



MODELS MATTER, DAMNIT

*PREPARED FOR THE
ENERGY SYSTEMS
INTEGRATION GROUP*

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MAY 14, 2019

@oboylemm

ENERGY INNOVATION
POLICY & TECHNOLOGY LLC

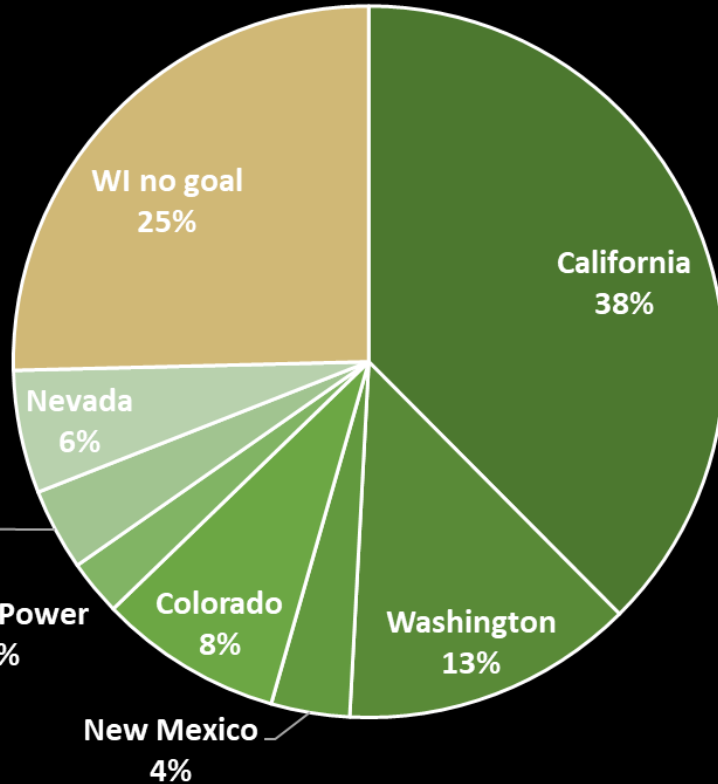
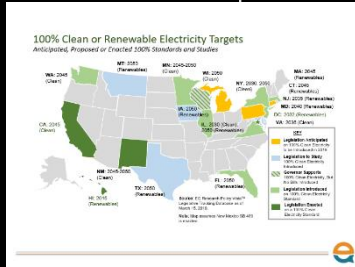


