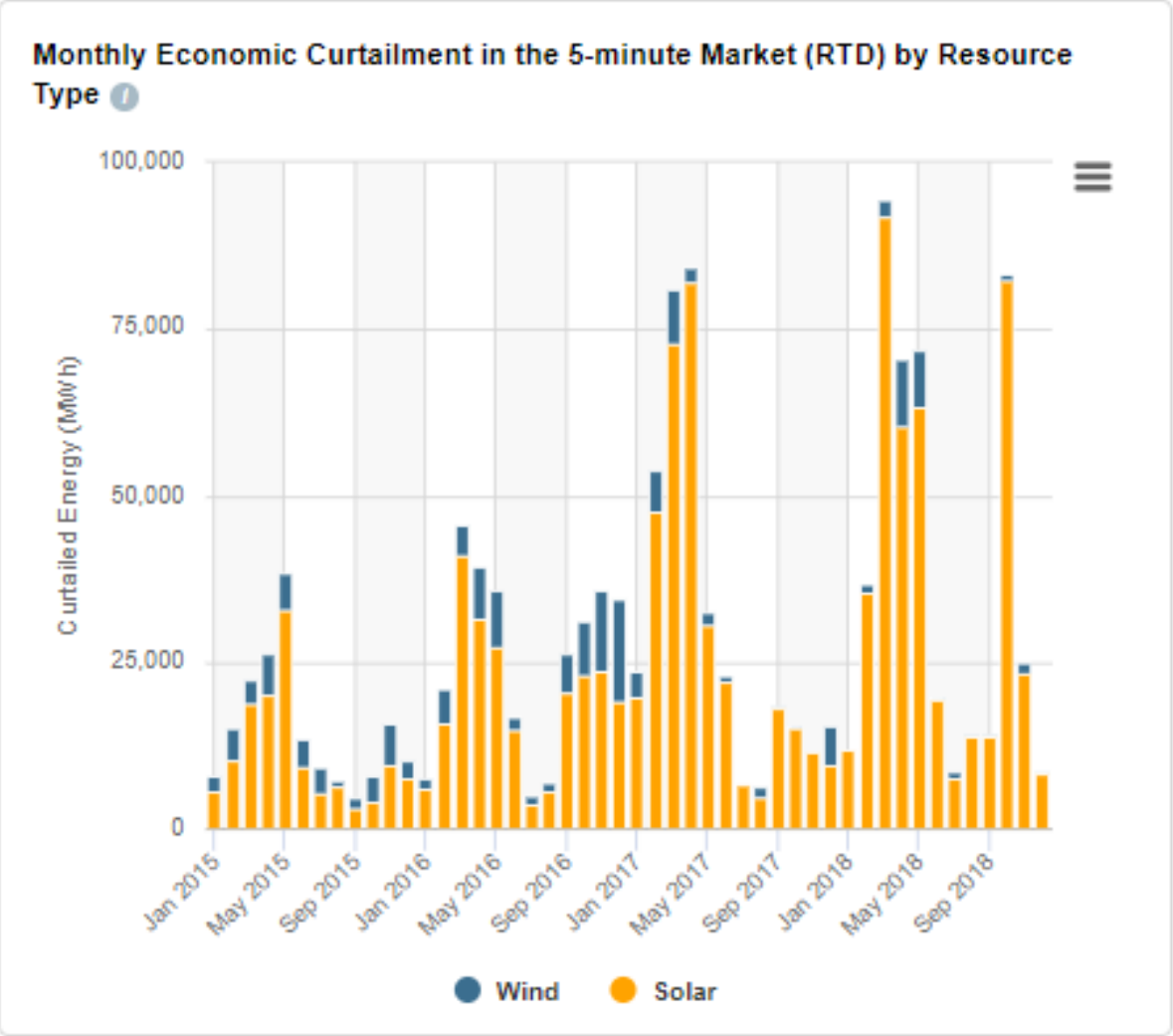

Source: CAISO

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Managed Charging

What is Managed Charging?

