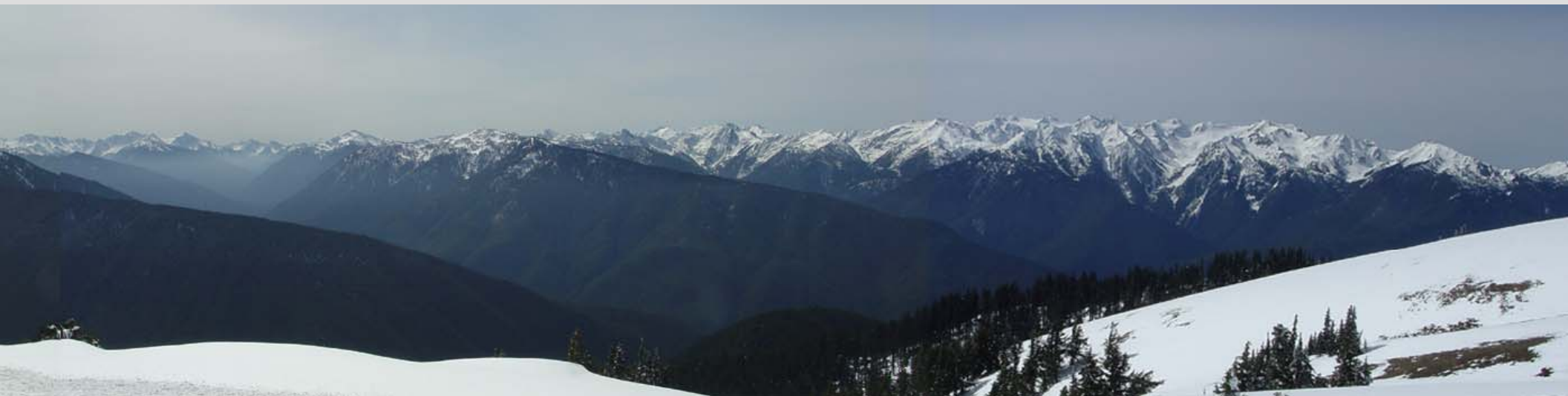




Climate Change & Northwest: An Introduction to Cap and Trade

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Seattle City Light
May 23^h, 2008



Cap and Trade Basics

- Theory: market forces can achieve most reductions at lowest cost**
- **Set a limit on carbon emissions**
 - **Create carbon market based upon planned scarcity**

Three Basic Introductory Concepts

1. The Cap

2. The Trade

3. Allocation Matters!

Other Considerations to Keep in Mind

- **What sectors covered?**
 - **Electricity & stationary source?**
 - **Transportation?**
- **Clean energy / green job opportunities?**
- **Co-benefits**
 - **Less dependence on foreign oil**
 - **Less air pollution**

Part I: The Cap

- **Declining limit on emissions**
- **Set at level needed to avoid environmental “tipping point”**
 - 450 parts per million – may need more?
 - 80% Reduction the gold standard

Part II: The Trade

- **Embed cost of carbon emissions into economic decisions**
- **Establishes “right to pollute” & “right to trade”**
- **Carbon market has huge value**
 - **Europe: \$57 b / year exists today**
 - **US estimated at \$50 – \$150 b /year**
 - **Exceeds annual earnings for electricity sector (current \$45 b / y)**

Musical Chairs: A Helpful Analogy

Each chair represents the “right to pollute”:

one ton of carbon dioxide (CO₂)

or an equivalent amount of any other greenhouse gas

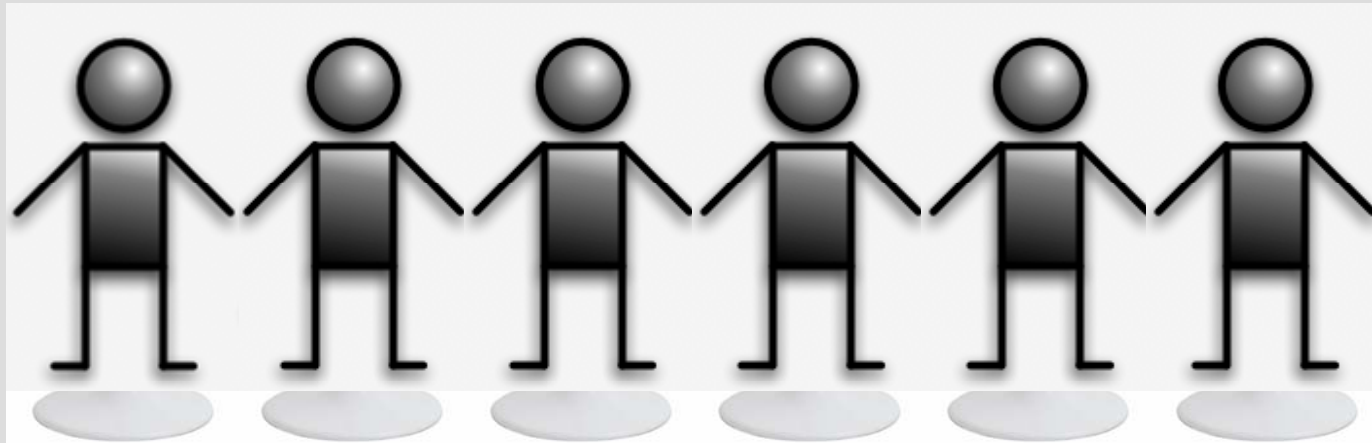


If you have a permit, you can have a chair.



