

# Transmission in the West: Themes in Energy Transition

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**Prepared for:**

UCLA Law

**Prepared by:**

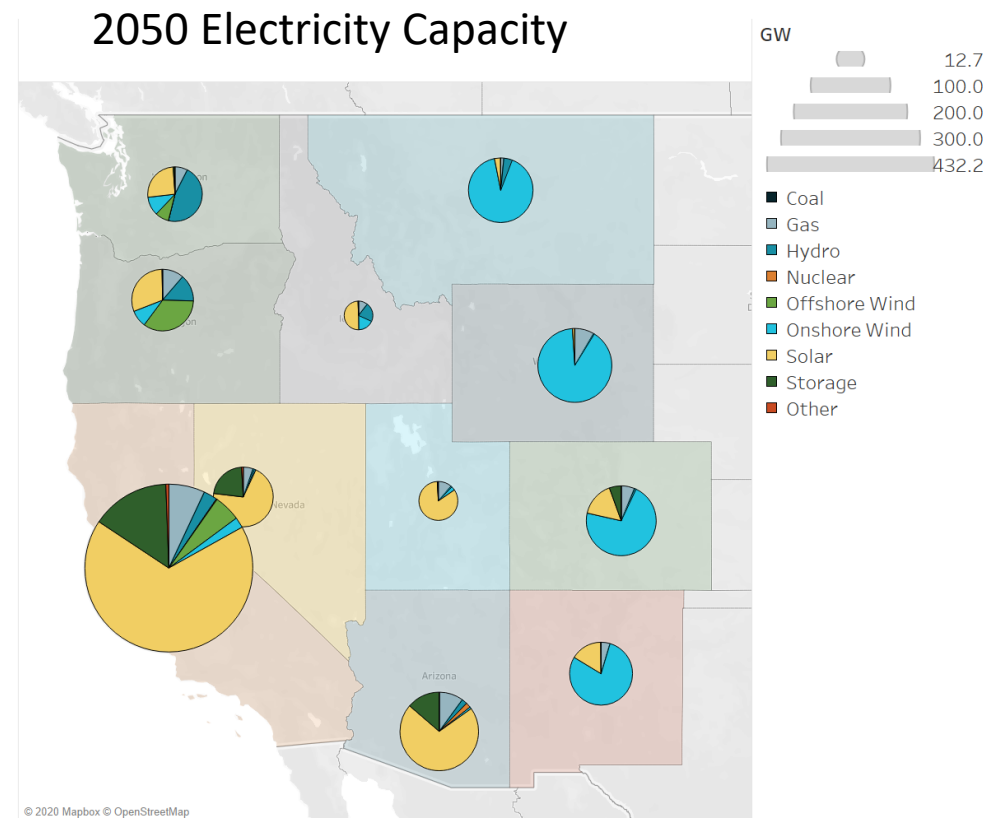
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# Siting/Permitting will Drive the New Energy Map

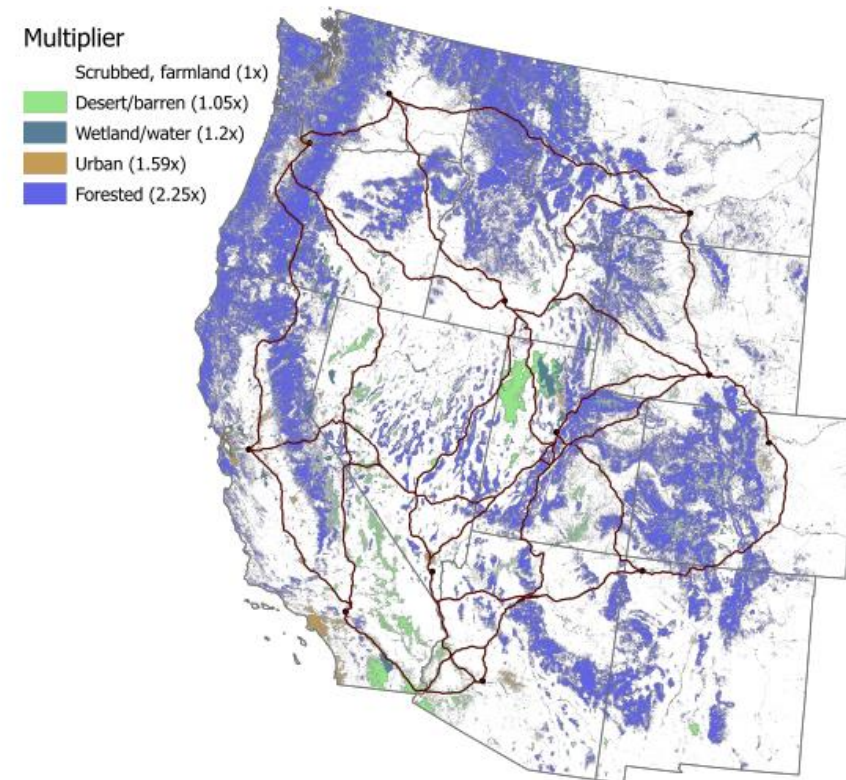
- **Regional transmission's role at the simplest level is for geographic and resource diversity in the West**
  - Move high quality Southwest solar to loads
  - Move high quality Northeast wind to loads
- **But rapid growth of the renewable energy sector will face challenges siting wind and solar plants, and expanded transmission**
  - What if renewables in particular regions not developed at the pace expected?
  - What if long-distance transmission or pipeline development faces obstacles?
- **Coordinated planning across the region will provide more options for success**
  - Profitable development of renewables and fuels production depends on access to markets
  - Transmission/pipeline development depends on development of renewables and fuels production



