

LOWERING

EMBODIED CARBON

CONSTRUCTION

REGIONAL APPROACHES
WITHIN THE U.S.



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ONE



Identify factors to evaluate building material options such as **transportation, regional availability** and **labor resources**.

TWO



Become familiar with **logistical considerations** as they apply for differing **climate zones** and how they impact the overall embodied carbon of the project.

Explain how the **regional-specific considerations** of a project **can support carbon neutral goals** and **initiatives**.



THREE

LEARNING
OBJECTIVES



FIGURE 1: LIFECYCLE STAGES

Data source: BS EN 15978:2011



FACTORS OF REGIONAL CONSIDERATION

[A1 / A2]
RAW MATERIAL AVAILABILITY

MANUFACTURING CAPABILITY

[A3 / A4]

[A5]
WORKFORCE CONSIDERATIONS

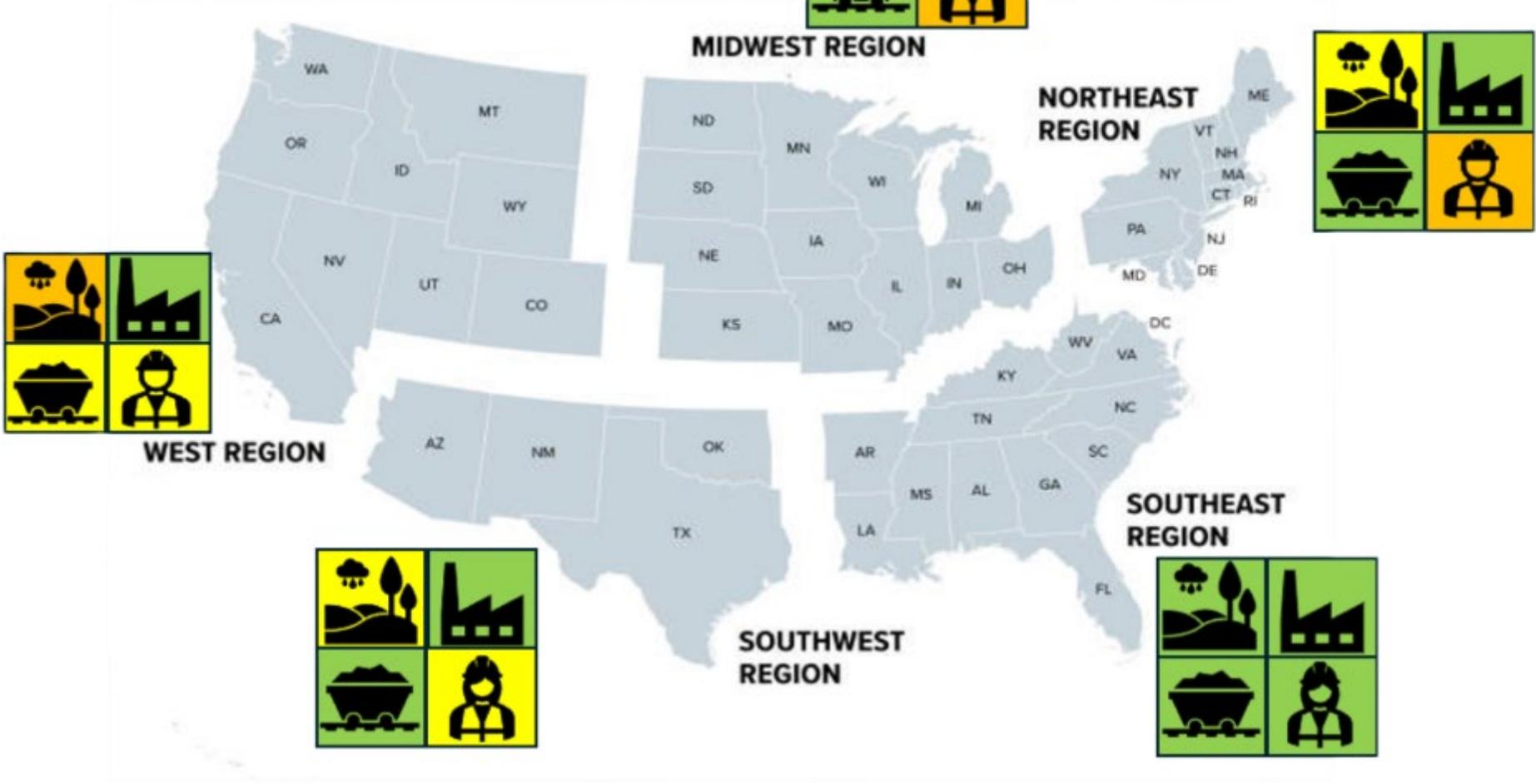
ENVIRONMENTAL SUITABILITY

[B2]

