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# Where will our electricity come from over our careers?

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# The future of electric generation and the grid

## Central Station

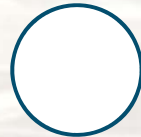
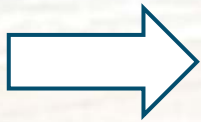
## Distributed Generation

Coal

Natural Gas

Renewable

Rooftop Solar



California seems yes  
Nevada seems no

**Policy**

NV SB123  
CA SB1368  
Haze  
MATS  
CPP

RPS  
ITC

NEM  
ITC

**Economics**

Low cost of gas

Dropping cost of wind and solar  
Low cost of debt  
Federal ITC extension

High compensation from NEM  
Falling cost of rooftop solar  
Federal ITC extension

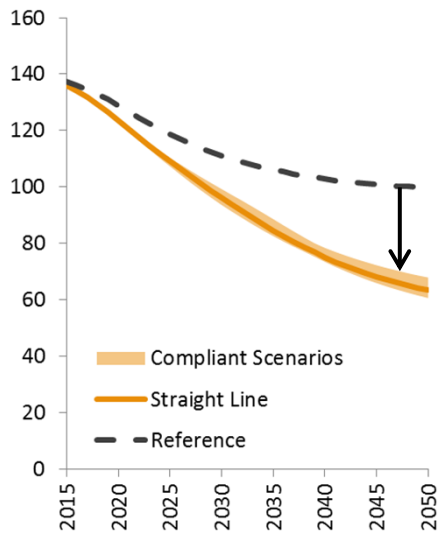


# 4 Pillars of the Energy Transition Common on All Scenarios that reach Deep GHG Goal

## 1. Efficiency and Conservation



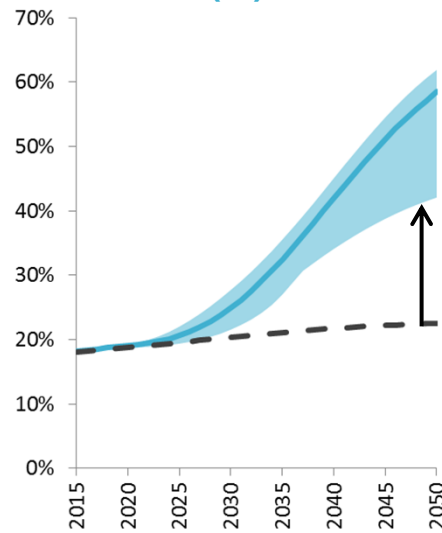
Energy use per capita (MMBtu/person)



## 2. Electricity as Fuel



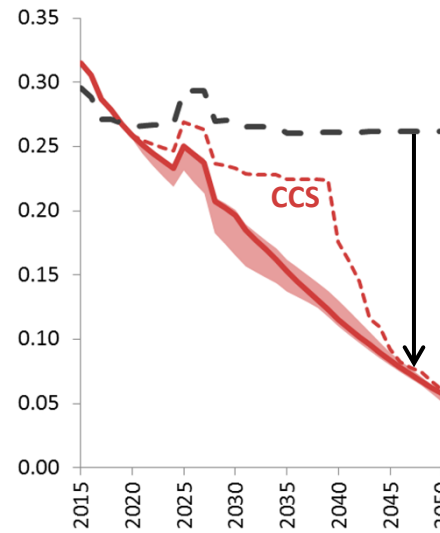
Share of electricity & H<sub>2</sub> in total final energy (%)



## 3. Decarbonize electricity



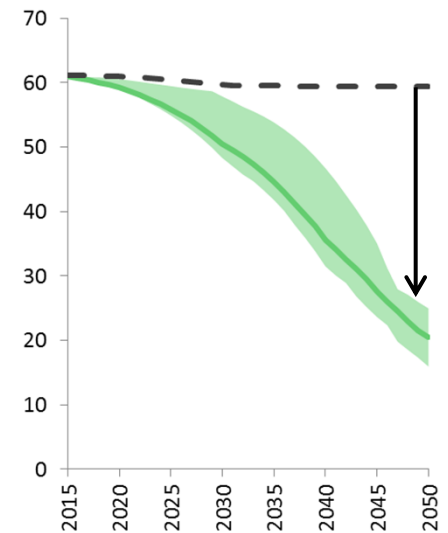
Emissions intensity (tCO<sub>2</sub>e/MWh)



