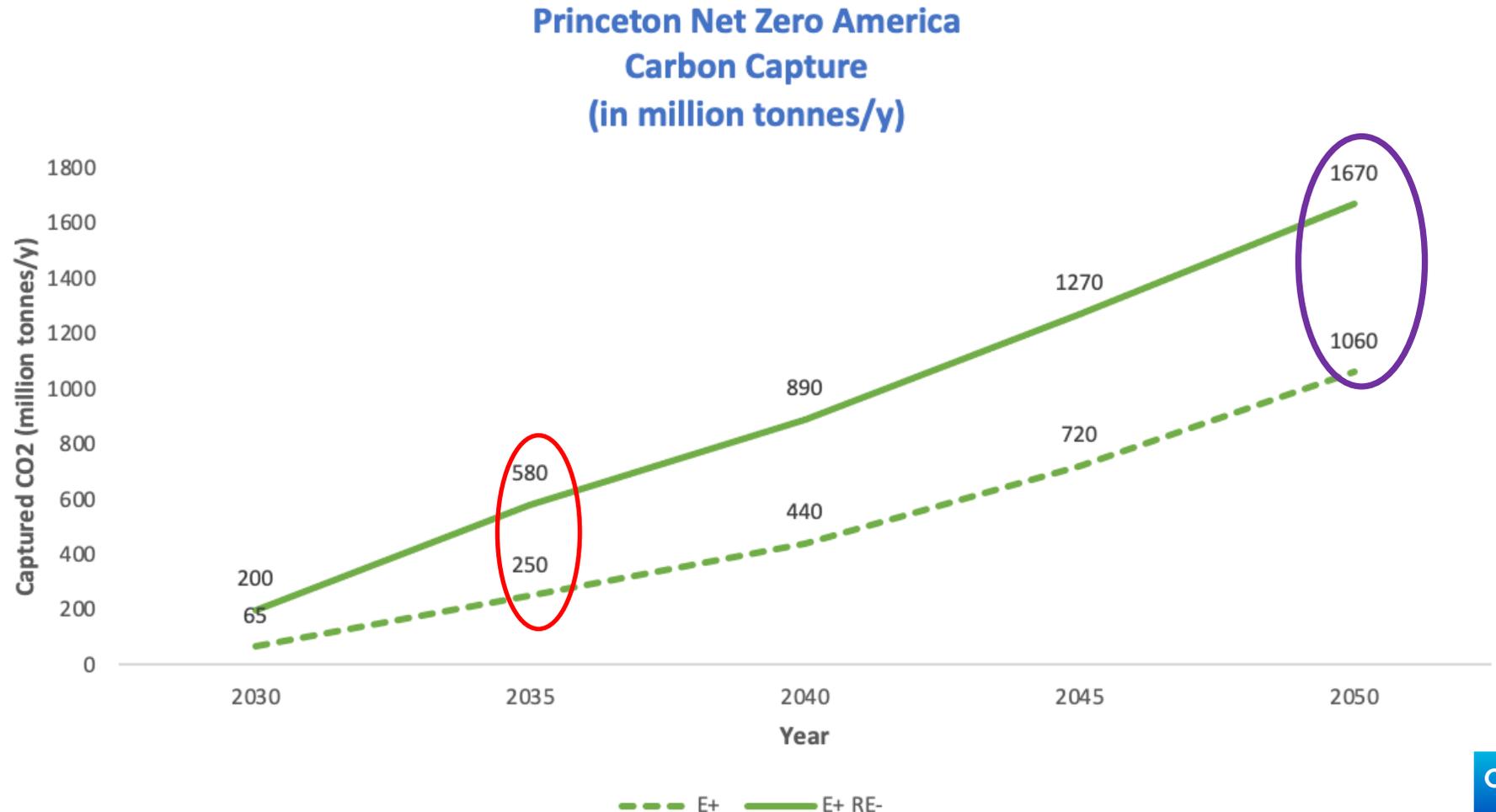


2050 and Take-Off Points in the U.S. for carbon sequestration

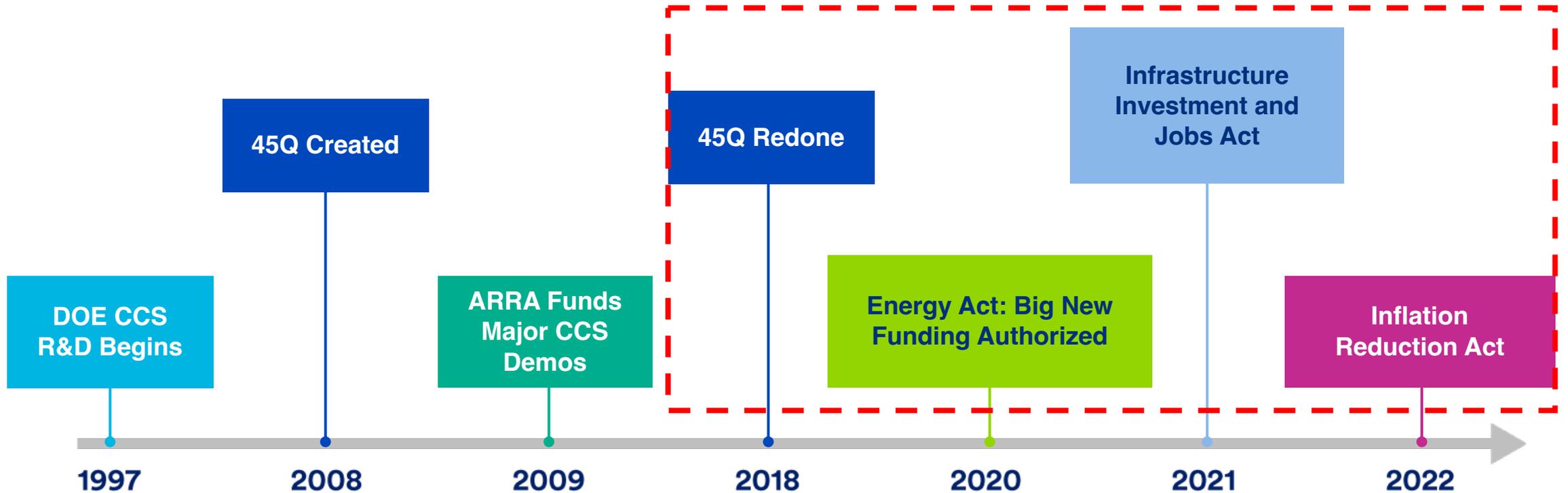
2035: need to establish infrastructure is around 250 million metric tons/yr

Source: [https://netzeroamerica.princeton.edu/img/Princeton%20NZA%20FINAL%20REPORT%20SUMMARY%20\(29Oct2021\).pdf](https://netzeroamerica.princeton.edu/img/Princeton%20NZA%20FINAL%20REPORT%20SUMMARY%20(29Oct2021).pdf)

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What Carbon Capture policies helped move CCS forward in the U.S.?



45Q Redone

- Increased credit values to \$50 saline storage
- Adopted commence construction approach (i.e. made it functional) to 2026