From Washington 2021 State Energy Strategy

# Competition for Transfer of Clean Energy: Wires versus Pipes

- **Diverse resources of varying quality across the West**
  - High quality renewables are often far from largest energy demands
- **Clean energy is useful as electricity and fuels, both are needed long-term to decarbonize the economy – what is the best way to transport it?**
  - Depends on relative **costs** and **feasibility** of transporting electrons, gases, and liquids
- **New potential opportunities:**
  - New long-distance transmission including HVDC
  - Reconductoring/new build with high ampacity conductors
  - Hydrogen/liquid fuels production local to high quality resources for export in pipelines
  - Direct air capture co-located with high quality renewables and sequestration sites



**Fig. S7.** Least cost path model results showing selected cost surface multipliers and new 500 kV transmission lines.  
Source: The Nature Conservancy Power of Place – West

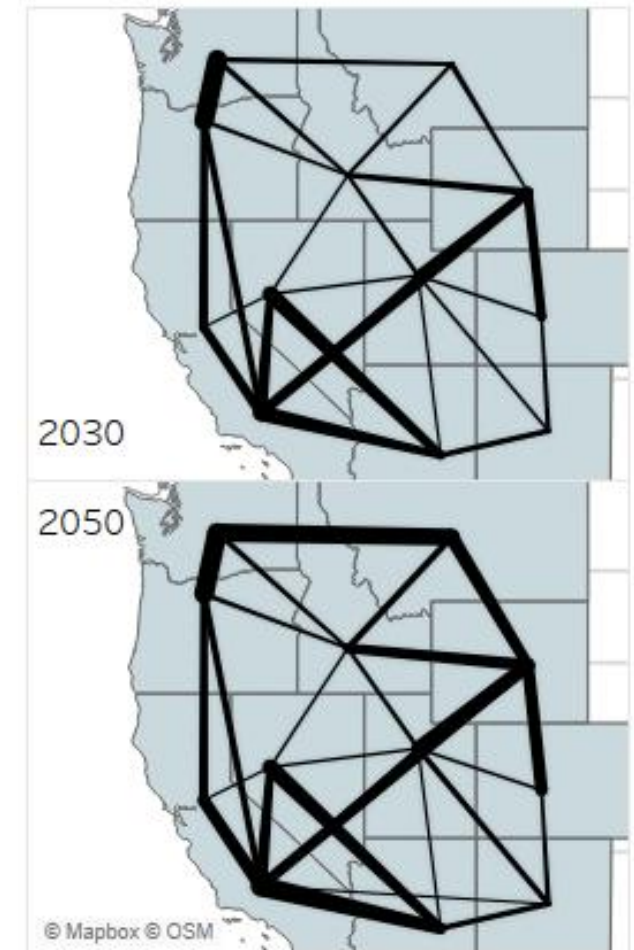
# IRA brings Forward Adoption of Nascent Techs and Electric Load Growth

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- **Technologies previously forecast for the 2040s shifted forward in time**
  - Incentive to build nuclear, electrolysis, and direct air capture in the early 2030s
- **EER national studies of IRA show that ITC and PTC incentives drive rapid adoption of renewables through 2035, in line with a pathway to net zero emissions**
  - Lowers costs in Western states with clean electricity policy, drives greater adoption in those without
- **Electrolysis to produce hydrogen is cost effective under IRA incentives**
  - Combined with lower cost renewables, states requiring near-term clean fuels to meet emissions targets will see significant economic benefits from IRA
- **IRA accelerates electrification, primarily through vehicle incentives**
- **What does this mean for transmission?**
  - Earlier growth of electric loads for end uses and fuels production coupled with greater renewables adoption require transmission expansion

# Transmission is Long Lead Time, Long Lifetime so Planning Should Start Now

- Transmission assets built in the next decade will spend much of their lives in a net zero economy
  - We know where we are going so plan proactively rather than reactively
    - Plan for integrated energy systems across geographies
    - Plan for sector coupling between electricity and fuels
- Transmission takes time to build – planning needs to start now
  - Planning transmission is time consuming and highly uncertain, both cost-wise and feasibility-wise
  - IRA accelerates the need for transmission to deliver low cost renewable energy
  - Pursuing multiple pathways to net zero will give us more ways of failing before achieving net zero is jeopardized



# A Final Word on Uncertainty

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- **Siting/permitting challenges, and by extension transmission expansion, are one of the largest uncertainties in both the rate of clean energy adoption and the pathway taken to net zero**
  - **Costs**
    - Little recent large-scale or interstate transmission development to benchmark costs against
    - Frequent cost overruns in past projects
    - However, our analysis shows that economic expansion of transmission is relatively insensitive to cost. Access to diverse and high-quality resources is so valuable
  - **Feasibility**
    - Many complex factors including physical and regulatory may be obstacles
    - However, limiting transmission puts greater stress on local siting and permitting in regions with potentially lower quality or unbalanced renewables
    - Pursuing transmission despite the uncertainty is valuable both economically and in providing optionality when achieving net zero goals
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# THANK YOU



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