CONCRETE



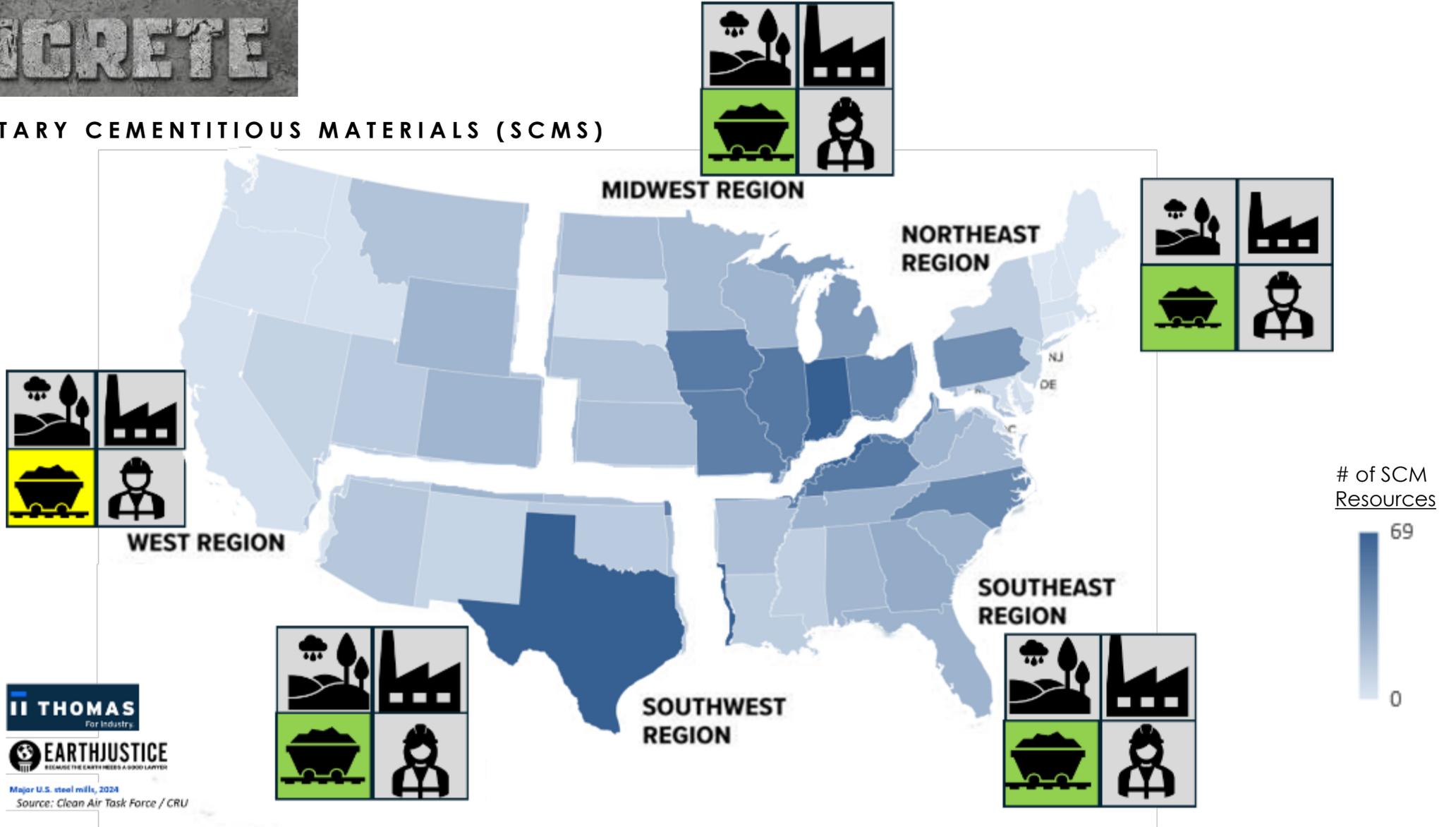
Good  Limited



- 
Environmental Suitability
- 
Raw Material Availability
- 
Manufacturing Capability
- 
Workforce Considerations

CONCRETE

SUPPLEMENTARY CEMENTITIOUS MATERIALS (SCMS)



SCM SOURCES CONSIDERED: Slag, Flyash, Pond Fines, Ground Glass Pozzolan (GGP), Alt. Pozzolans

