



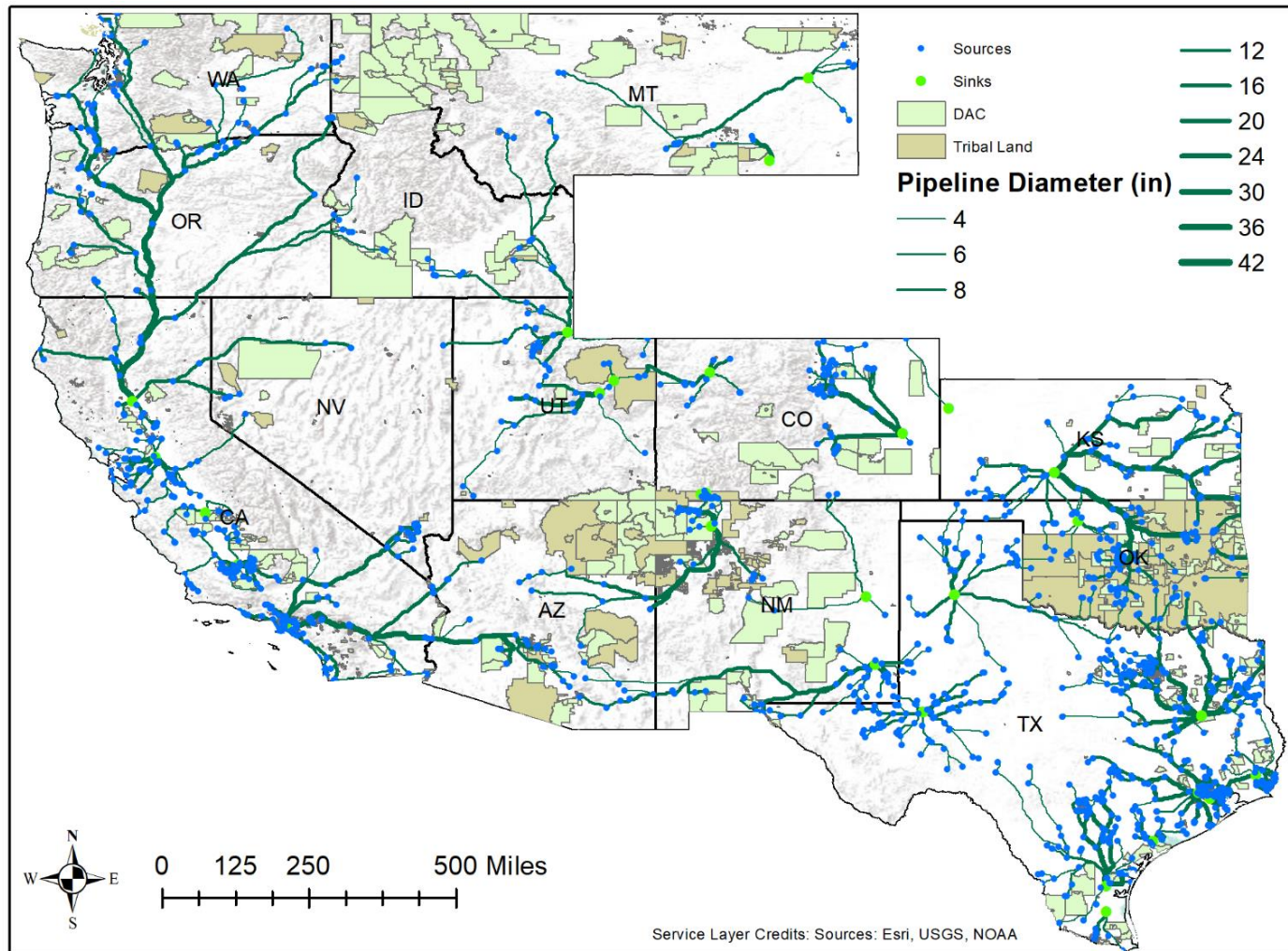
# The impact of IRA on CO<sub>2</sub> transportation infrastructure in the CUSP-West region

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# Take Home Message!



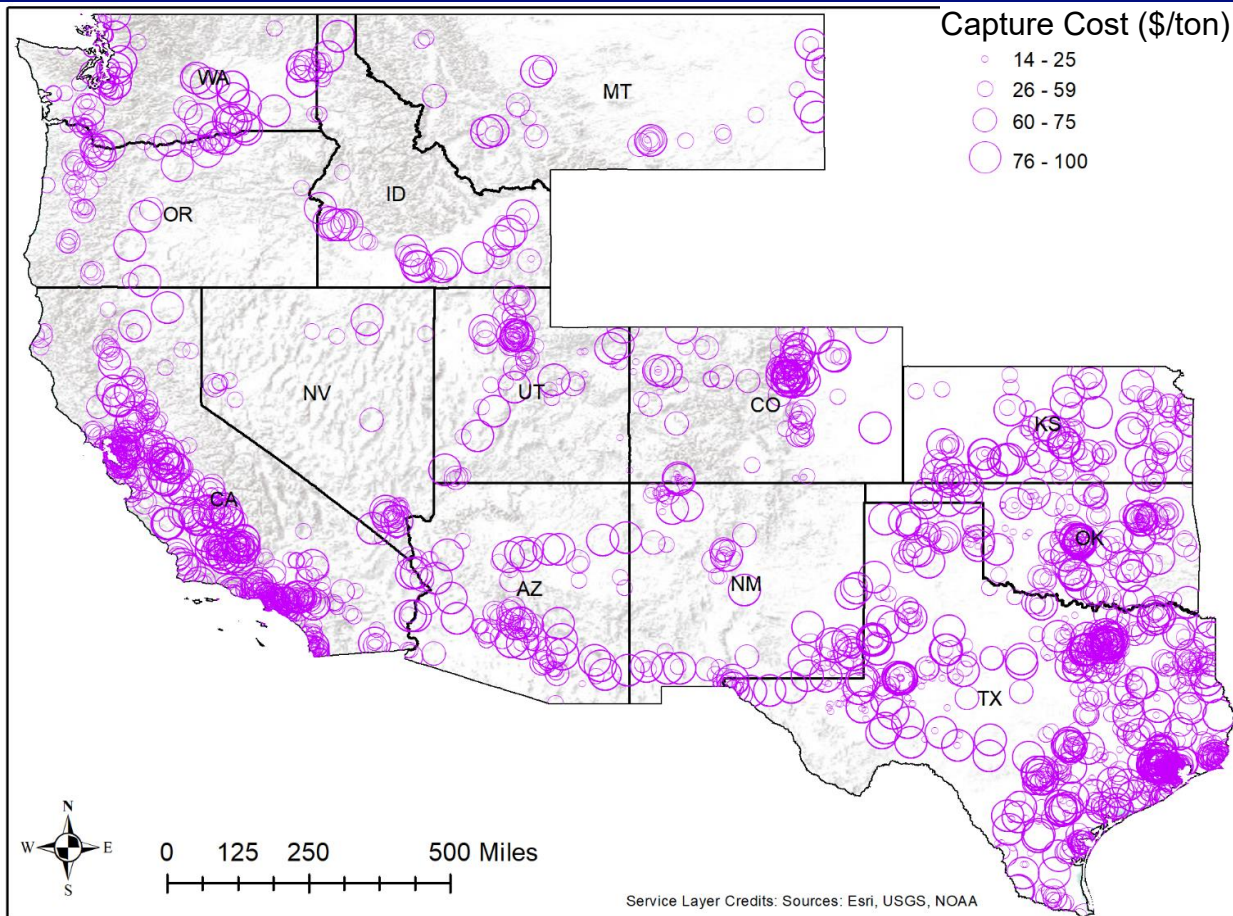
- The difference between the BBA and IRA 45Q Rules
- The difference between cost components for CCS projects
- The difference in infrastructure development and O&M costs

# 45Q Tax Credit (BBA 2018 and IRA 2022)

It is an Internal Revenue Code (IRC) Section 45Q introduced in 2008  
It incentivizes investment in carbon capture and sequestration