Musical chairs

At the start of the game, everyone has a seat – because there are no limits on carbon emissions.

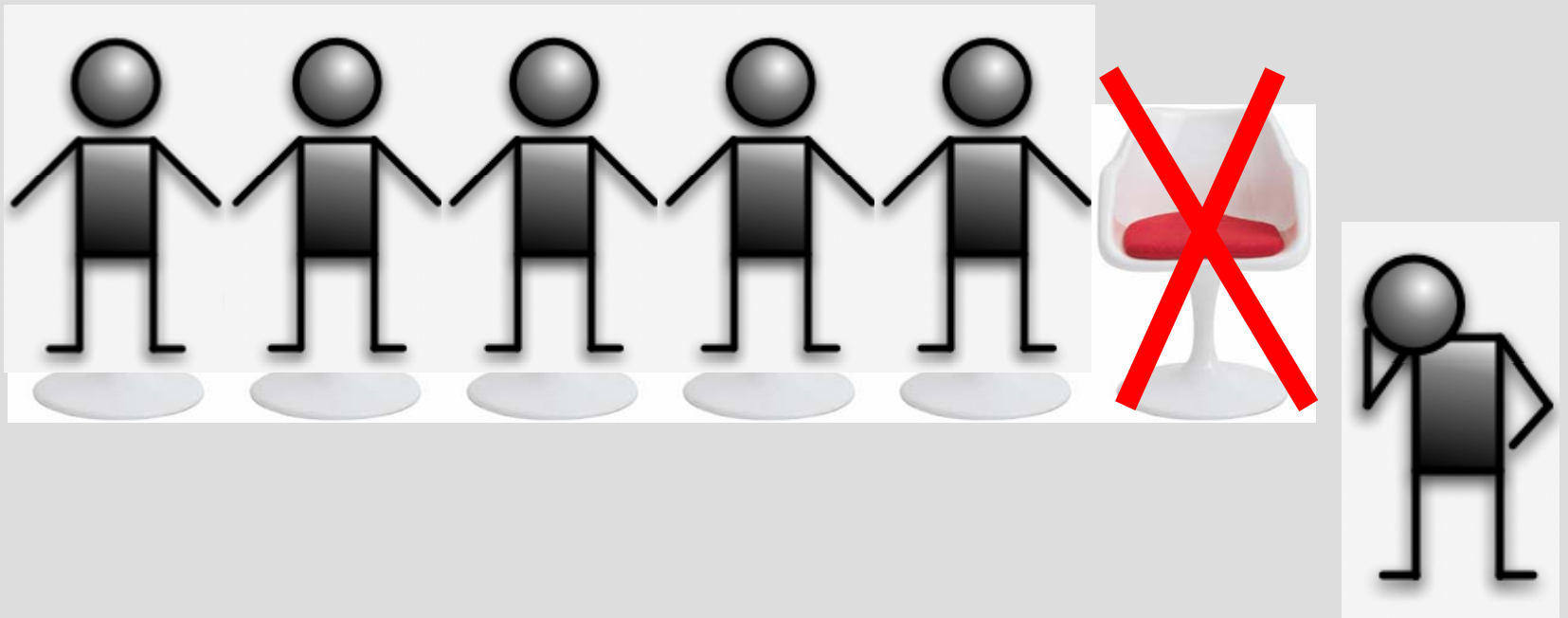




1. Cap Imposed

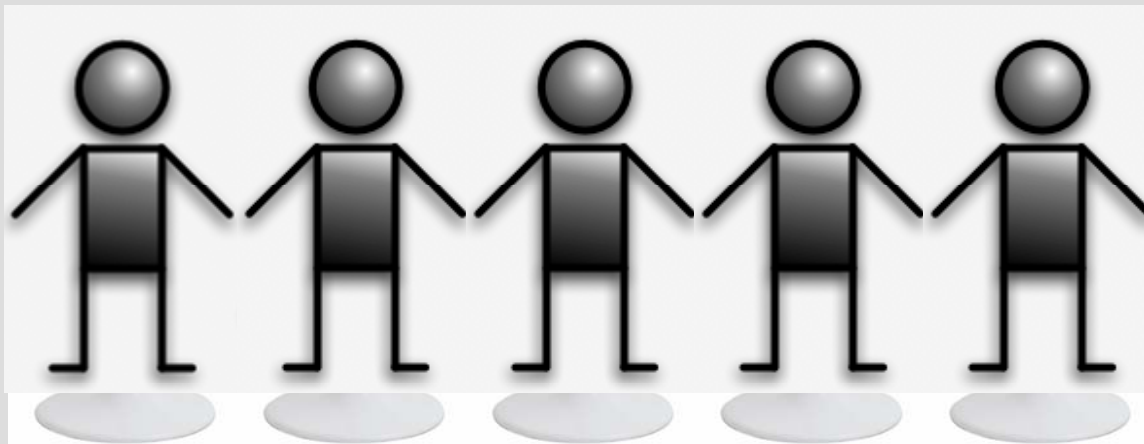
After the first year, a cap is imposed by limiting the amount of permits

Suddenly, one player doesn't have a chair...