STEEL



MIDWEST REGION



NORTHEAST REGION



WEST REGION



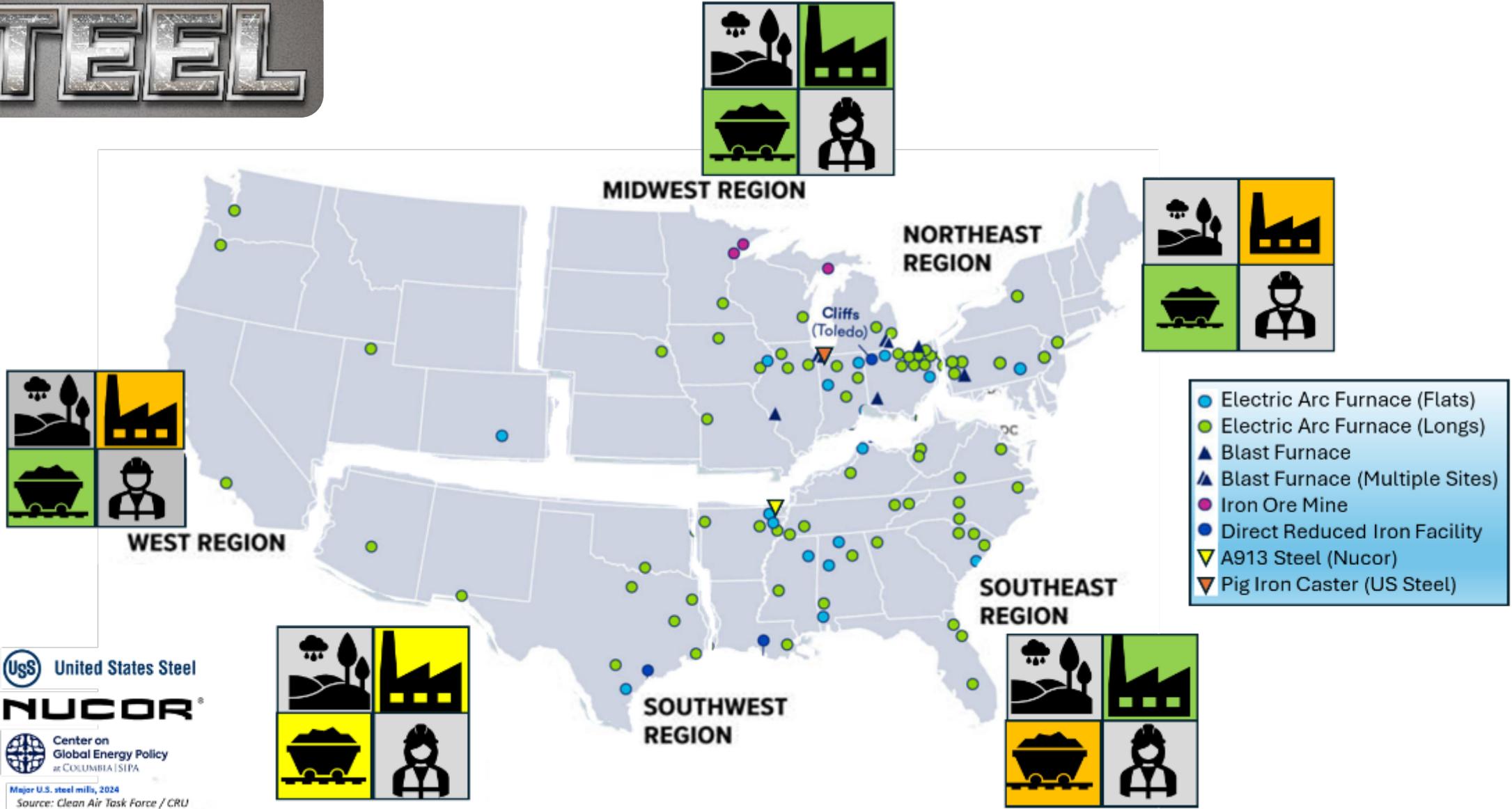
SOUTHWEST REGION



SOUTHEAST REGION

- Environmental Suitability
- Raw Material Availability
- Manufacturing Capability
- Workforce Considerations