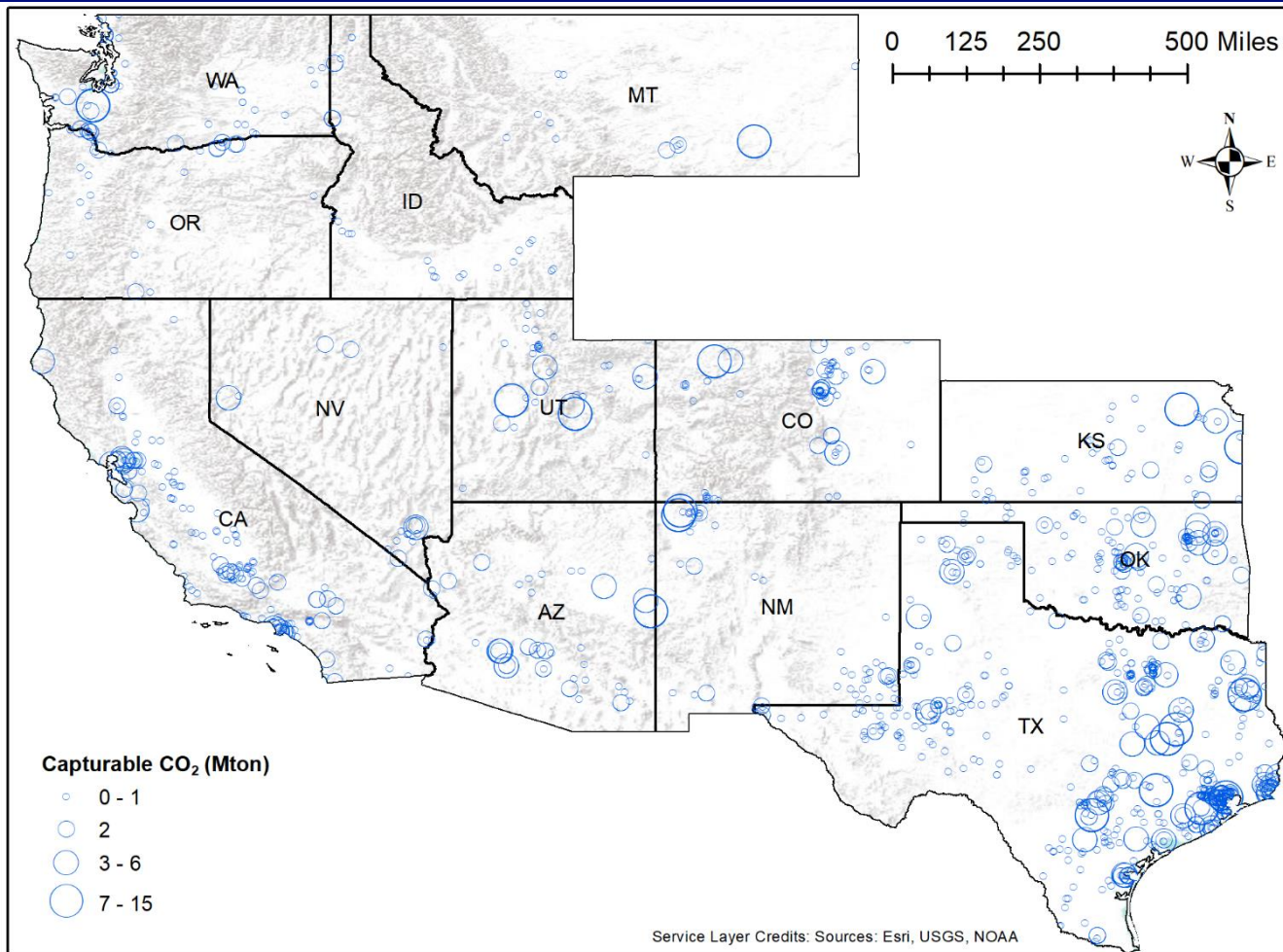
	45Q Tax Credit (BBA)	45Q Tax Credit (IRA)
<b>Permanent Storage (\$/ton)</b>	50	85
<b>EOR (\$/ton)</b>	35	60
<b>DAC (\$/ton) stored/used</b>	36 / 26	180 / 130
<b>Project Size (tons/yr)</b> power plants / industrial facilities / DAC	500k / 100k / 100k	18,750 / 12,500 / 1,000
<b>Construction Deadline</b>	2026	2033
<b>Direct Pay</b>		Taxpayer can claim the credit
<b>Transferability</b>		Can be transferred to unrelated taxpayer

# Point Sources in the CUSP-West Region



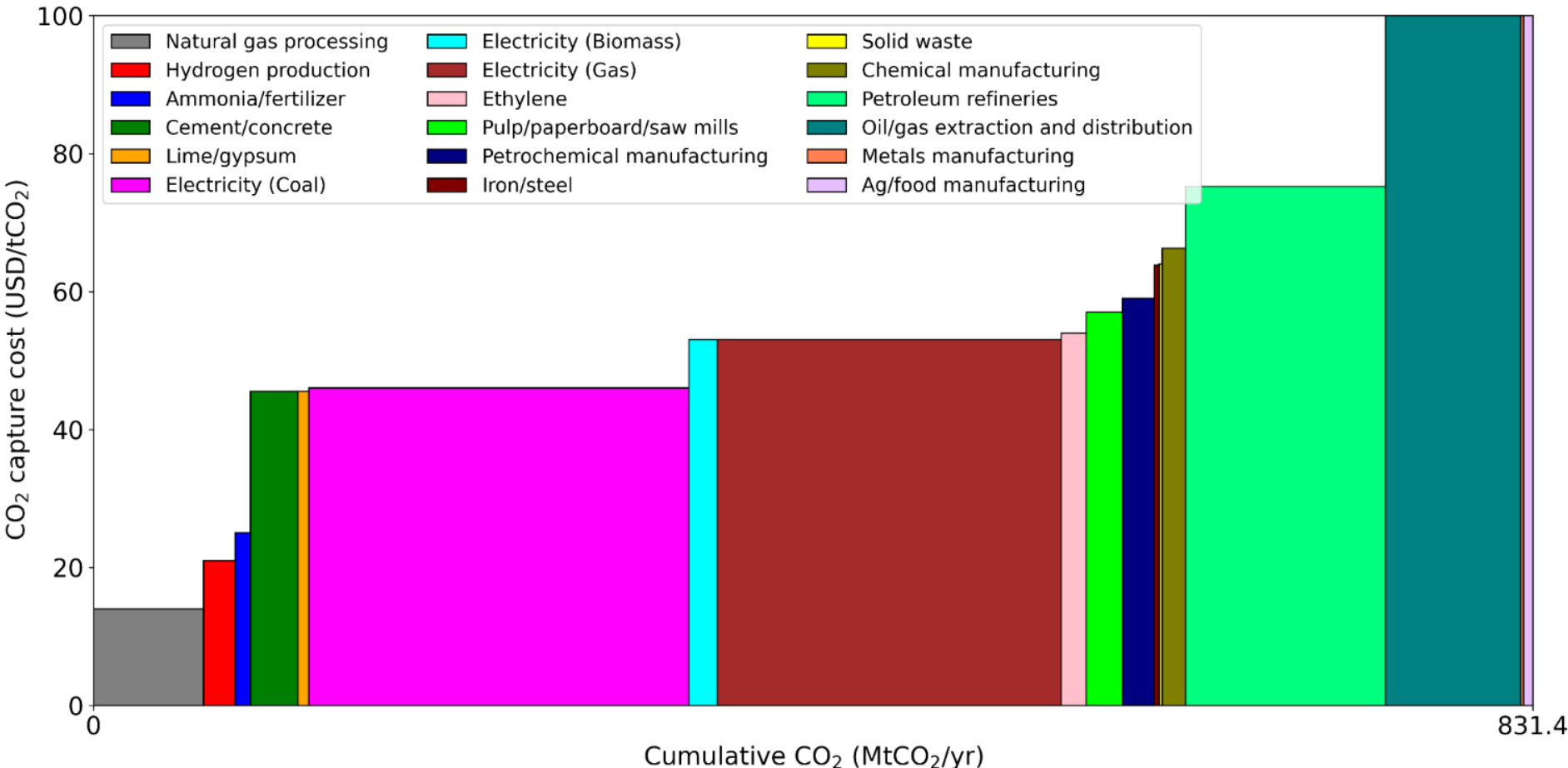
- Total point sources are 3,332
- Electricity generation point sources are 1,008
- Non-electricity generation point sources are 2,324
- Total emission is ~919 MtCO<sub>2</sub>

