Jacobs Challenging today. Reinventing tomorrow.

Decarbonization Throughout the Value Chain – Perspectives from the Tech Sector

TE CLIMA

Agenda

- Moderator: Sharon Jean-Baptiste, Vice President for Growth & Sales at Jacobs
- Jameson Morrell, Director of Sustainable Solutions at Jacobs will discuss decarbonization at Jacobs
- Andy Solberg, Global Technology Lead, Facility Modelling & Analytics at Jacobswill talk about decarbonization throughout the value chain
- Joshua Parker, Assistant General Counsel and Head of Sustainability at Western Digital will discuss emissions management in tech manufacturing
- Sean James, Director of Energy Research at Microsoft will talk about investing and piloting new clean energy technology for datacenters
- Q&A

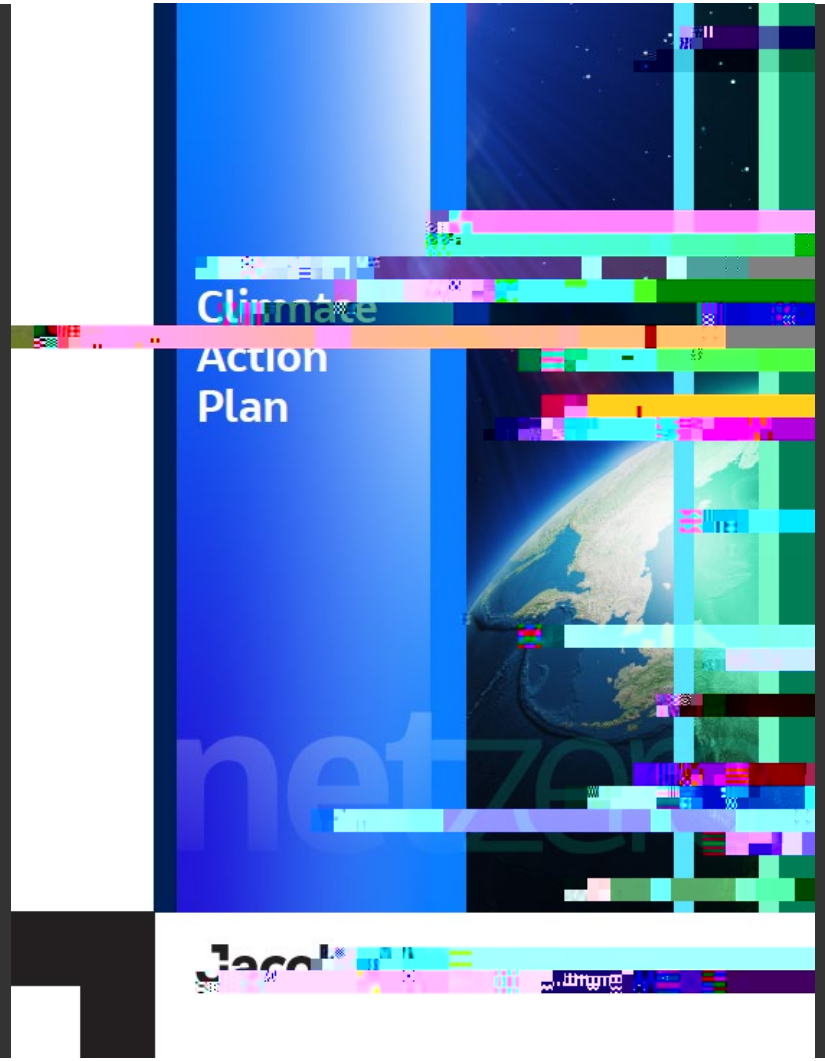
Limiting global warming ê å " S ¿ × Ø å ì Û æ è industrial levels will require businesses and industries to look beyond their own direct emissions.

Partnering across value chains in every sector is critical to ensuring lifecycle decarbonization and achieving sustainable outcomes.

Decarbonization at Jacobs

Jameson Morrell, Director of
Sustainable Solutions at Jacobs

Climate Action Plan



1. 100% renewable energy for our operations in 2020.
2. Net zero carbon for our operations and business travel in 2020.
3. Carbon negative for our operations and business travel by 2030.

Working across the Technology Value Chain

Energy	Materials	Air	Security	Data Center
Power	Components	Land	Operations	Waste
Mining	Hardware	Water	EHS	Remediation
Chemical	Software	Transport	Compliance	Re-use

Our biggest impact, lowering carbon here.

