A painting depicting a bustling market scene in a Middle Eastern city. In the background, a tall, slender minaret rises against a clear sky. The foreground is filled with people in traditional robes, some walking and others sitting at stalls. Stalls with colorful awnings are lined along the street. A camel is visible on the left side. The architecture features buildings with multiple arched doorways and windows.

Analysis of IR

PS 1599 | Week 13: Coordination

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Administration

- Office hours, aklin@pitt.edu
- Exam
- Shorter class today

Brief reminder

- Research paper: who is supportive/unsupportive of clean energy (age, education, gender, etc.)
- Policy paper: suggest policies to deal with the problems identified in *Research Paper*
- Chuang's office hours: Fr 12-2:30pm
- Next two Mondays: drop-in session for your final projects
- Lots of material on course website!

What did we talk about
last time?

- Problem-solving addresses...
 - **Natural** problems
 - **Individual** problems
 - **Social** problems
- Social problems have many causes
 - So far: public goods/externalities
 - Next: **coordination** and **commitment** problems
 - Matters for policy

Coordination problems

Definition

- People benefit if they **coordinate** their behavior
 - I don't care strongly what we do as long as we adapt to each other
 - Canonical example: driving side
- When actors fail: coordination failure
- Differs from public goods
 - **no** incentive to free-ride
 - problem is to select an equilibrium

Coordination problems in markets

- a. **Format wars**: sectors often create industry-wide **formats**
 - Consumers don't care which format (smaller=better)
 - Important for firm planning
 - Eg: blu-ray vs HD DVD, QWERTY
- b. **Network effects**
 - = value to consumers goes up w/ more consumers
 - Eg: phones, vaccines, Playstation, Minidiscs
- Both relevant for sustainable technology

Case 1: network effects

- Consider electric vehicles (EV) and ignore externalities
- Still a challenge to switch from gas to EV
- Reason: both EV and gas require **infrastructures**
 - Infra is only provided if enough customers exist
 - If not: useless car

<i>Jane</i>	<i>John</i>	Gasoline car	Electric car
Gasoline car	1, 1	0, 0	
Electric	0, 0	1, 1	

- Equilibria?

<i>Jane</i>	<i>John</i>	Gasoline car	Electric car
Gasoline car	1, 1	0, 0	
Electric	0, 0	2, 2	

- Equilibria?

<i>Jane</i>	<i>John</i>	Gasoline car	Electric car
Gasoline car	2, 2	0, 0	
Electric	0, 0	1, 1	

- Equilibria?

Assume you're working for the White House.

How would you ensure a transition to EV?

Policies

- Classic (same solutions as for **public goods**)
 - Pigouvian tax on cars
 - Subsidies for EV
- Coordination-specific solutions
 - Subsidy for infrastructure (charging stations)
 - R&D on flexible charging stations
 - Regulations on new apartment buildings

1. Law. Rule out one some options. Eg EU and gasoline cars
2. Services. Build charging stations.
3. Money. Subsidize EV
4. Taxes. Tax gasoline cars
5. Moral. ?

EU Lawmakers Vote to Ban Sale of New Gasoline-Powered Cars From 2035

Law requires new cars and vans to have significantly lower carbon emissions by 2030

Source: Wall Street Journal (Feb 14, 2023)

Tesla opens its EV charging network to the masses

By David Ferris | 02/15/2023 07:05 AM EST

Tesla Inc.'s deluxe electric vehicle charging network will start to serve other automakers' EVs, the Biden administration said Wednesday, in a move that could drastically expand Americans' options for plugging in.

'It's an instant closing of some gaps in the EV infrastructure market,' said Nick Nigro, the founder of Atlas Public Policy, which studies EV trends.

EE News, Feb 15, 2023

Case 2: format wars

- Electric vehicles must be charged
- Currently: <300 miles
- Problem: brands have competing charging standards
- Equivalent: having different plugs based on your electric supplier

J1772



CHAdMO



CCS Type 1



CCS Type 2



Tesla



Source: <https://electrek.co.>

<i>Tesla</i> <i>BMW</i>	<i>Tesla supercharger</i>	<i>CCS</i>
<i>Tesla supercharger</i>	2, 1	0, 0
<i>CCS</i>	0, 0	1, 2

- Two equilibria
- But **distributional impact**

Assume you're working for the White House.
How would you select an EV standard?