# Point Sources for the BBA Scenario



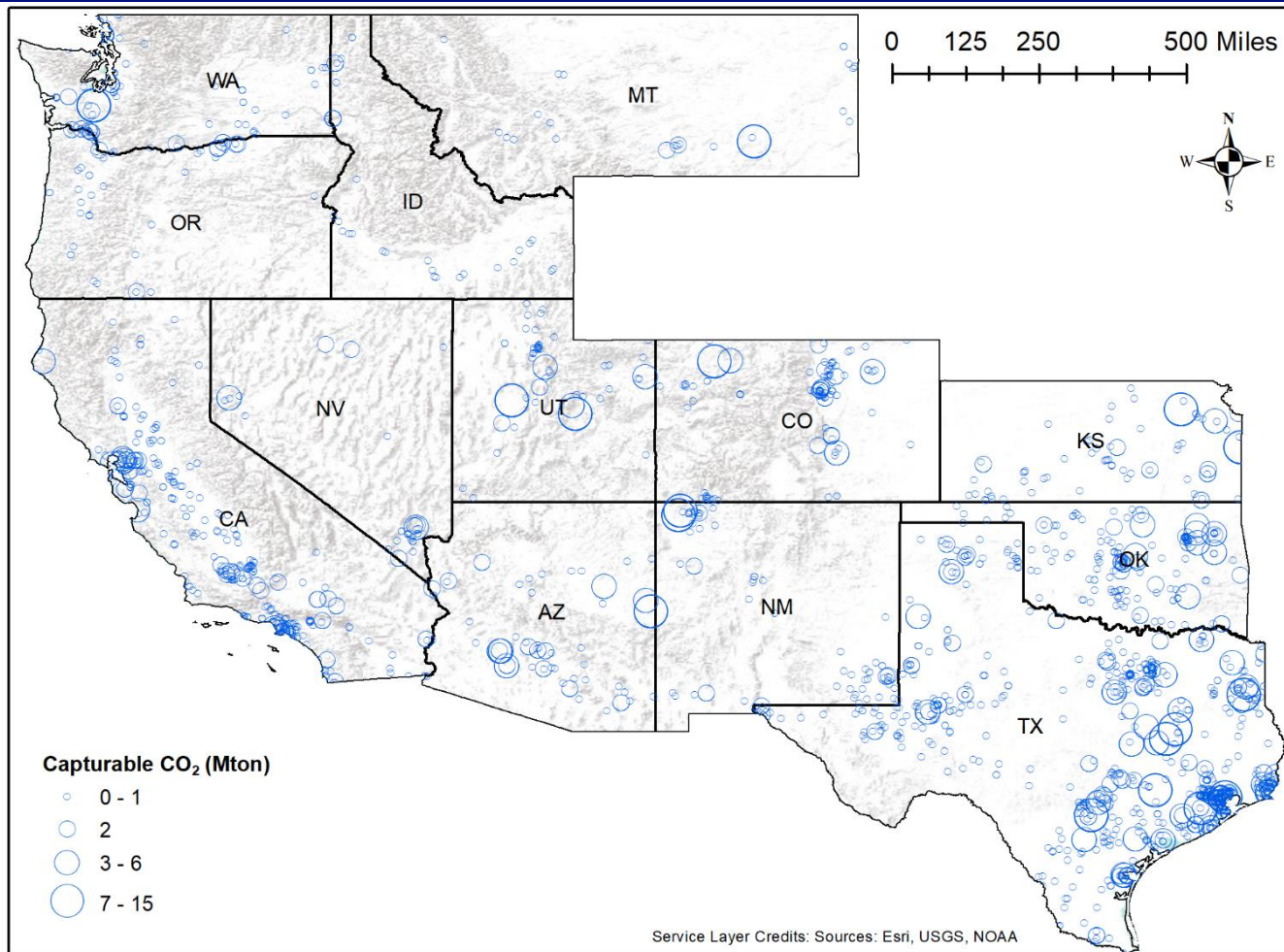
- 90.4% of emitted CO<sub>2</sub> are eligible for 45Q tax credit
- Electricity generation point sources are 200
- Qualified point sources for non-electricity sector are 1,455

# Supply Curve for the BBA Scenario



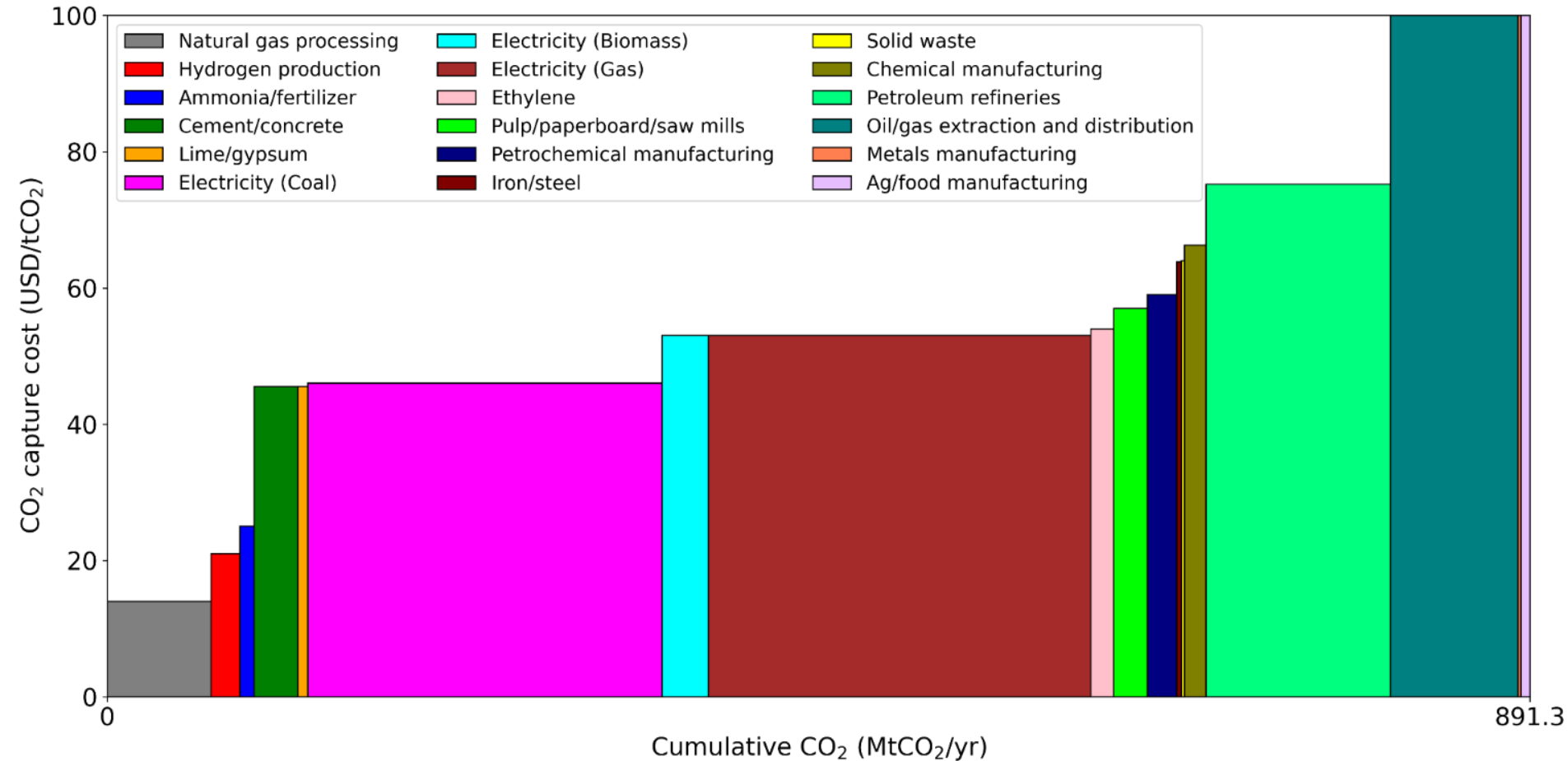
- Eligible for tax credit is ~831 MtCO<sub>2</sub> (90.4%)
- Major sources are from
  - electricity generation power plant by coal and natural gas
  - petroleum refineries, oil/gas extraction facilities