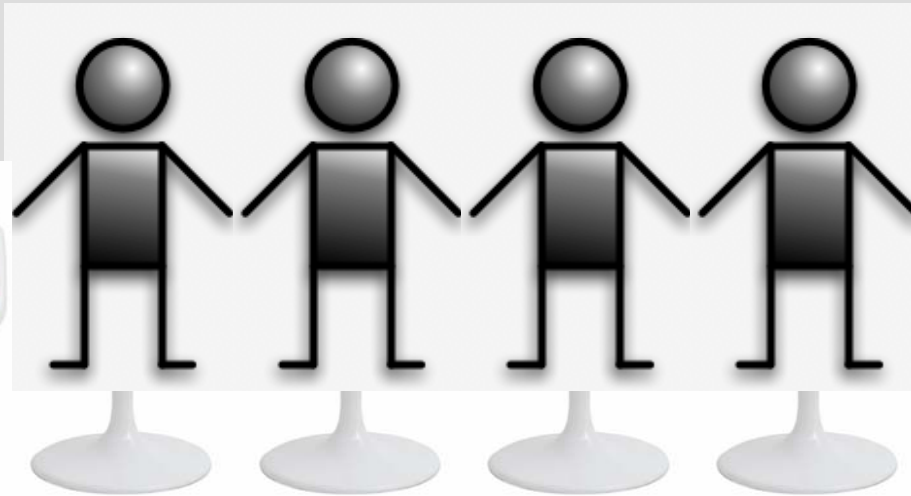


II. Trading Begins!

Would anyone be willing to trade their chair for \$30?



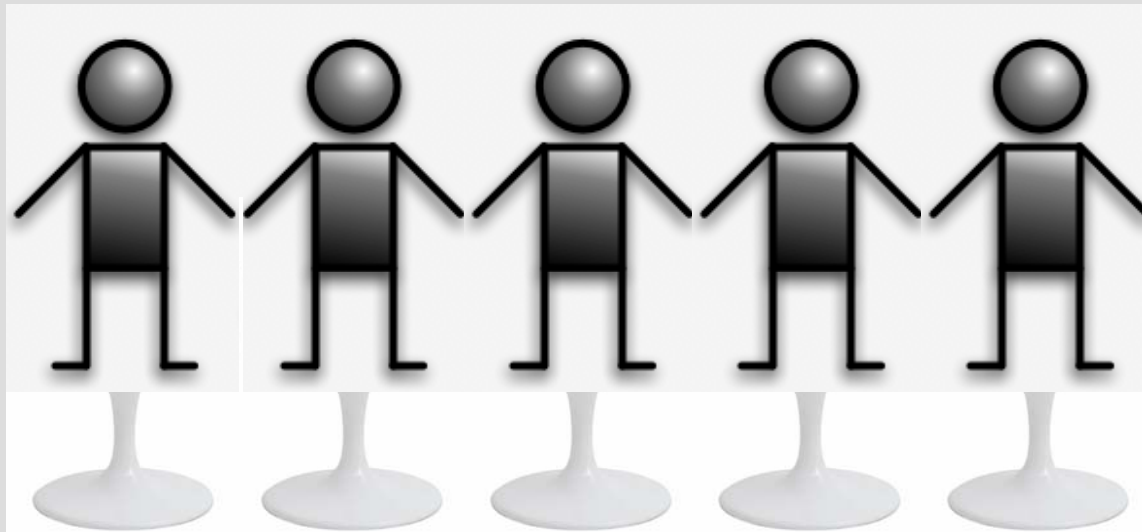
Sure! For that price, I can finance an efficiency upgrade, eliminating my need for a pollution permit.



Market Price Set / Carbon Reduced

So, the **market price** for the “right to pollute” in the first year is \$30 for one ton of carbon dioxide...

