

# Analysis of IR

PS 1599 | Week 5: Non-market competition

Michaël Aklin  
University of Pittsburgh

# Administration

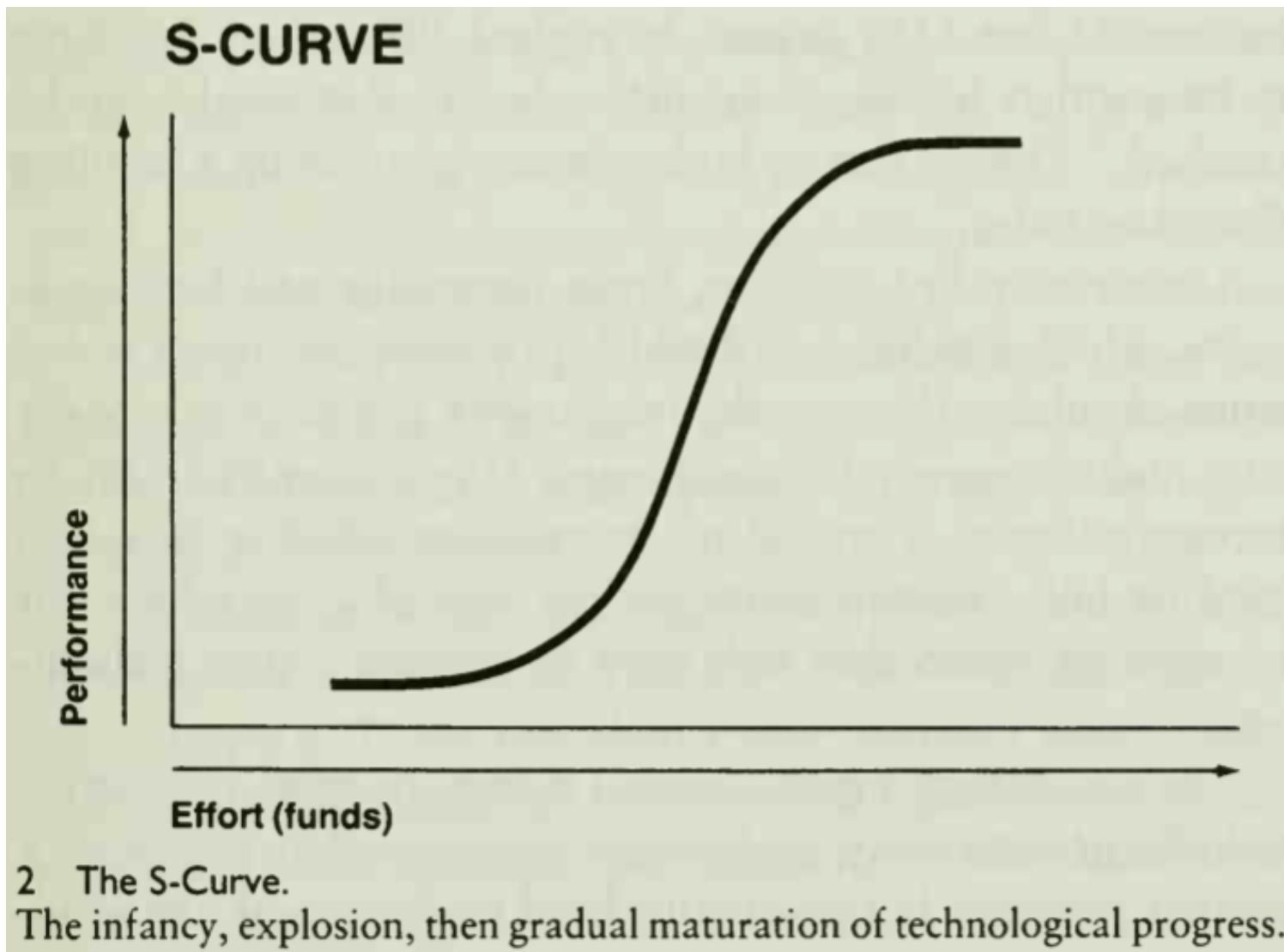
- Office hours
- aklin@pitt.edu
- Workshops: rescheduling

What did we talk about last time?

# Today

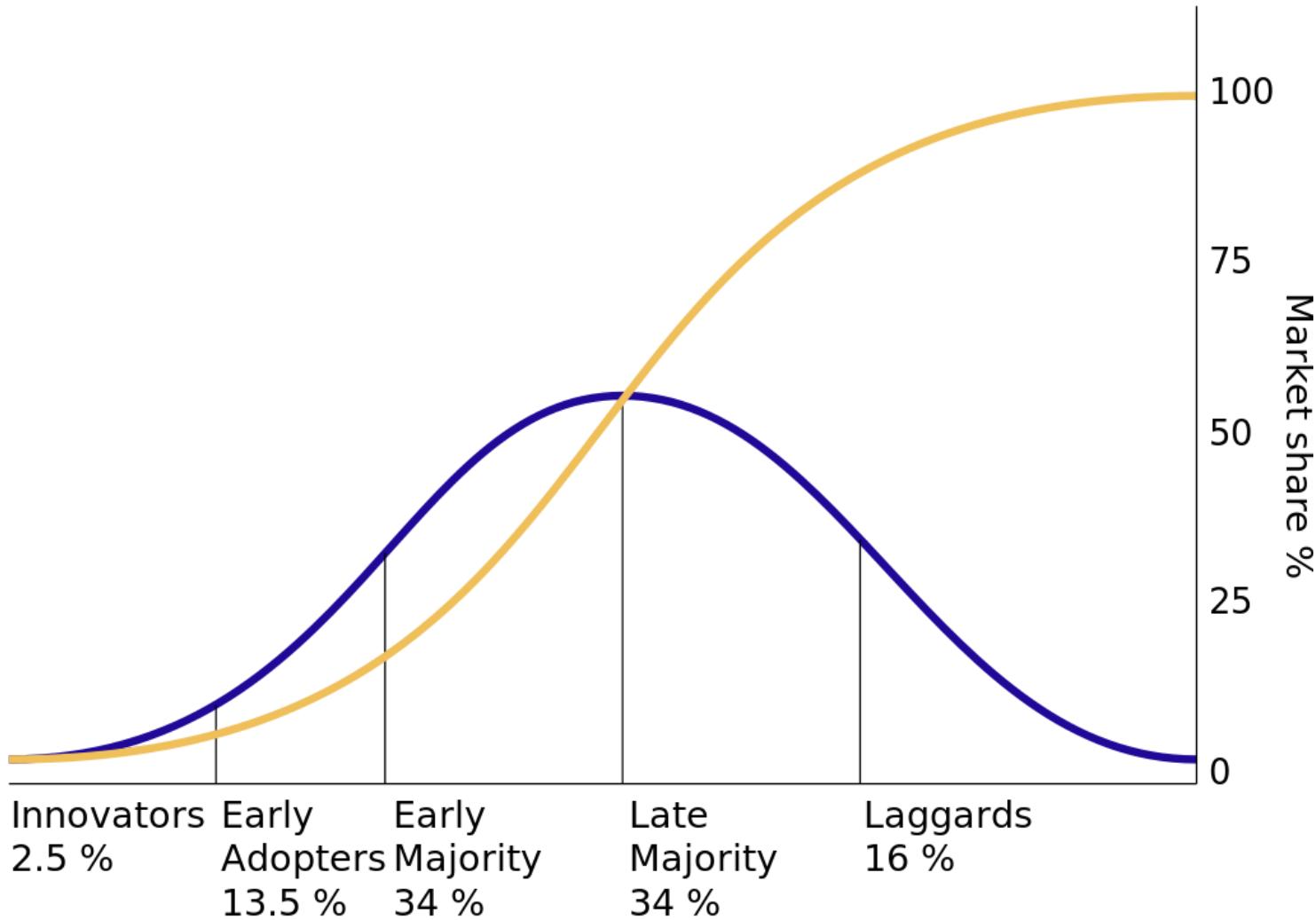
- Politics of innovation, technology, development
- Politics matters in several ways
  - At inception of new prods
  - At diffusion of new prods
- Today: finish inception, start diffusion