## 4. Decarbonize fuels (liquid & gas)



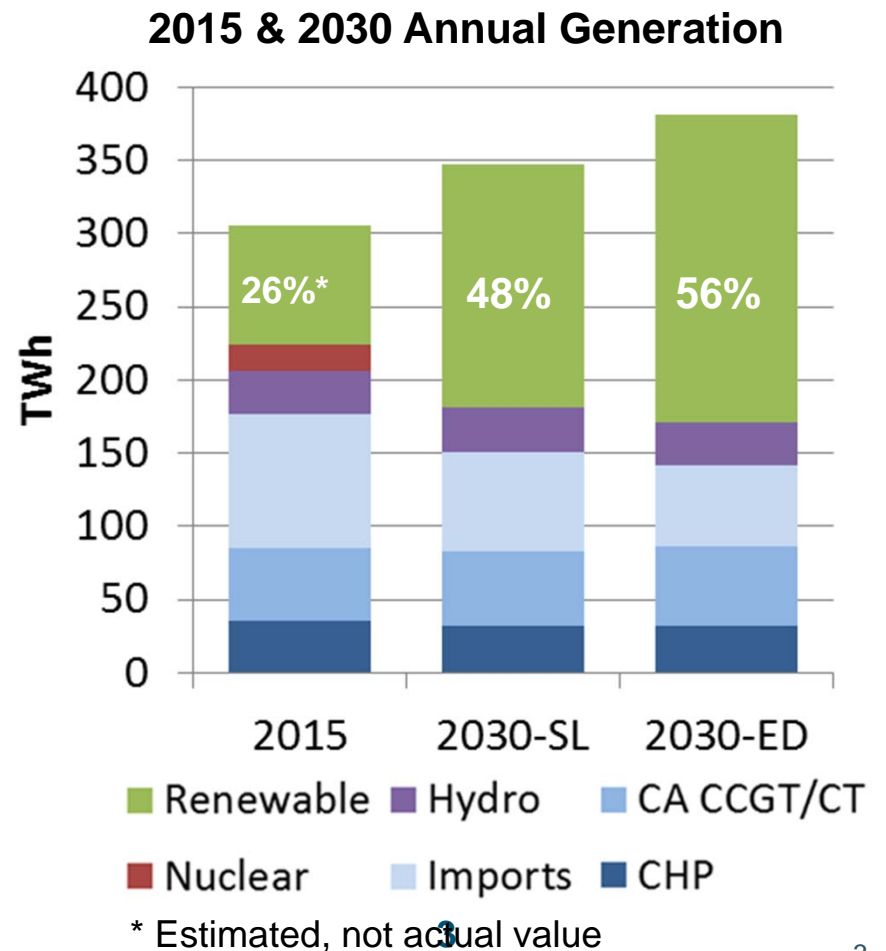
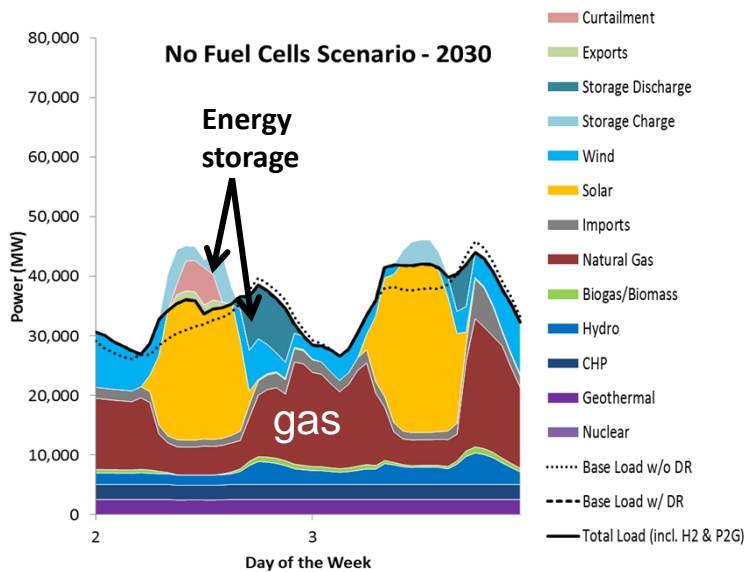
Emissions intensity (tCO<sub>2</sub>/EJ)