AND: ***One ton of carbon has been reduced!***

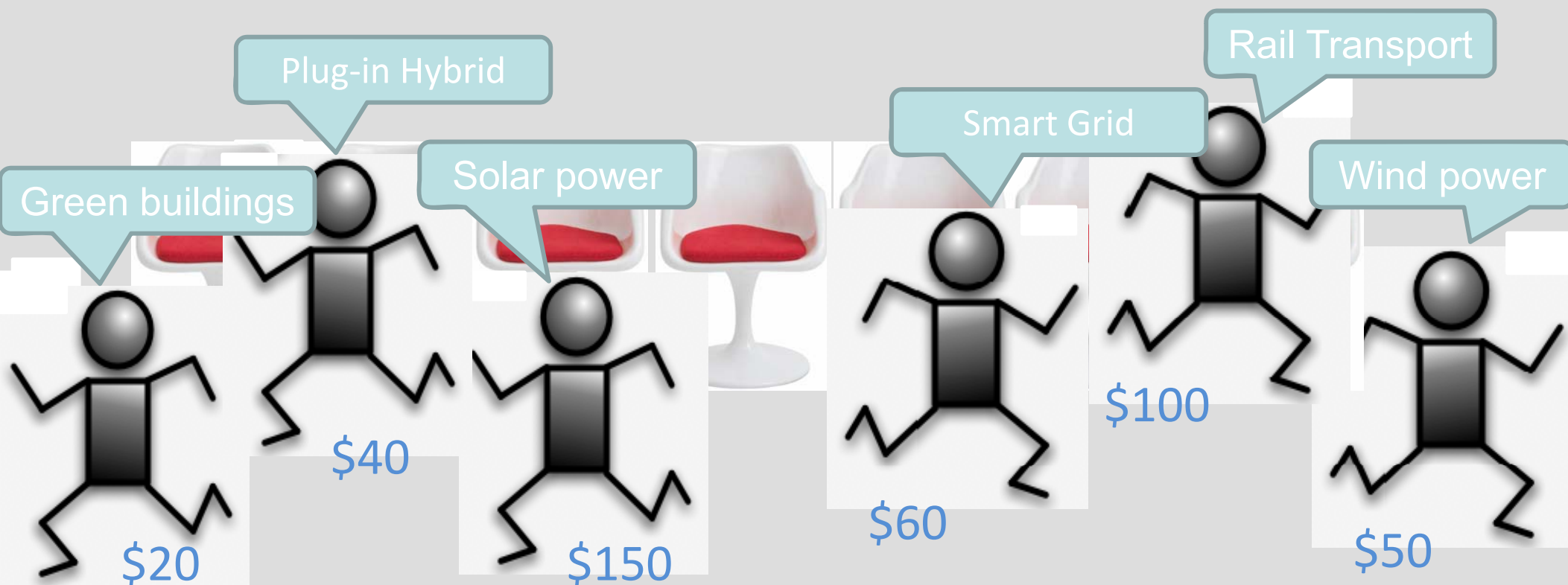




Declining Cap Spurs New Behavior

More chairs are taken away, players leave when they lose a chair OR find better options

Players choose at what price they leave the game – and how they want to make that change.





Achieving Reduction Targets

Who will be the last one left?
One w/ Least options / most
\$\$ / highest cost to change



III. Allocation: Who Gets A Chair?

Need Rules to Distribute Chairs (i.e. “right to pollute”)

For Free?

Just to polluters? / To all within sector? / To LSEs

Auctioned by the US Government?

If so... what to do with the revenues?



If you have a permit, you can have a chair.

What does this mean for Seattle / NW

- **About the Cap?**
- **About Trading?**
- **About Allocation?**

State's shrinking glaciers: Going ... going ... gone?

Scientists are watching Washington's mountains with concern, finding that many glaciers are rapidly receding, and some have begun disappearing.