# Supply-side

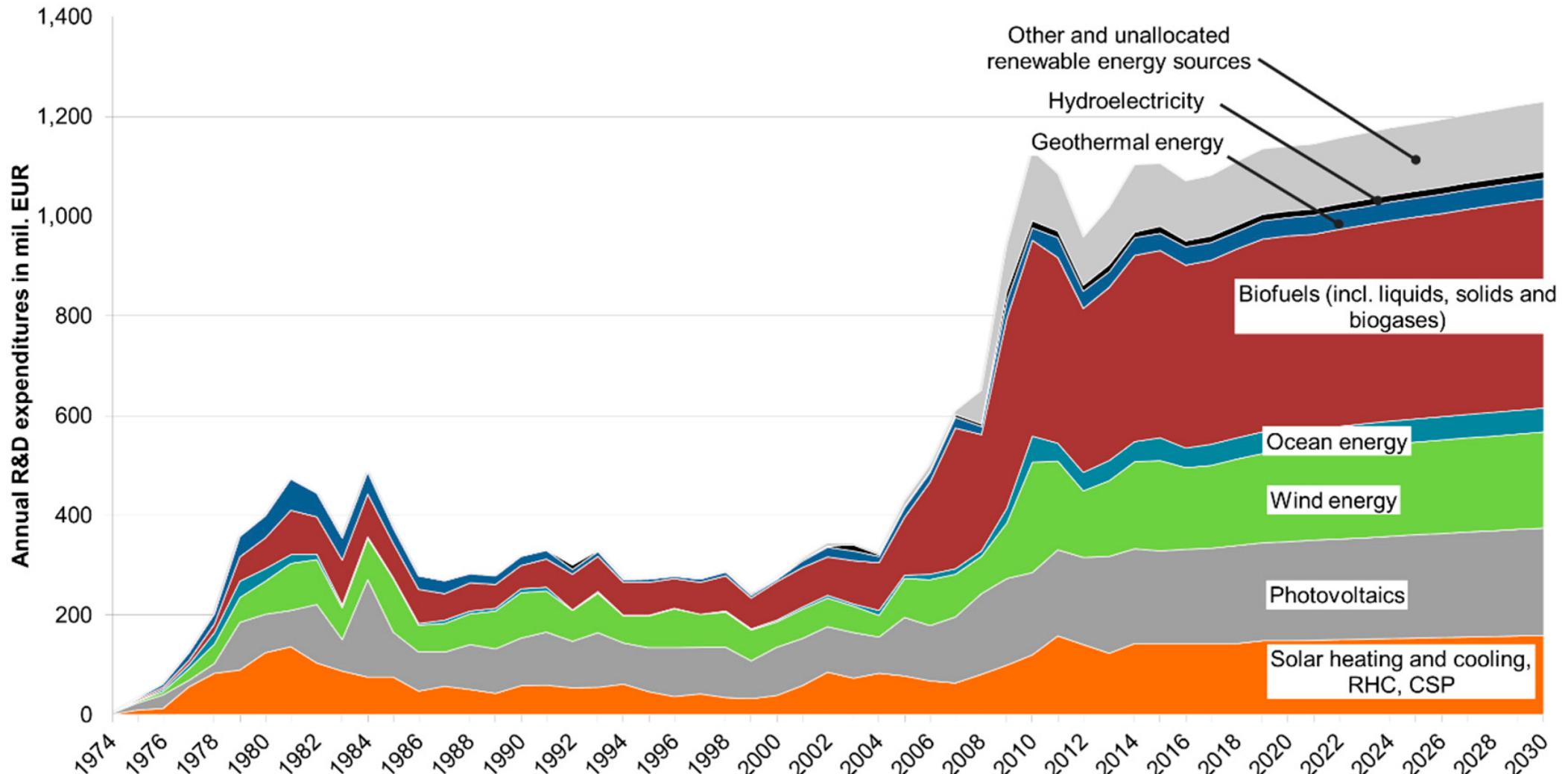


Source: Foster (1986).

# Demand-side



Source: wikipedia



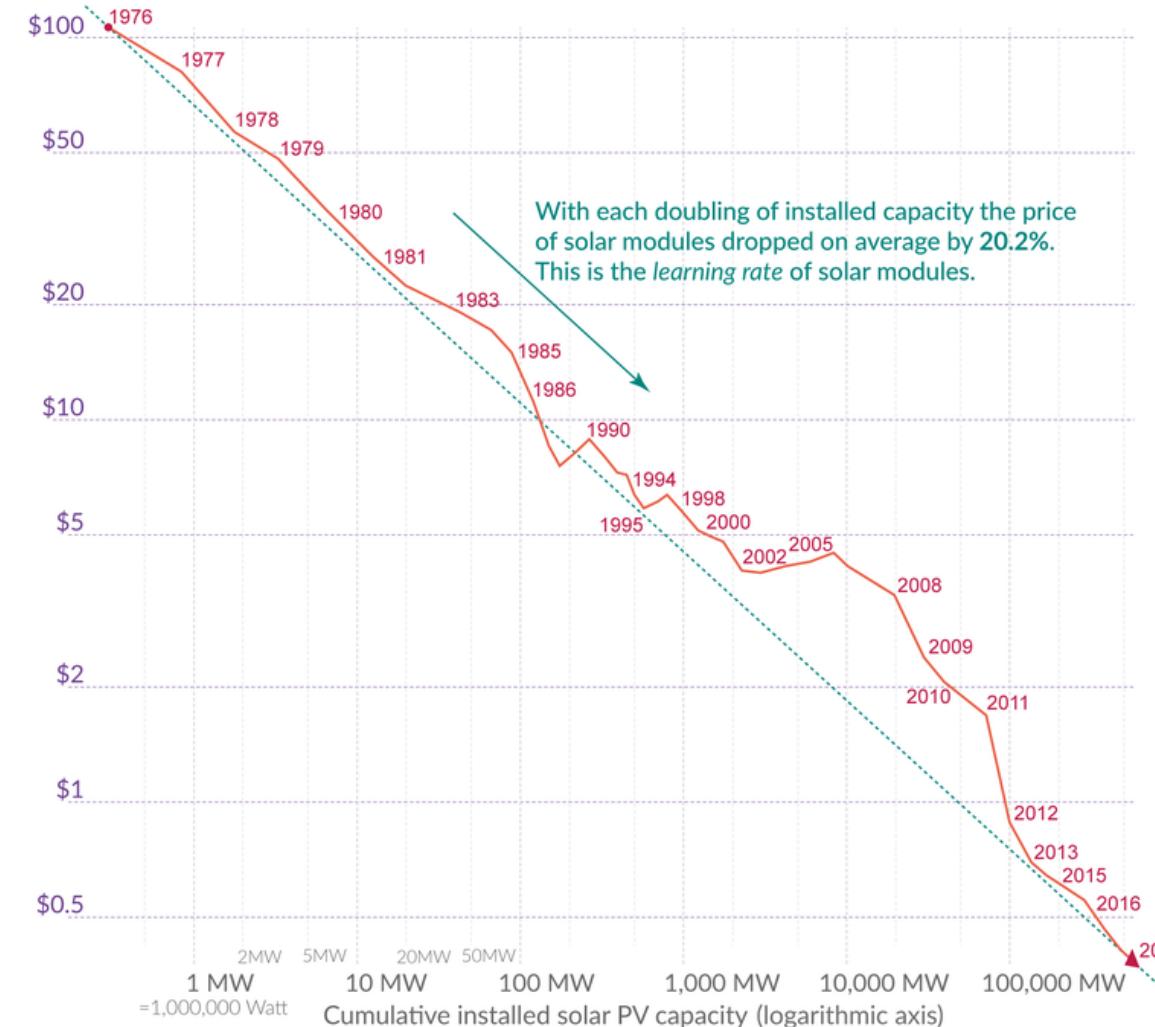
Source: Bointner et al. (2016)

