



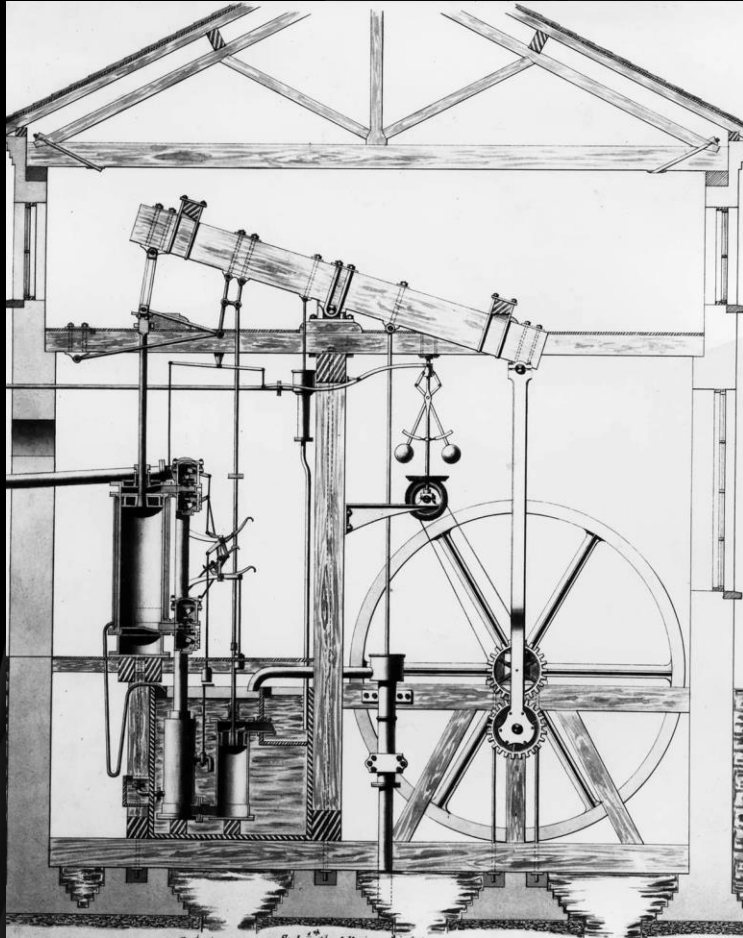
# THE NEXT ERA OF INDUSTRIALS INNOVATION



**Yuan-Sheng Yu**  
Senior Director, Research

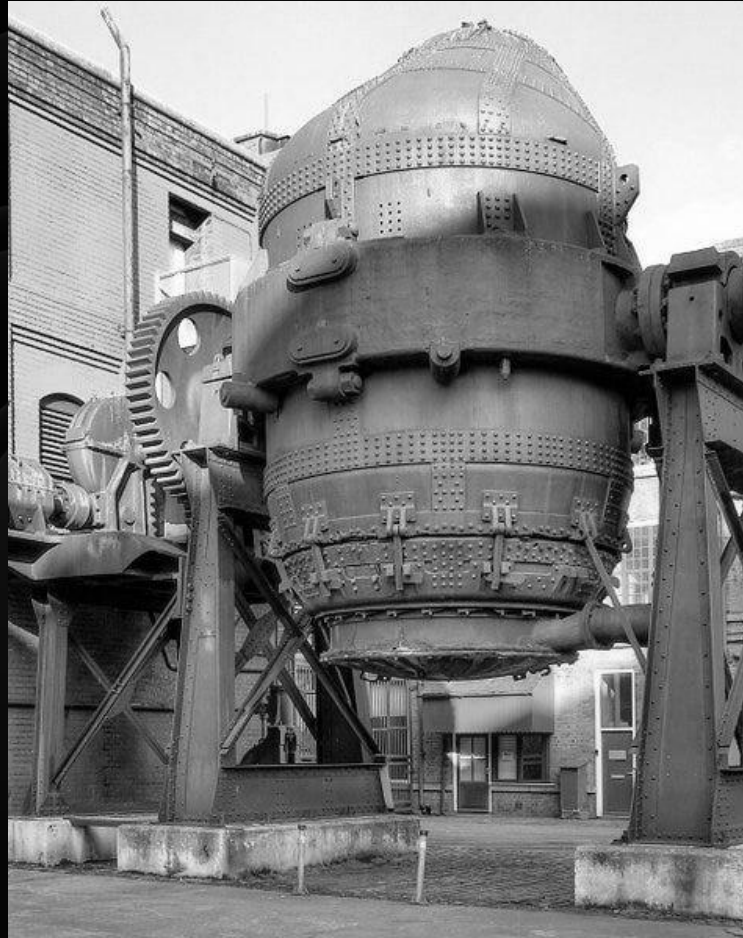
# 18<sup>TH</sup> CENTURY

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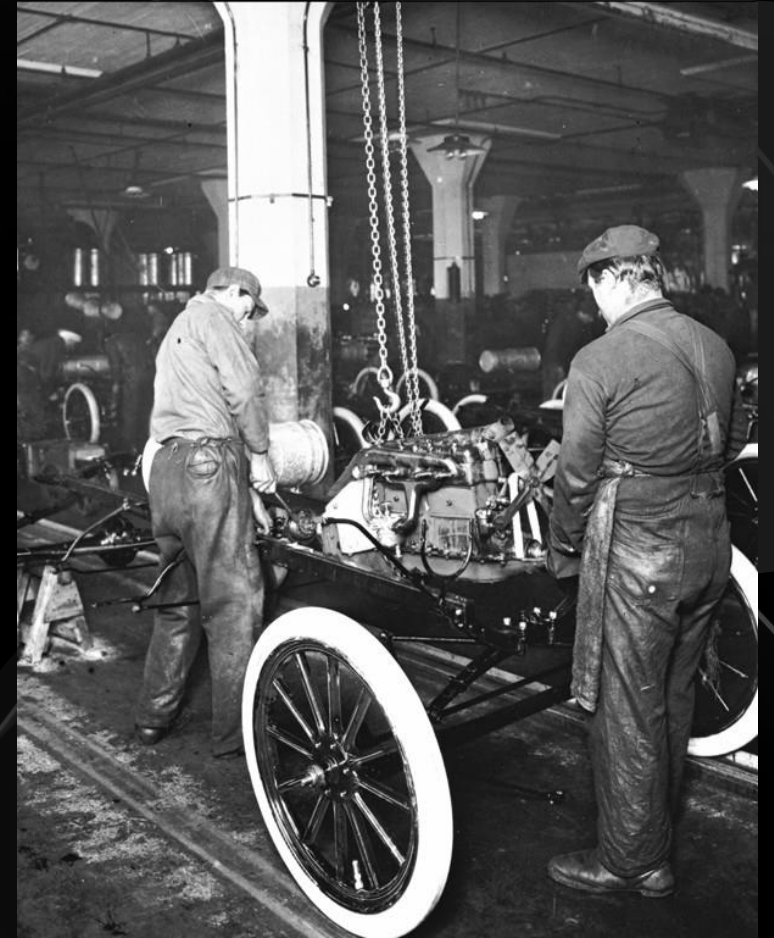
# 19<sup>TH</sup> CENTURY