Scope 3

Many value chain companies will likely need to set a Scope 3 target.

Most common categories:

- Purchased Goods and Services; and
- Use of Sold Products.

Source: sciencebasedtargets.org

Our Approach

To decarbonize requires collaboration & engagement inside each organization and across the value chain on multiple levels:

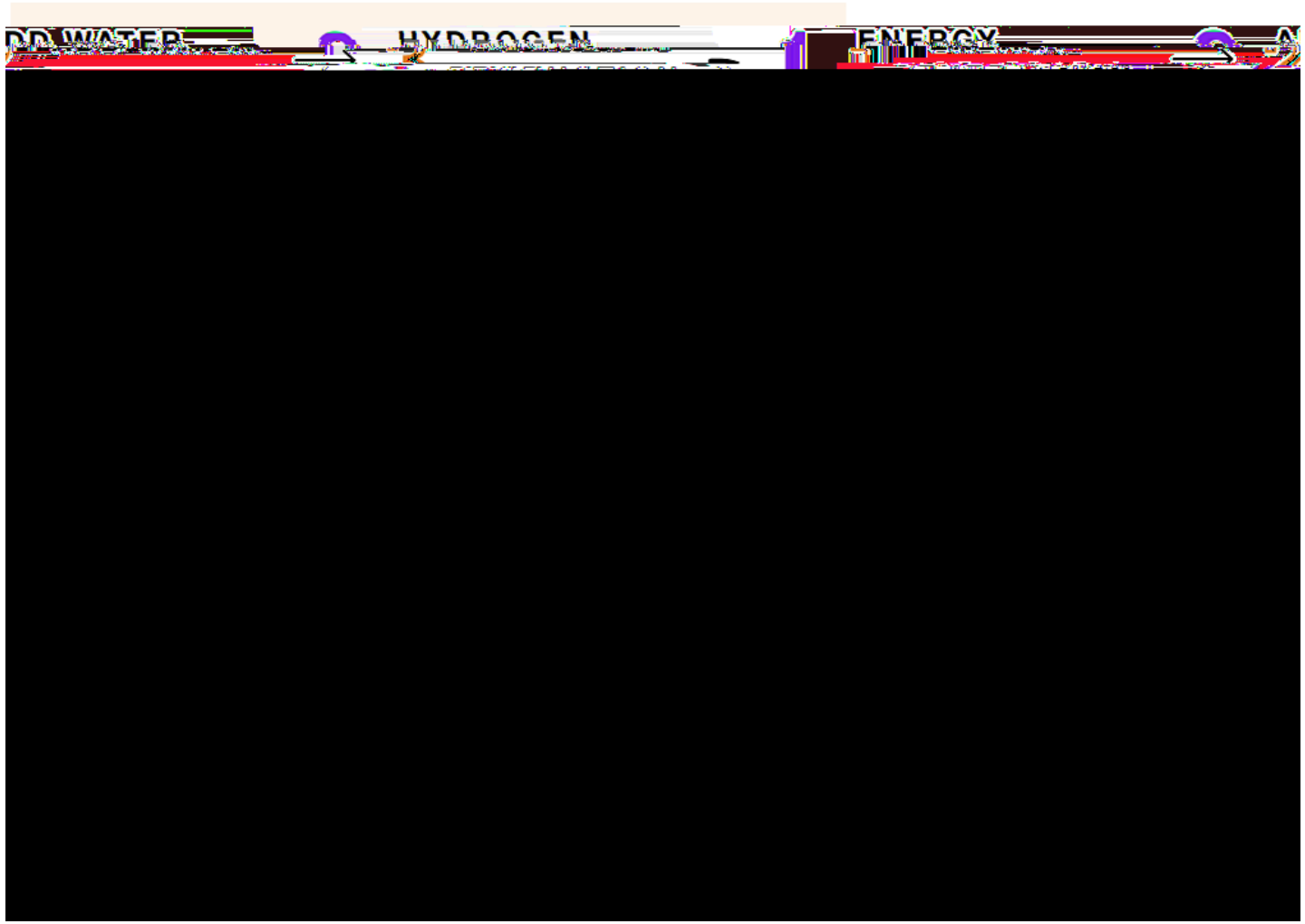
- Continuous Improvement - ongoing effort to improve products, services, and processes.
- Innovation – developing new capabilities, technologies, & opportunities
- Ideation – finding solutions that go beyond business-as-usual
- Influence – drawing board, completely shifting the way we do business.