STEEL



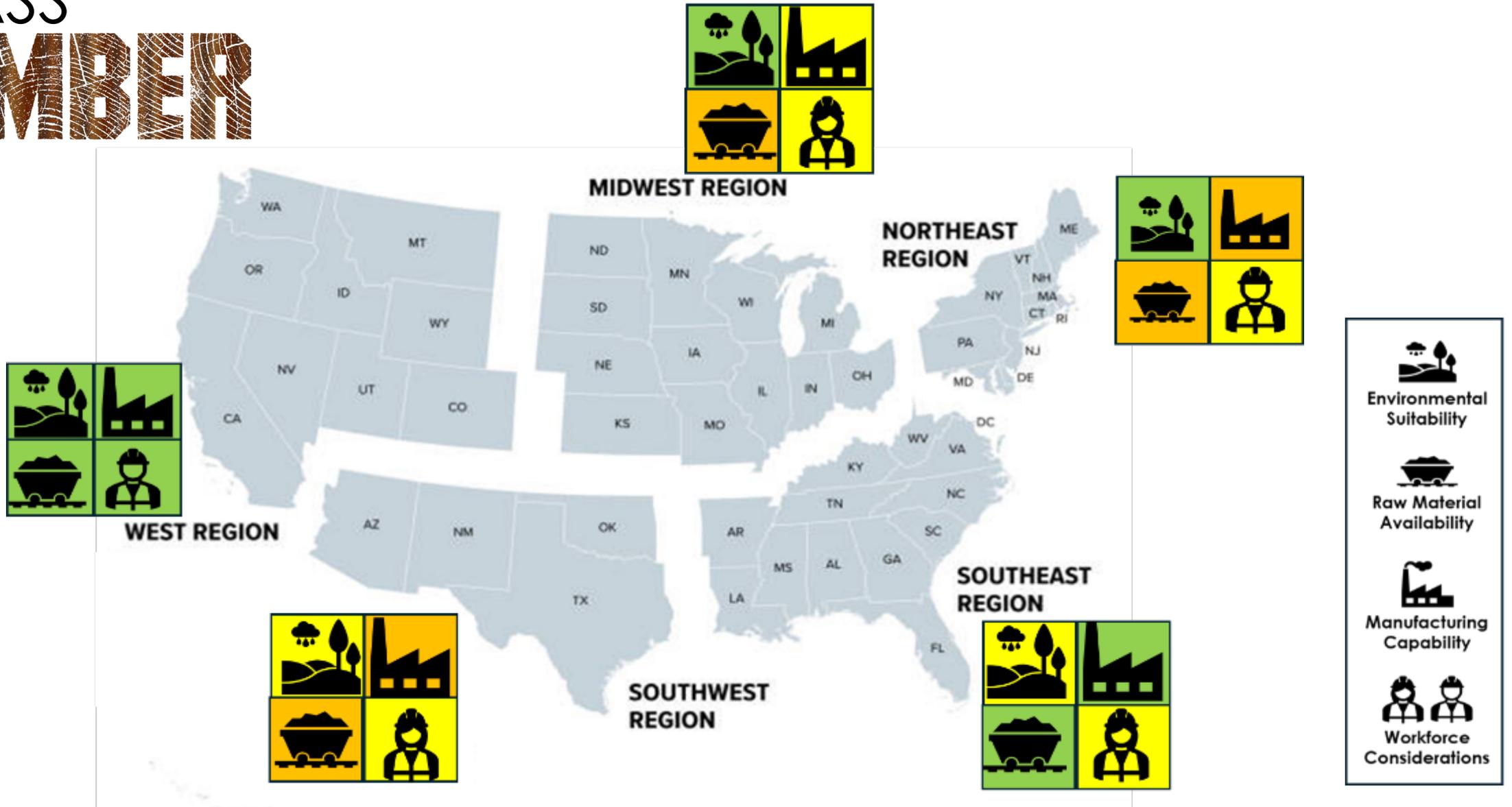
U.S. United States Steel

NUCOR

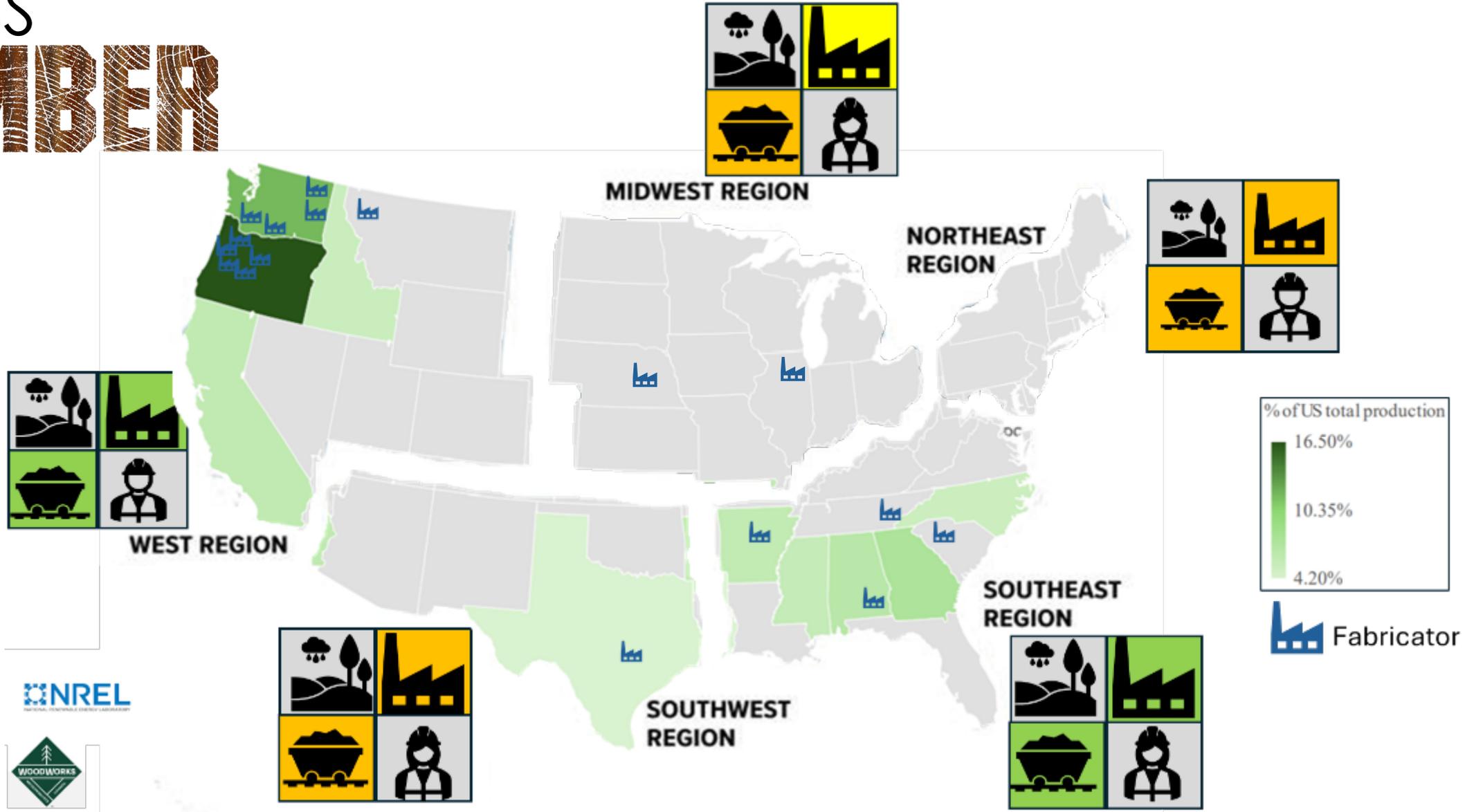
Center on Global Energy Policy at COLUMBIA SIPA

Major U.S. steel mills, 2024
Source: Clean Air Task Force / CRU

MASS TIMBER



MASS TIMBER



WHITING-TURNER

CARBON STUDY OF MASS TIMBER
TRANSPORT OPTIONS



UNIVERSITY OF MARYLAND
Zupnik Engineering Building

SUSTAINABILITY CASE STUDY

MASS TIMBER TRANSPORTATION - NORTH AMERICA

OPTION 1



1,750 Miles



75 Trucks



1310006

TOTAL SHIPMENT MILES

SUSTAINABILITY CASE STUDY

MASS TIMBER TRANSPORTATION – EUROPEAN

OPTION 2



4,900 Miles ^(2.8X option 1)



TOTAL SHIPMENT MILES (-2X option 1)