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# 20<sup>TH</sup> CENTURY

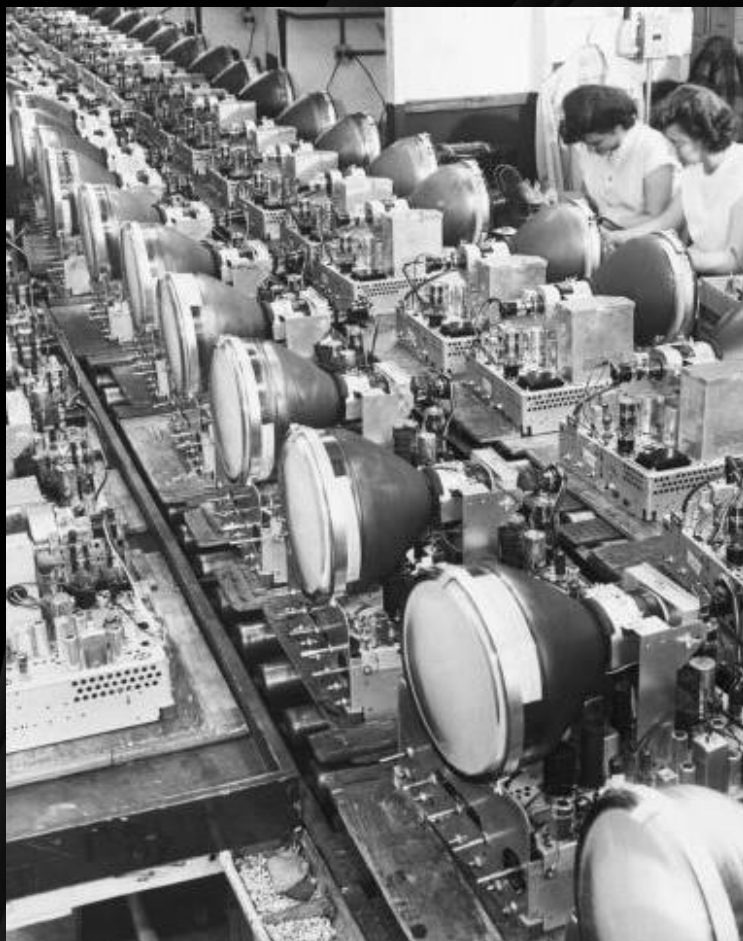
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# WESTINGHOUSE ELECTRIC

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# INTERNATIONAL HARVESTER

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# BETHLEHEM STEEL

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# Getting to the core of the most critical innovation priorities