Approach Matrix

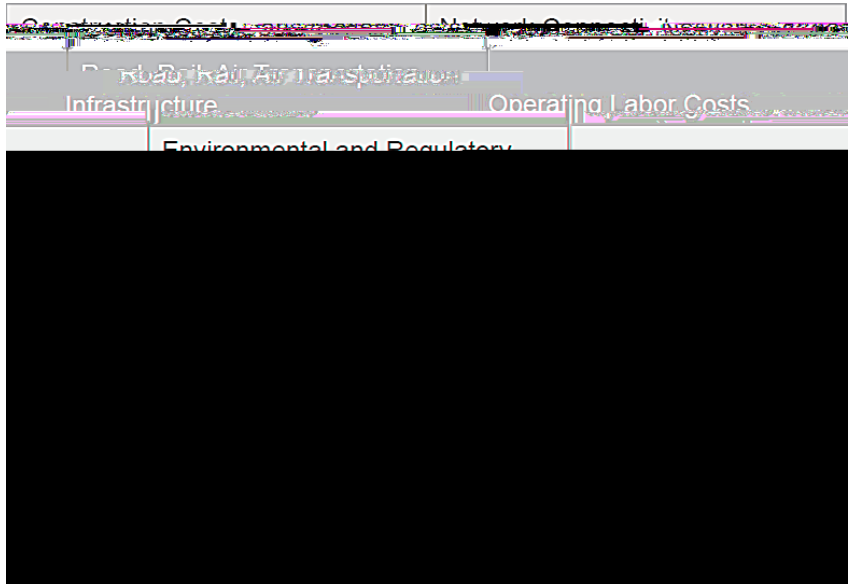
Scope / Channel	Improvement	Innovation	Ideation	Influence
Suppliers (Scope 3)	Measure Supplier Performance	Track Performance	Reward Performance	Next Generation Products/Suppliers?
Operations (Scope 1)	Resource Efficiency	Bio-fuel, Alternative Chemistry	AI/IoT Optimization	Sustainable Technologies?
Energy Supply (Scope 2)	Renewable Energy	Hydrogen	Integrated Siting	Distributed Energy?
Product Use (Scope 3)	Life-Cycle Analysis	Capture Program	Circular Economy	New PrC -0.001 Tc -0.011 T
JTc -5 (us)1.6 (t)0.9 (ic)6.5 (e)1.1 ( )-.00& Equity “Scope 4”	Education/Capacity	Measure Impa11 Tw 10.	CC -0.00m-defined Metri11 Tw 10s	

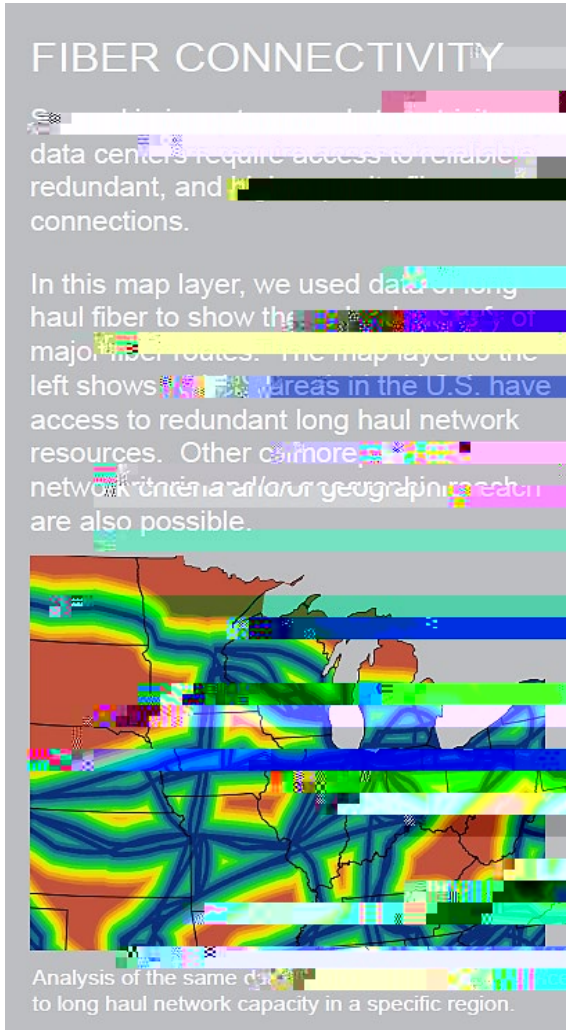
Innovation: Hydrogen

- Regenerative infrastructure and circular economy
- Zero emissions (air and water)
- Integrate energy and water
- Renewable energy with hydrogen
- 24/7 resilient operations
- New revenue streams
- Community building and social values



