Household-Level Costs of Net Zero 2050 in the U.S.

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Pop quiz: What will Net Zero 2050 cost your average family?

A. Nothing, because it's not authorized by Congress
B. A small amount that few will notice.
C. Larger than a breadbox, smaller than a house.
D. All the tea in China.
E. Don't know.

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Net Zero 2050 is happening now, without legislative authorization

- Goal of the 2016 Paris Agreement

  'Holding the increase in the global average temperature to well below 2℃ above pre-industrial levels and pursuing efforts to limit the temperature increase to 1.5℃ above pre-industrial levels' [Art. 2(1)(a)]

- Biden Administration Policy

  Attacking the climate 'crisis' 'requires[s] net-zero global emissions by mid-century or before' (Executive Order 14,008, § 101)

- Goal of the Net Zero Asset Managers Initiative

  > 315 firms with > $59 trillion assets under management

  Includes 5 of top 10: BlackRock ($8.6t), Vanguard* ($7.2t), StateStreet ($4.1t), JP Morgan Chase ($3.0t), and Allianz ($2.4t)

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How to fairly estimate the cost of Net Zero 2050

1. Take advocates seriously.

2. Use their ‘social cost of carbon’ estimates.

3. Allocate cost across States and households.

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How to fairly estimate this cost

1. Take the advocates seriously.
   'An extinction-level event'
2. Use their 'social cost of carbon' estimates.
   NGFS, McKinsey, Swiss Re, Biden admin
3. Allocate cost by State CO2 emissions.
   States vary from 2.81Mmt to 683 Mmt
4. Divide by the number of households.
   States vary from 0.2M to 13.1M

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Main assumptions

1. Carbon tax is least-cost path to Net Zero
2. The ‘right’ carbon tax rate’ = ‘SCC’.
3. Carbon tax/SCC must be high enough to achieve the goal.
4. The full carbon tax is borne by US households
5. No offsetting tax cuts or regulatory relief.
6. Households don’t move to less expensive states.
7. US households do not pay for CO2 reductions outside the US.

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Actual US household costs could be higher or lower

Cost is Higher	Cost is Lower
Political compromises required	No political compromises needed
Regulations supplant markets	Regulatory regimes rescinded
Technology is more expensive	Technology is less expensive
More grid unreliability	Technology solves grid unreliability
Significant environmental damages	No environmental damages
Carbon tax is not ‘revenue neutral’	Carbon tax is ‘revenue neutral’
Significant permanent unemployment	Labor transition is easy
US does not subsidize other nations	US subsidizes many nations

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Data

- CO2: Energy Information Administration
- Population, HH size, median income: Census
- Carbon Tax Rate/SCC: NFGS, McKinsey, Swiss Re Institute, White House

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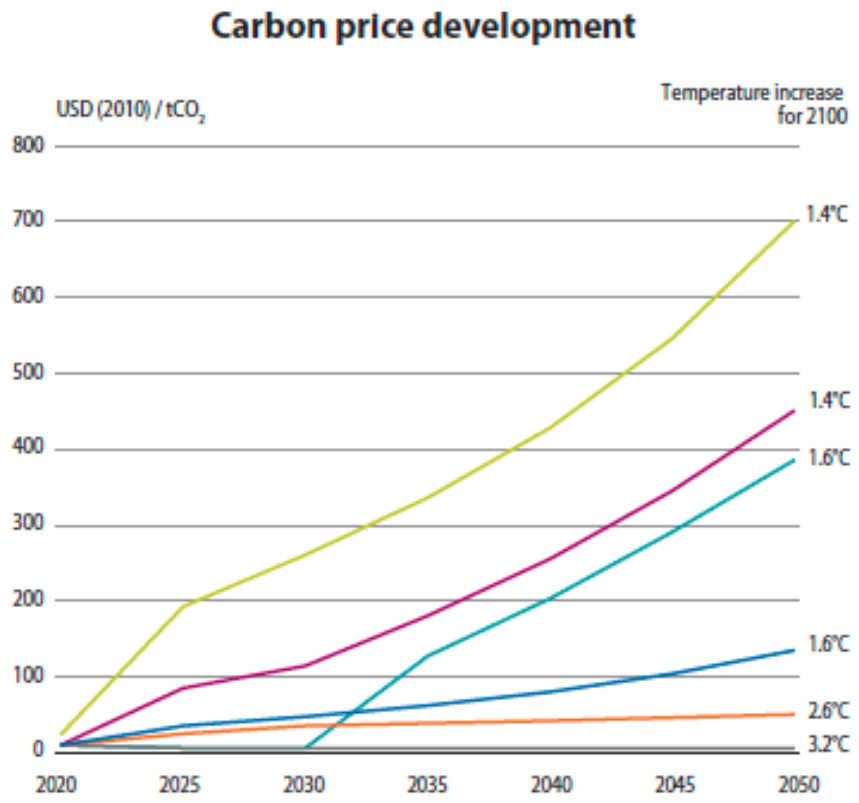
Six NGFS scenarios: 2050 temperature & SCC