# The price of solar modules declined by 99.6% since 1976

Our World  
in Data

Price per Watt of solar photovoltaics (PV) modules (logarithmic axis)

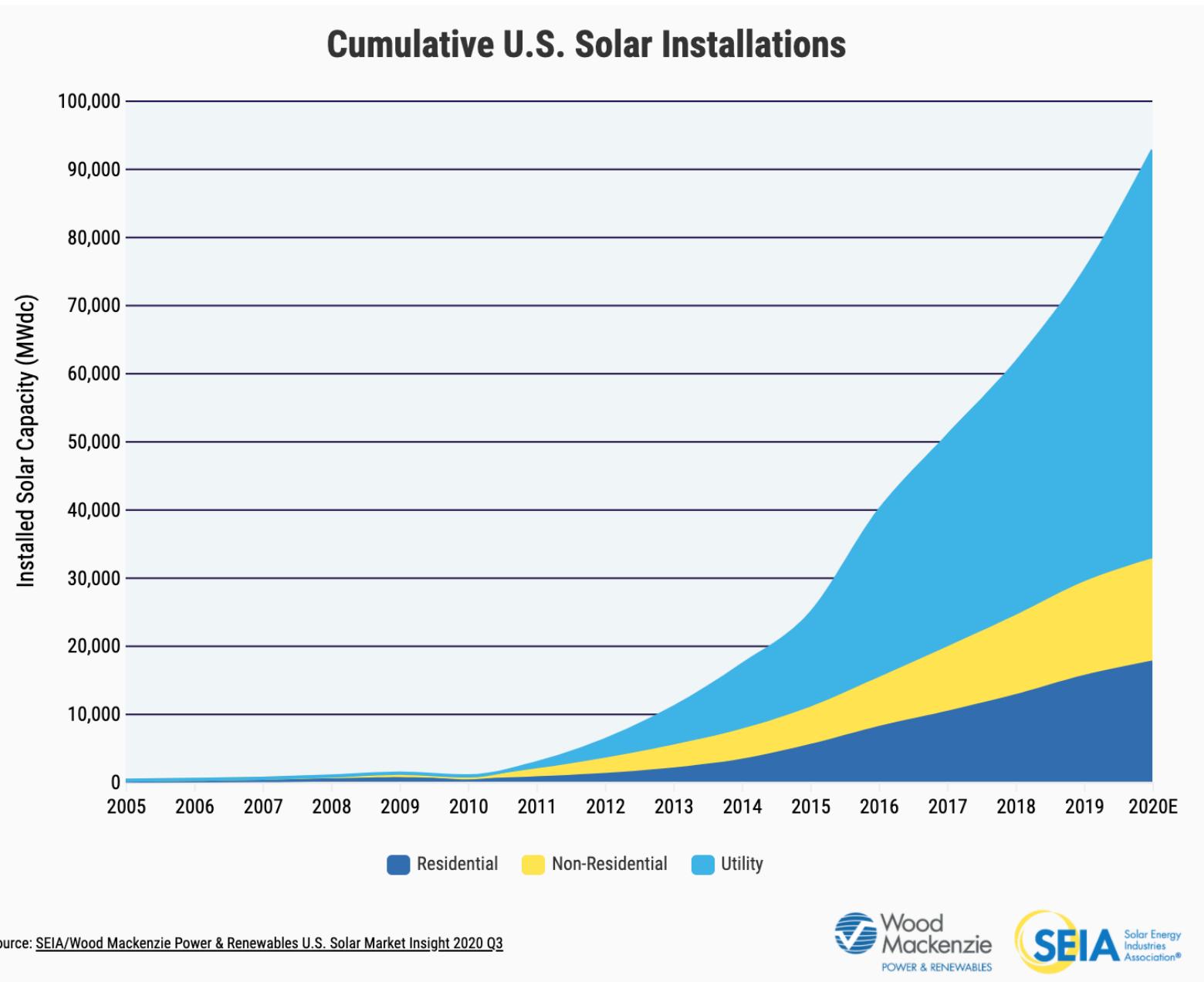
The prices are adjusted for inflation and presented in 2019 US-\$.



Data: Lafond et al. (2017) and IRENA Database; the reported learning rate is an average over several studies reported by de La Tour et al (2013) in Energy. The rate has remained very similar since then. OurWorldInData.org – Research and data to make progress against the world's largest problems.

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“Swanson’s law” (-20% cost to produce PV cells when production doubles) (from “Moore’s law”)



Source: [SEIA/Wood Mackenzie Power & Renewables U.S. Solar Market Insight 2020 Q3](#)



- What's the problem with R&D? Can't the market solve that?
- Fundamental problem: **collective action failures**
  - = indivs behave in a way that's not optimal for society
  - Note: optimal ≠ rational. Optimal = normative
  - Politics = study of CA problems
- Main types of CA probs: **public goods, coordination failures, commitment problems**
- Today: public goods

	Excludable	Non excludable
Rival	Private	Open-access
Non-rival	Club	Public

- Definitions
  - **Excludable**: users can be excluded from accessing good
  - **Rival**: stock of good decreases with consumption

- **Private goods:** your pen
- **Open access good:** public parc
- **Club good:** Netflix
- **Public goods:** ideas!
- **Market failure:**
  - Situations where markets don't work optimally
  - Common outside of private goods

- Problem: public goods are generally under-produced
- Why? Free-riding
- Often captured by the prisoner's dilemma
- Example: you are asked to contribute to a group project
- PD is useful, but doesn't capture uncertainty of result

- N: people who would benefit from project
- n: people who contribute (aside from you)
- B: your benefit if project succeeds; everybody gets it (public good)
- $\frac{n}{N}$ : probability of success of project
- c: your cost of participating
- Cost-benefit:
  - If you don't participate:  $B \cdot \frac{n}{N}$
  - If you participate:  $B \cdot \frac{(n+1)}{N} - c$
  - Participation is worth it if  $\frac{B}{N} > c$

- R&D is a **public good!**
- Thus: here, research is done if  $\frac{B}{N} > c$  (if model is true!)
- Suppose  $N$  is the US (300m),  $B = \$1m$
- You won't contribute if costs > 0.3 cents!
- R&D will be underprovided...
- General insight by Olson (1965): with public goods...
  - Large N: bad
  - **Diffuse interests:** bad

- Problem: you don't capture benefits from your investments
- Ideas are domestic+global public goods!
- Need solution to free-riding
- How can we solve this problem?