Ideation: Integrated Site Selection with GIS Risk Management





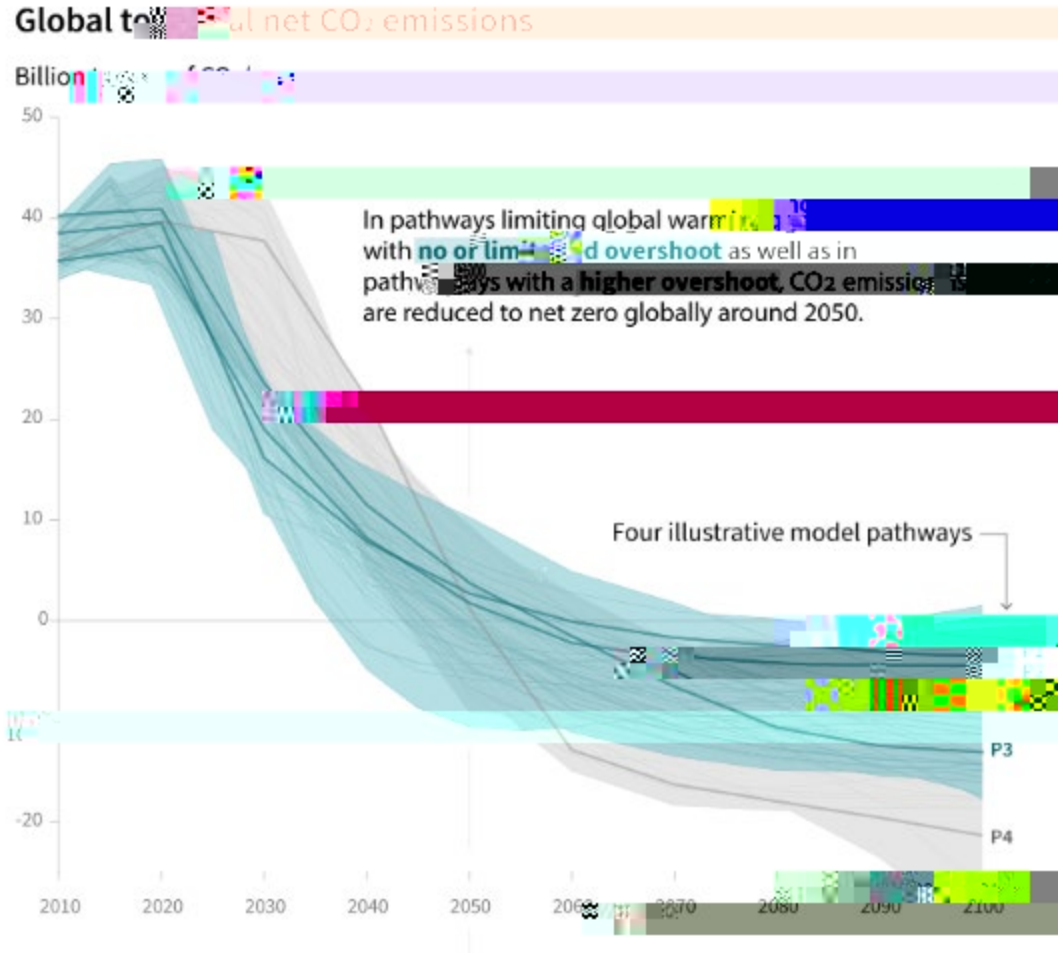
Decarbonization Throughout the Value Chain