# Point Sources for the IRA Scenario



- Eligible for 45Q tax credit according to new rules is ~97%
- Qualified point sources from electricity sector are 555
- Qualified point sources from non-electricity sector are 1,688

# Supply Curve for the IRA Scenario

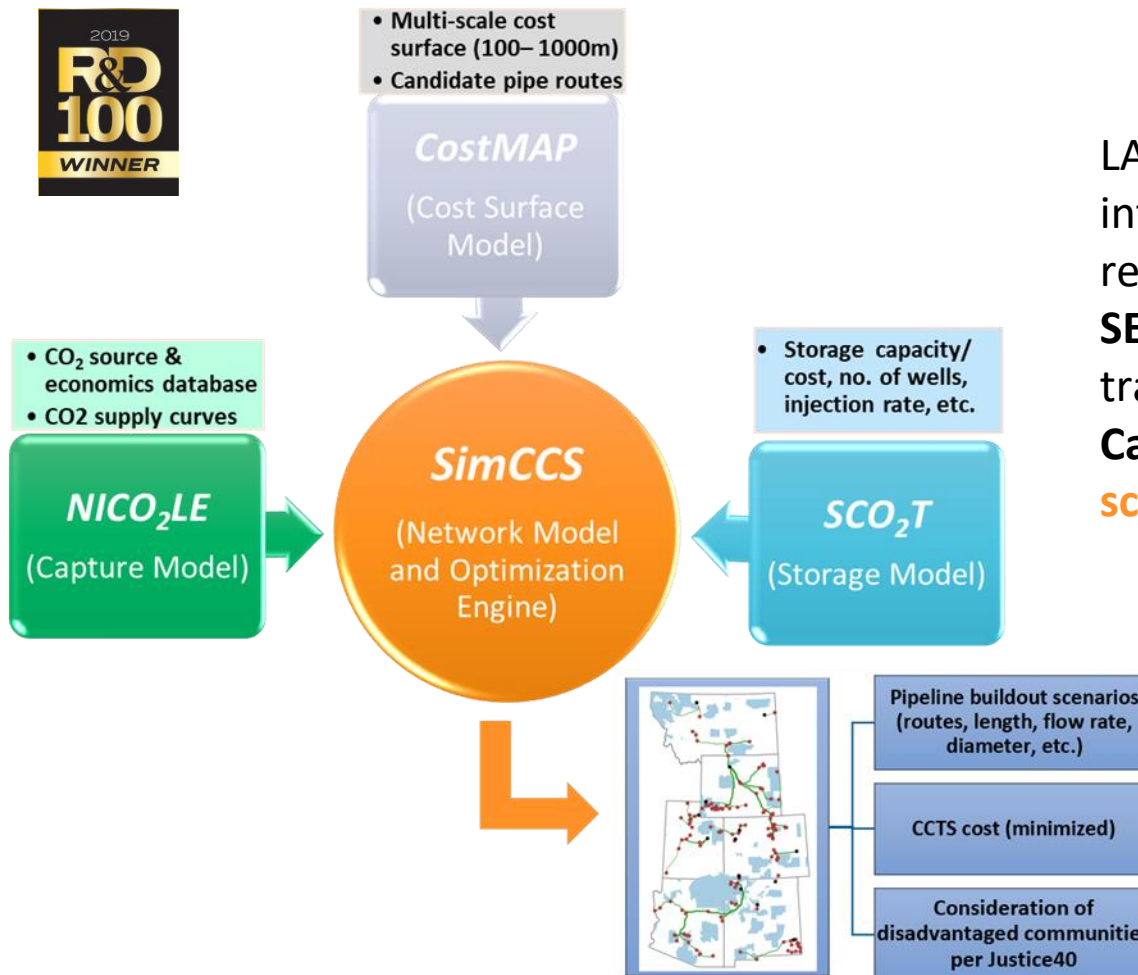


- Eligible for tax credit is ~891 MtCO<sub>2</sub> (97%)
- Major sources are from
  - electricity generation power plant by coal and natural gas
  - petroleum refineries, oil/gas extraction facilities



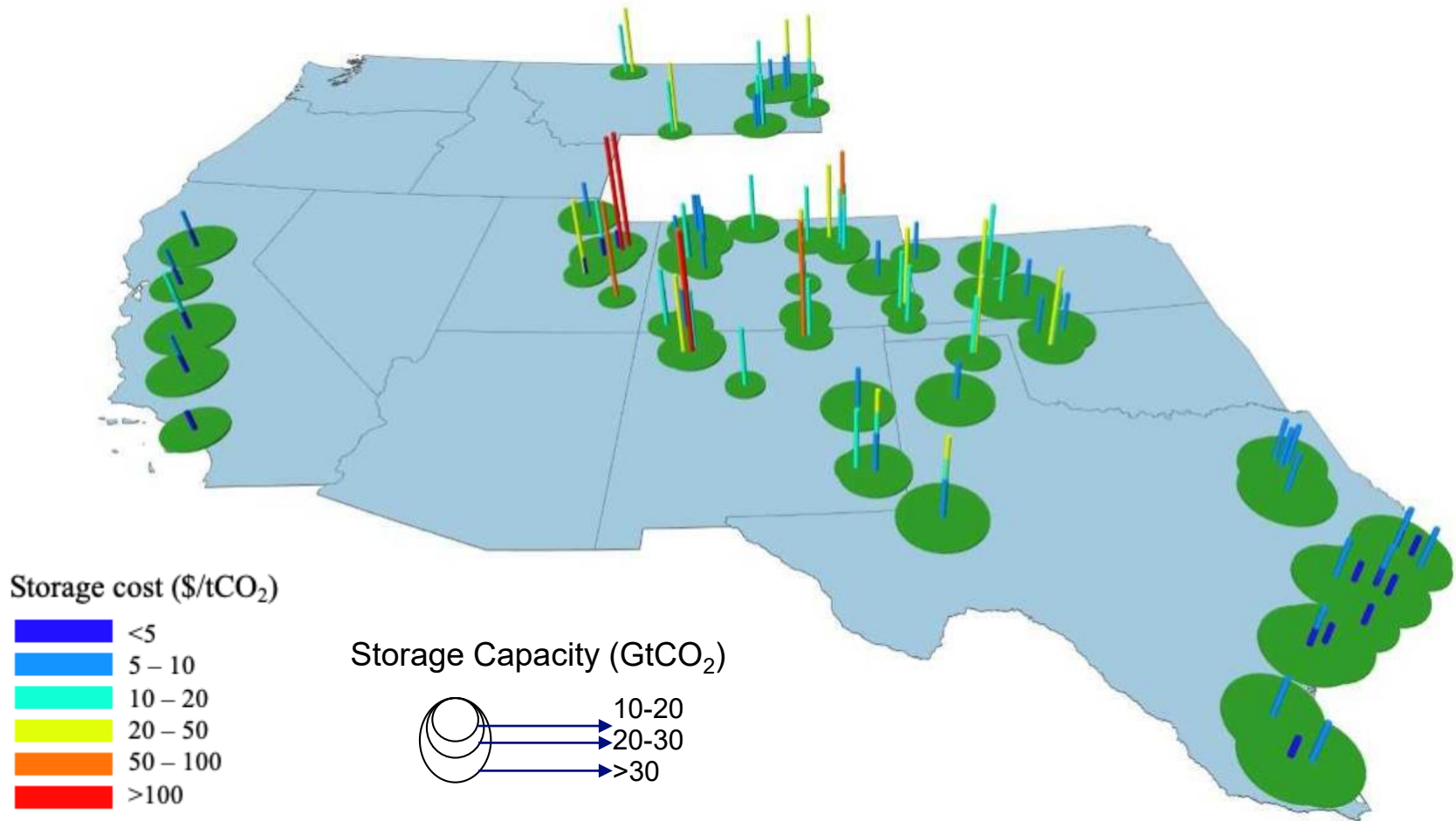
# SimCCS determines costs and optimized pipeline routing by integrating factors across the CCS value chain

