

Managing the Grid

- Moderator:
 - **Chris Nelder**, Manager, Rocky Mountain Institute
- Speakers:
 - **David Danner**, Chairman, Washington Utilities and Transportation Commission
 - **Nancy Ryan**, Partner, E3
 - **Bryce Yonker**, Executive Director, Smart Grid Northwest



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Commission**

#WeTheStates



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Nancy Ryan, Partner, E3

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Energy+Environmental Economics

NGA Western States Transportation Electrification Workshop

Seattle, WA
April 5, 2019

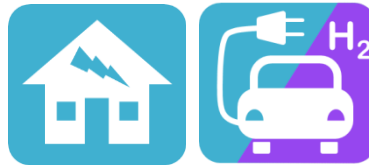
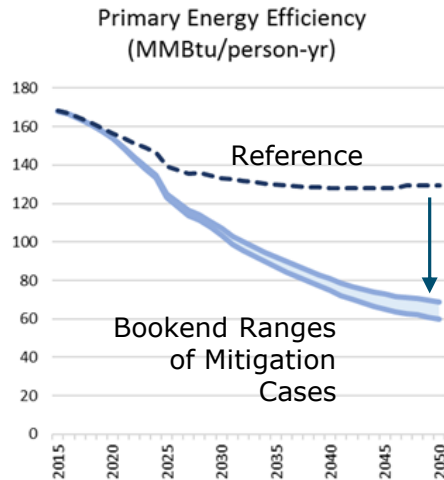
Nancy E. Ryan, Ph.D.
Partner



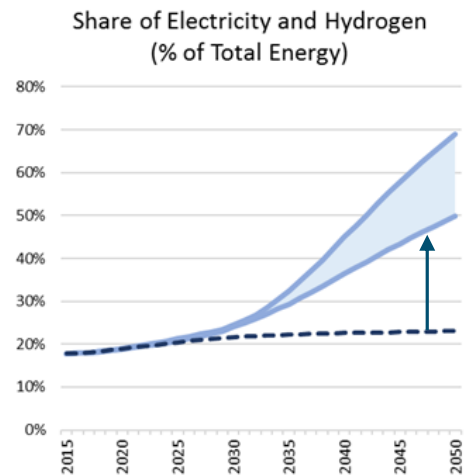
Four Pillars of GHG Reduction Need to Achieve Deep Decarbonization



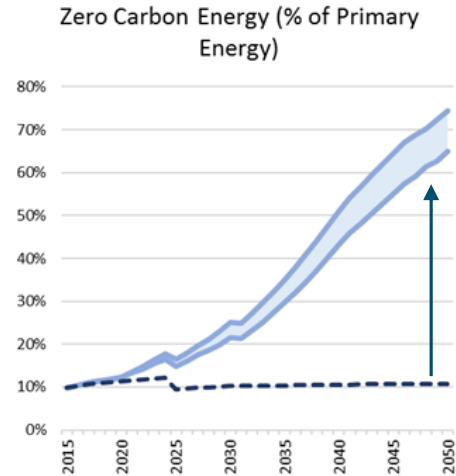
Energy efficiency & conservation



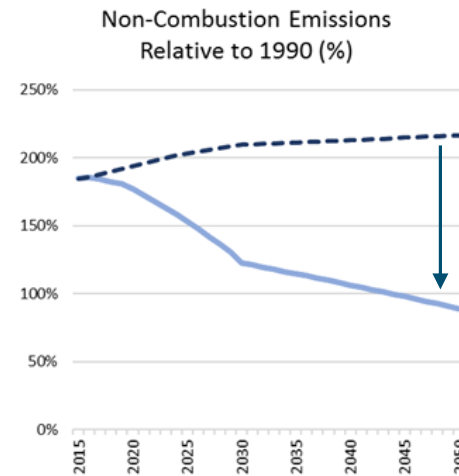
Electrification



Low-Carbon Fuels



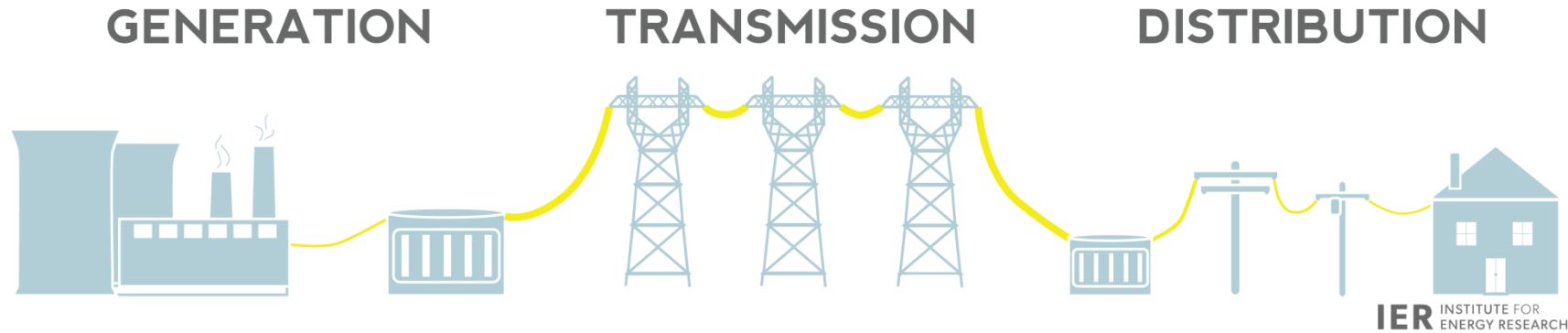
Reduce non-combustion emissions



+ Significant progress is needed across all four pillars, with fastest ramp-up between today and 2030