NGFS Scenario

← **Divergent Net Zero 2050**

← **Net Zero 2050**

← Below 2°C

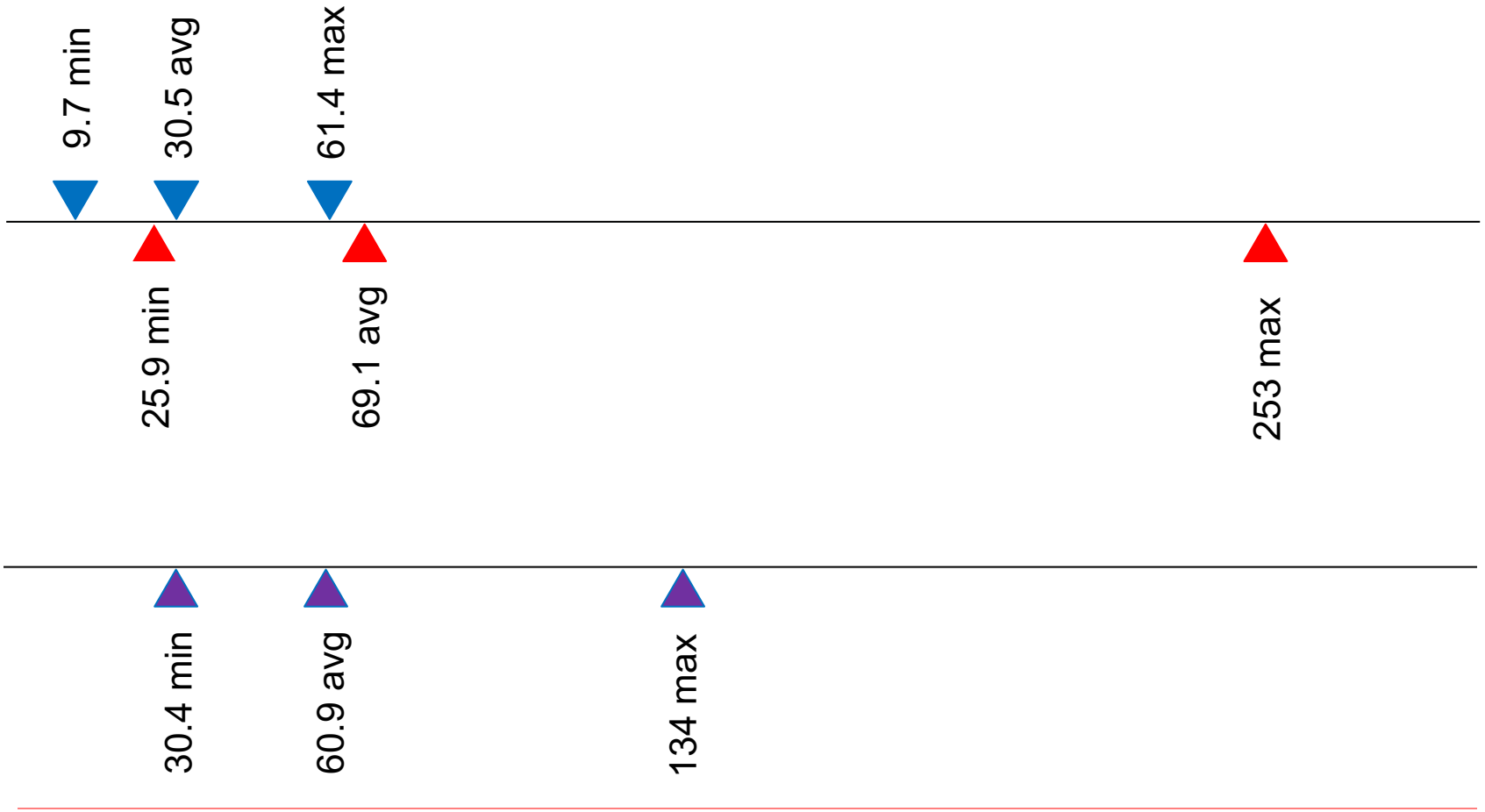
← Delayed transition

← Nationally Determined Contributions

← Current policies

Red states, blue states: CO2 emissions/household (mt)