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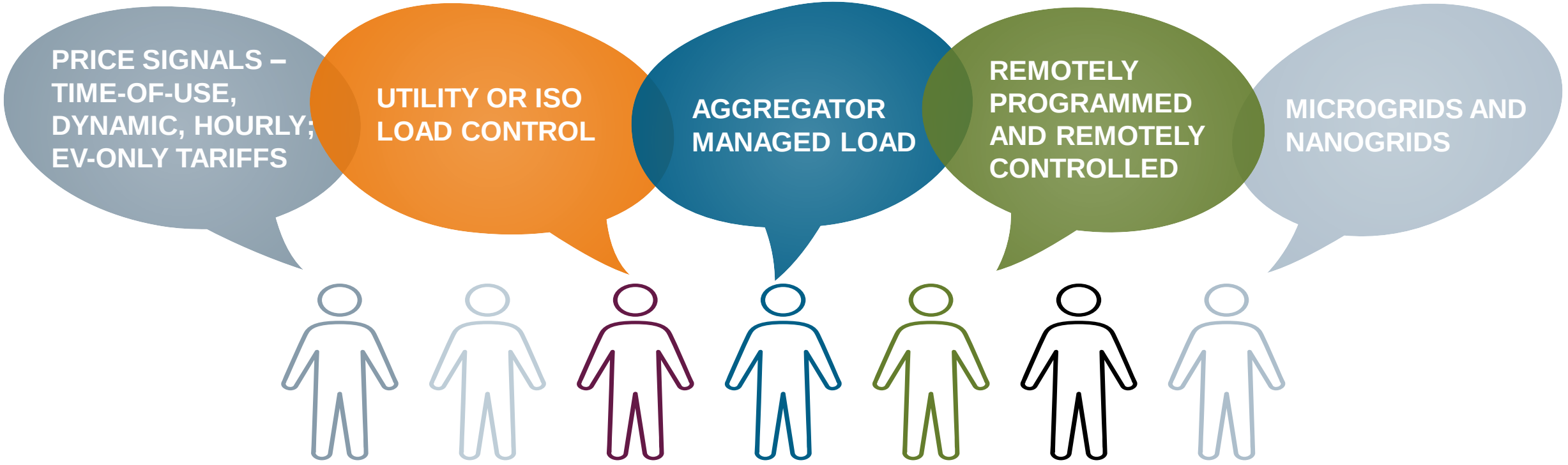

LEVERAGING THE FLEXIBILITY OF AVAILABLE TECHNOLOGY

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Smart Chargers

Chargers should be “smart” and comply with open technical and payment standards

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A smart charger is one that has a **sub-meter, is networked, and is integrated to back-end IT systems**, including billing, charger management, demand response, and consumer apps, be they provided by a utility, EVSP, ESP, aggregator, or other entity

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The **charger-utility link** (the communications from a utility application such as demand response or grid control to the charger) is foundational to grid integration

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Standards are driven by the procurer of the equipment. Utilities can procure EVSEs in quantity, either directly or via rebates and, therefore, can **drive charger standards**

Who Benefits?

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Drivers

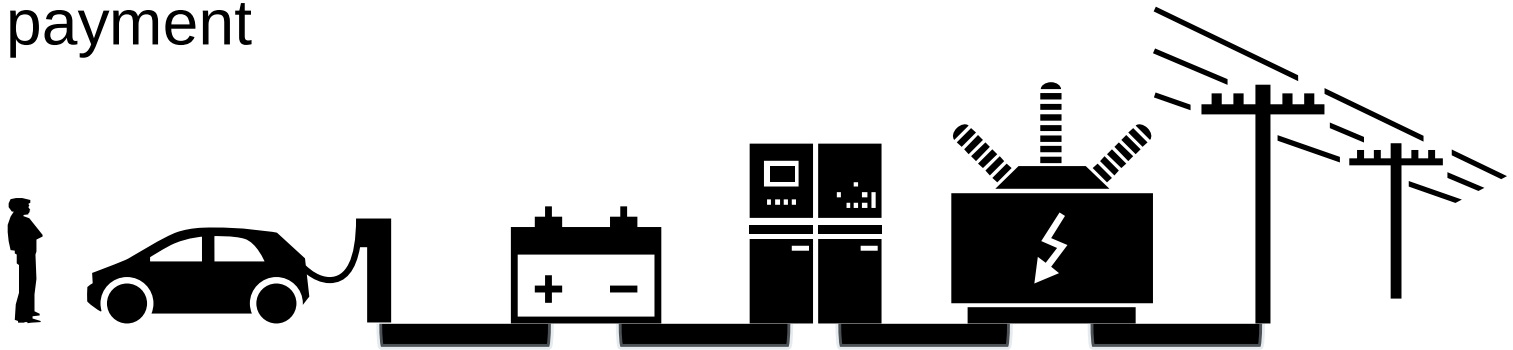
- Lower fuel costs
- Lower rates…?
- Information
  - ✓ Cost to charge
  - ✓ kWh
- Convenience
- Seamless payment