# Side note: problem-solving

- Many models (Define-Measure-Analyze-Improve-Control)
- First: define the **problem**
  - What *should* the goal be? Ethics!
- Second: establish **mechanisms** leading to prob
  - What is the **cause** of prob? Theory and evidence
- Third: design+test **interventions** (policies)
  - What is the **solution**? Experiment

Problem: research is a **global public good!**

How do you solve it?

- Define goals
- Mechanisms of prob
- Solutions to (root of) prob

# Goals and mechanisms

- Goal(s)
  - Possibly: *High levels of R&D, \$700b/year, \$500b in clean energy, \$200 in electric cars, 1000 startups by 2050, etc.*
  - Consequentialism ethical view
- Mechanisms
  - Free-riding: investors don't get rewarded
  - Domestic + international

# Solutions

- Need to solve **domestic** free-riding:
  - **Incentivize** private sector: patents, prizes, subsidies
  - **Socialize** research: public unis, research centers
- Need to solve **global** free-riding:
  - World Intellectual Property Organization (WIPO)
  - International treaties (Patent Cooperation Treaty, 1970)
  - Punishment?

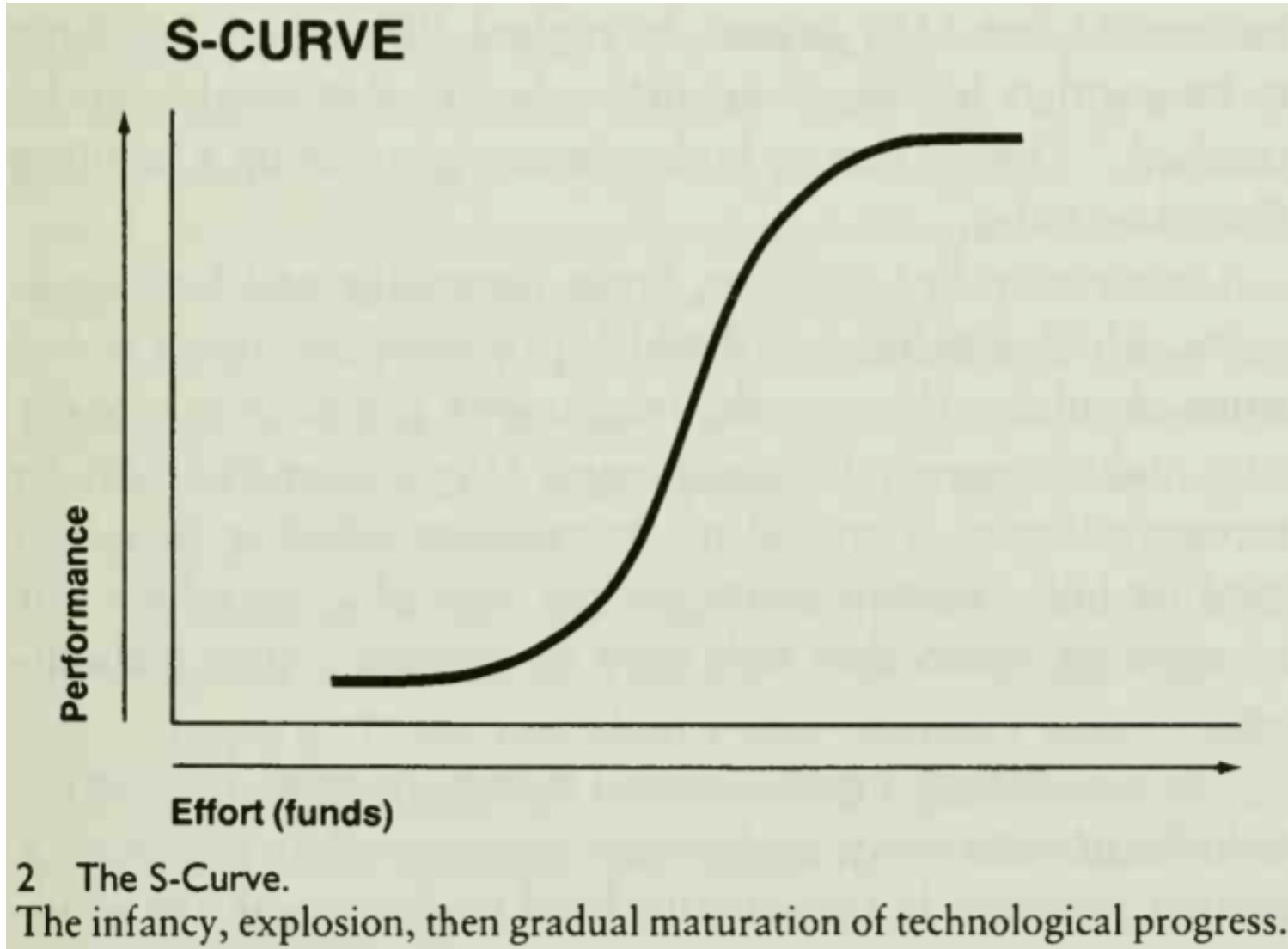
# Conclusion

- We (often) want new goods/services
- Innovations are generally needed to obtain them
- Innovation is often under-produced (public good and free-riding)
- Solutions: domestic+international rules to solve free-riding