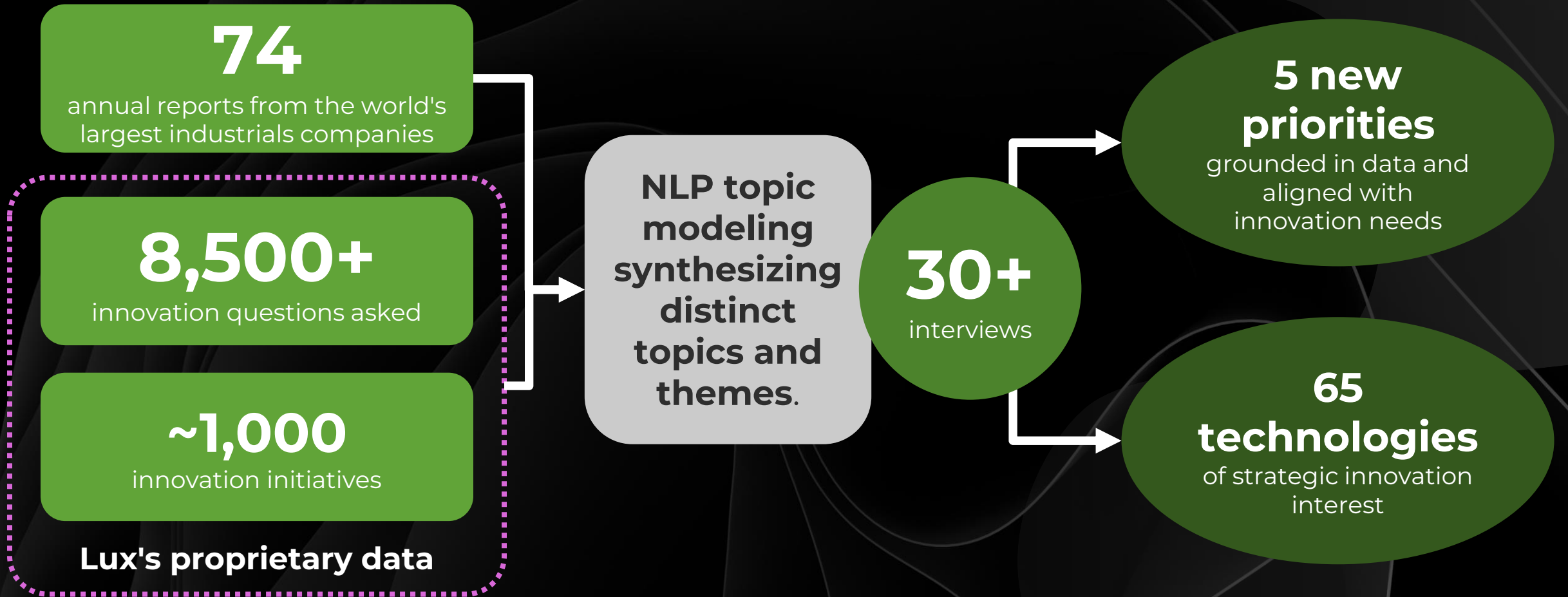
# AGENDA

**01** | Unbiased, customer-centric methodology

**02** | Lux Client Priorities for Industrials Innovation Leaders

**03** | Capitalizing on the next era of industrials innovation

# UNBIASED, CUSTOMER CENTRIC





# INDUSTRIALS LUX CLIENT PRIORITIES

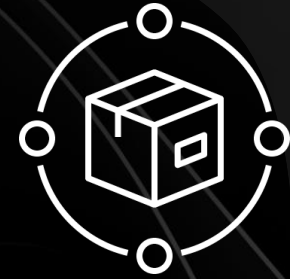
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**Decarbonizing  
Operations**