Site Hosts

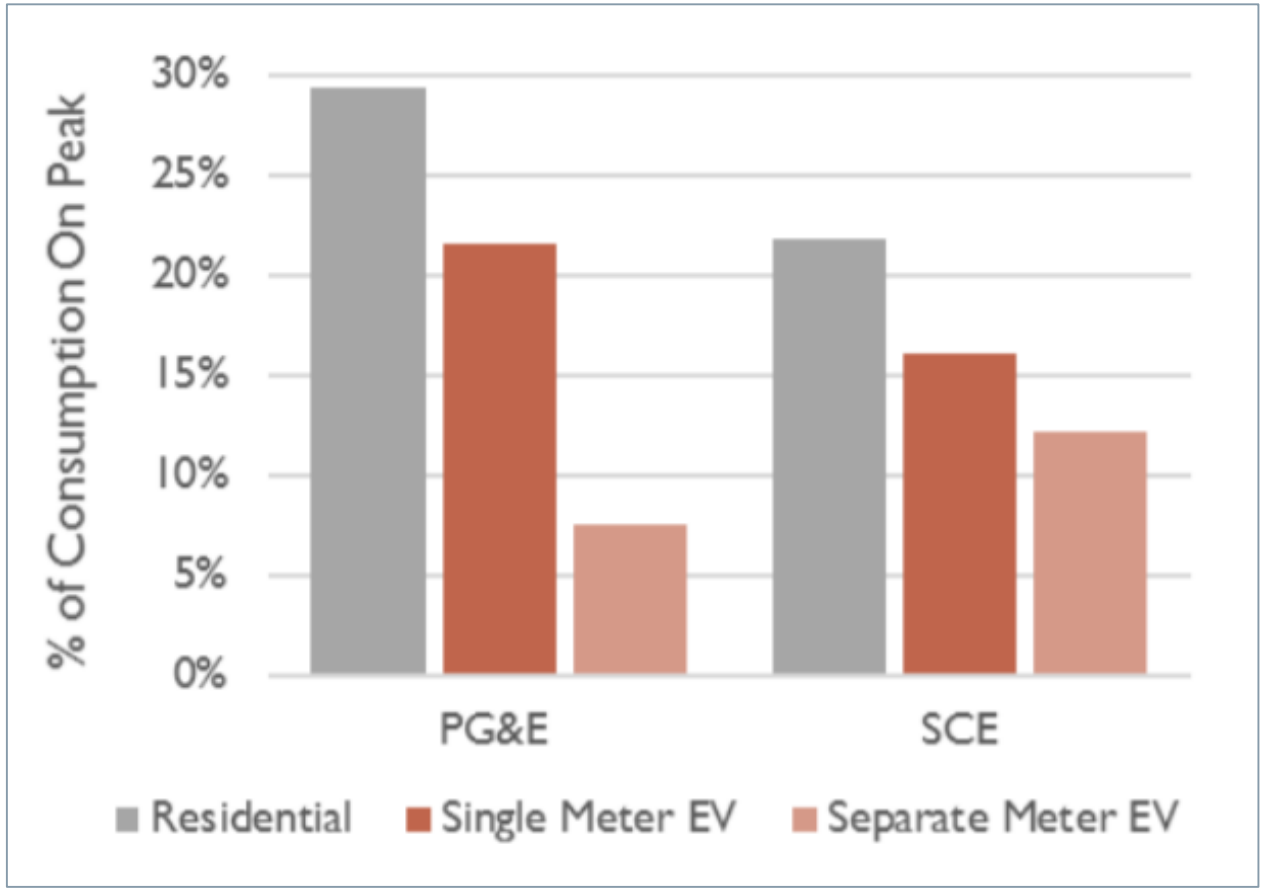
- Improved utilization
- Demand charge optimization
- Management tools
- Equipment monitoring