SUSTAINABILITY CASE STUDY

MASS TIMBER TRANSPORTATION – NORTH AMERICAN VS. EUROPEAN

Truck



1,750 Miles

443 Tons of Carbon

OPTION 1

443

Tons of Carbon

Ship



3,964 Miles

74 Tons of Carbon

Truck



162 Miles

88 Tons of Carbon

Rail



582 Miles

24 Tons of Carbon

OPTION 2

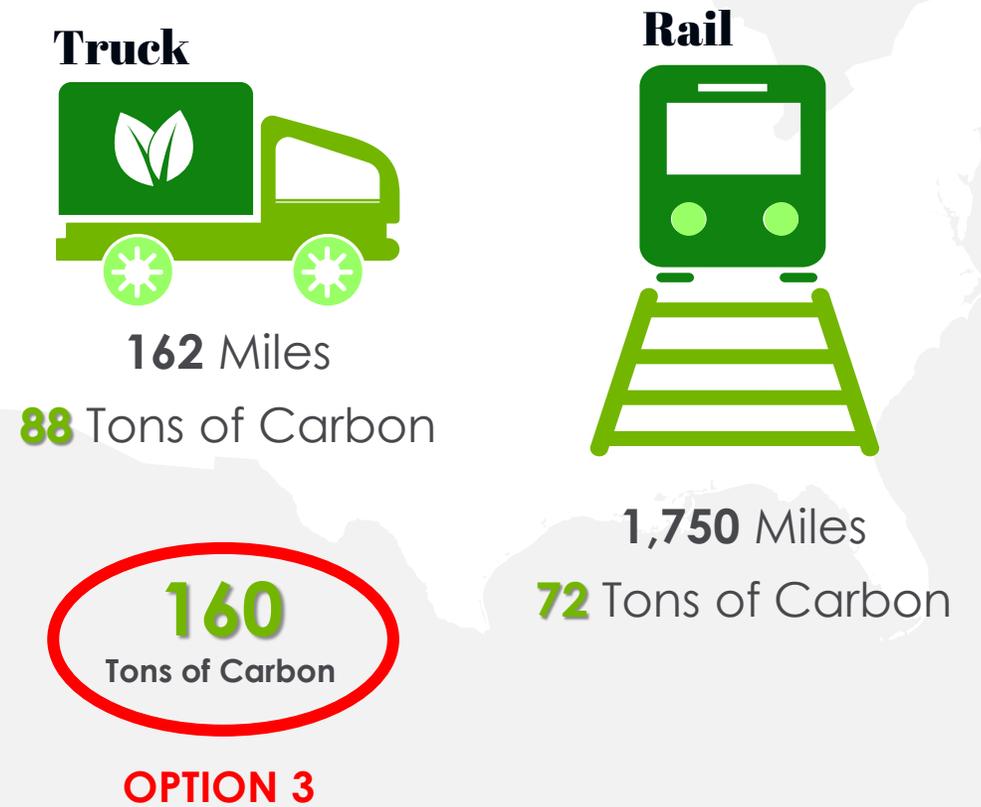
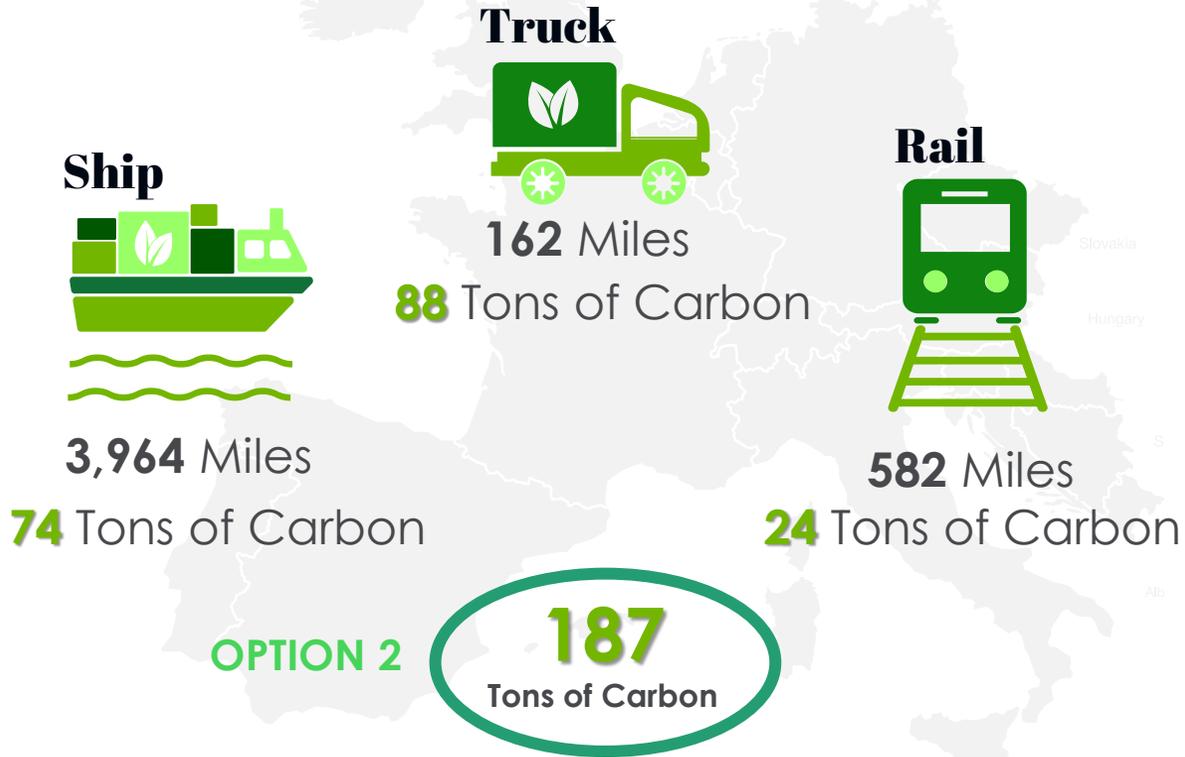
187

Tons of Carbon

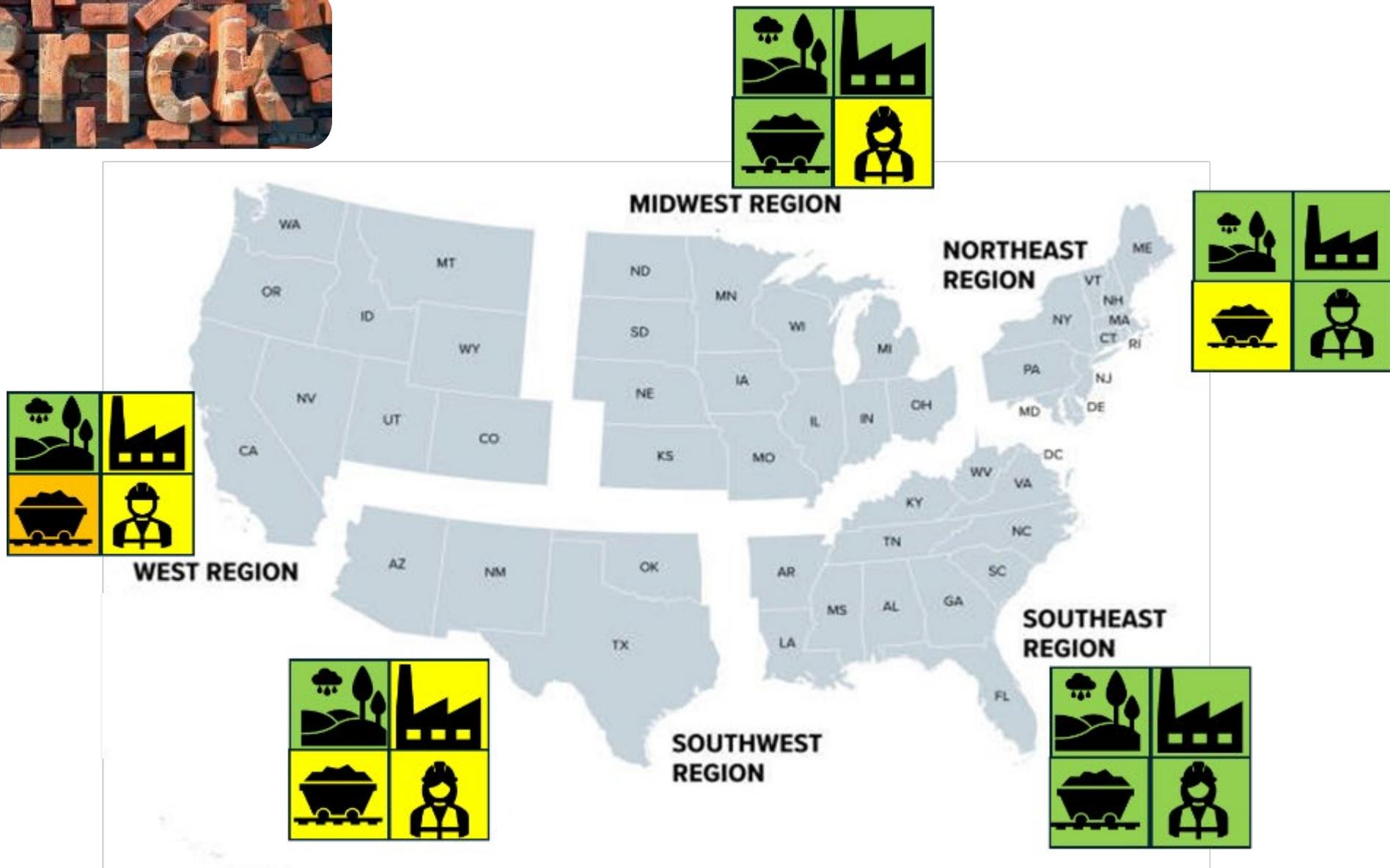
European Sourcing Offers
2.4x Less Carbon Emissions