- Difficult choice: can the White House predict the future?
- One possibility: let the market decide (like blu-ray vs HD DVD)
- Problem: slows down the transition to EV
- Can use technical criteria. But same problem: no idea which format is superior in the long term
- Maybe best (?): force industry to pick

1. Law. Impose to all a standard that you think is superior
2. Services. Build charging stations.
3. Money. Compensate the loser
4. Taxes. Compensate the loser (lower taxes)
5. Moral. ?

- The Department of Transportation, in partnership with the Department of Energy, finalized new standards to make charging EVs convenient and reliable for all Americans, including when driving long distances. The new standards will ensure everyone can use the network – no matter what car you drive or which state you charge in. The standards also require strong workforce standards;

Source: White House, February 15, 2023

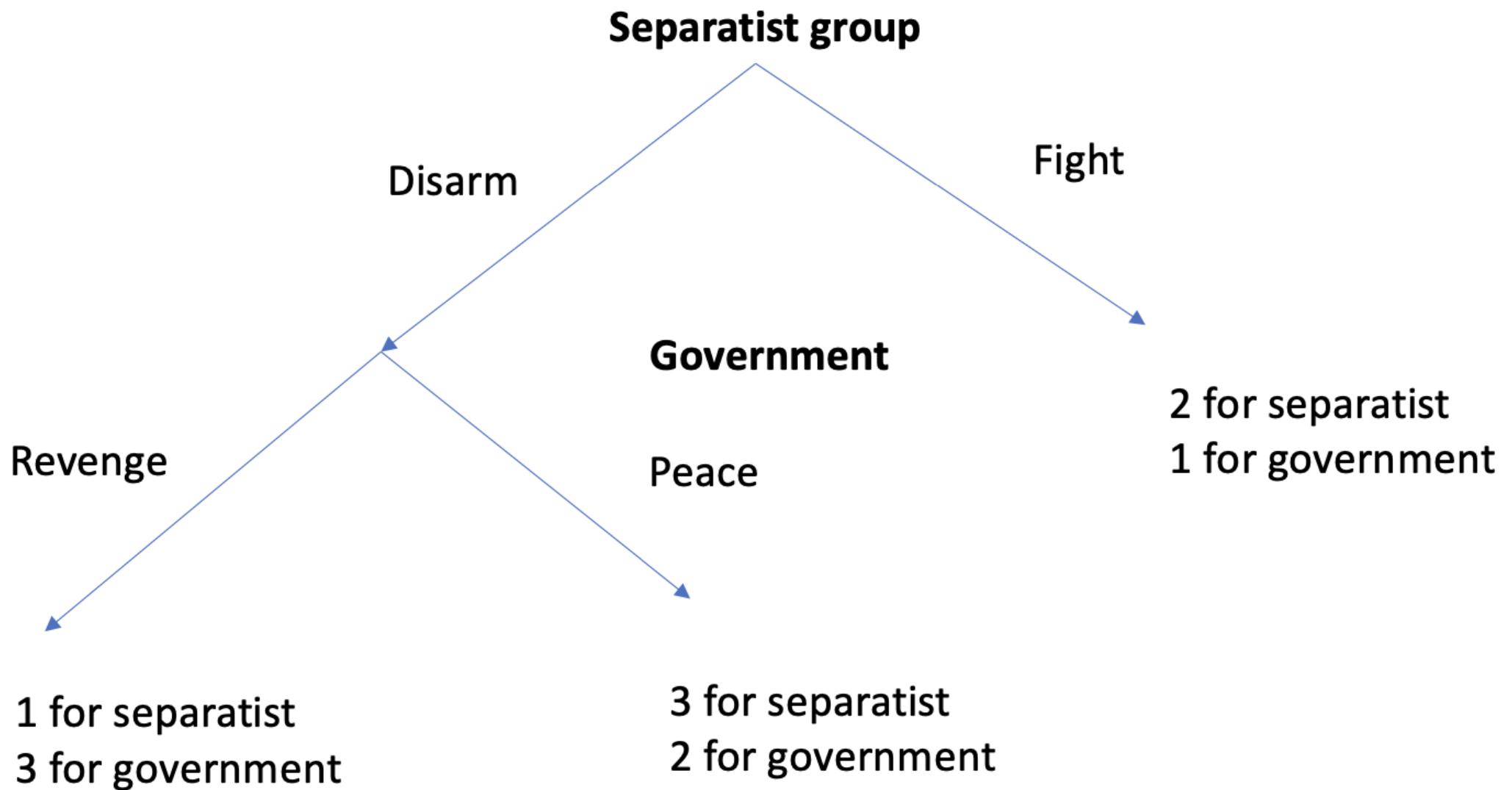
Conclusion

- Public goods are not the only social problems
- Coordination failures are also important
- Relevant for sustainable technology
 - Network effects
 - Format coordination
- Policies are different from those for public goods
- Implication for your projects