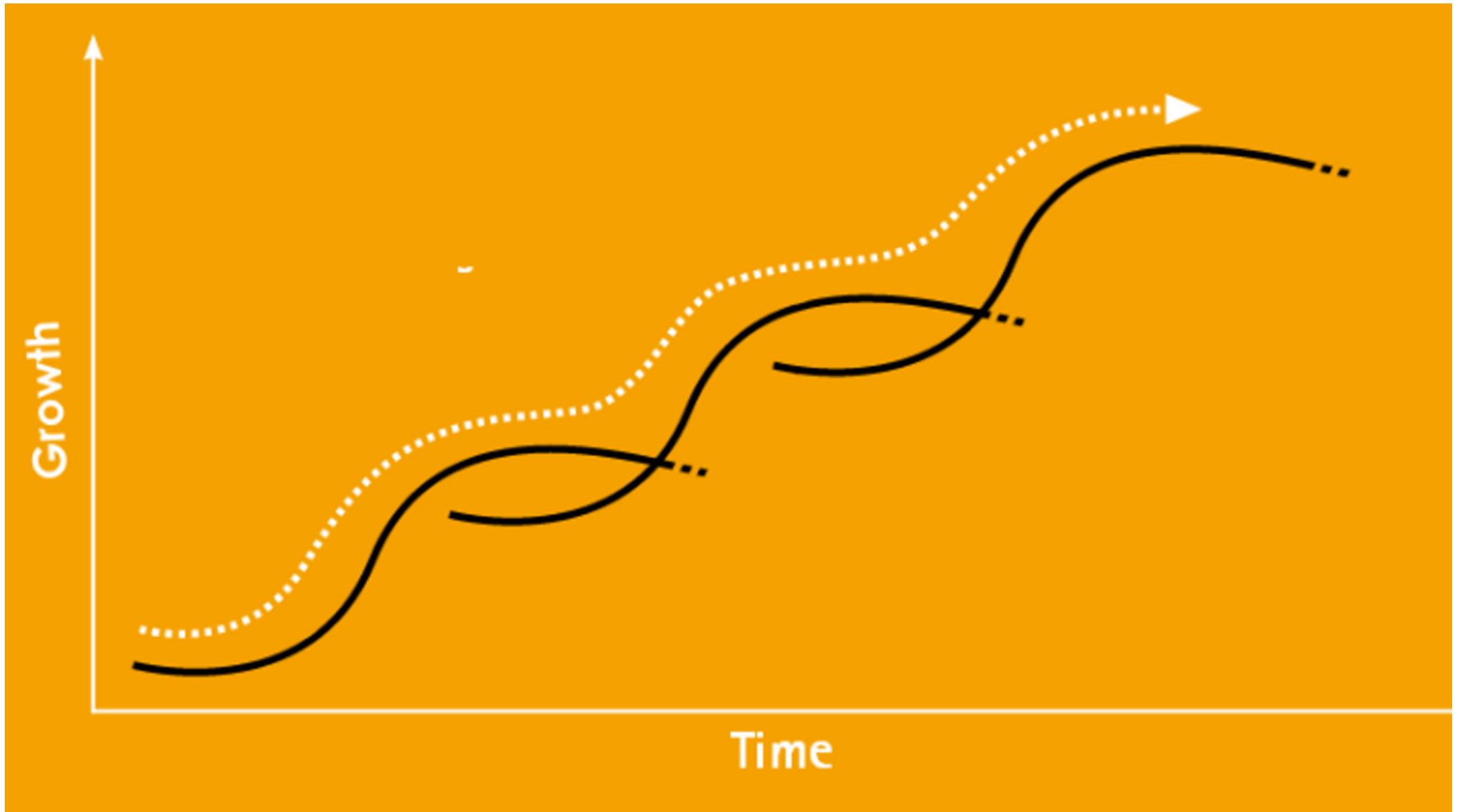
**Non-market  
competition**

- So far: (international) politics of early innovations
- Can happen in any market, even w/ perfect competition
- Happens under other systems too!
- Next: non-market competition.
  - =Competition that isn't occurring via price or quality
  - Diffusion stage of innovation

# Context



Source: Foster (1986).



Source: Future Business Tech

- Competitive market: near zero-sum game for producers
- Market strategies
  - Cut prices (possibly after adopting similar tech)
  - Increase product differentiation
- Not always feasible, affordable, efficient
- Problem when new technologies appear

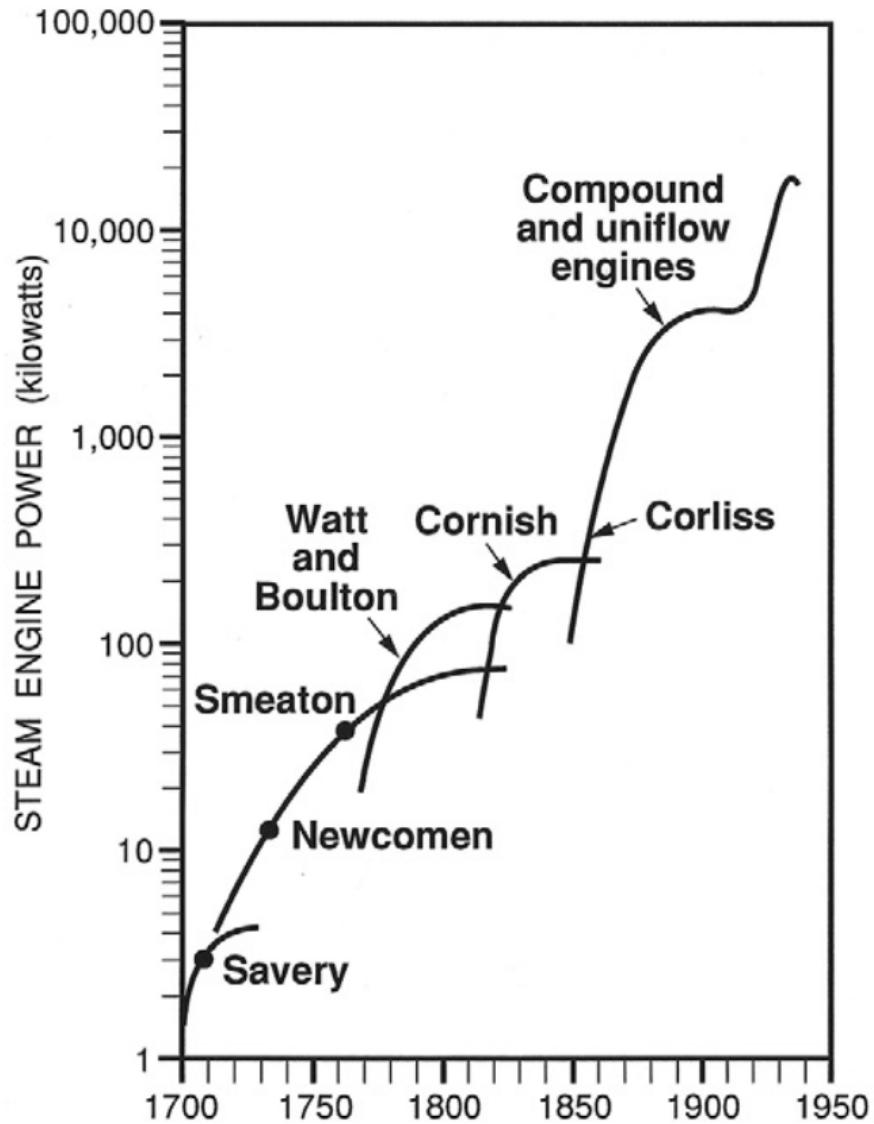
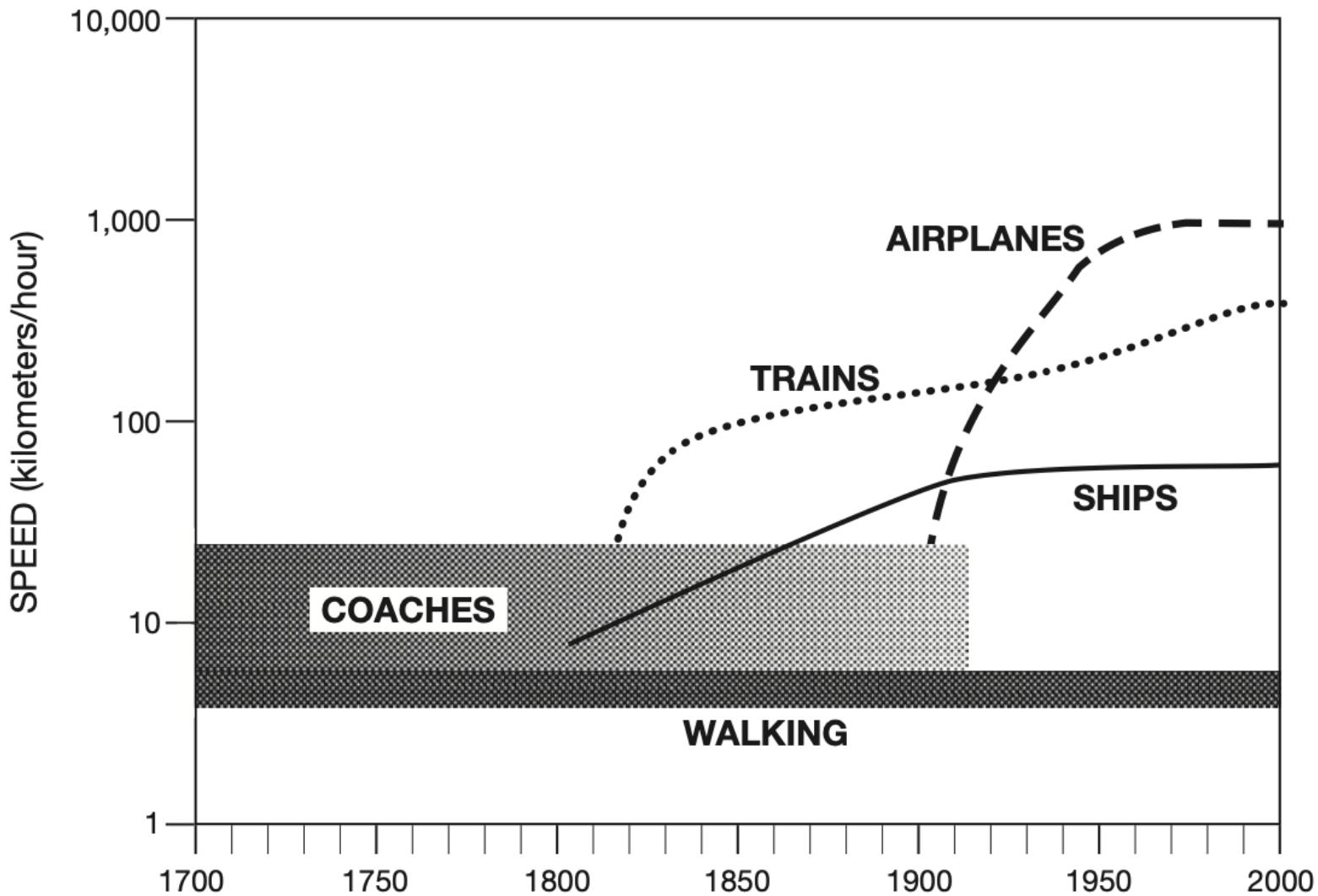