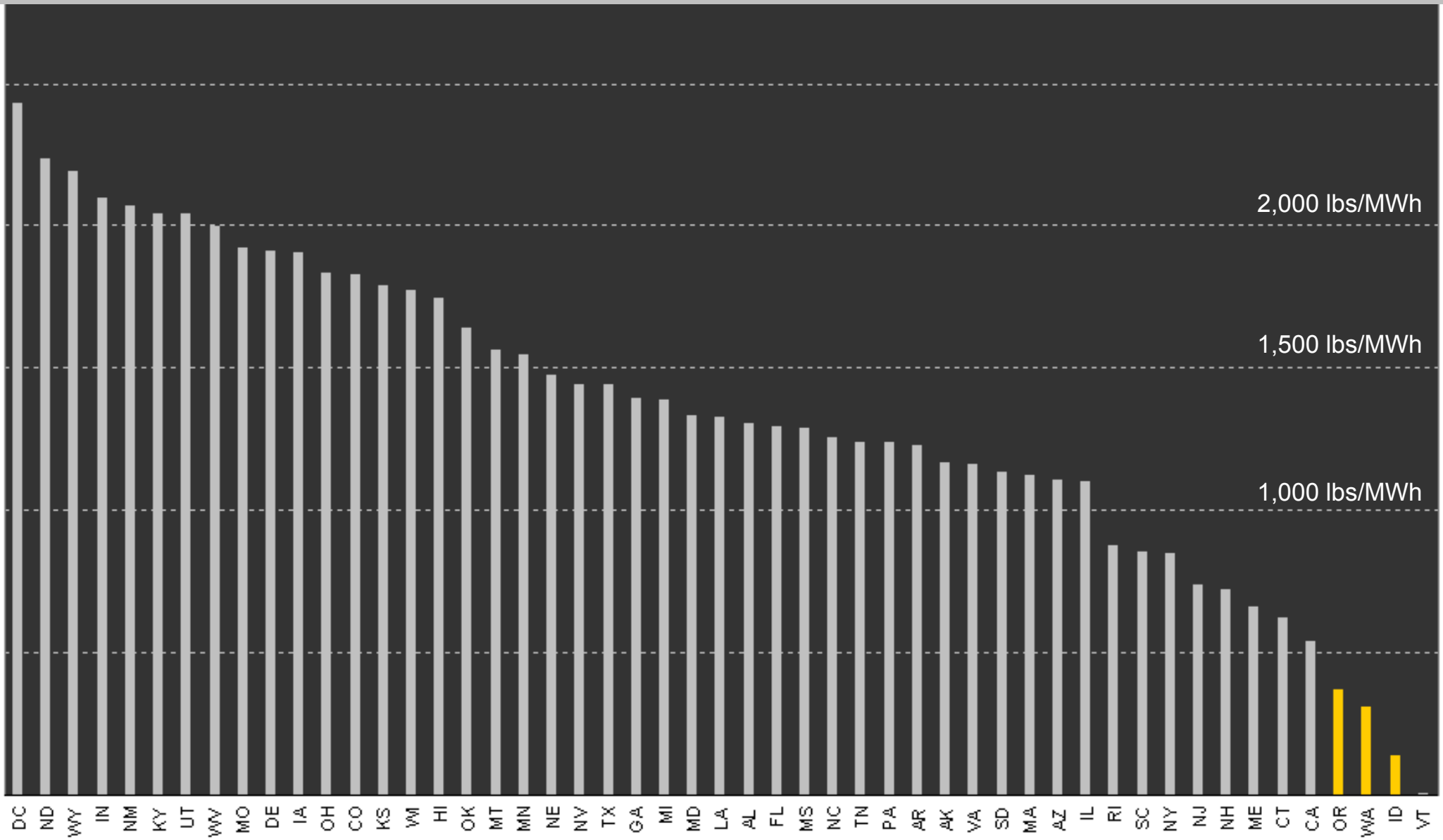


Carbon Trading: NW is Unique

- **Role of hydropower & low-emitting generation**
- **30-Year commitment to conservation**
- **Transportation largest source of GHG**
- **Somewhat skeptical of trading and risk of market manipulation**

Lowest Emission Rates in US

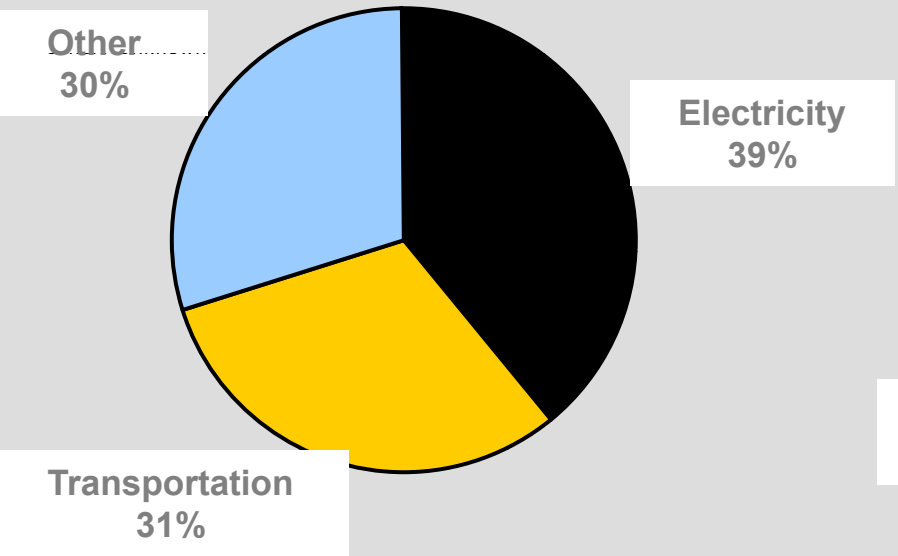
(lbs of CO2 per mwh of electricity produced)



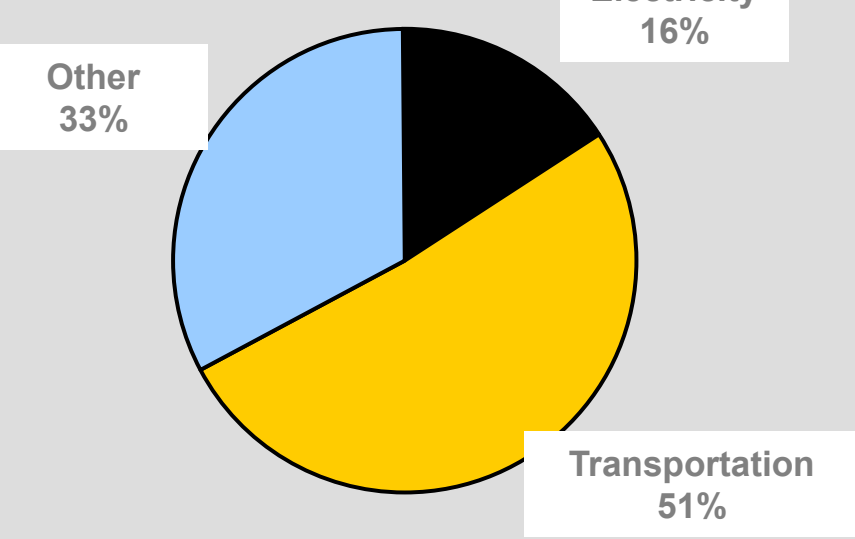
CO2 Emissions by Sector

Sources: U.S. EPA, Energy CO2 Emissions by State, http://www.epa.gov/climatechange/emissions/state_energyco2inv.html, and Seattle City Light, personal communications, May 2008

U.S.