# To reach 40% GHG goal, CA renewables are 50-60% of annual generation by 2030

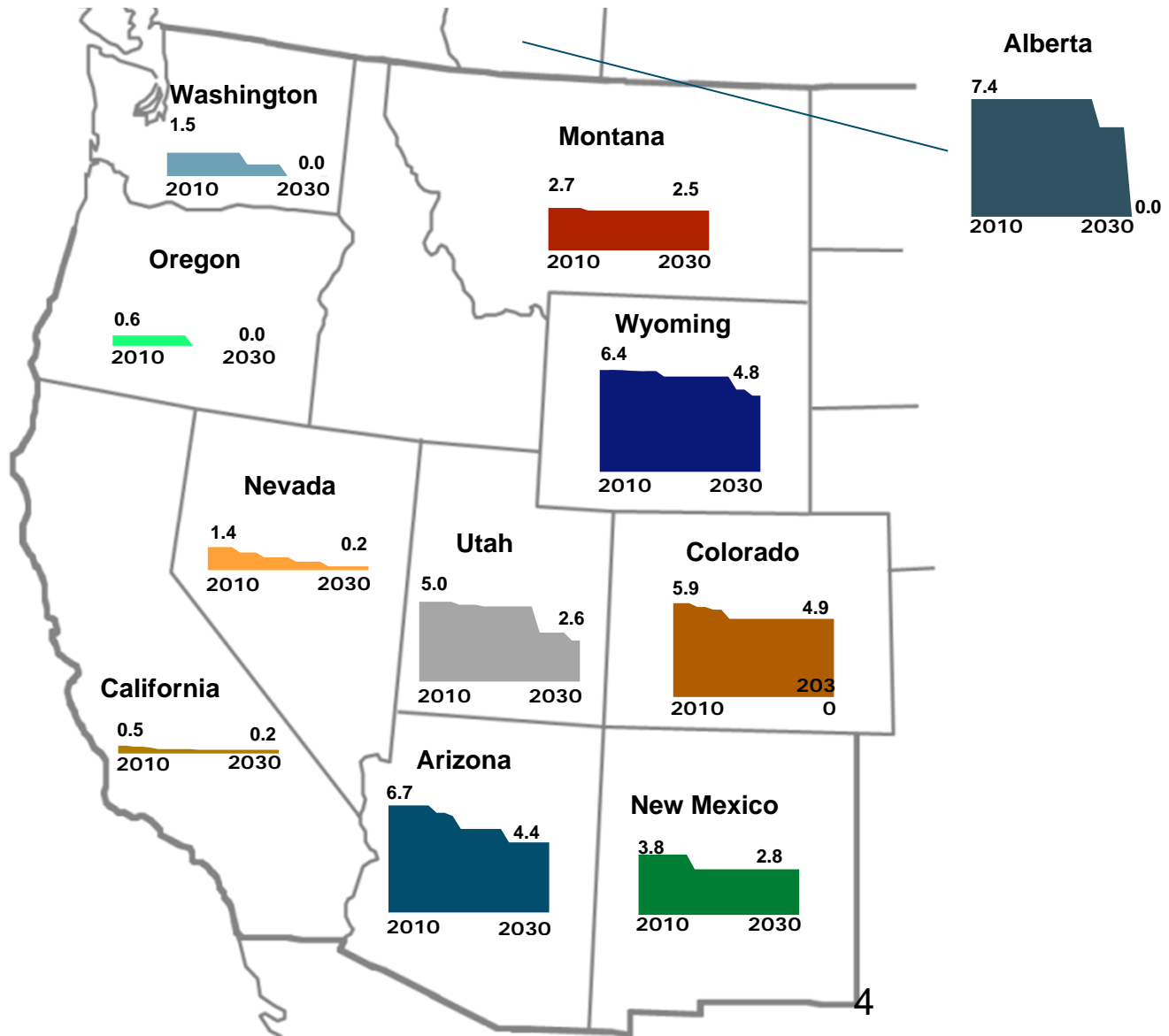
- + Grid scale renewable additions are ~23,900 MW (mostly solar, wind) plus 11,800 MW rooftop PV between 2015 and 2030
- + Natural gas generation is still used to balance the grid in 2030, shift to night-time generation