Red states, blue states, purple states: CO2 emissions/household (mt)



Scenarios examined

A. Tax based on in-State emissions, divided across in-State households
B. Tax based on U.S. emissions, divided across U.S. households

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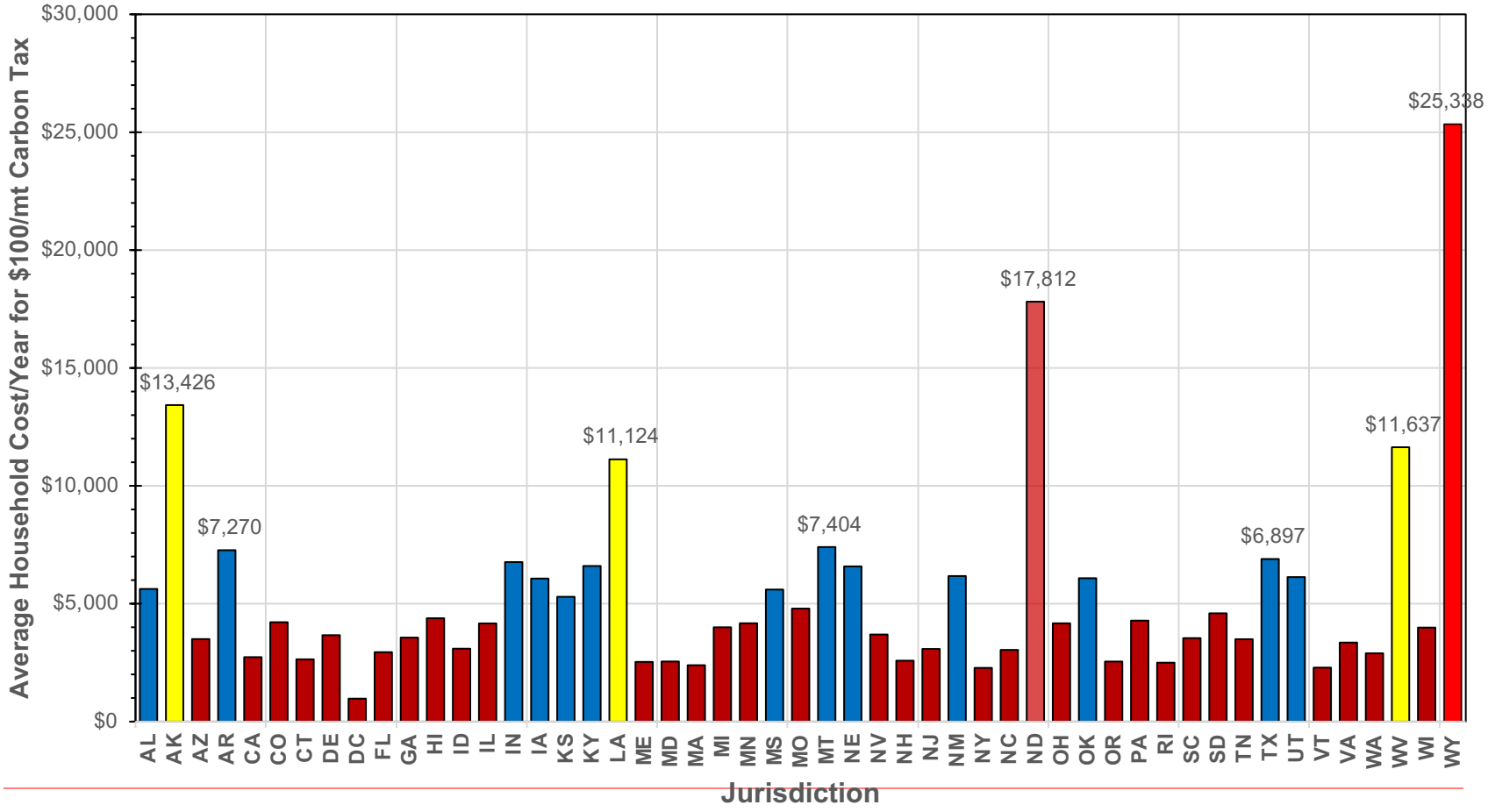