SimCCS can help determine optimal, regional network of CO<sub>2</sub> sources, CO<sub>2</sub> sinks and CO<sub>2</sub> transport infrastructure that meet desired CCS goals



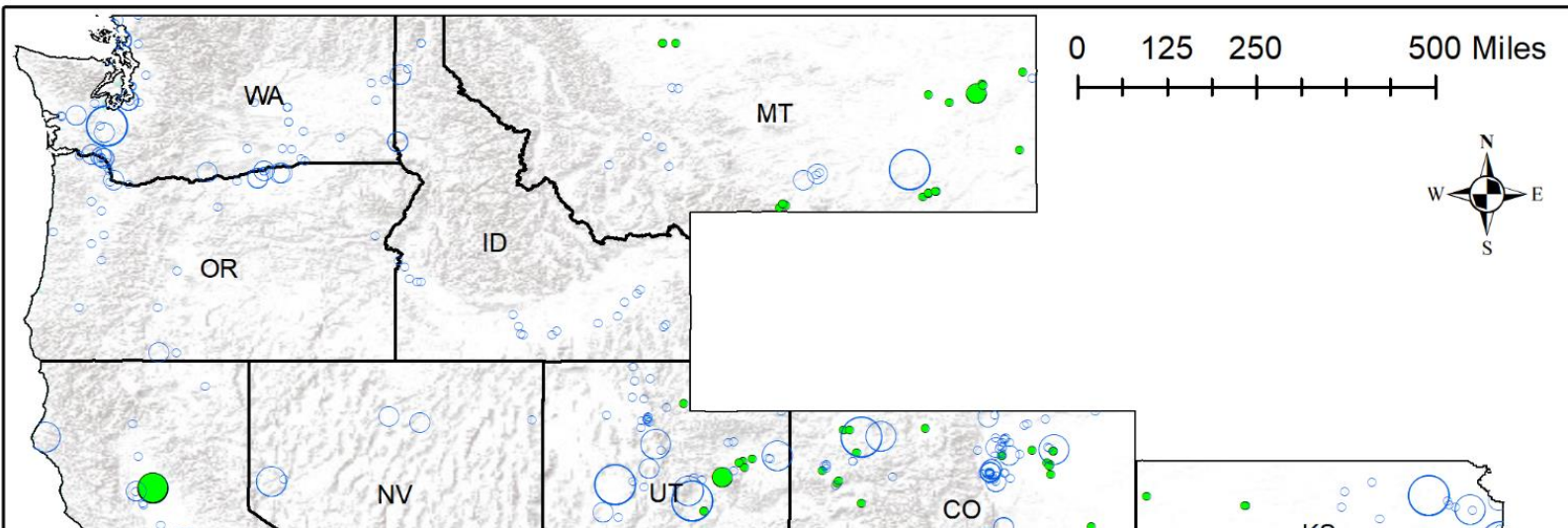
LANL is utilizing *SimCCS* to support infrastructure modeling in three regional CCUS initiatives (**CUSP**, **SECARB-USA**, **MRCI**), one energy transition initiative (**I-WEST**), **CarbonSAFE Projects** and **national scale CCS pipeline modeling**