Figure 5.5

Source: Smil (2018)



**Figure 7.7**

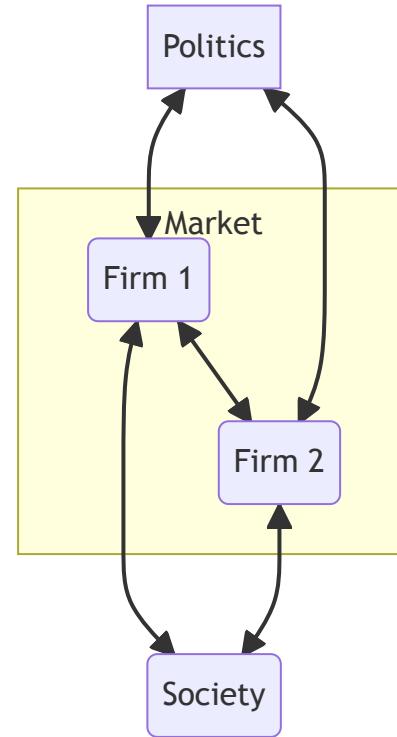
Maximum speeds of passenger **transportation** rose from less than 20 km/h for coach-

Source: Smil (2018)

# Puzzle

- Before we go into NMS: why don't firms **adapt**?
- Firms adapt all the time
  - Apple: computer to phone to iphone, etc.
- Problem for firms: **disruptive** tech
- Tech can represent an **existential** threat
  - **Sustaining** vs. **disruptive** tech
  - Hard to switch to disruptive tech, thus NMS

# Non-market strategies



# Non-market strategies

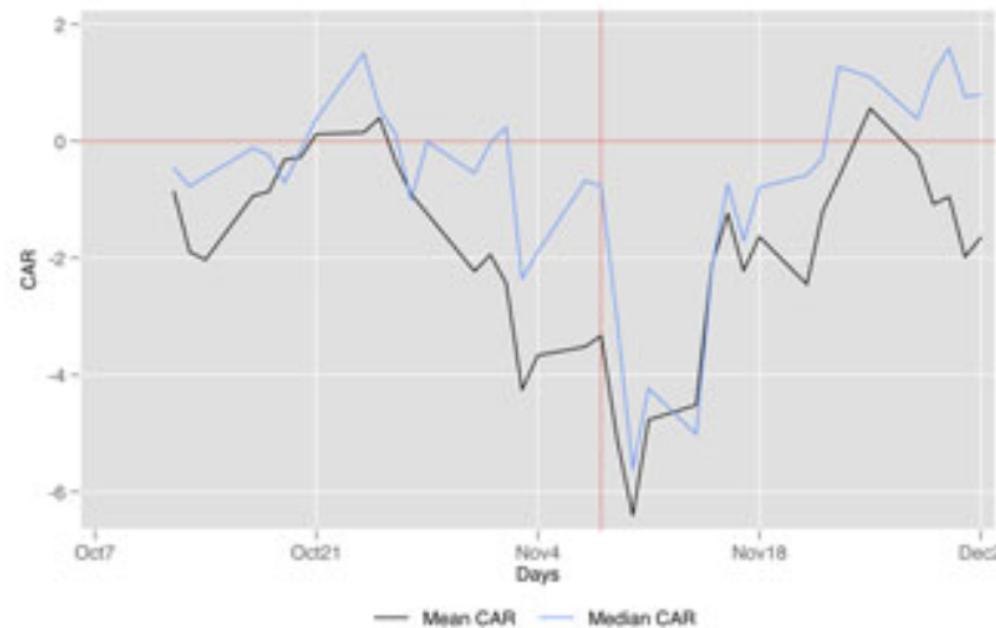
- Idea: firms modify **(business) environment**, not product
- Some is “good”: **corporate social responsibility**, ESG, ...
- But some is “bad”: eliminate competition
- Bad = bad for consumers, society
  - Higher prices
  - Slower adoption of new tech
- Happens w/ politics + w/ society + within markets