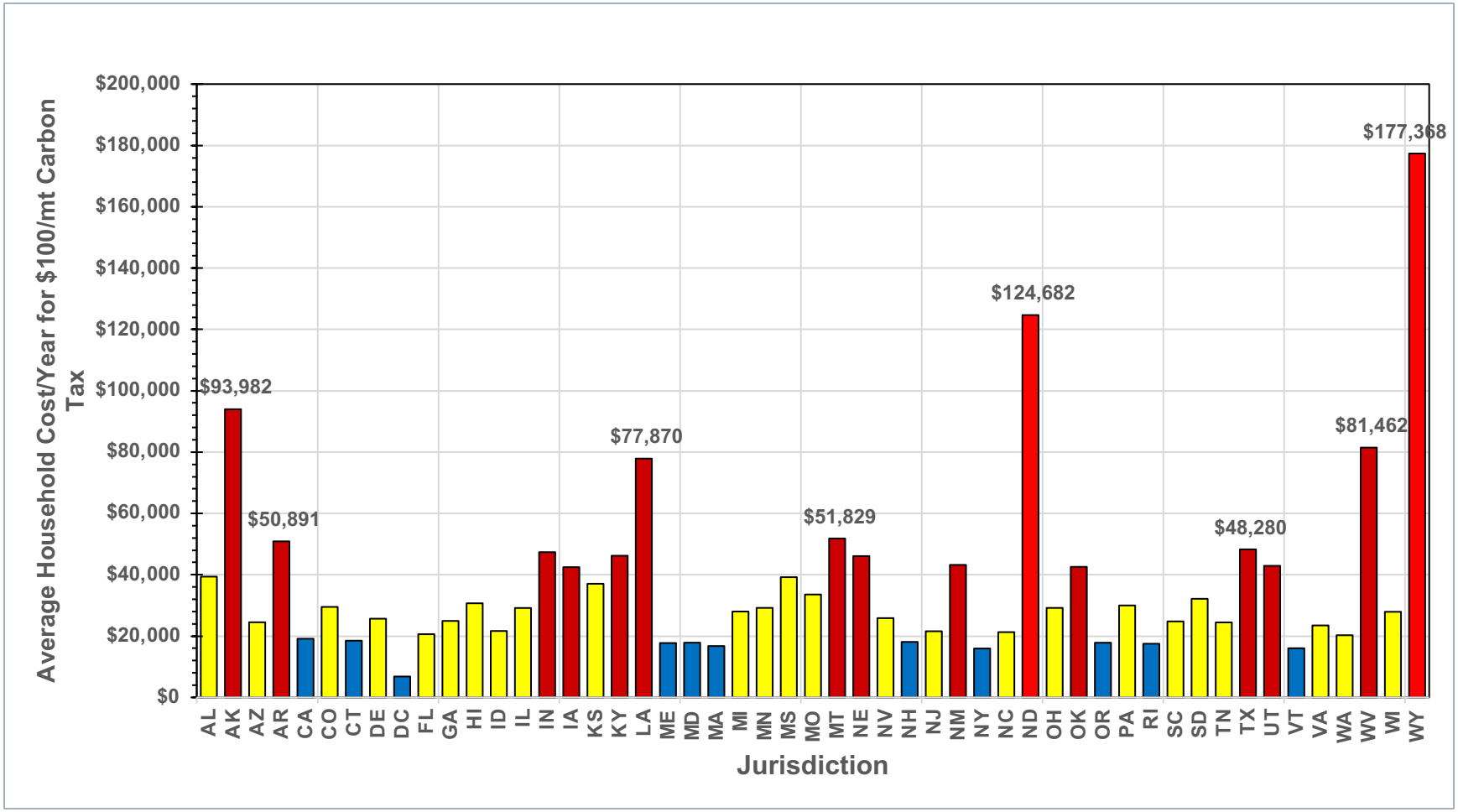
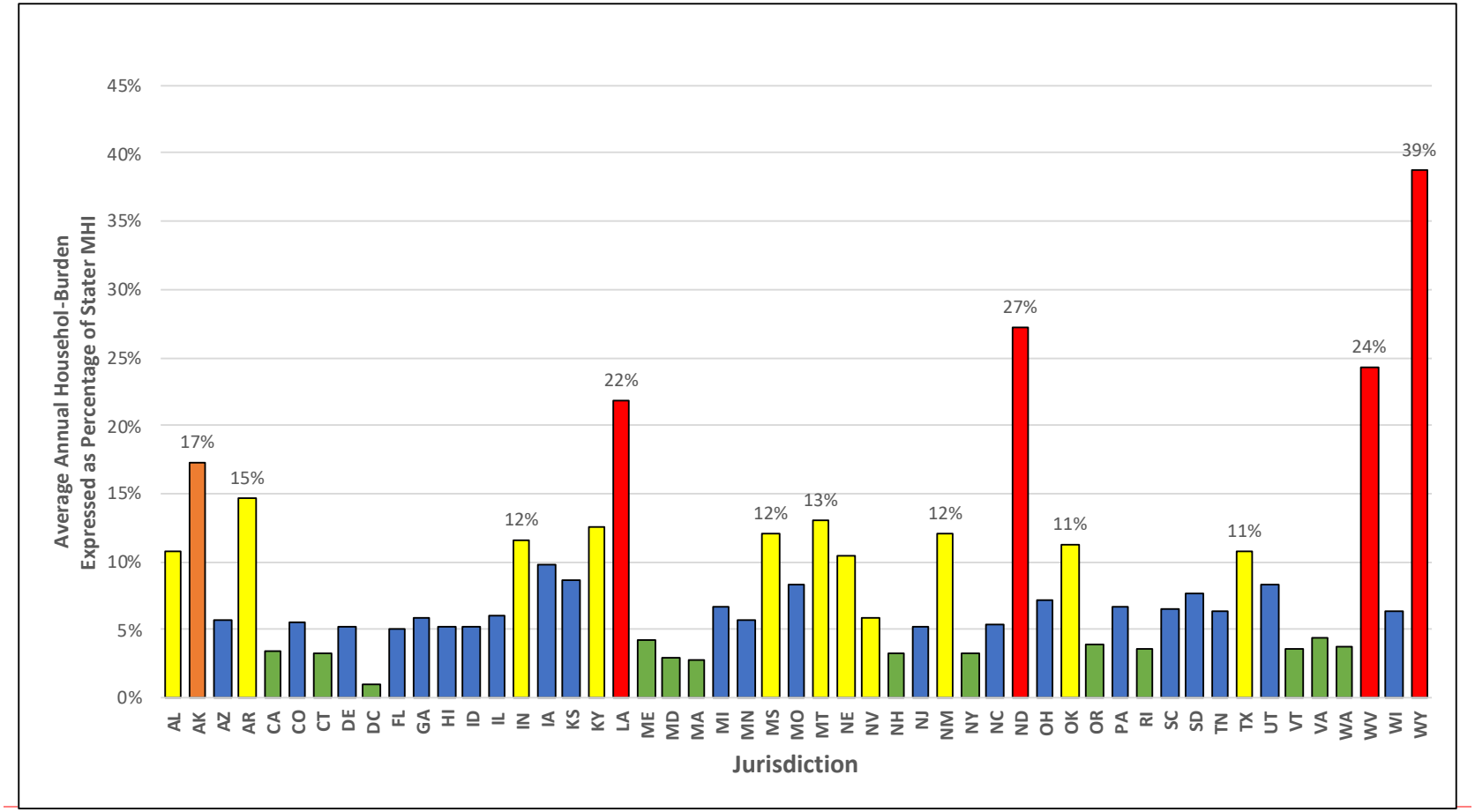
$/Household/Year by State: Scenario A, $100/mt