# Model Setup: "Known" Saline Storage Site and Cost

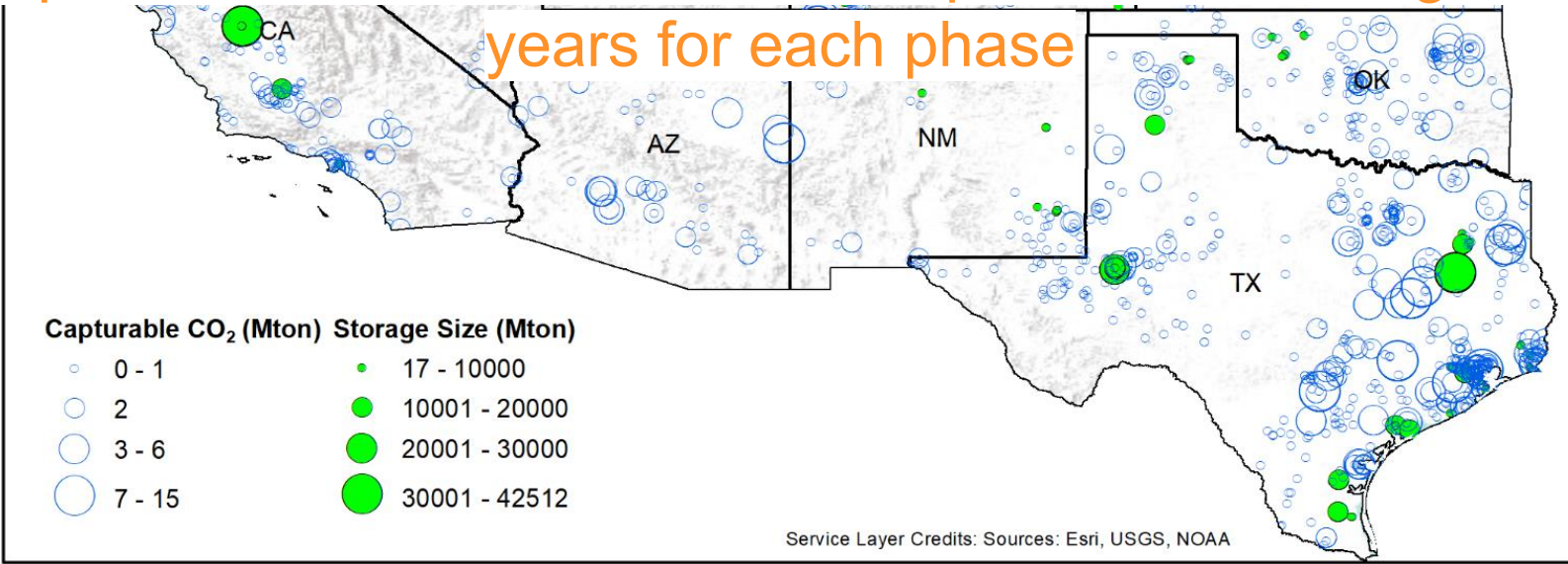


Source: NATCARB database

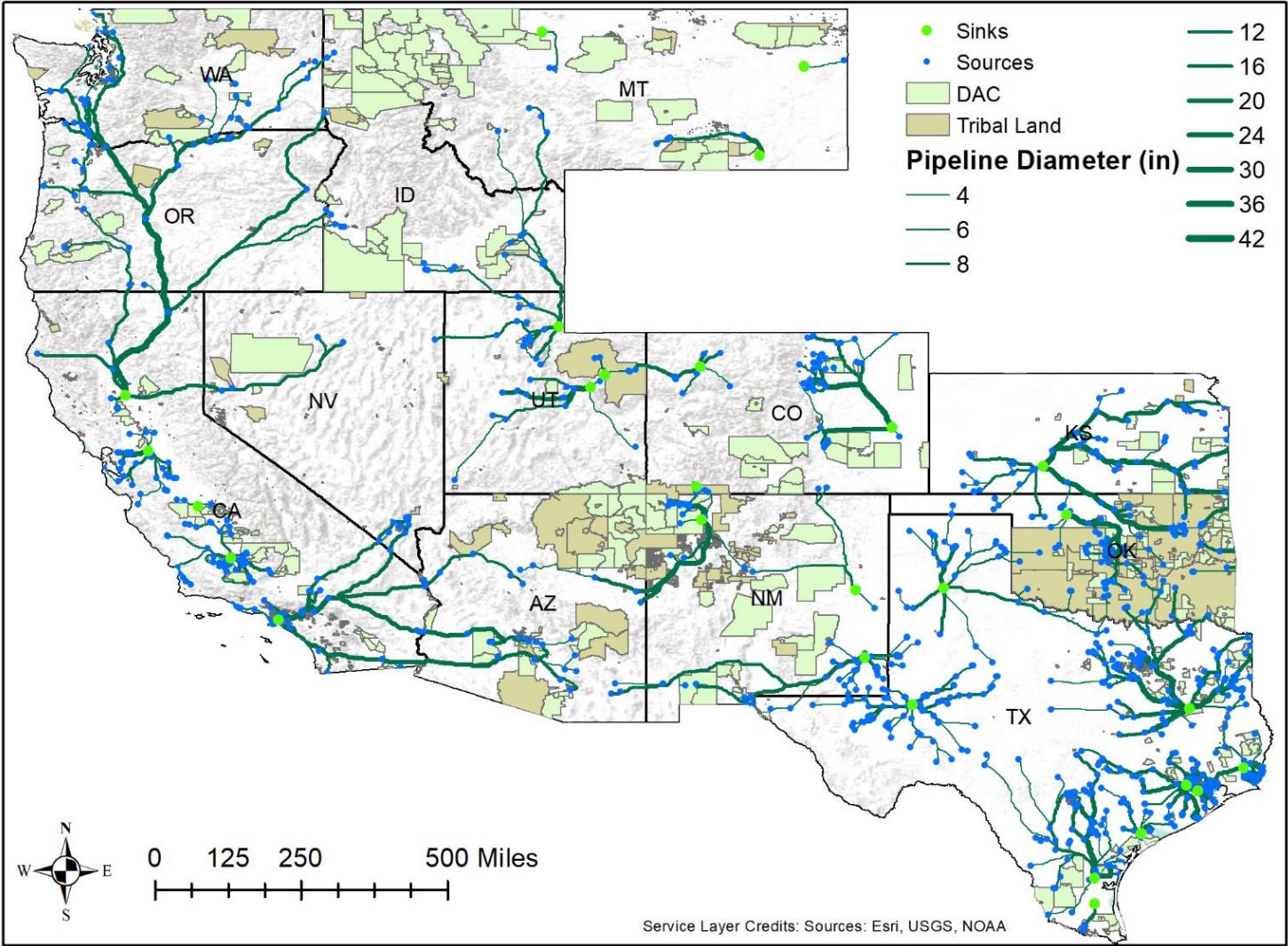
# CO<sub>2</sub> Sources and Sinks for the BBA Scenario



We performed the simulation in four phases consisting of five years for each phase