# Politics (1)

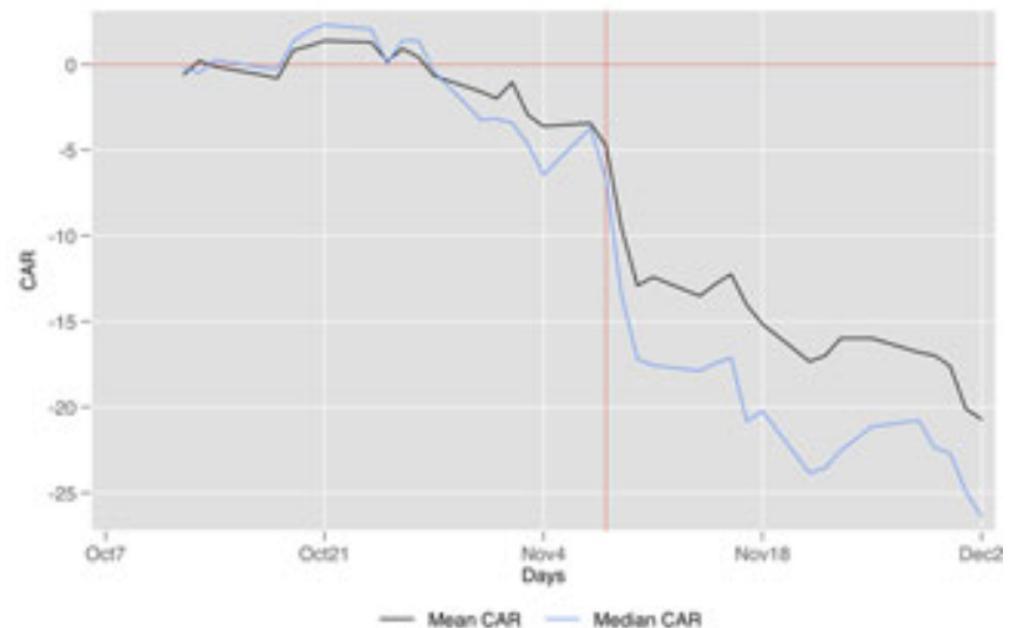
- **Ideology**: policy preferences of govs
- Everyone has preferences!
- Rulers: incentives to intervene to shape world accordingly
- **Myth** of neutral/benevolent/scientific ruler
- Problem: markets w/ market failures are exposed to change in gov preferences

# Example

- Trump admin: opposed to climate policy
- **Clean energy**: primary tool to cut US GHG
- US clean energy depends on **imports**
- 2019: 30% tariff (tax) on imports of solar equipment
  - Domestic solar panel producers win (First Solar) (small share)
  - Installer lose

**A**

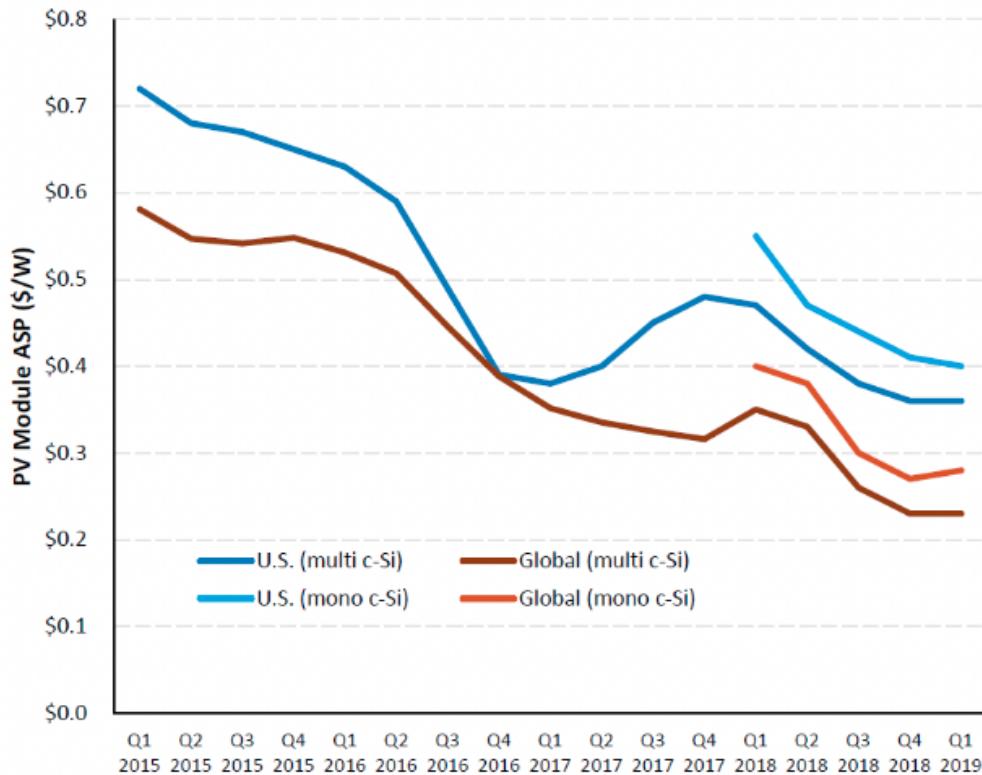
Firms headquartered in the United States

**B**

Firms headquartered in the rest of the world

Source: Aklin (2018)

# Tariff Impact: Higher U.S. Prices



Technology advances have helped lower solar prices around the world.

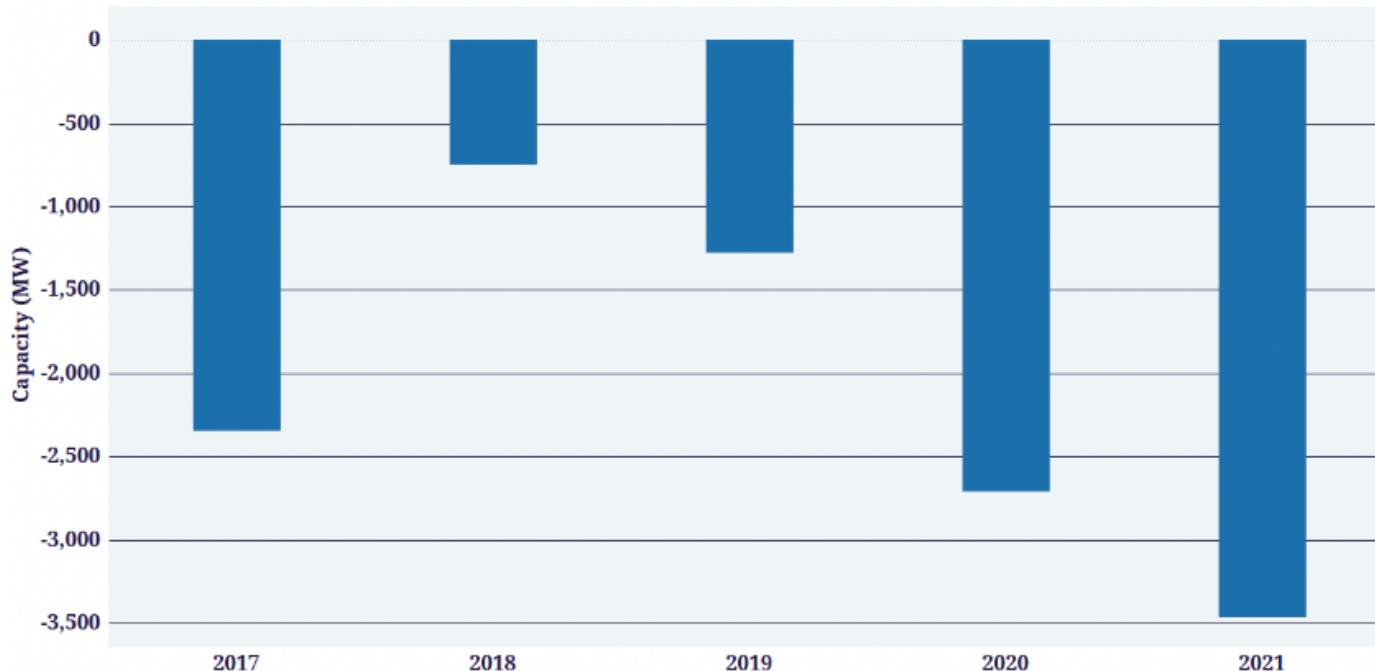
**In the United States, however, price declines have been significantly undercut by the safeguard tariffs—with U.S. prices now among the highest in the world.**