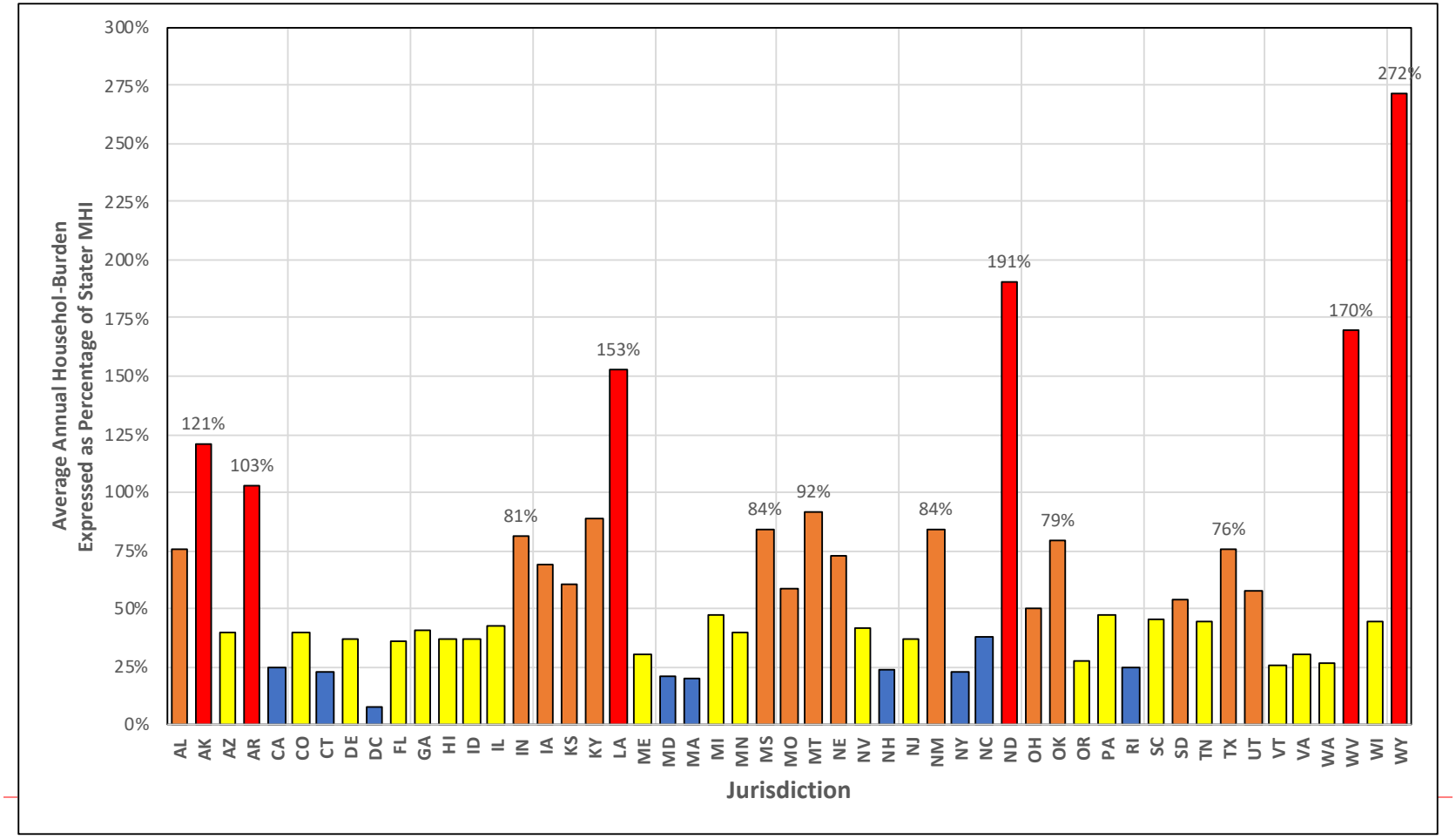
$/Household/Year by State: Scenario A, $700/mt