OUTLINE

1. Taking stock of renewables policy in the U.S.
2. The need for action
3. Questions we need answered

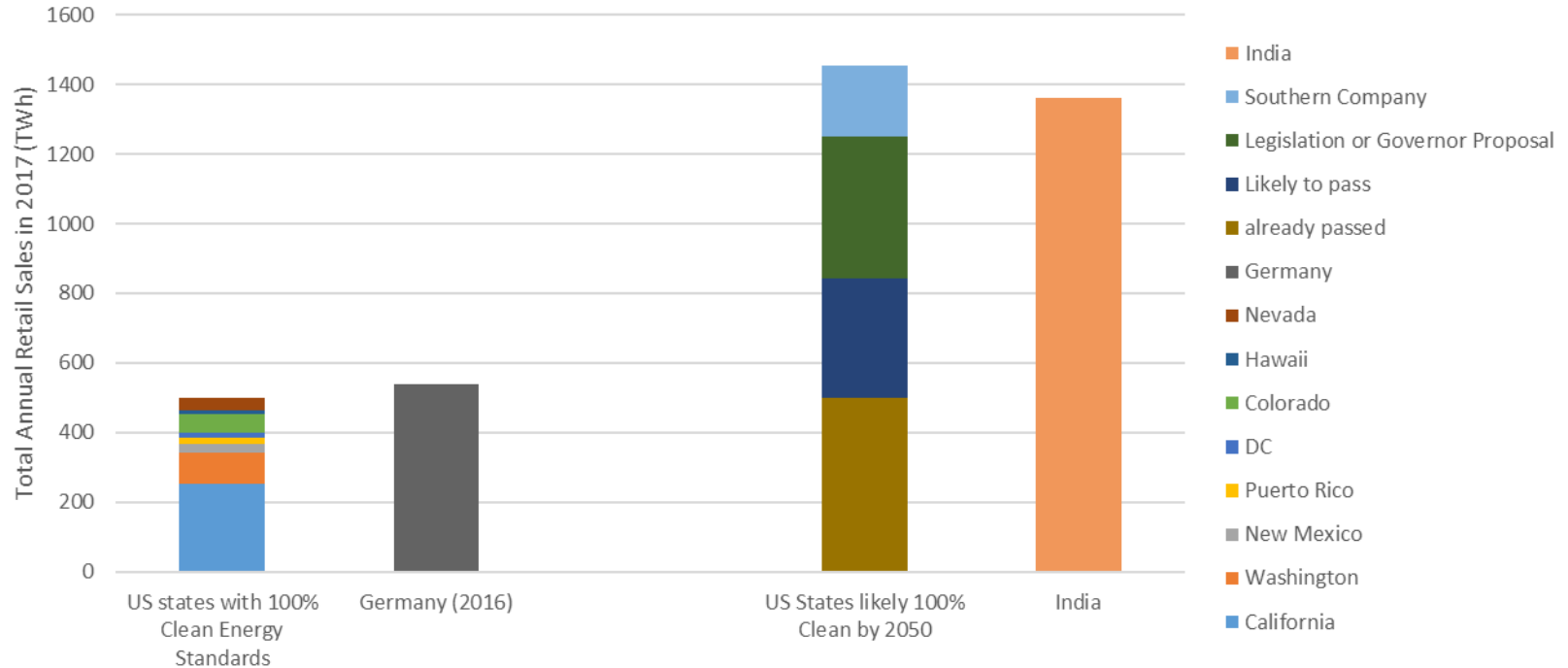