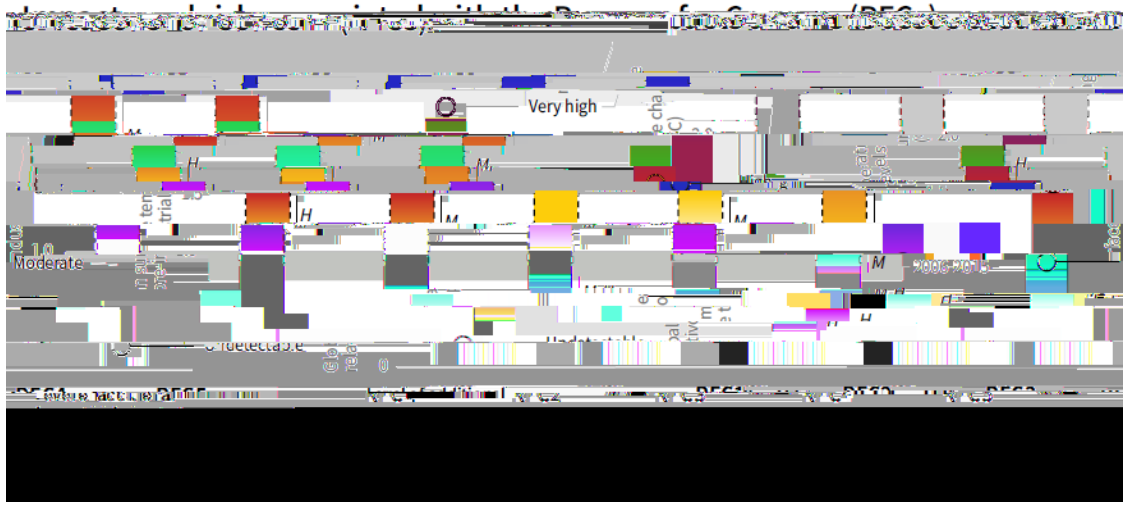
Andy Solberg, Global Technology Lead
Facility Modeling & Analytics at Jacobs

Climate Action - Tech Sector Leadership

“This generation owes it to the next generation to address climate

When- Timing of Net Zero CO_2

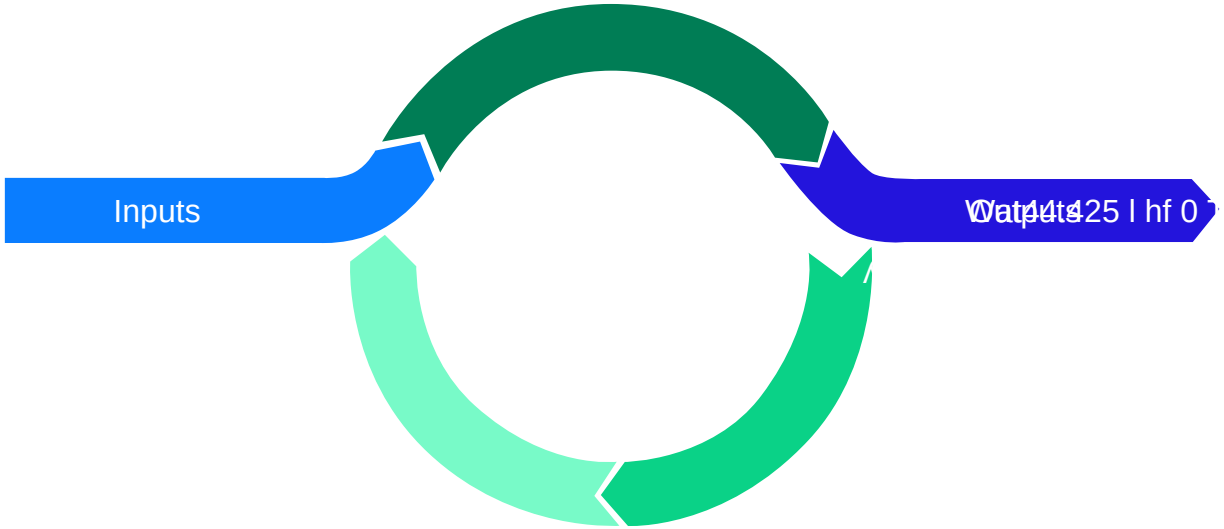




Source:

Outputs

- Energy
- Water
- Raw Materials



GHGEmissions – Language of Carbon Neutrality

Electronics Value Chain

Scope 3

Scope 1 and 2

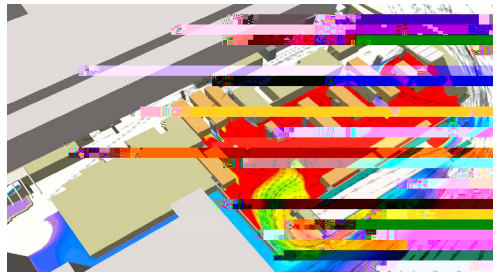
Scope 3

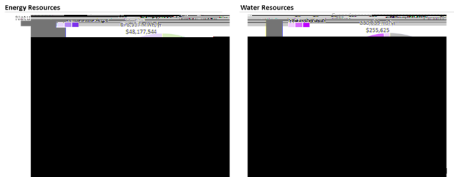
Mining, manufacturing, assembly and packaging account for 85% to 95% of a smart phone's annual carbon footprint.

