



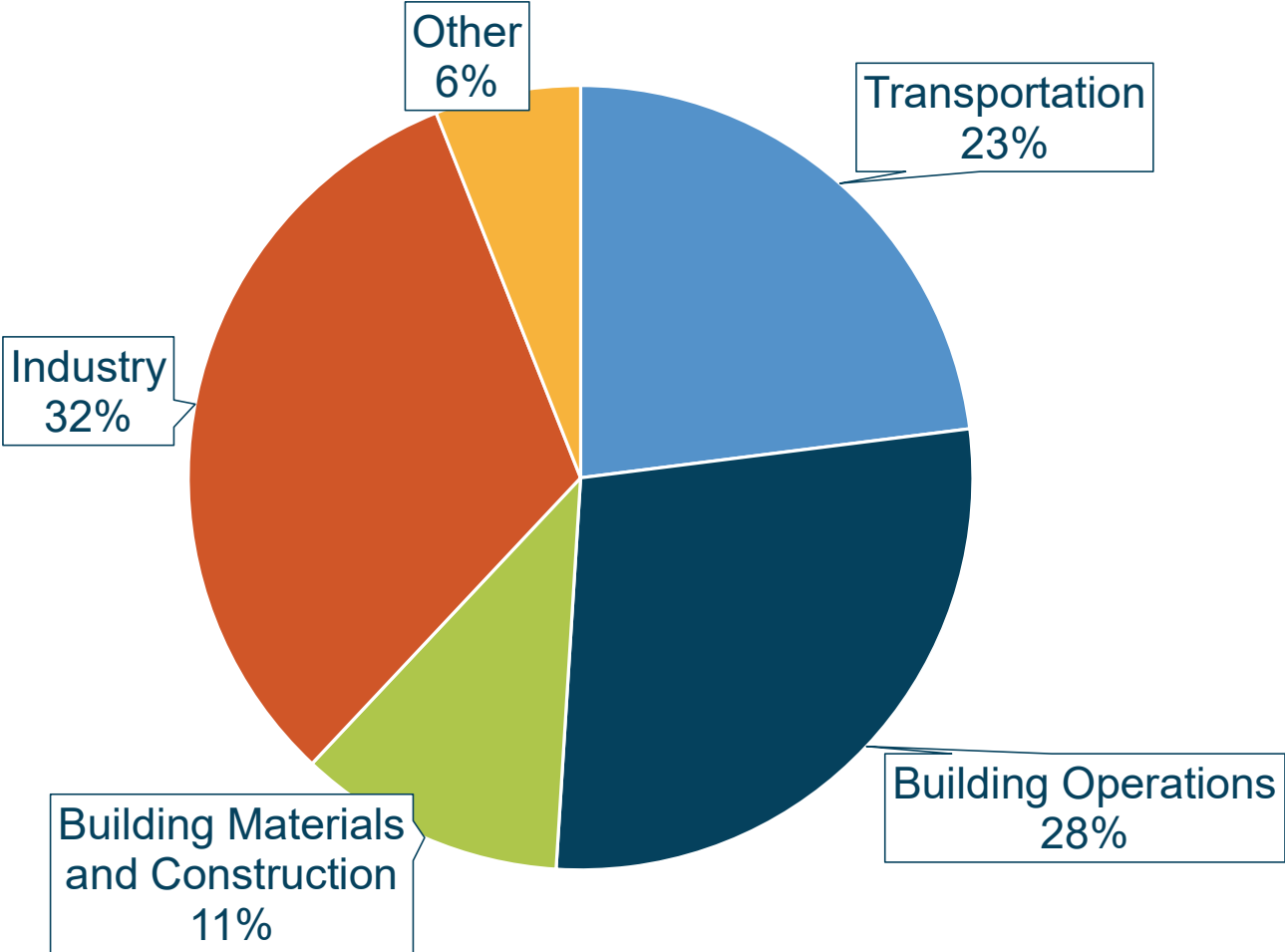
Frick Environmental Center | Pittsburgh, PA *Photo: Ed Massey*

nbi new buildings
institute

Carbon Neutral Buildings

September 2021

Carbon Emission Sources



Data source:
International Energy Agency. World Energy Statistics and Balances (Database). 2019. Online at: www.iea.org/statistics



Low-Embodied Carbon Materials

Critical Considerations:

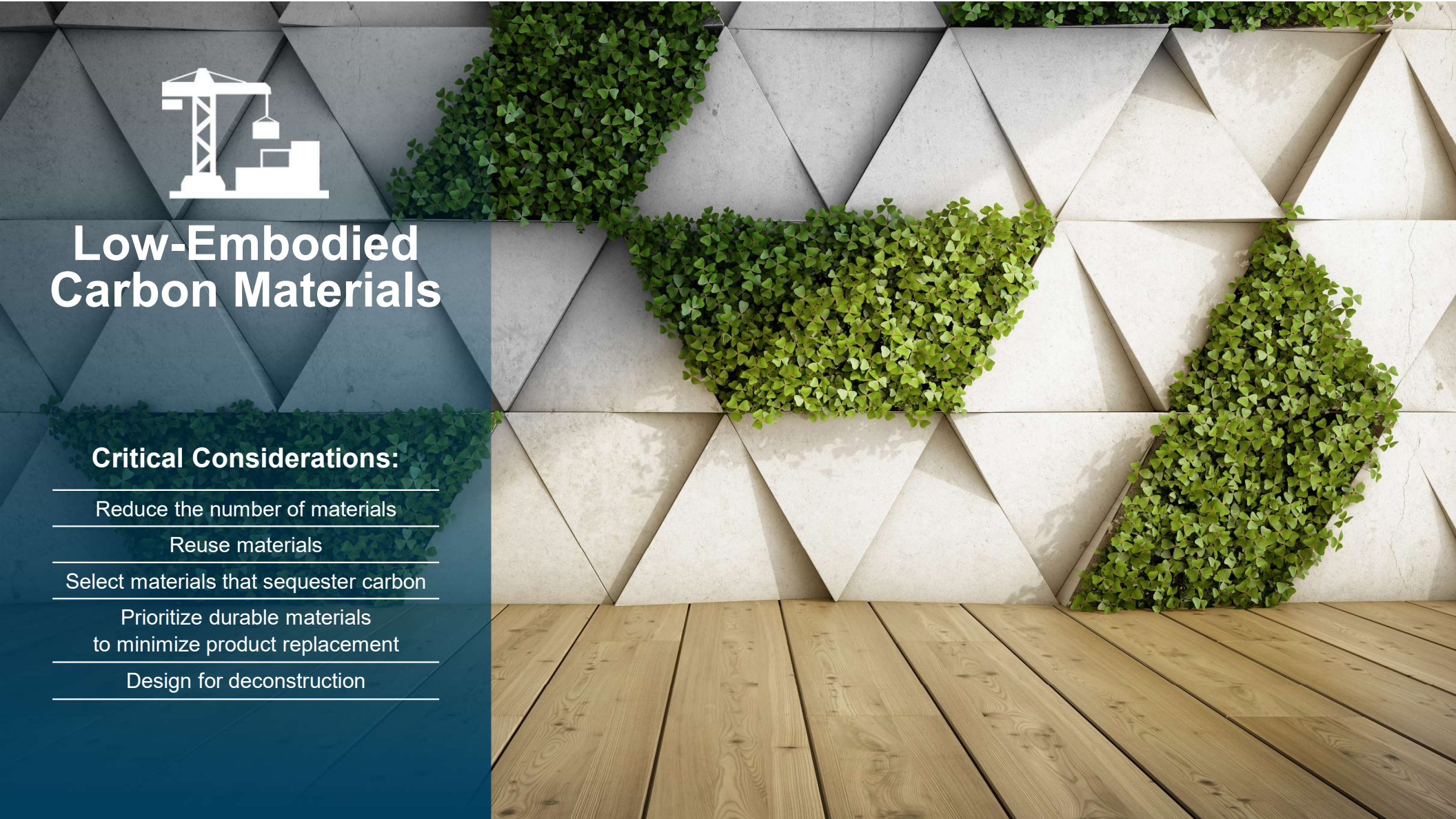
Reduce the number of materials

Reuse materials

Select materials that sequester carbon

Prioritize durable materials
to minimize product replacement

Design for deconstruction





Low-Global Warming Potential Refrigerants

Critical Considerations:

Compare equipment efficiency with different refrigerants

Minimize equipment requiring refrigerants

Consider equipment with medium and low temperature refrigerants

Manage refrigerants leakage during operation





Electrification-Ready Infrastructure

Critical Considerations:

Energy efficient equipment

High-capacity electrical panels

Electrical chases and conduit runs for future renewables and electric vehicles

Electrical outlets near gas equipment



Electrification of On-Site Fossil Gas Combustion

Critical Considerations:

Equipment selection

High-capacity electrical panels

Electrify HVAC, hot water heating,
kitchen, dryer and other gas loads

Include electrical outlets near gas
equipment



Maximize Energy Efficiency

Critical Considerations:

High performance building envelope

Efficient equipment and appliances

Smart building controls

Energy efficient lighting

Energy Star appliances



Renewable Energy Sources

Critical Considerations:

Solar harvesting available on-site

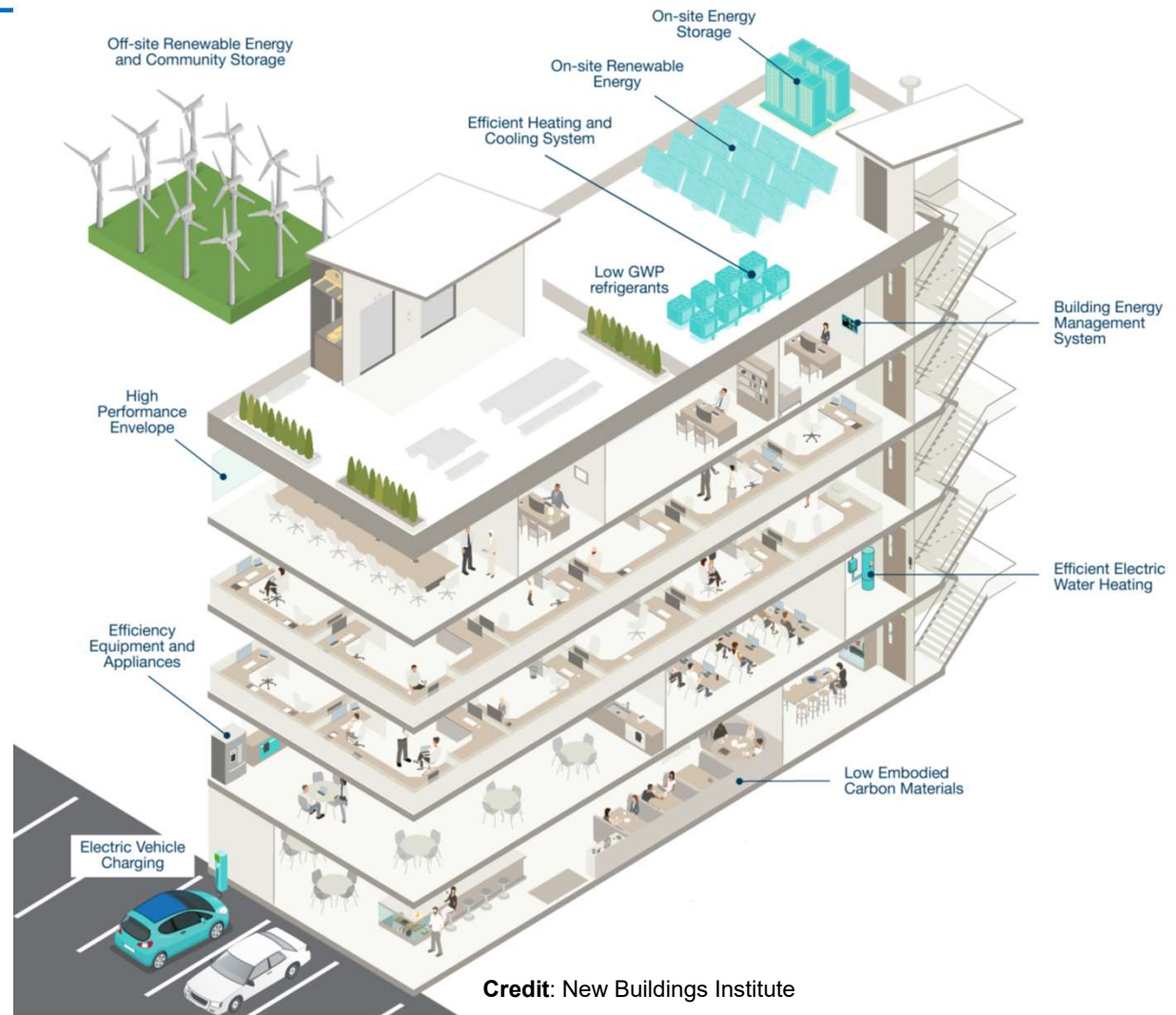
Location / ownership of renewables on building

Off-site sources

Ownership and duration of renewable energy certificates (RECs)

Carbon Neutral Buildings

- Maximize efficiency
- Are all-electric
- Served by 100% renewable energy
- Consider lifecycle impacts of materials and refrigerants
- Are grid responsive



Thank you

Amy Cortese, Director of Programs
New Buildings Institute