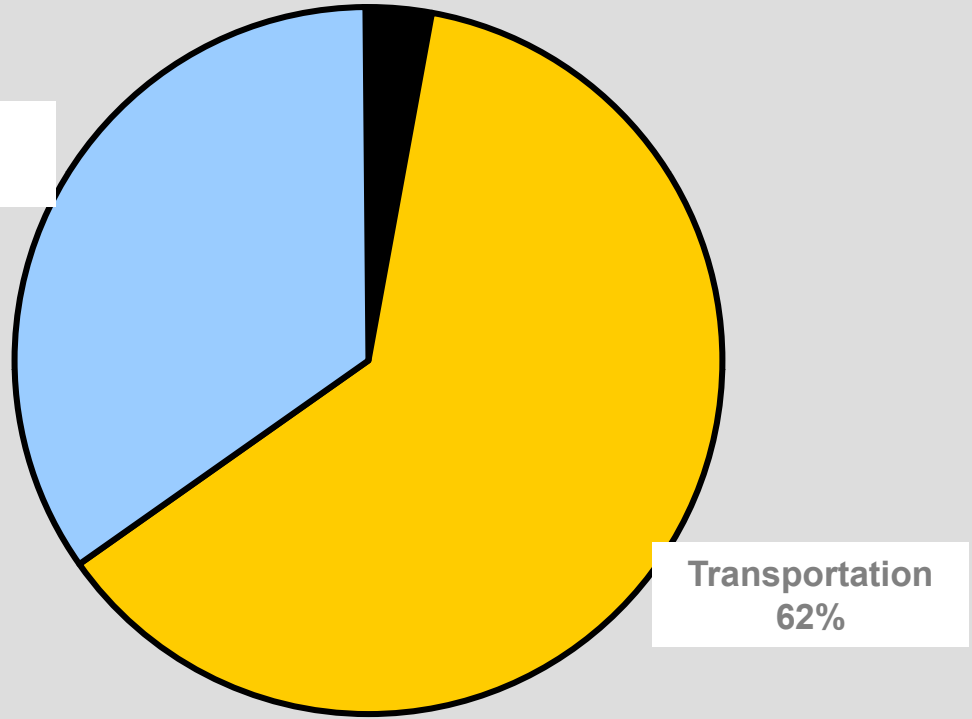


Washington State



**Electricity
3% (pre-
offsets)**

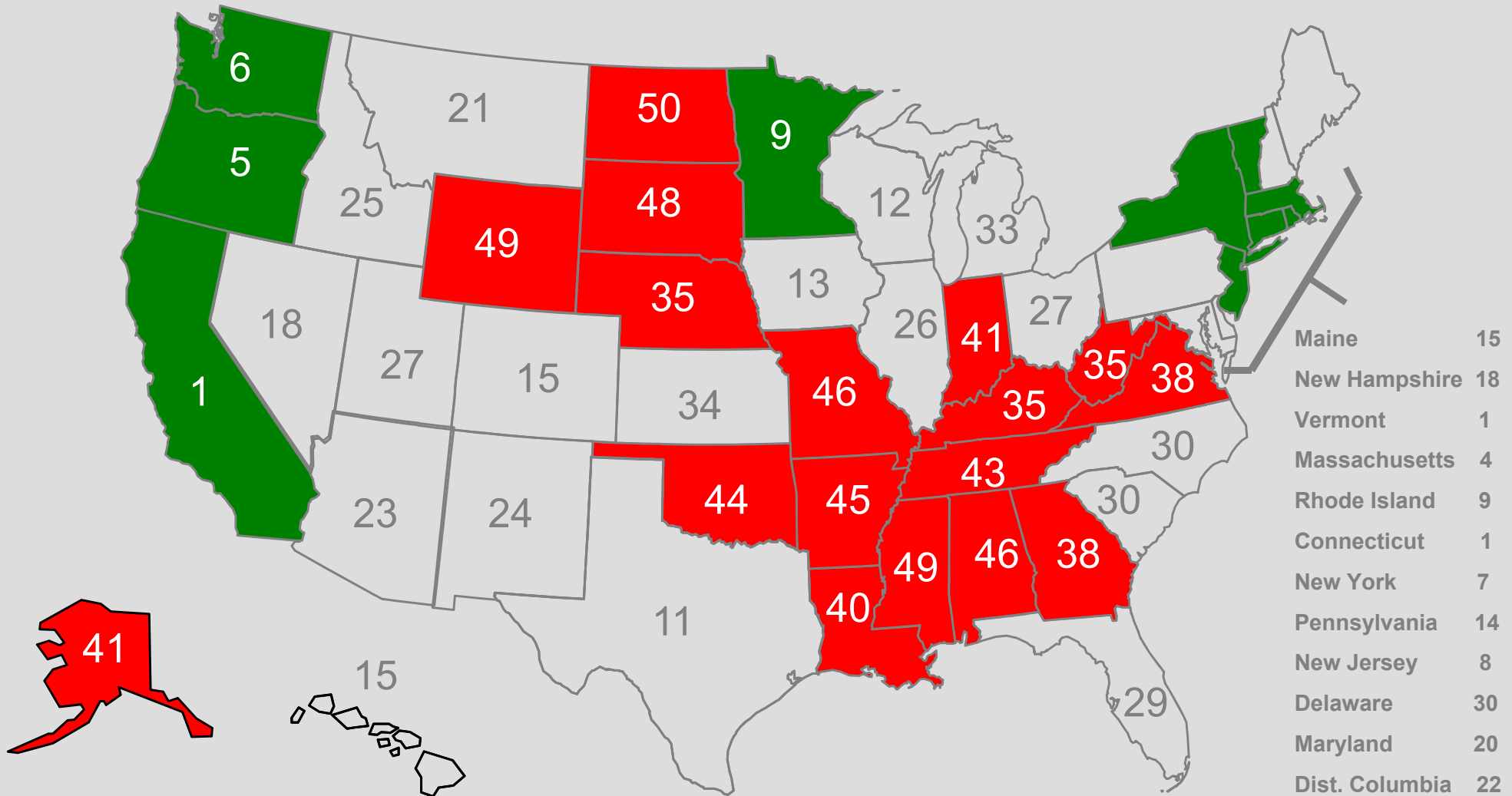
**Other
35%**



City of Seattle

Energy Efficiency Scorecard

Highest ranking states: VT, CT, CA, MA, OR, WA, NY, NJ, RI



Lowest ranking states (number higher due to