Commitment problems

Definition

- Actors sometimes make promise about the future
- These promises might not be **credible**
- Eg: teenage wanting to go out tonight and clean room tomorrow
- Problem: knowing this, actors will make worse decisions today
- Eg: peace treaty



- Despite peace being superior, actors with foresight will not go for it
- Problem: risk of being vulnerable later if you agree to disarm now
- Thus: need to find a way to generate a **credible commitment**

How would you overcome this
commitment problem?

- Law. Joint control of gov/legislature? Legal institutions? UN Blue Helmets?
- Services. Shift control of military?
- Money. Provide separatist resources to re-buy weapons if needed?
- Taxes?
- Moral: publicly tie your hands.

Risk and sustainable industries

- Commitment problems are common in new industries
 - Need gov support to grow
 - But govs come and go
- Creates **political risks**
- Issue: who will invest in clean tech if govs might pull the plug later?

Case: off-grid renewable energy

- About 700m w/o electricity
- Could be powered w/ coal...
- Better solution: off-grid tech
- Electricity is generated locally

- In practice: off-grid mostly provided by private firms
 - Material (turbines, solar panels, etc.)
 - Sales (connection of households, firms)
- Requires public support
- Two problems
 - Governments change. Democracy!
 - Customers: unwillingness to pay bills
- In India: both problems very relevant



Source: Fortune, January 21, 2020

How can you overcome this commitment problem?

From the side of (a) the **gov** and (b) the **firm**...

Government strategies

- Law: legal rules (eg SupC vs gov), law enforcement (customers)
- Services: ?
- Money: fund gov projects upfront
- Taxes?
- Morality: public commitments/**audience costs**

Firm strategies

- Law: n/a (reserved to governments)
- Services: smart metering
- Money: upfront payment, pay-as-you-go
- Taxes: n/a (reserved to governments)
- Morality?

Conclusion

- Credible commitments are very important
- Yet different from coordination/public goods
- Dynamic problem
- Requires to find **credible commitments**

Industrial policy and climate change

- Three problems: public goods, coordination, commitment
- Can be addressed individually
- But that's sometimes insufficient
- Solution (?): **industrial policy**

History

- 19th century: conservation
- Up to 1960s: other priorities (WWI, Great Depression, WWII, Cold War)
- Since 1960s: growth of environmental movement
- Since 1980s: concern about climate change and ozone layer
- To keep warming limited: need to reach net-zero by 2050
- **Wicked problem**: dom/global public goods, coordination, commitments

Climate policy

- Clinton: international climate treaty (Kyoto Protocol)
 - Treaty to deal w/ global negative externalities
 - Tech transfer to deal w/ domestic social problems
- Congress: domestic carbon pricing
 - Failures in 2003, 2005, 2008
 - Waxman–Markey: carbon trading scheme (2009)

- Problem: all these efforts failed
- Domestic: no carbon pricing
- International: very soft global rules
- Political problem: hard to mobilize voters
 - Taxes create **distributional** effects
 - Hard for green voters to vote for others (**credibility**)

Solution

- Potential solution: **industrial policy**
- Idea: vast set of policies to jumpstart an industry
- Deals with all 3 problems:
 - Public goods: public resources
 - Coordination: creates entire markets
 - Commitment: creates pro-policy constituencies