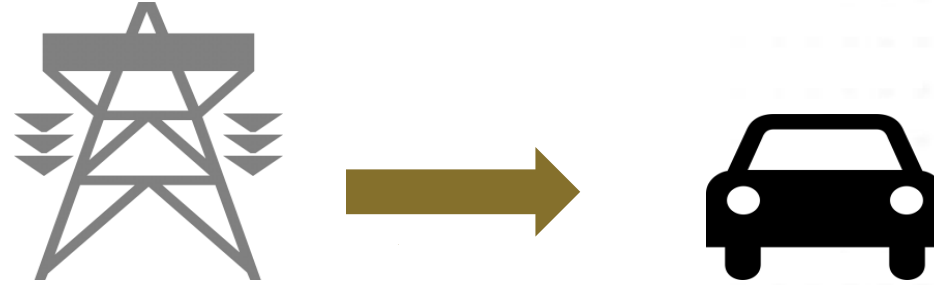
PEV Grid Integration: Issues



- + Do we need new power plants or transmission lines to support PEV charging?**
- + What are the opportunities to exploit the latent flexibility in PEV charging load to balance out fluctuations in renewable energy generation?**
- + Will EV charging overload local distribution circuits?**
 - New upgrades needed?
 - Safety/Reliability affected?
- + Can PEV charging be timed to coincide with rooftop solar generation?**



Technologies and policies are developing to support vehicle-grid integration (VGI)



'Smart' charging (or 'V1G') through targeted utility tariffs or communication from grid operator to aggregator / vehicle



V2H/V2B/V2X capability can enhance PEV value proposition



V2G capability allows PEV to discharge to grid, receive payment for services



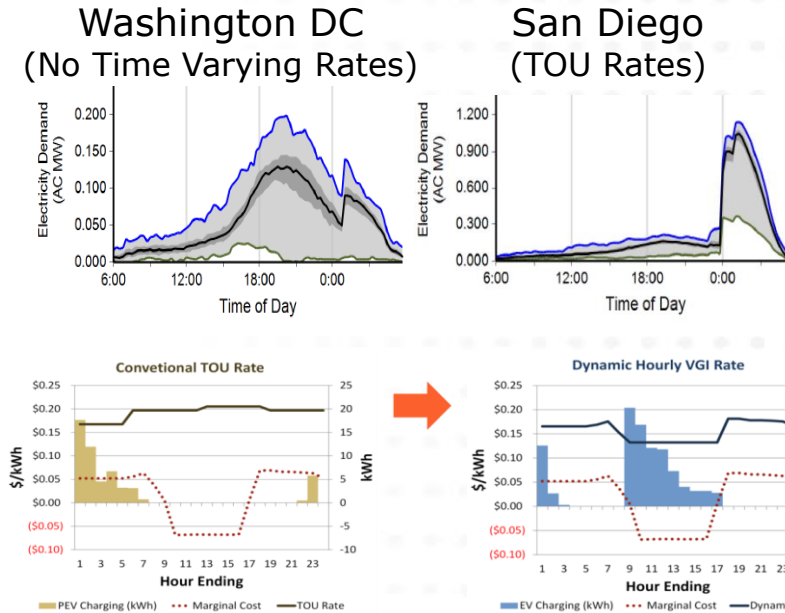
Grid integration measures: Smart Charging (V1G)

+ Rate design:

- **Time of use** (TOU) rates vary on a fixed schedule and are higher during periods of peak demand on the bulk power system.
- **Dynamic rates** vary from hour to hour with conditions on the bulk system or local grid (SDG&E's Charge Ready Pilot)

+ Demand response:

- The utility or a third party directly controls when and even where a vehicle charges: PG&E/BMW pilot
- Customer is paid for performance and can over-ride if desired.
- Aggregator may employ stationary battery backup to assure performance.



GET UP TO \$1,540* FOR CHARGING YOUR BMW i3.



Virtual TOU: ConEd SmartCharge

+ Incentive program partnership between ConEdison and FleetCarma

- \$150 sign-up bonus for installing FleetCarma tracker
- \$5/month for charging anywhere in ConEd service territory
- \$0.10/kWh incentive for charging off-peak (12AM-8AM, 365)
- \$20/month in summer for completely avoiding charging during peak summer hours (2PM-6PM, June-September)

+ Uses vehicle telematics, but mediated by FleetCarma device





THANK YOU

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Partner

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