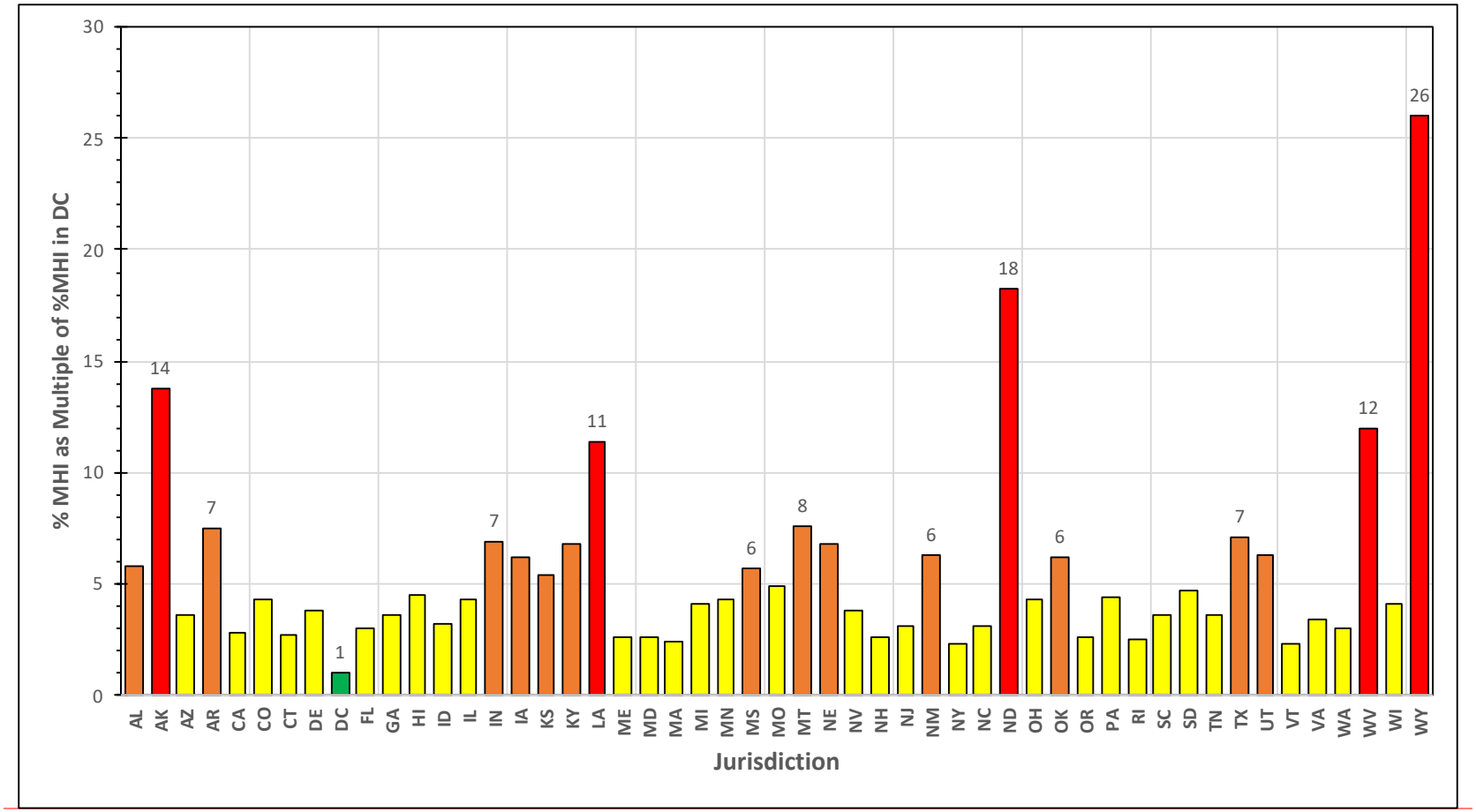
Percent of MHI/Year by State: Scenario A, $100/mt