Biden

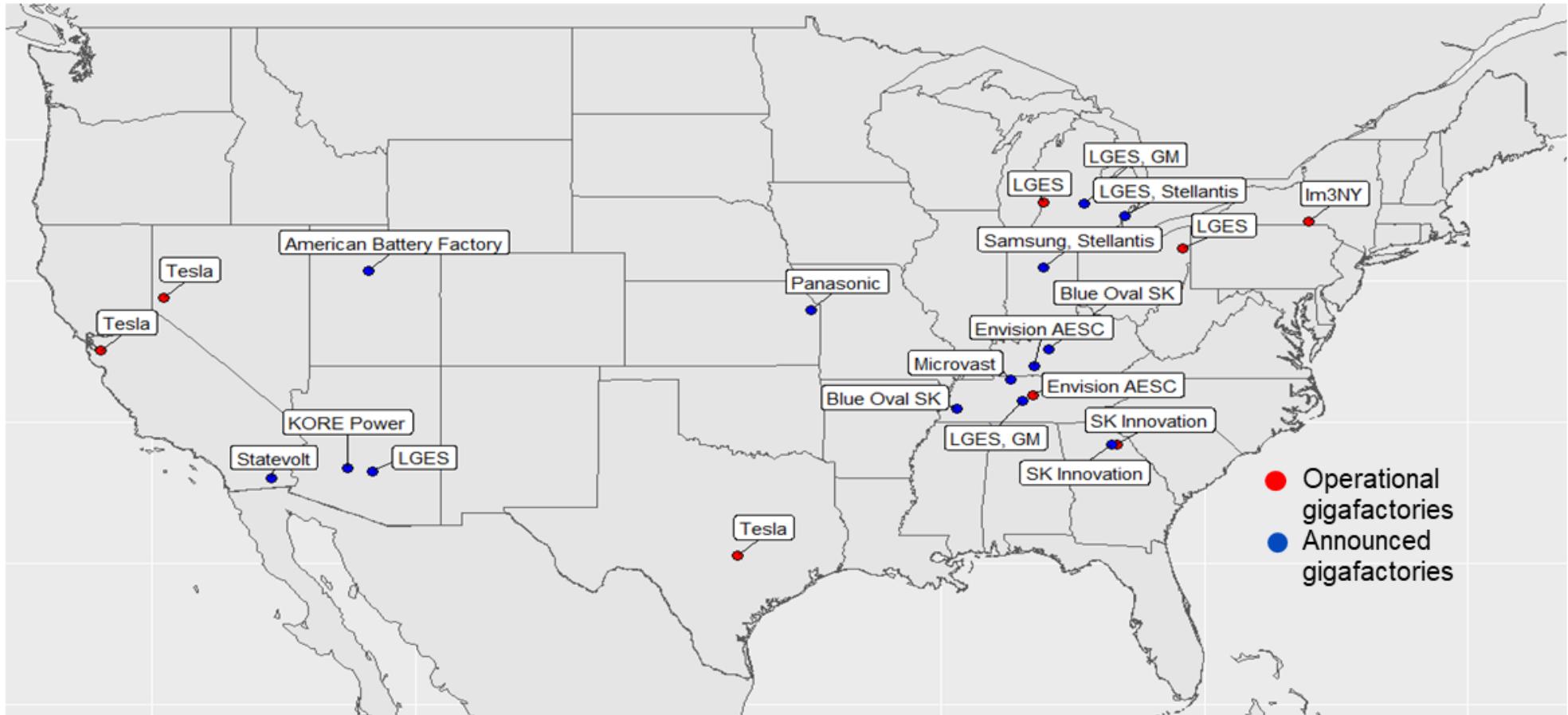
- Three packages passed 2021-2022 (**law**)
 - Infrastructure Investment and Jobs Act (IIJA)
 - CHIPS and Science Act (CHIPS)
 - Inflation Reduction Act (IRA)
- Total: over \$500b public investments (**service**), research (**service**), and tax credits (**money/tax**) for clean energy

Economic effects

- Makes clean energy cheaper via **subsidies**
- Makes clean energy cheaper via **tech innovation**
- **Incentivizes** private sector
- Addresses **public good** and **commitment** problems
- What about **commitment** problem (by government)?