**Resource Security  
and Circularity**



**Next-Gen Materials  
and Manufacturing**



**Enabling the  
Energy Transition**

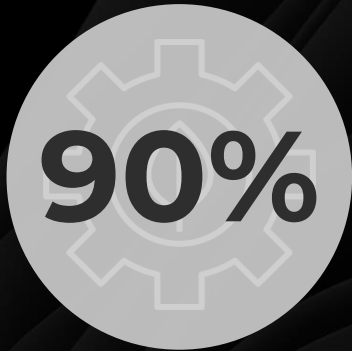


**Retooling for New  
Market Opportunities**

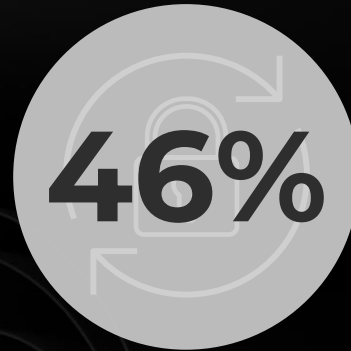


**Policy and Regulations**

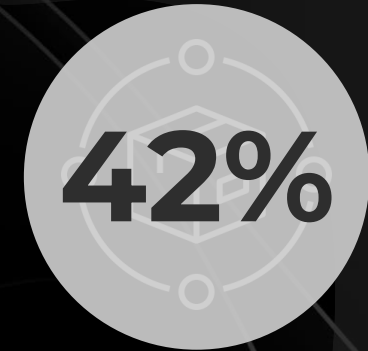
# INDUSTRIALS LUX CLIENT PRIORITIES



**Decarbonizing Operations**



**Resource Security and Circularity**