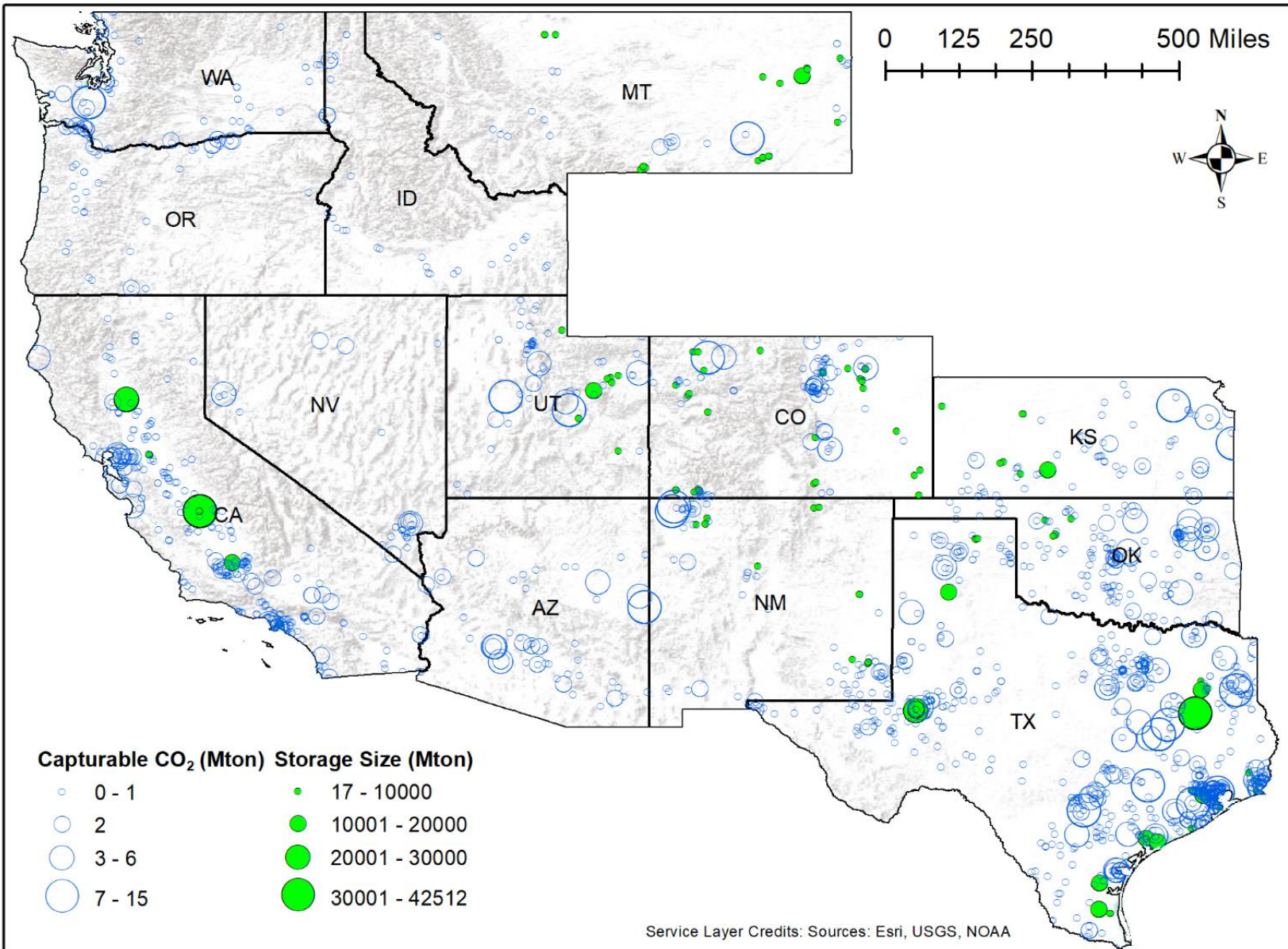


# Pipeline Infrastructure for the BBA Scenario

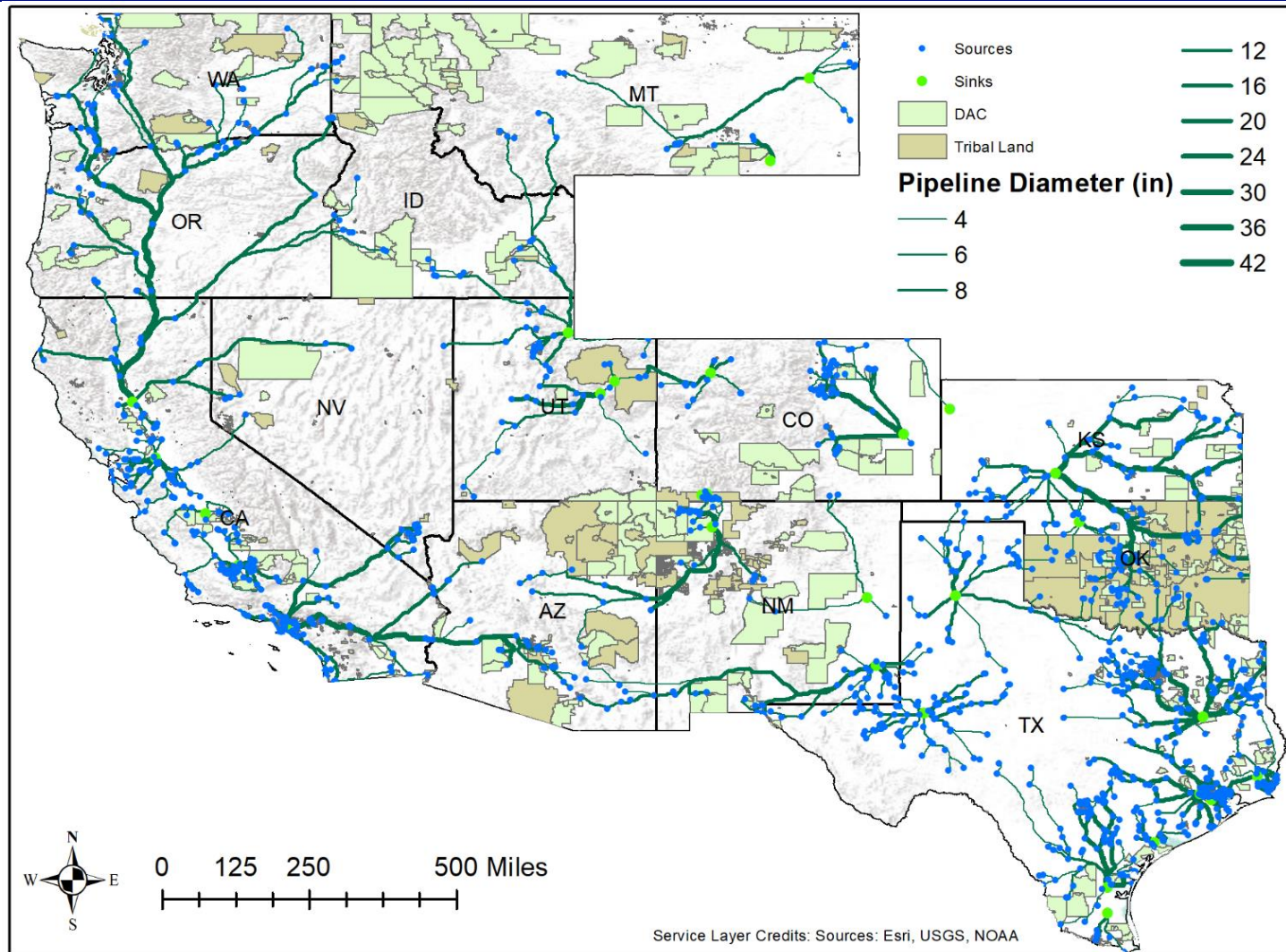


- Pipeline diameter ranges between 4-42”
- Total approximate pipeline length is 26,579 Miles

# CO<sub>2</sub> Sources and Sinks for the IRA Scenario



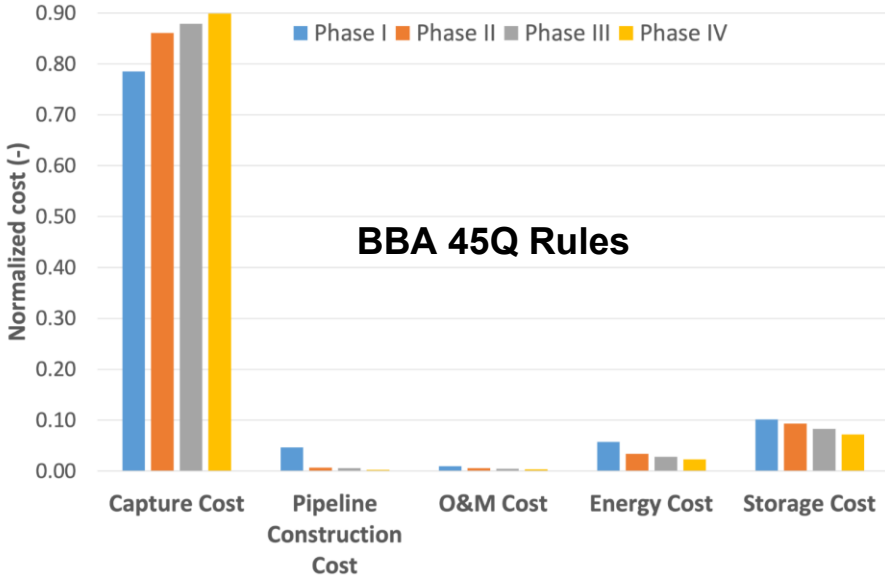
# Pipeline for the IRA Scenario



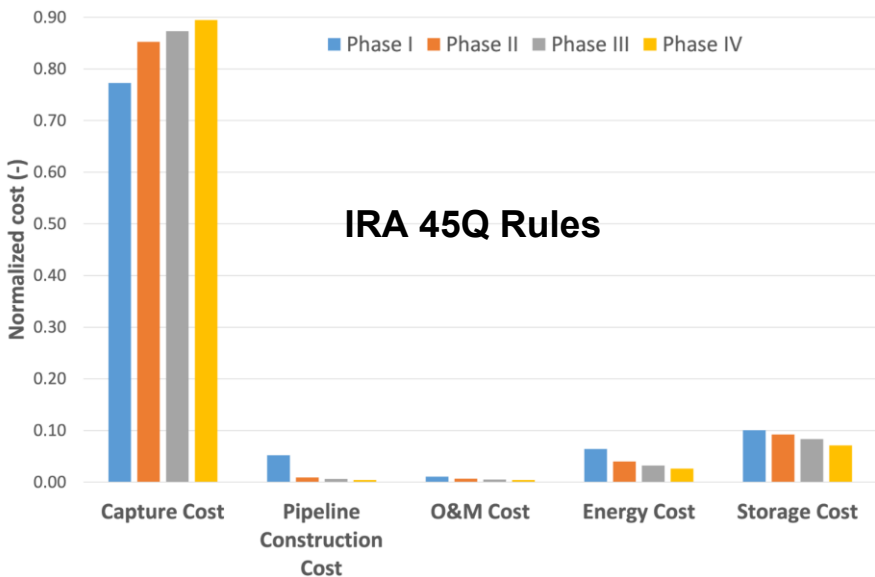
- Pipeline diameter ranges between 4-42"
- Total approximate pipeline length is 31,772 miles
- ~20% more pipeline length compared to the BBA scenario

# Cost Comparison

Phase	Storage (MtCO <sub>2</sub> /yr) BBA	Storage (MtCO <sub>2</sub> /yr) IRA
I	200	200
II	400	400
III	600	600
IV	831	891