Chart 3

New Gigafactories Cluster in the Midwest, South and Near Tesla Facilities

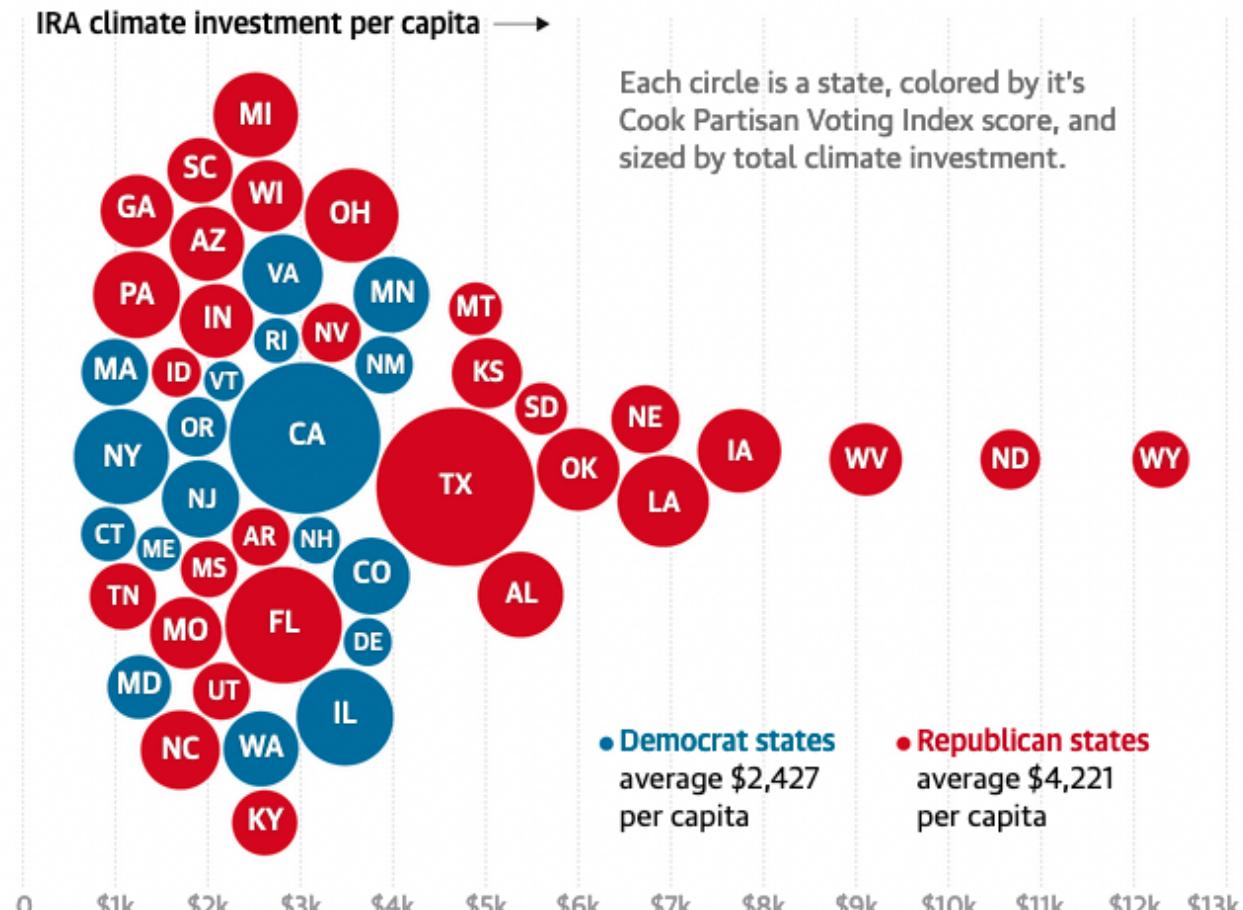


NOTES: We define a gigafactory as having capacity of 1 gigawatt hour or greater. Map does not include announcements missing a location or capacity estimate.

SOURCE: Company announcements, media reports, NAATBatt North American Lithium-Ion Battery Supply Chain Database.

Republican-leaning states receive larger climate investments per person from the Inflation Reduction Act

Under a scenario where consumers and businesses adopt clean technologies at the pace and scale needed to meet national climate targets by 2030.



Guardian graphic. Sources: RMI, The Cook Political Report. Note: Alaska and Hawaii were not included in the analysis.

Source: Guardian, February 22, 2023

- Not just about economics
- Politics: create strong pro-climate policy constituencies
- Important: could overcome commitment problem depending on next elections
- But could **backfire**: picking winners, inefficiencies, consumer costs

Conclusion

- Major social problems: public goods, coordination, commitment
- Policies can address each
- But when all happen together: **wicked problem**
- One solution: **industrial policy**
- Pessimism: rarely works as intended: larger the policy, the higher the odds that something goes wrong...

Questions?

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Source for title page painting: Alberto Rossi, *The Arab market in kalona*

References

- Busse, Matthias, and Carsten Hefeker. 2007. “Political Risk, Institutions and Foreign Direct Investment.” *European Journal of Political Economy* 23 (2): 397–415.
- Kelly, Bryan, Lubos Pastor, and Pietro Veronesi. 2014. “The Price of Political Uncertainty: Theory and Evidence from the Option Market.”
- Nahm, Jonas. 2021. *Collaborative Advantage: Forging Green Industries in the New Global Economy*. Oxford University Press.
- Skocpol, Theda. 2013. “Naming the Problem.”