Utilities

- Promote EV adoption
- Load visibility
- Peak demand management
- Grid and market integration



TOU rates work well to manage peak, EV-only TOU tariffs even better



Fuel dollar distribution during a car's lifetime, gas vs. electric

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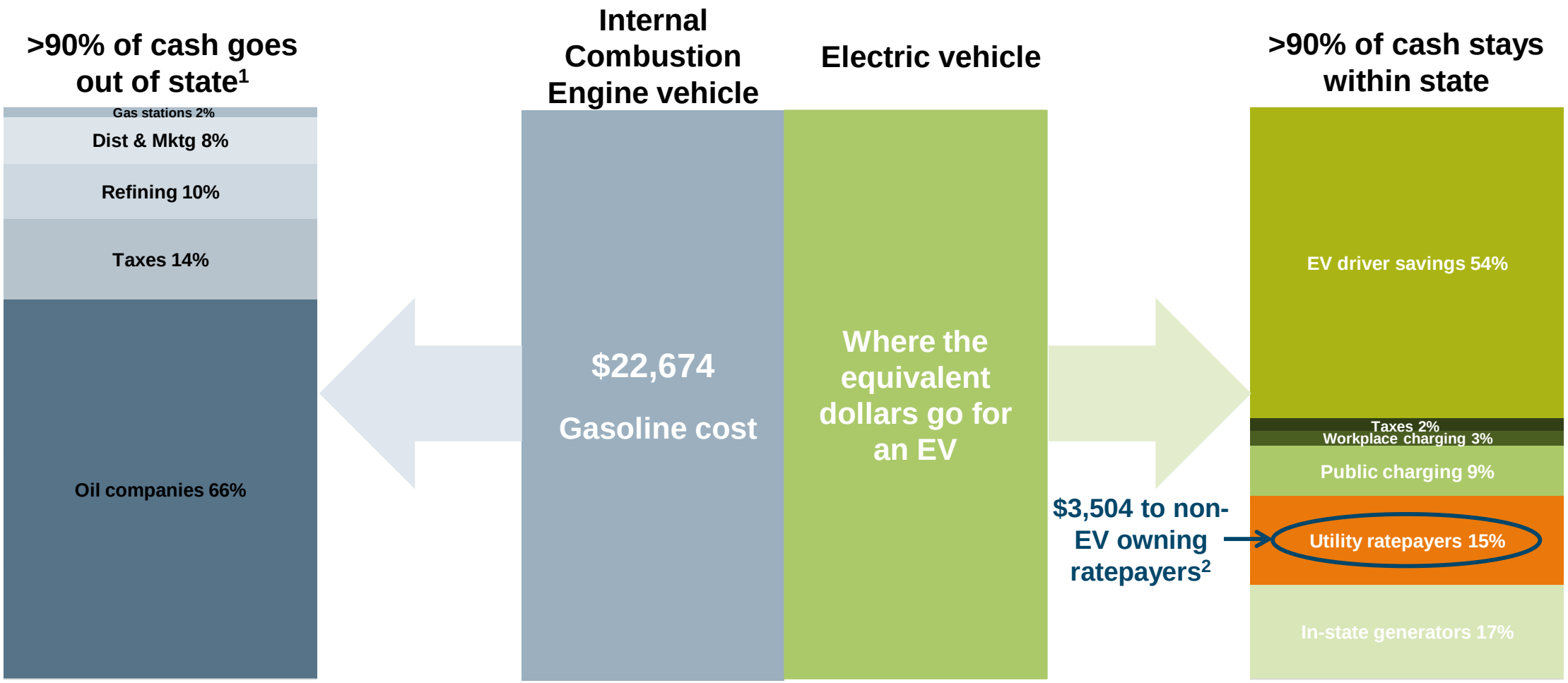

[1] – percentage is lower for oil-producing states

[2] – EV charging revenue paid for T&D portion of electricity rates; assumes 90% of charging is off-peak and, therefore, minimal T&D investment is required

Sources: Energy Information Administration, Union of Concerned Scientists, Siemens

Wrap Up

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"New Load" is coming in a big way

Massive stress risk on grid

Managed Charging via Smart Chargers

Sustainable Industry Growth

With Utility engagement, the industry will charge ahead

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Thank you!

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