BUT WAIT...*There's Another Option*

MASS TIMBER TRANSPORTATION - NORTH AMERICAN **VIA TRAIN**



Brick



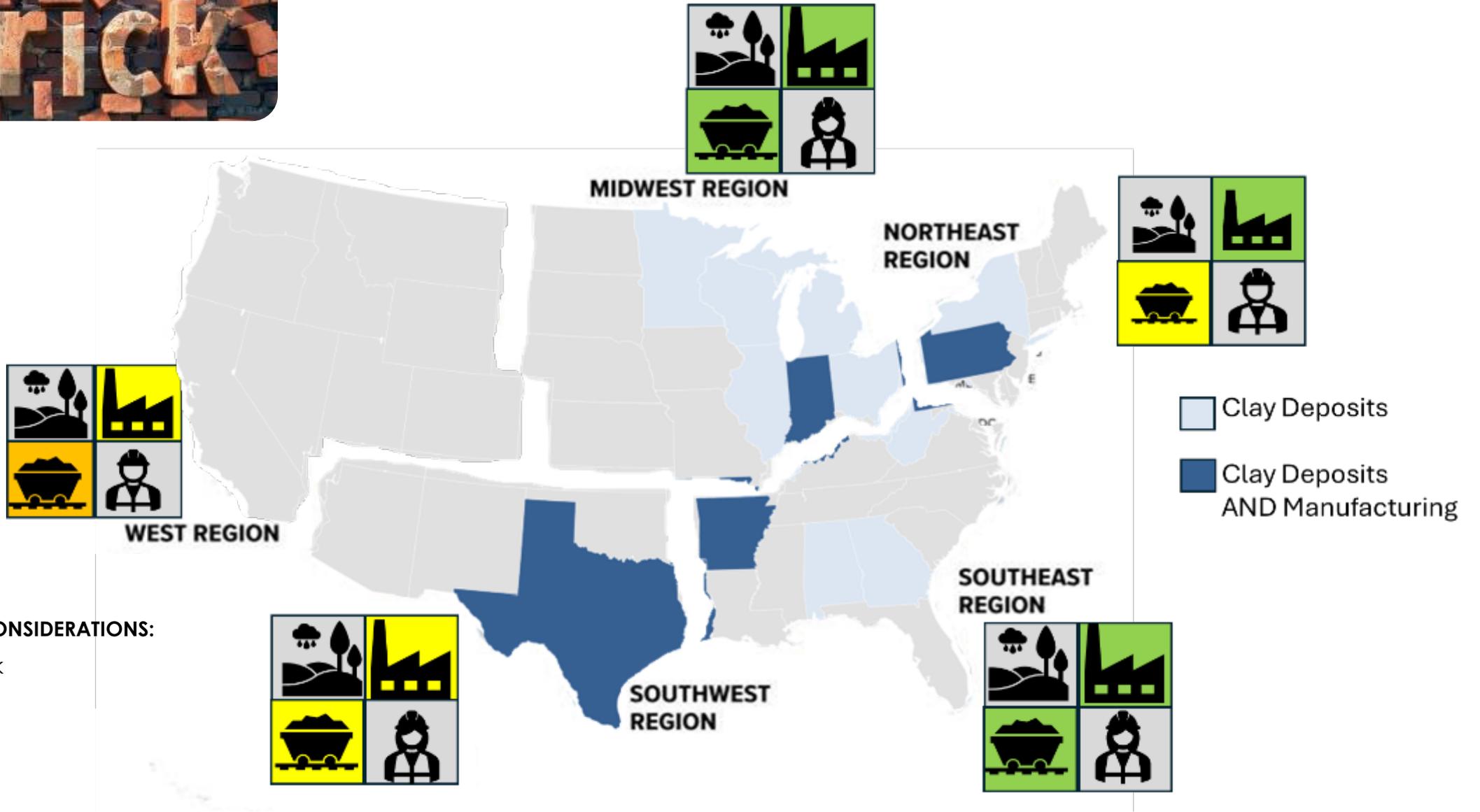

Environmental Suitability


Raw Material Availability

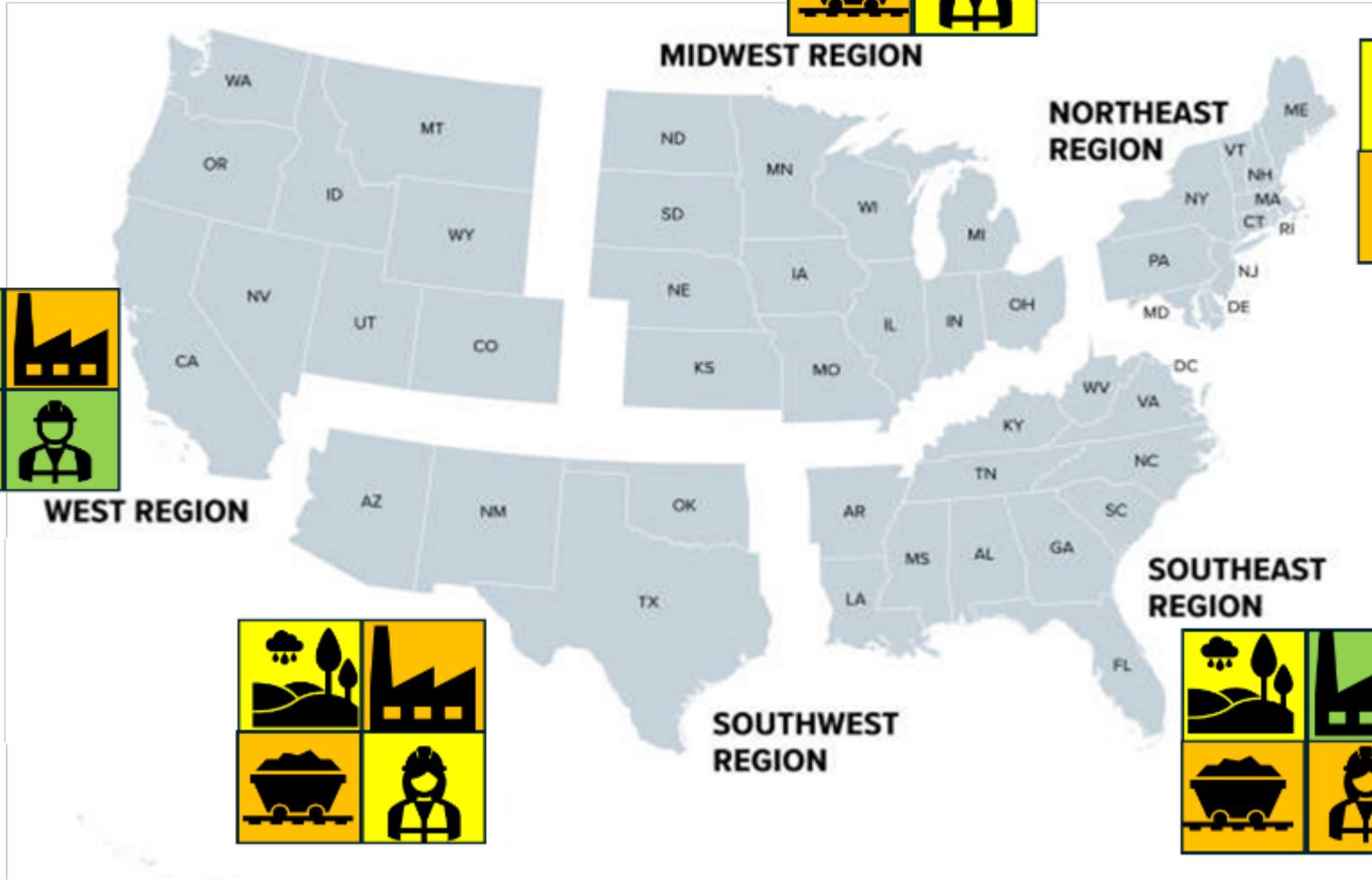

Manufacturing Capability


Workforce Considerations

Brick

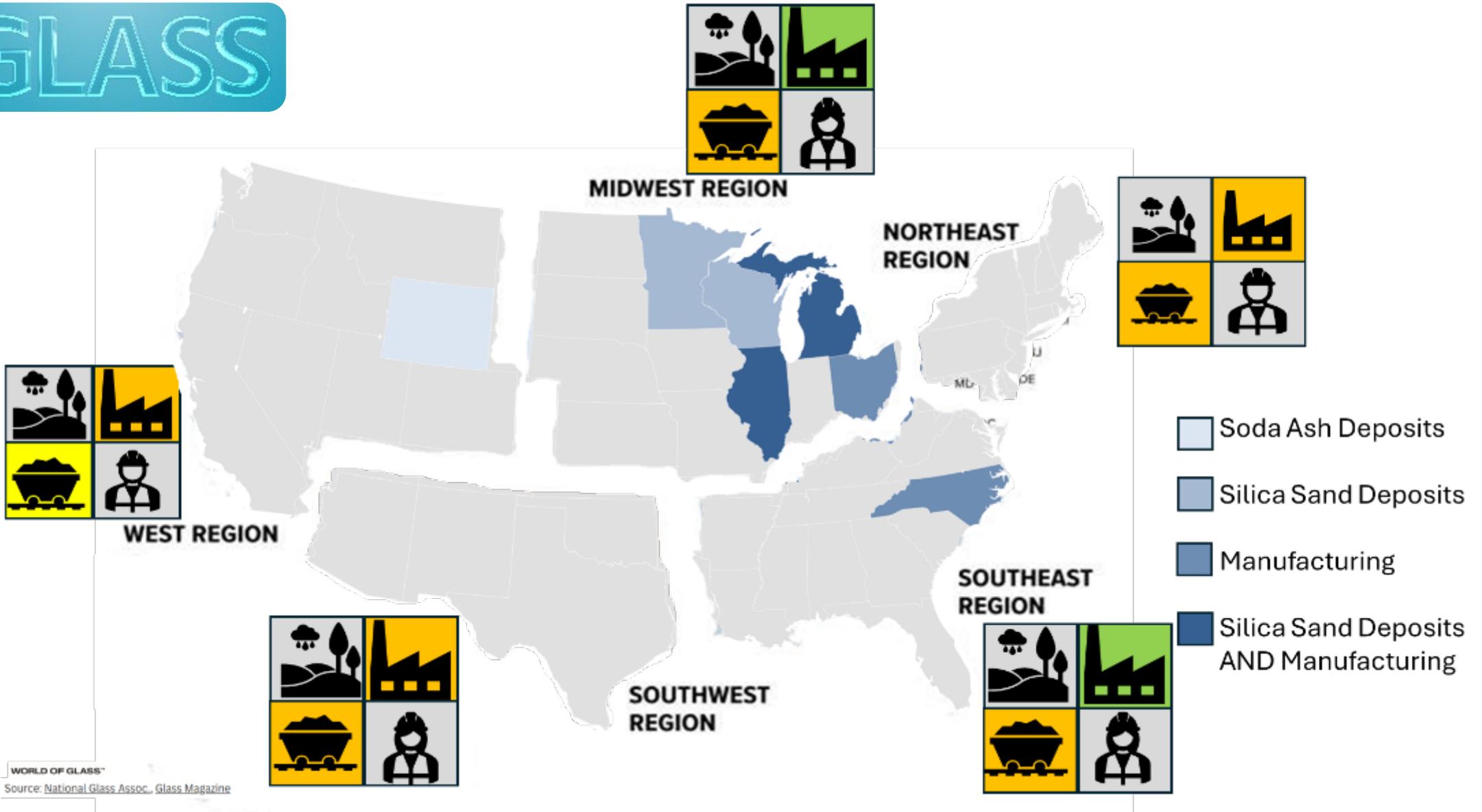


GLASS



-  Environmental Suitability
-  Raw Material Availability
-  Manufacturing Capability
-  Workforce Considerations

GLASS



WHITING-TURNER