WESTERN INTERCONNECTION 100% CLEAN ENERGY 2050



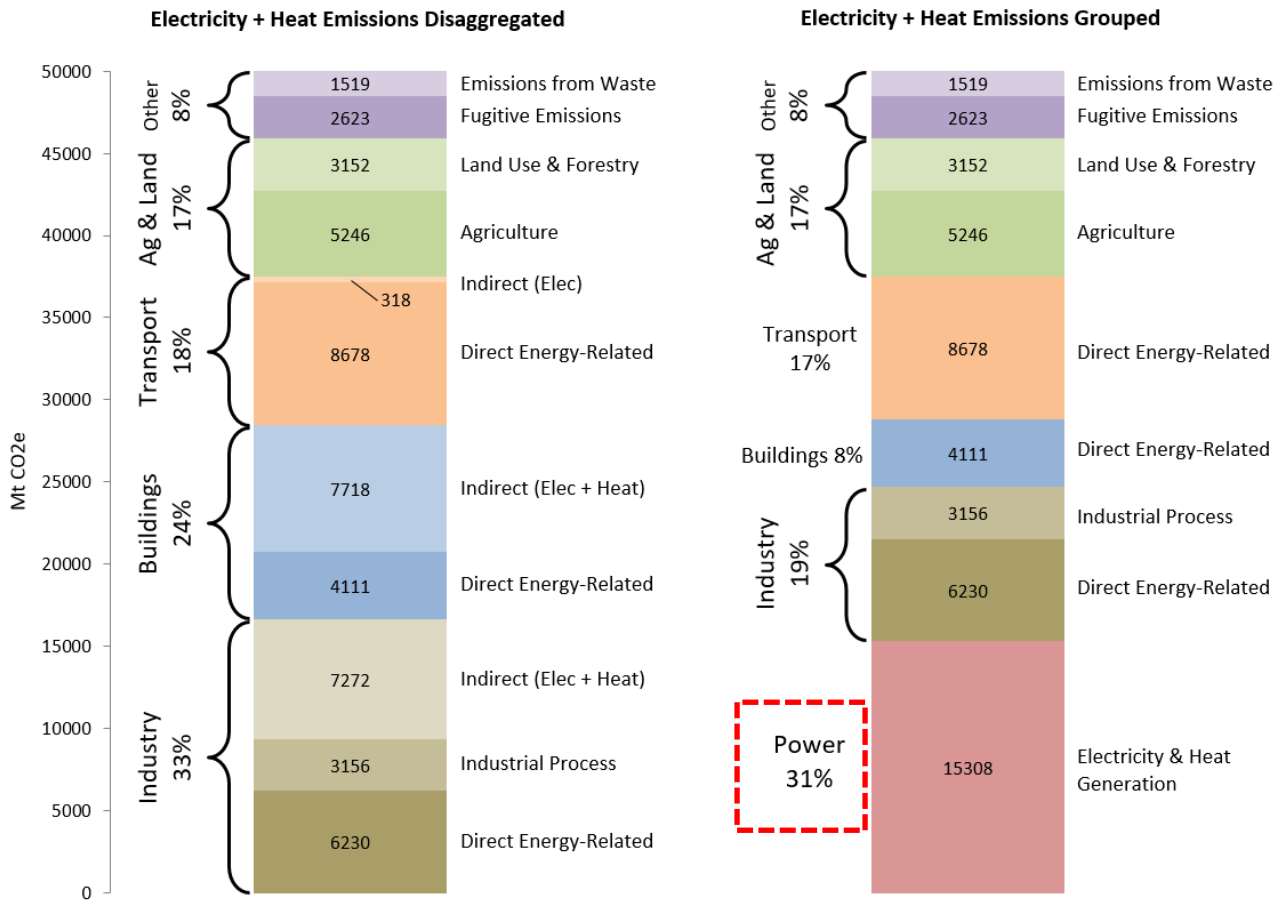
RENEWABLE ENERGY IS RACING FORWARD

Sizing up 100% Clean Energy Standards & Utility Goals in the U.S.