Higher prices reduce the size of the addressable market by pushing economics in favor of substitutes (existing generation, gas and wind) in marginal markets.

Source: NREL, Q1/Q2 2019 Solar Industry Update

Source: SEIA ([2019](#))

## Tariff Impact on Deployment

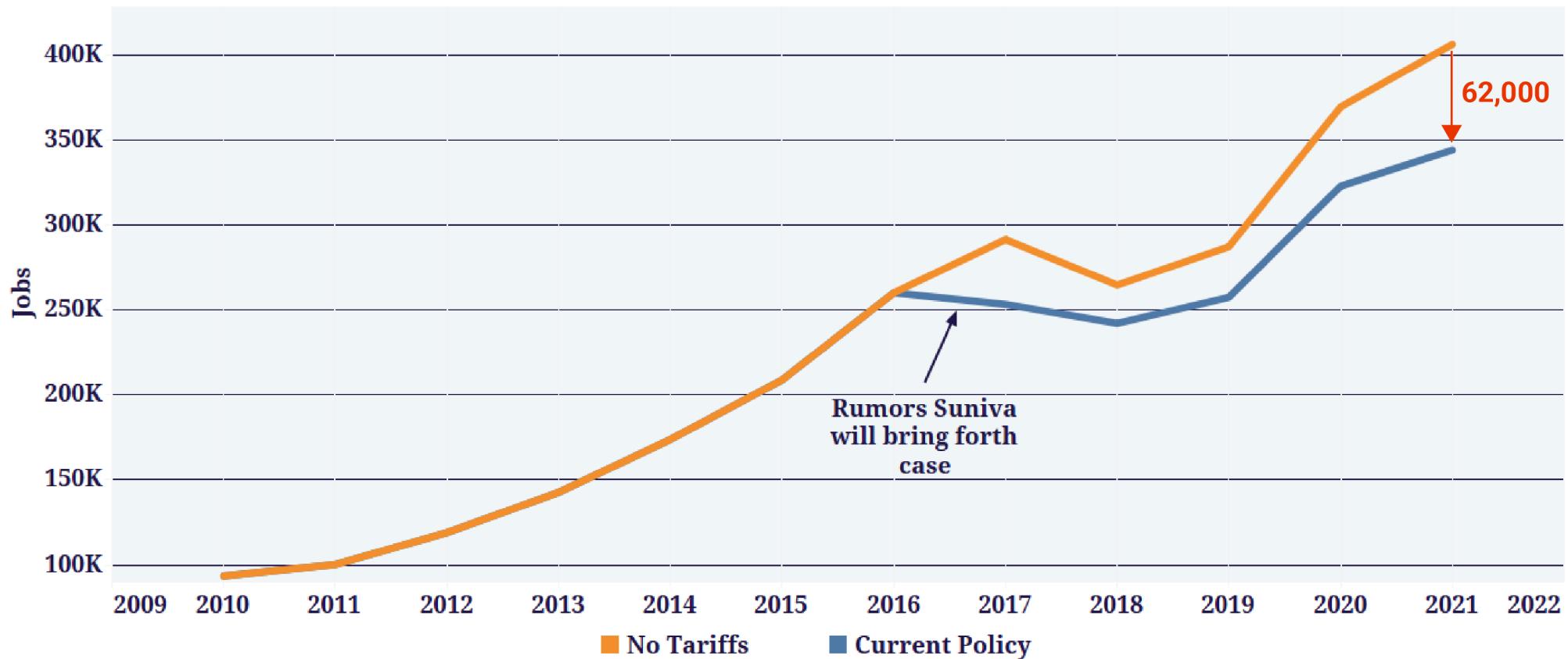


Uncertainty caused the market to **lose out on 3 GW of installations** as rumors and actual tariffs disrupted contracts in 2017 and 2018.

The safeguard tariffs **reduce the market for new projects by 7.5 GW** from 2019 - 2021.

Source: SEIA ([2019](#))

## Section 201 Tariff Impact on U.S. Solar Jobs



Source: SEIA (2019)

#StopSolarTariffs  
[www.seia.org/TariffImpacts](http://www.seia.org/TariffImpacts)

# Politics (2)

- **Lobbying**
- Modification of the law to disadvantage newcomers
  - Outlawing newcomers (Uber)
  - Barriers to entry (cost, eg via taxes)
  - Standards
- Note: often requires cooperation among firms (=public good)
- Feasible for firms that can cooperate

# Example

- FirstEnergy (Ohio): investor-owned utility that serves ~6m people (\$10b+ in annual revenues)
- Problem: it relies heavily on old coal nuclear plants
- Not competitive against up-and-coming renewables
- Solution: lobby Republican majority in Ohio House to subsidize their plants (2020) (House Bill 6)
- Problem: illegal contributions (about \$6m in exchange for \$1.3b subsidies – NB: not bad!)
- Ongoing legal battles

# Within markets (1)

## Predatory pricing

- Idea: reduce price below prod cost in foreign markets
- Makes it impossible to newcomers to compete
- Feasible for established firms with cash
- Example: Walmart

# Within markets (2)

## Dumping

- Same as predatory pricing, but global
- Producer in cntry A exports at low price to cntry B
- Producers in cntry B go bust
- Producer in cntry A becomes dominant

# Within markets (3)

- Monopolistic acquisitions
- Acquisition of firms...
- Acquisition of talent (**human capital**)
- Example: facebook

How would you solve issues such as  
**dumping, lobbying, etc.?**

Pick one and use problem-solving skills!

# Case study

# Conclusion



# Questions?

aklin@pitt.edu

Source for title page painting: Stoyanka Ivanova, *Clock of Universe*

# References

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