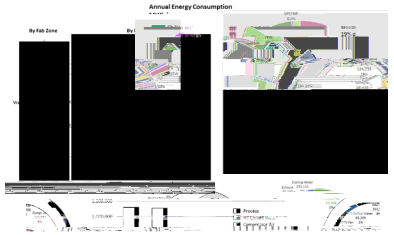
Telecom infrastructure, data centers, and charging are about 2/3 rd of ICT emissions.

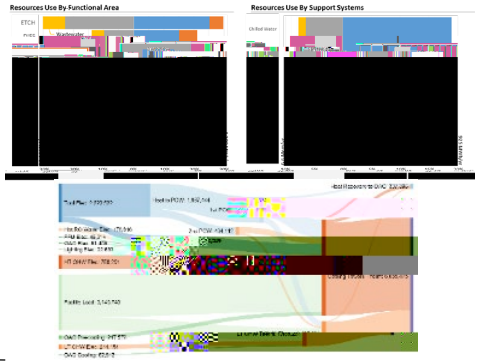
Average life span of a smart phone is 2 years.

Less than 1% of smart phones are recycled.





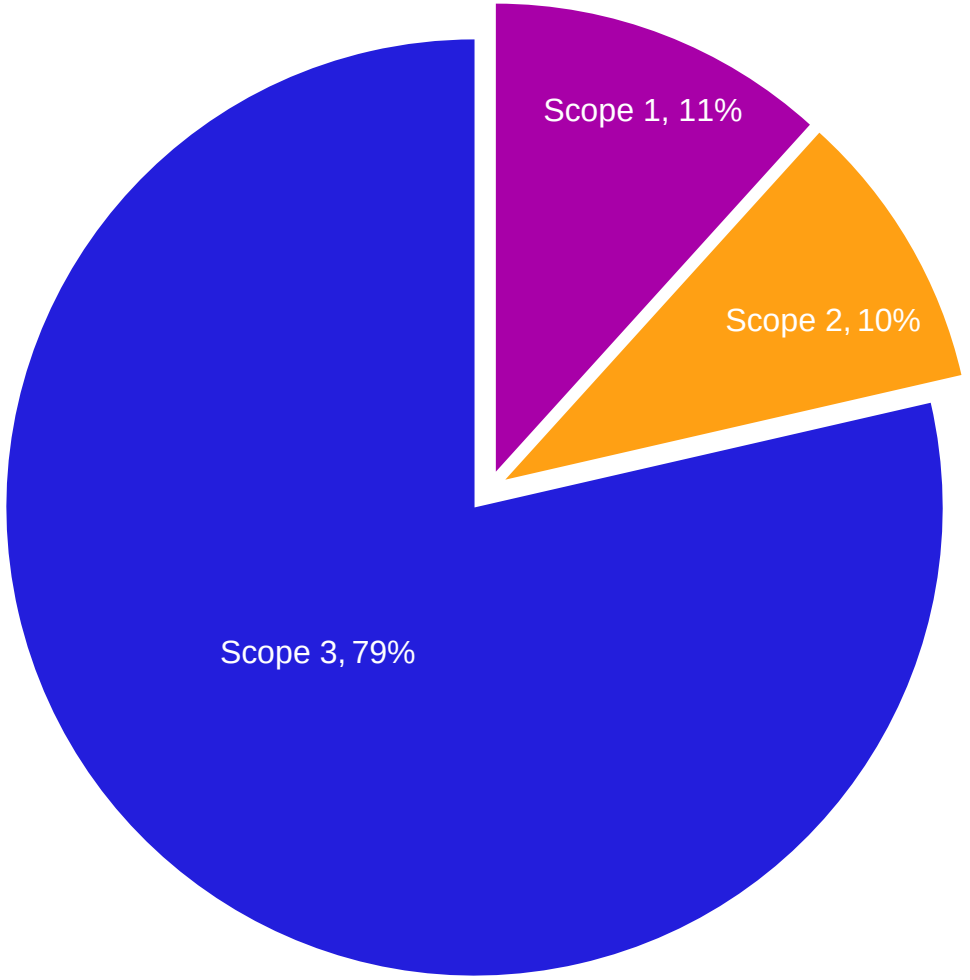


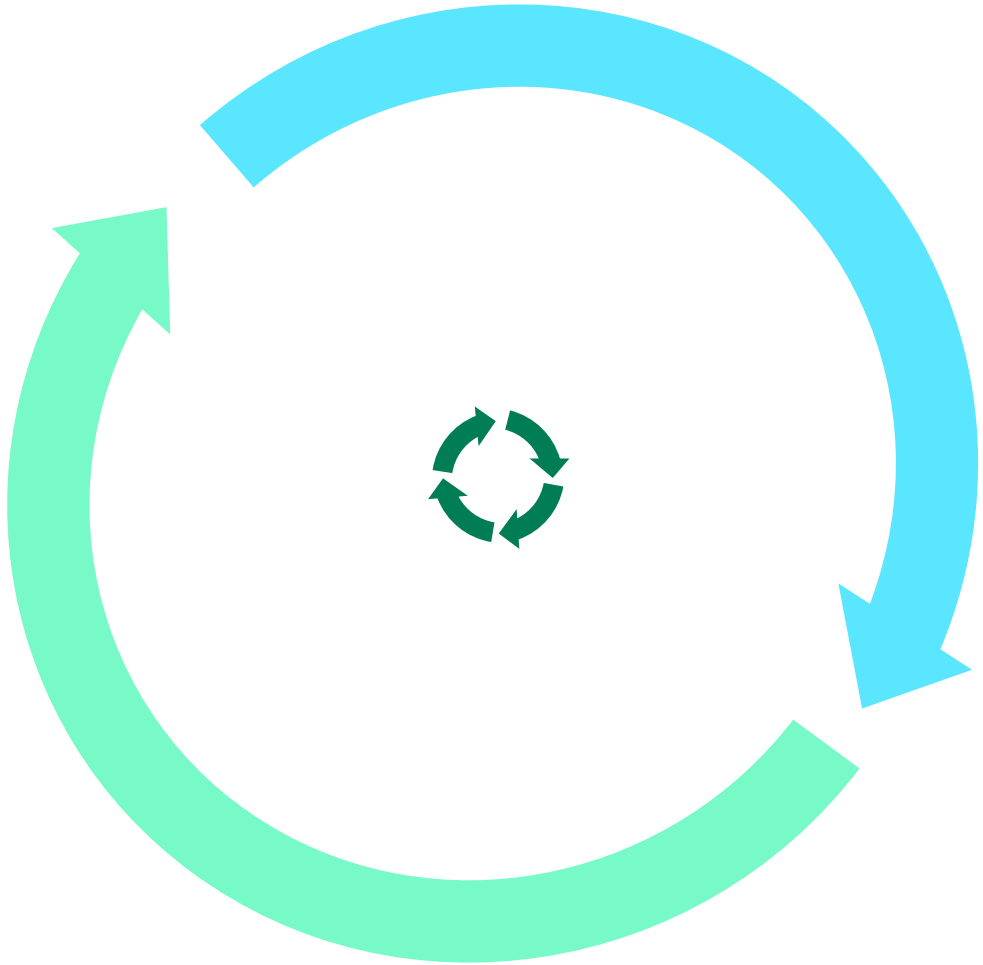


BIM Model = Facility Digital Twin

Scope 3 (Supply Chain)

- Scope 3 is often the largest source of emissions
- Focusing on Scope 1 and 2 emissions could exclude significant emission sources
- From WRIcorporate inventories completed, scope 3 emission account for 79% of a company's total emission on average





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The Path Forward

- Coordinated push for renewable energy options in common manufacturing locations
  - Broad demand can lead to infrastructure investments
- Collaborative approach to track and reduce emissions throughout the value chain, upstream and downstream
  - Standardization of GHG targets and disclos9.7 1cdu.8 (GH)1]TJ 0 Trtm

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Clean Energy Technology for Data Centers

Sean James, Director of Energy
Microsoft

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Reinventing tomorrow.