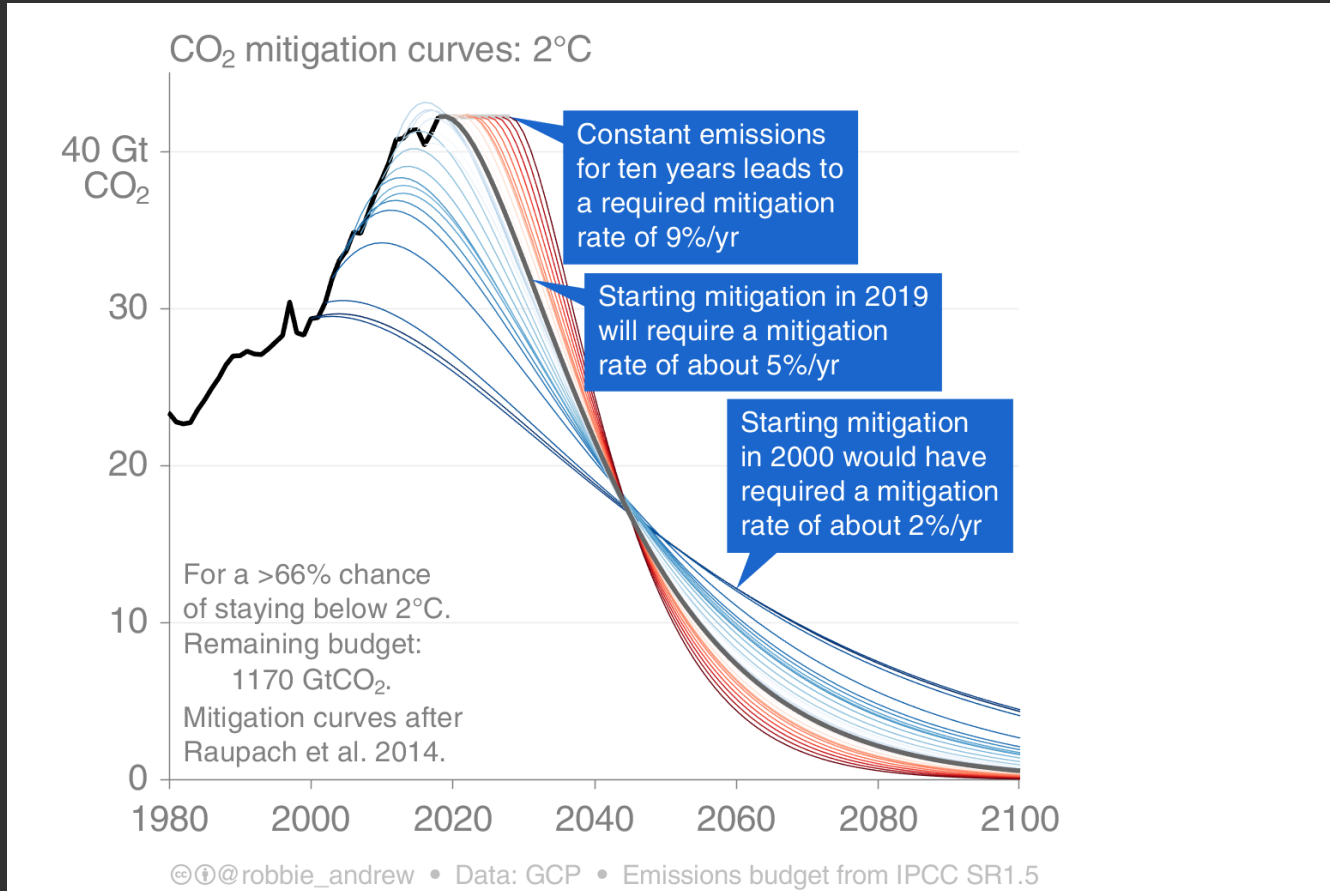


**BUT 100%
CLEAN
ELECTRICITY
IS NOT
ENOUGH.**

GLOBAL GHG EMISSIONS BY SECTOR IN 2014



WE CANNOT REST ON OUR LAURELS



POLICY MOMENTUM IS OUTPACING THE MODELING



100% Clean Electricity by 2035



Net-Zero Emissions by 2050

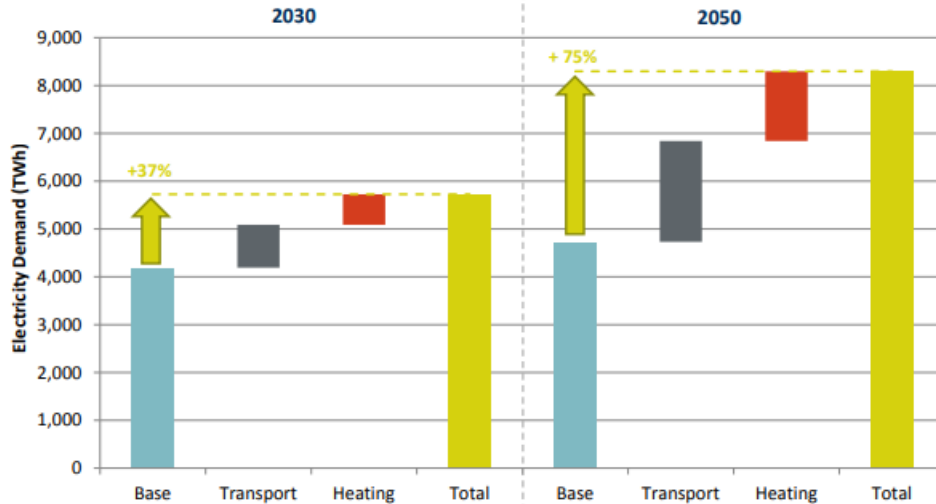
POLICYMAKERS NEED YOUR COVER



WHERE POLICYMAKERS ARE FLYING BLIND

FIGURE 6

Incremental Electricity Sales due to Electrification of Heating and Transport



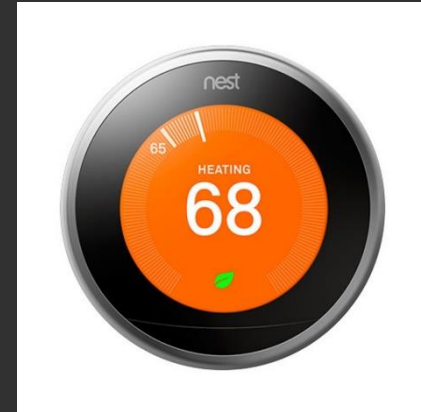
Source: AEO 2015, NREL 2016, The Brattle Group analysis

ELECTRIFICATION

- Renewables integration
- Infrastructure needs
- Demand-side participation, flexibility, elasticity
- Industrial electrification