Energy Act: Big New Funding Authorized

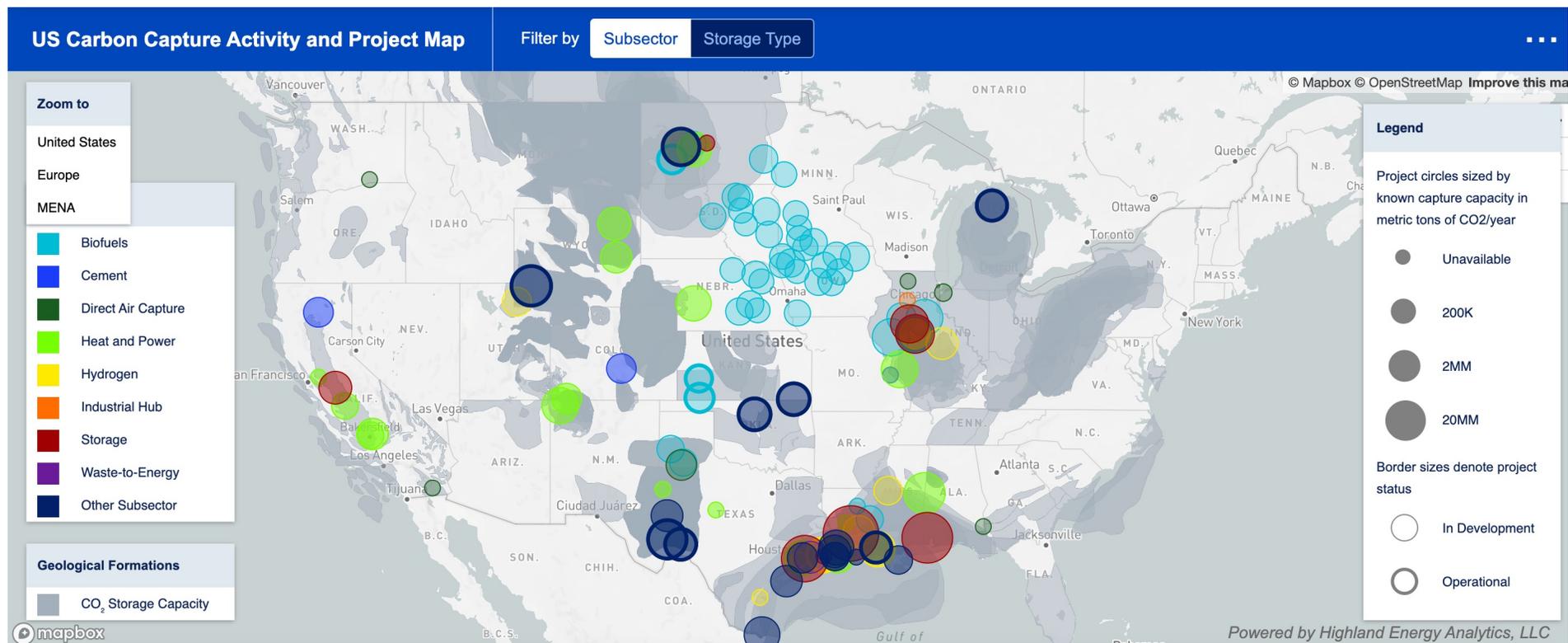
- \$ 7 billion for CCUS R,D&D – including demos funding and feed studies, covering coal and gas power and industrial decarbonization stack capture demos as well as for DAC and early-stage R&D

Infrastructure Investment and Jobs Act

- \$12 billion for CCUS R,D&D including industrial stack capture and DAC demos, pipeline and saline storage hub development, permitting support

Inflation Reduction Act

- Increase credit values to \$85 stack capture saline storage and \$180/ton for DAC saline storage
- Commence construction to 2033
- Direct Pay
- Lower capture threshold



- The vast majority of projects in 2021 were ethanol projects enabled by the proposed development of CO2 pipelines in the Midwest. Estimated tonnes of announced capacity: 27 million.
- By Q3 of 2022, 27 new projects had been announced. Of these 27 new projects, six were DAC projects, nine industrial (two cement, one iron), seven power plants, and five storage projects. Estimated tonnes of announced capacity: 33 million.

Incentive level versus projected costs

Which industries benefit from raising 45Q to \$85?

Industry	Total costs of CCS (\$/tonne) ¹
Chemicals	55 - 65
Hydrogen	61 - 82
Cement	65 - 100
Refineries	68 - 93
Steel	80 - 89
Petrochemicals	82 - 85



Key issues going forward

- Inflation, inflation, inflation
- Infrastructure build out rate (and public support)
- Historical inequity and environmental justice impacts
- Regulatory capacity
- Long-term drivers for continued application and growth of CCUS