# Coal capacity is declining consistently throughout the West

Area	Coal Capacity to Retire from 2010 to 2030 - GW Nameplate
AB	7.4 (100%)
AZ	2.3 (35%)
CA	0.3 (52%)
CO	1.0 (17%)
MT	0.2 (7%)
NM	1.0 (25%)
NV	1.2 (83%)
OR	0.6 (100%)
UT	2.4 (49%)
WA	1.5 (100%)
WY	1.6 (25%)
<b>Total</b>	<b>19.5 GW (46%)</b>





## Nevada NEM Reform, significantly reduces economics of rooftop PV

- In December 2015, the Nevada Public Utilities Commission voted to implement NEM reforms<sup>1</sup> aimed at reducing the cost-shift to non-NEM customers
- The new structure phases in larger monthly fixed charges, lower volumetric charges, and lower excess energy credits over a period of 12 years<sup>2</sup>

	Fixed Monthly Charge (\$/mo)	Volumetric Charge (\$/kWh)	Excess Energy Credit (\$/kWh)
Existing	\$12.75	\$0.113	n/a
2016	\$17.90	\$0.111	\$0.092
2028	\$38.51	\$0.102	\$0.026

- The current decision applies to all solar customers, including those with existing systems – the PUC is currently reviewing the issue of grandfathering for existing customers
- Litigation is expected from the solar parties

<sup>1</sup>[http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS\\_2015\\_THRU\\_PRESENT/2015-7/8305.pdf](http://pucweb1.state.nv.us/PDF/AxImages/DOCKETS_2015_THRU_PRESENT/2015-7/8305.pdf)

<sup>2</sup>[https://www.nvenergy.com/renewablesenvironment/renewablegenerations/NetMetering.cfm?utm\\_source=nve\\_fr\\_ontpage&utm\\_medium=banner&utm\\_content=%25E2%2580%25A6](https://www.nvenergy.com/renewablesenvironment/renewablegenerations/NetMetering.cfm?utm_source=nve_fr_ontpage&utm_medium=banner&utm_content=%25E2%2580%25A6)



## California NEM 2.0, similar to NEM 1.0

- Requires payment of non-bypassable charges (2 to 3 cents per kWh) and time-of-use rates when available
- Under the adopted NEM 2.0 decision, the NEM Public Tool projects between 17 GW and 21 GW of solar PV adoption in IOU service areas by 2025
  - Up from 3.8 GW installed today and 5.5 GW expected under NEM 1.0
- The NEM Public Tool projects total cost shifts of \$3.2-4.6 billion/year by 2025 under the NEM successor tariff
- The NEM Public Tool projects bill increases for non-NEM residential customers of \$12-19 per month, or 13-21%, by 2025
  - This is in addition to the embedded bill impacts of NEM 1.0 of \$5 to \$6 per month

	High DER Value	Low DER Value
2025 Installed MW	20,860	17,356
2025 Annualized Cost-Shift	\$3.19 billion	\$4.61 billion
Residential Bill Impact	13.3% \$12 per month <sup>2</sup>	20.7% \$19 per month <sup>2</sup>
Non-Residential Bill Impact	4.0%	3.9%
Average Levelized Solar Avoided Cost	12.6 cents per kWh	7.1 cents per kWh
Average Levelized Solar Compensation under NEM	23.9 cents per kWh	27.0 cents per kWh