- Synthetic fuel production

WHERE POLICYMAKERS ARE FLYING BLIND

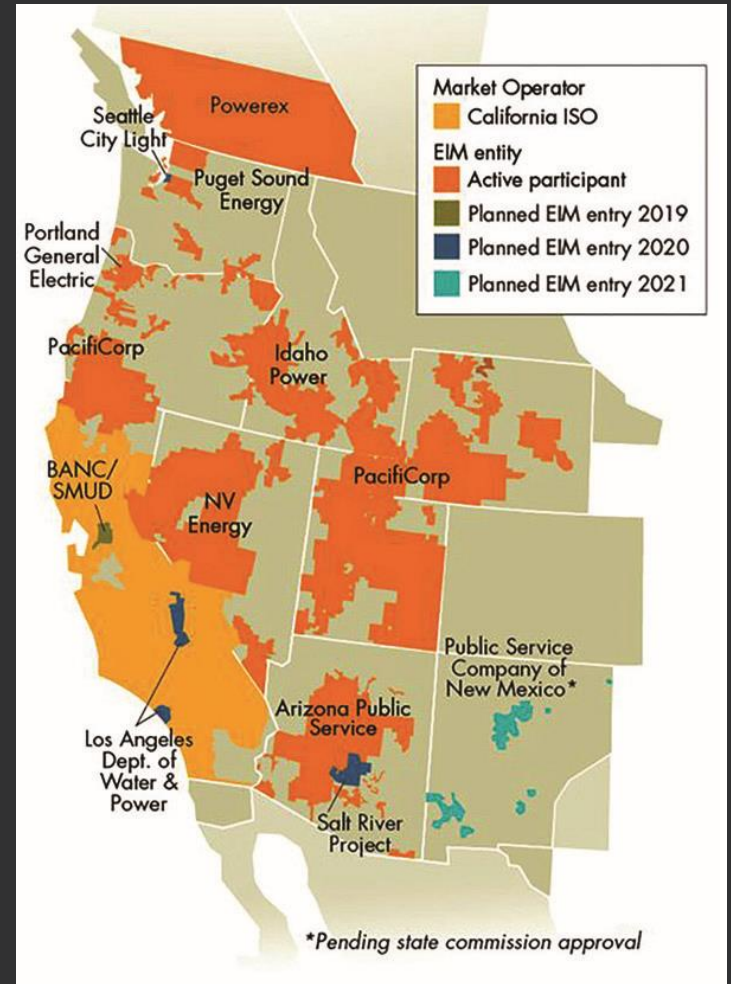
Uncertainties around the roles of **disruptive technologies**



WHERE POLICYMAKERS ARE FLYING BLIND

Modeling institutional reforms policymakers are considering

- Market design
- Utility reforms



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THANK YOU

WHAT WE UNDERSTAND WELL

- 80-90% renewable and coal-free can be done affordably and reliably
- Transmission enables high penetrations of RE at lower cost
- Inverter-based resources provide many reliability services better than conventional resources
- Demand-side resources are key
- We can innovate our way through uncertainty related to 100% clean...