ties): ND, WY, MS, SD, AL, MO, AR, OK, TN, AK, IN, LA, GA, VA, KY, WV, NE

Source: *The State Energy Efficiency Scorecard for 2006*, ACEEE, June, 2007

Allocation (i.e. Chairs) Matters For NW

Three Approaches: (free allowances)

1. Based upon past emissions?

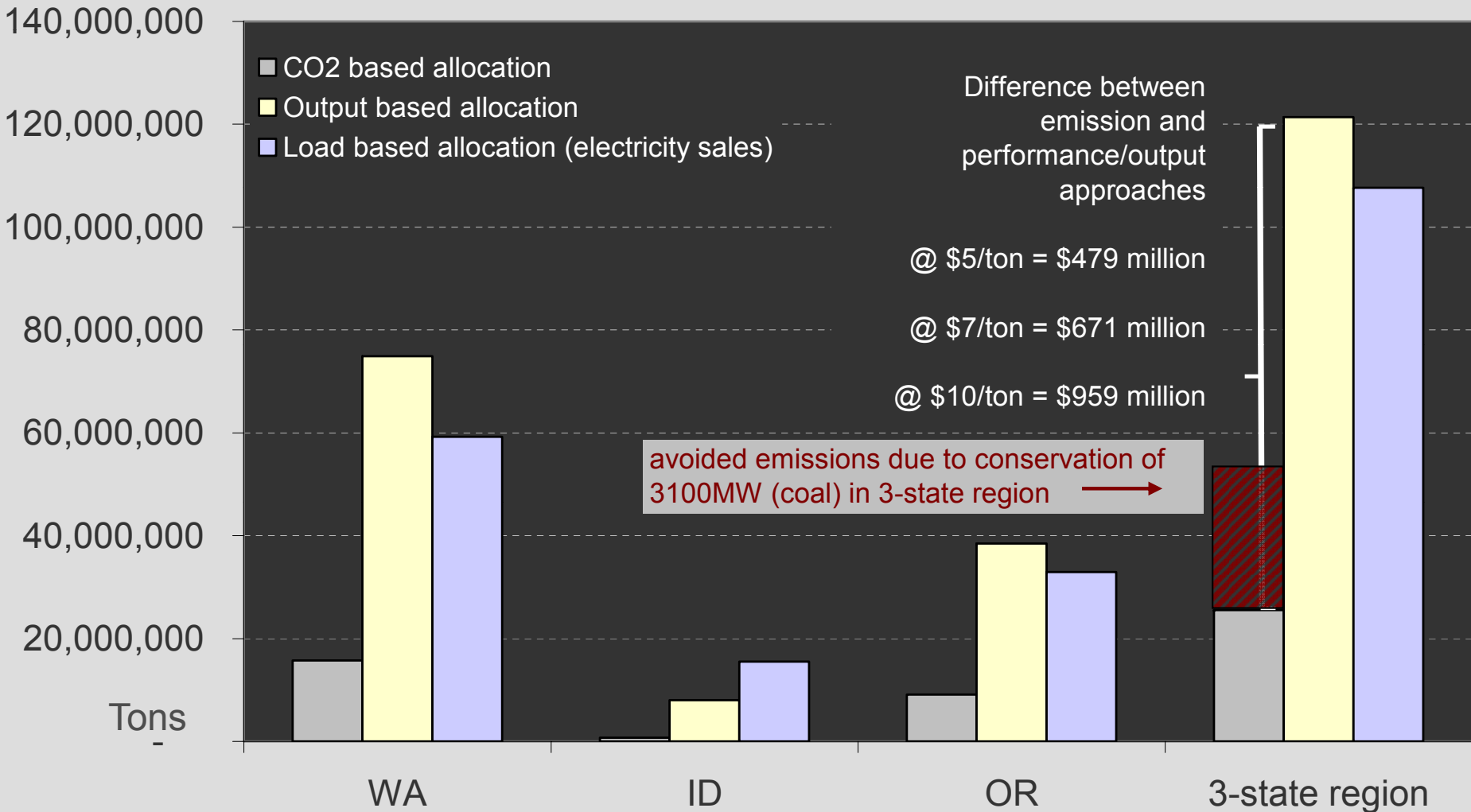
2. Based upon electricity generated?