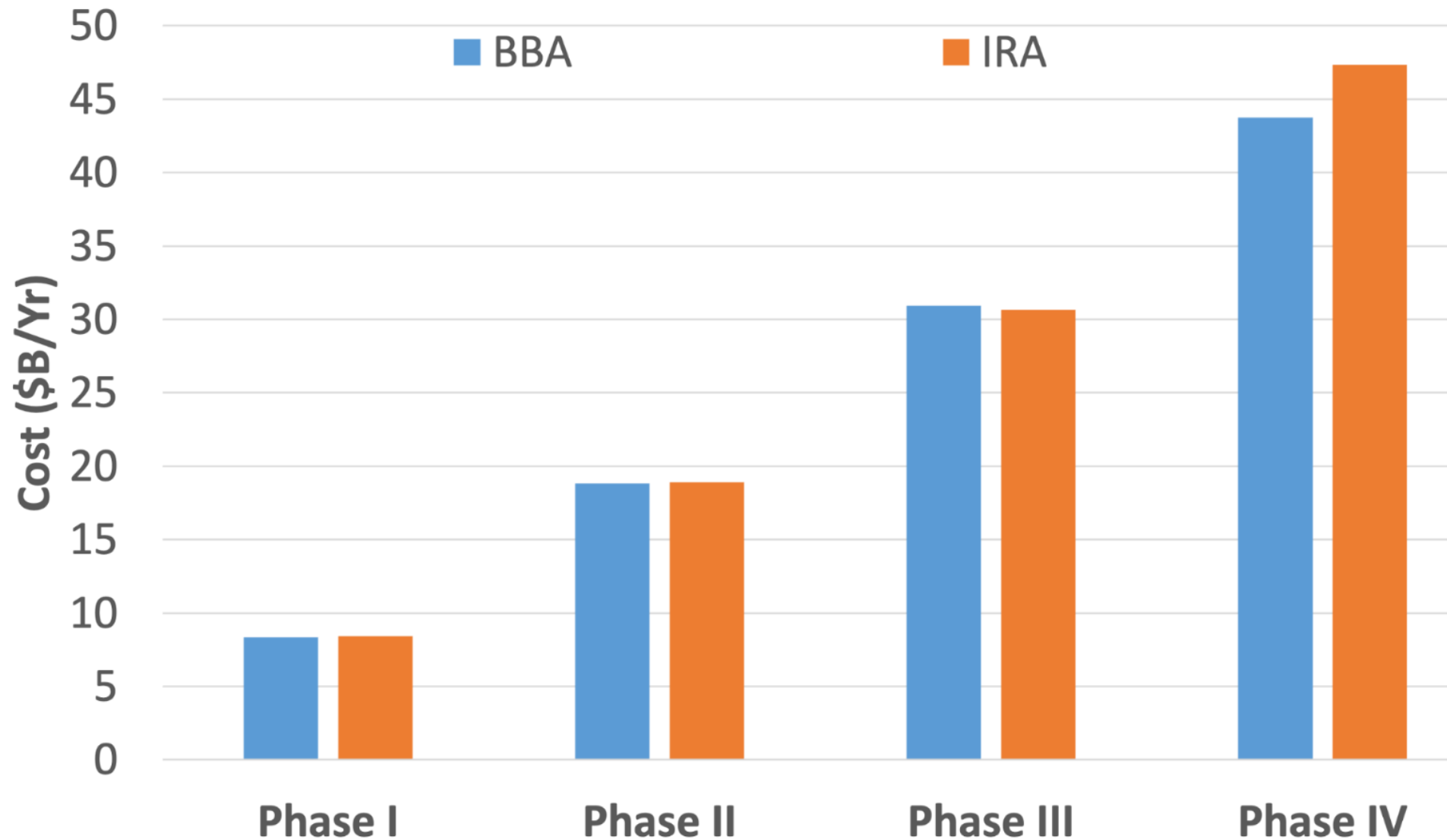


Total cost ~ 43.7 \$B/yr



Total cost ~ 47.3 \$B/yr

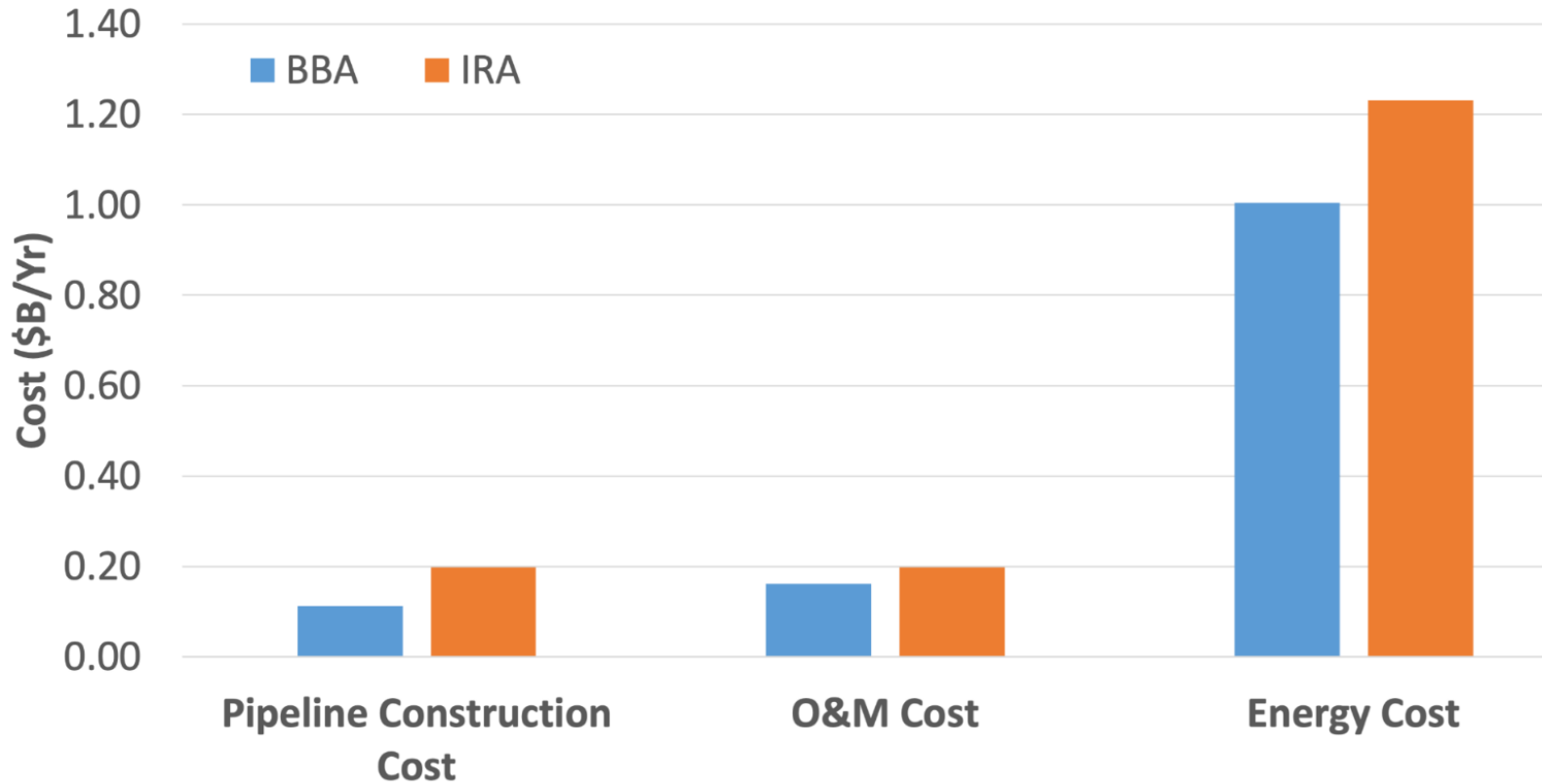
# Cost Comparison in Different Phases



**Cost differs in the final phase**



# Infrastructure Cost Comparison



Cost Component	Change in % with respect to the total cost for the BBA scenario
Pipeline Construction	0.20
O&M	0.084
Energy	0.52

# Conclusions

- Total number of point sources are 3,332 (~919 Mt)
- Eligible for tax credit according to
  - the BBA 45Q rules are 90.4% (~831 Mt)
  - eligible for tax credit according to the IRA 45Q rules are 97% (~891 Mt)
- The total cost according to 2018 economic scenario
  - BBA is 43.7 \$B/yr
  - IRA is 47.3 \$B/yr
- 8.24% cost increase for the added 60 Mt/yr
- Costs differ when all emissions are stored, and they mainly accrued from the capture cost
- For the infrastructure, cost difference is **less than 1%**

# Acknowledgement



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