Percent of MHI/Year by State: Scenario A, $700/mt



% State MHI/% DC MHI Scenario A



Take Home Lessons

1. Net Zero 2050 is extraordinarily expensive.

% of MHI for Selected States		
State	$100/mt	$700/mt
FL	5.1%	36%
GA	5.8%	41%
NH	3.3%	23%
NE	10%	73%
SC	6.5%	45%
DC	1.1%	7.5%

% of MHI for Hardest-Hit States		
State	$100/mt	$700/mt
WY	39%	272%
ND	27%	191%
WV	24%	170%
LA	22%	153%
AK	17%	121%
AR	15%	103%

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Take Home Lessons

2. Costs are happening now and will persist if Net Zero 2050 isn't (or can't be) achieved.
   - High electricity prices ('renewables') and grid unreliability
   - EPA rules (power plants, motor vehicles)
   - DoE rules (appliance standards)
   - SEC rules (CO_2 'reporting')
   - ESG (asset manager coercion)

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More details!

- I have prepared short slide decks for a few individual States. Copies are available after the workshop.
- Even more detail can be found in my working paper. You can find it two ways:
  - Use the URL https://bit.ly/44Y7aKb
  - Go to http://www.rbbelzer.com, click on Working Papers in the left margin.

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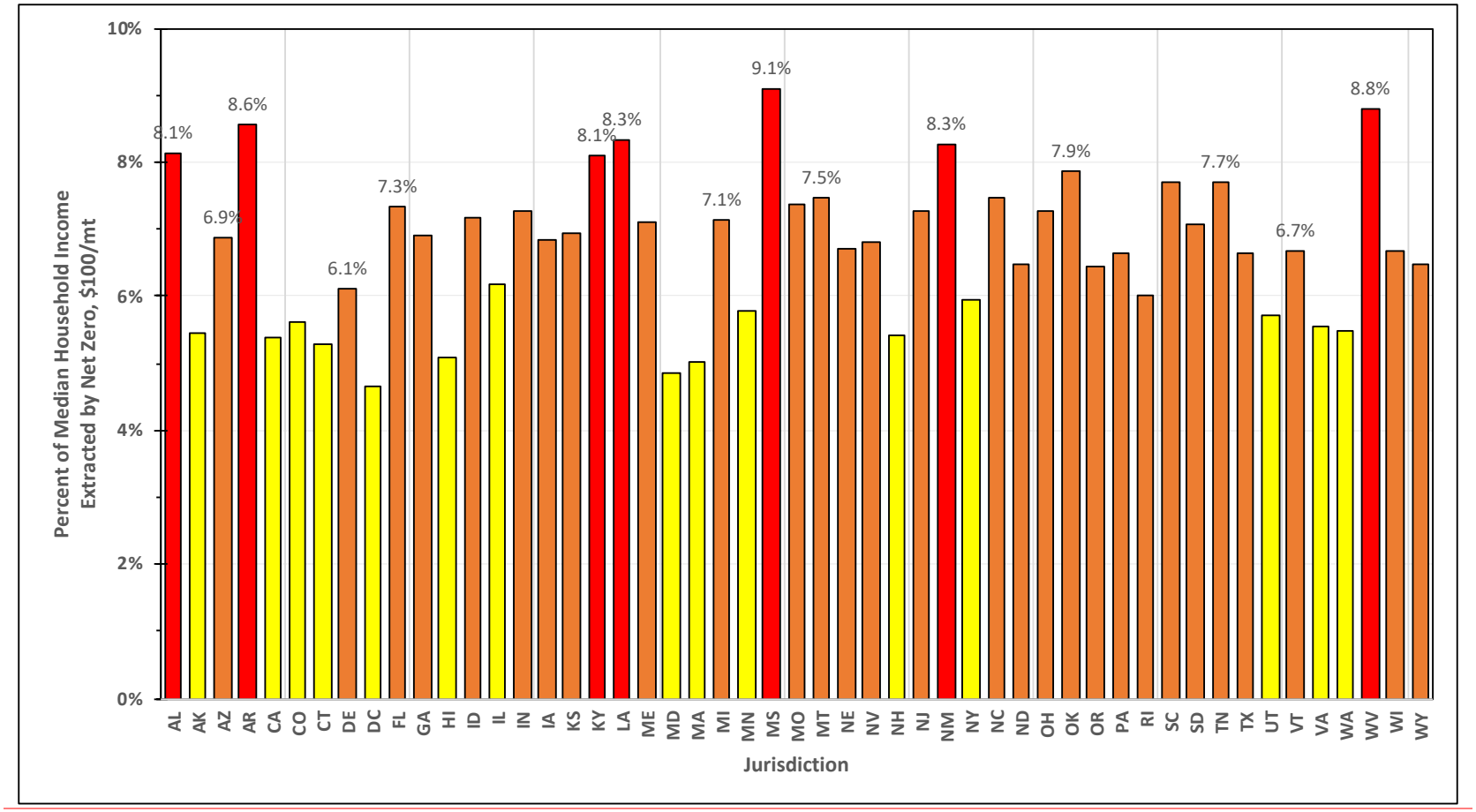
Percent of MHI/Year by State Scenario B, $100/mt



Percent of MHI/Year by State: Scenario B, $700/mt