3. Based upon load served to customers?

CO2 Allocation Comparison:

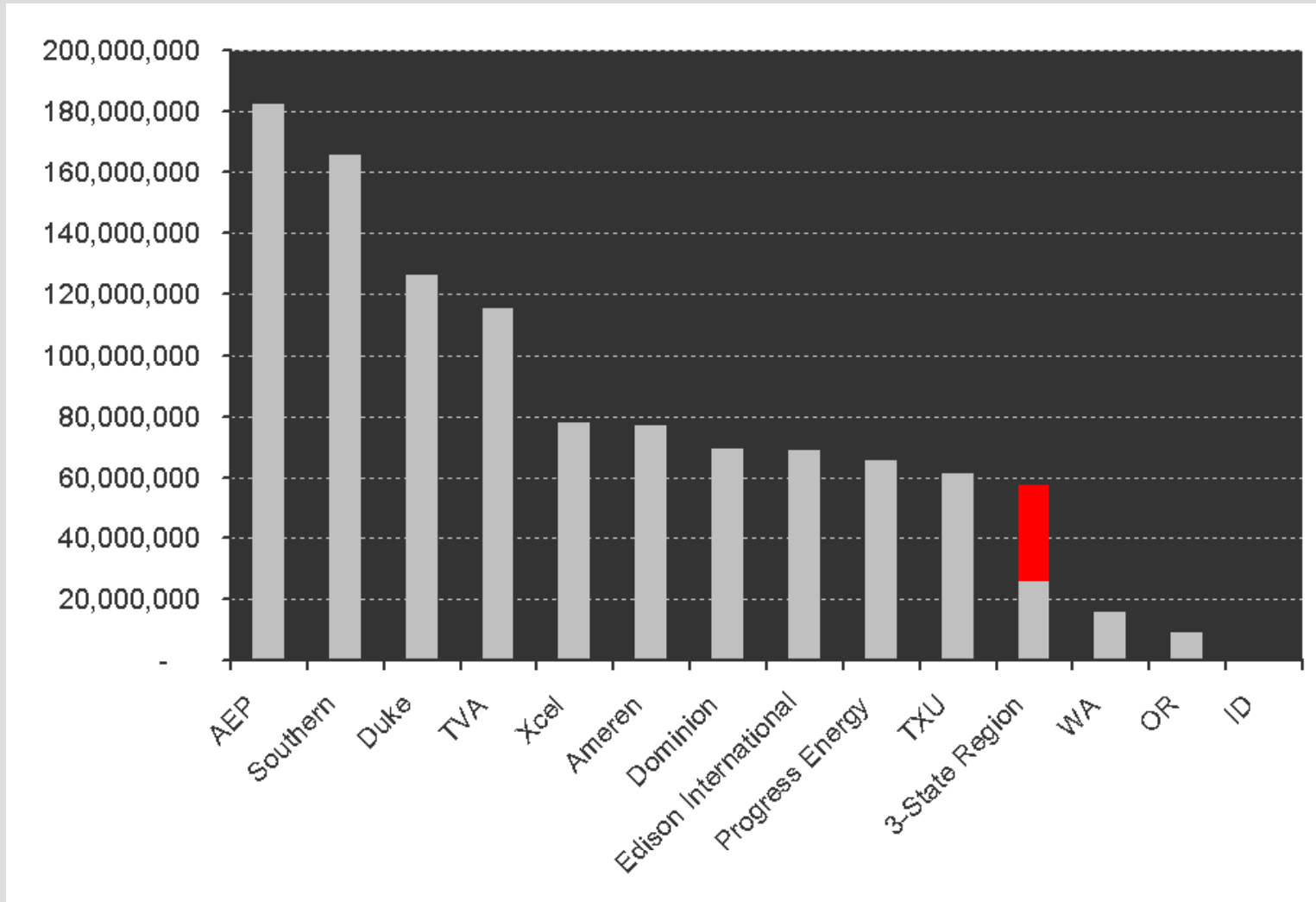
Historic Emissions Based Approach vs. Output Based Approach* vs. Load Based Approach

Based on EIA 2004 & 2005 data



*CO₂ allowance allocation based on total electricity output, including fossil, renewable, and incremental nuclear output (relative to 1990).

Emission-Based = Chairless in Seattle?



Conclusion

- **Hydro most vulnerable power source to global warming**
- **Seattle's leadership & early action should be recognized (at least not ignored!)**
- **Swift action provides regulatory certainty and moves us forward**