BRICK & GLASS SUPPLY
OPTIONS

UNIVERSITY OF CALIFORNIA - DAVIS

Aggie Square



Both the brick and glass curtain wall finishes on the exterior of the Lifelong Learning building (foreground) were made by some of the many Sacramento-based firms working on the project.



FURTHER CONSIDERATIONS

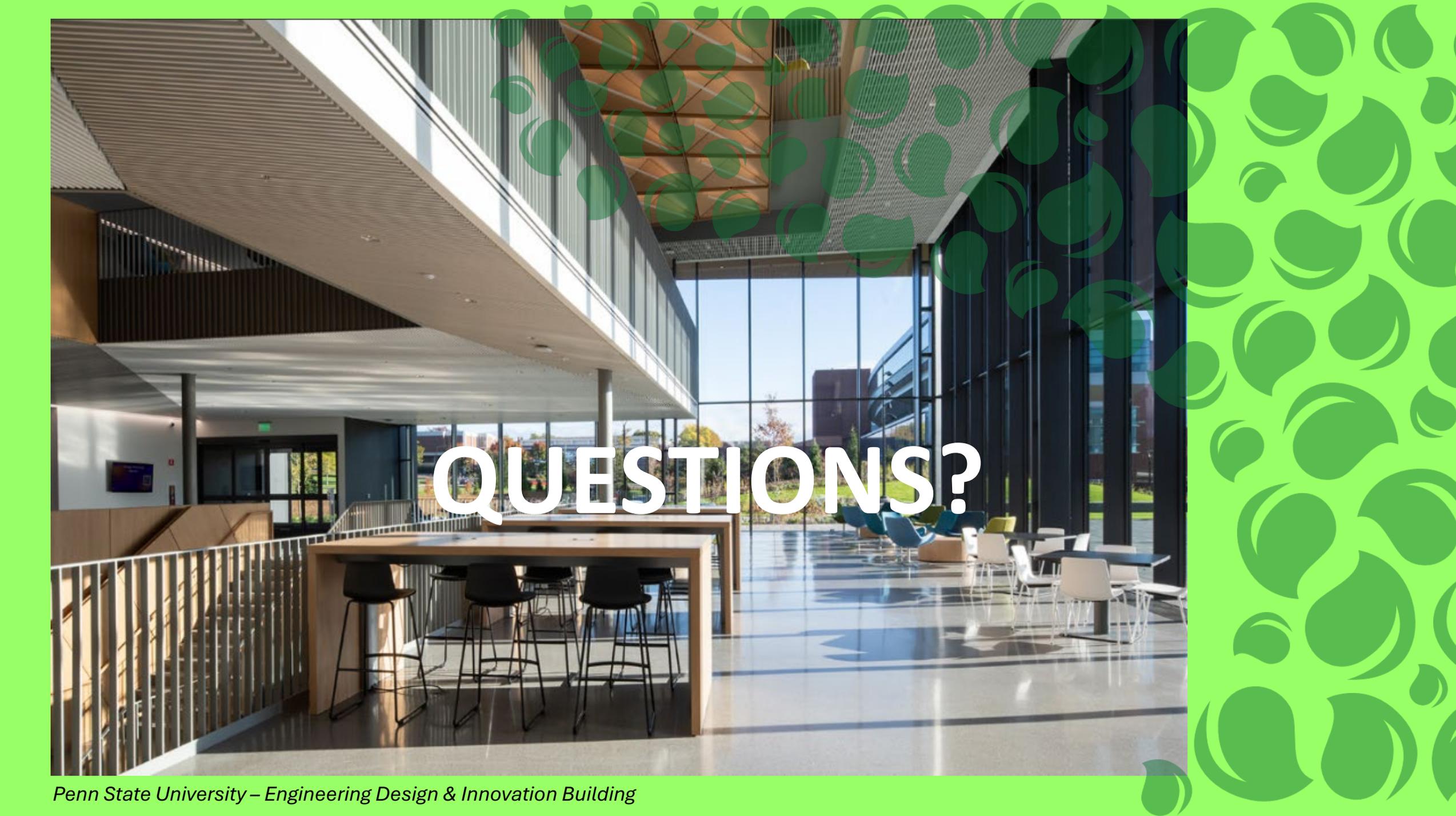
Prefabrication
options available
in the local market

Access to **ship and rail** transportation
options for material
deliveries

Access to **'clean'**
power grids for the
construction and
building operational
carbon footprints

Regionally specific
**temporary
construction
measures**

End of Life
**deconstruction/
recycling options** for
demolished materials

A photograph of a modern, multi-level interior space, likely a university building. The space features large windows, wooden tables, and black chairs. The word "QUESTIONS?" is overlaid in large white letters. The background is a bright green wall with a pattern of green leaves and circles.

QUESTIONS?