**Next-Gen Materials and Manufacturing**



**Enabling the Energy Transition**



**Retooling for New Market Opportunities**

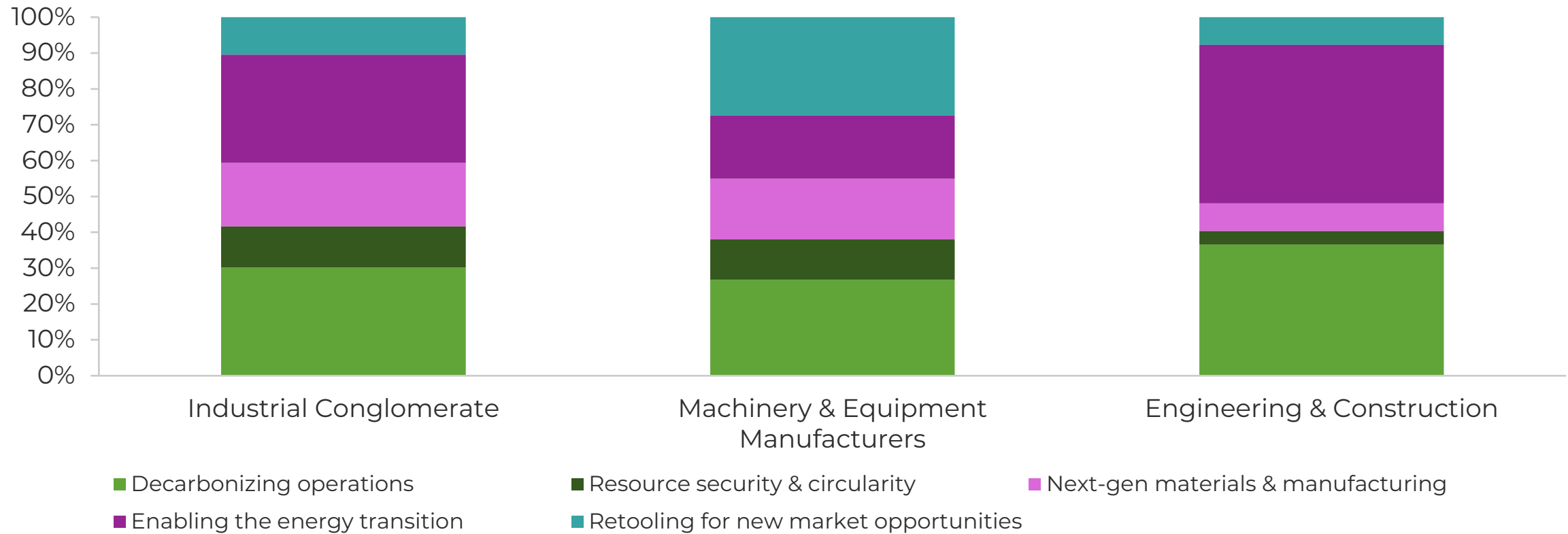


**Policy and Regulations**



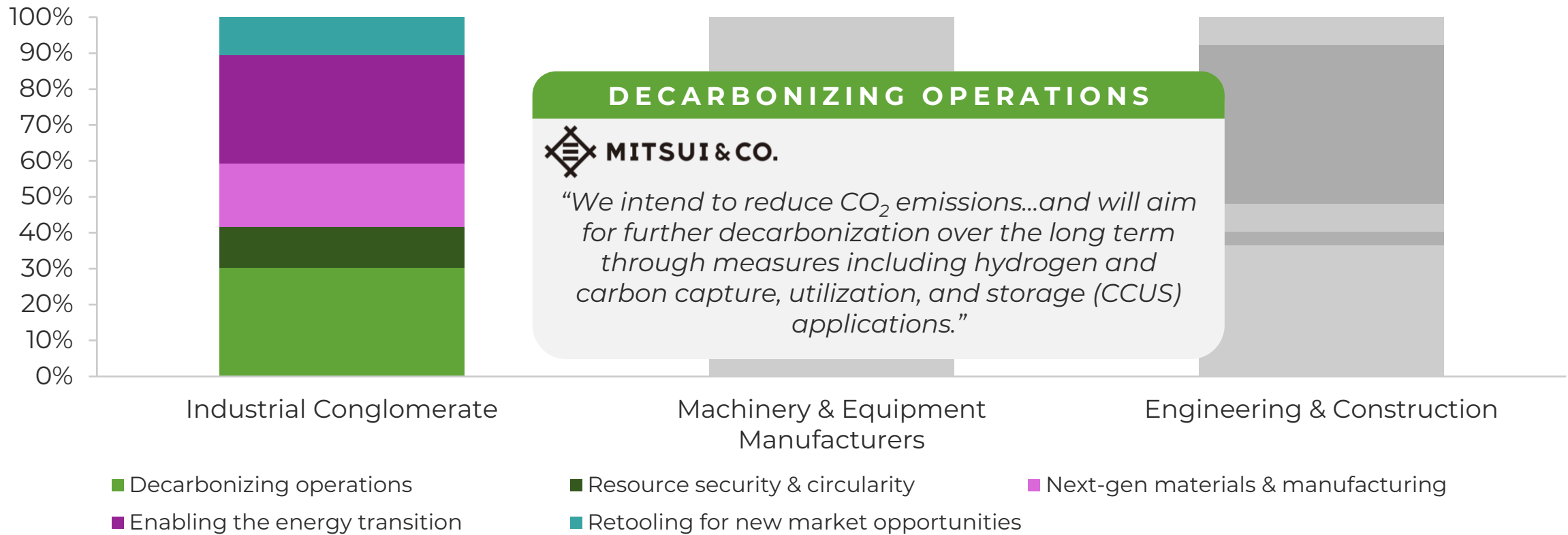
# DISTINCT PRIORITIES IN SUBINDUSTRIES

## Industrials Lux Client Priorities by Subindustry



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## Industrials Lux Client Priorities by Subindustry



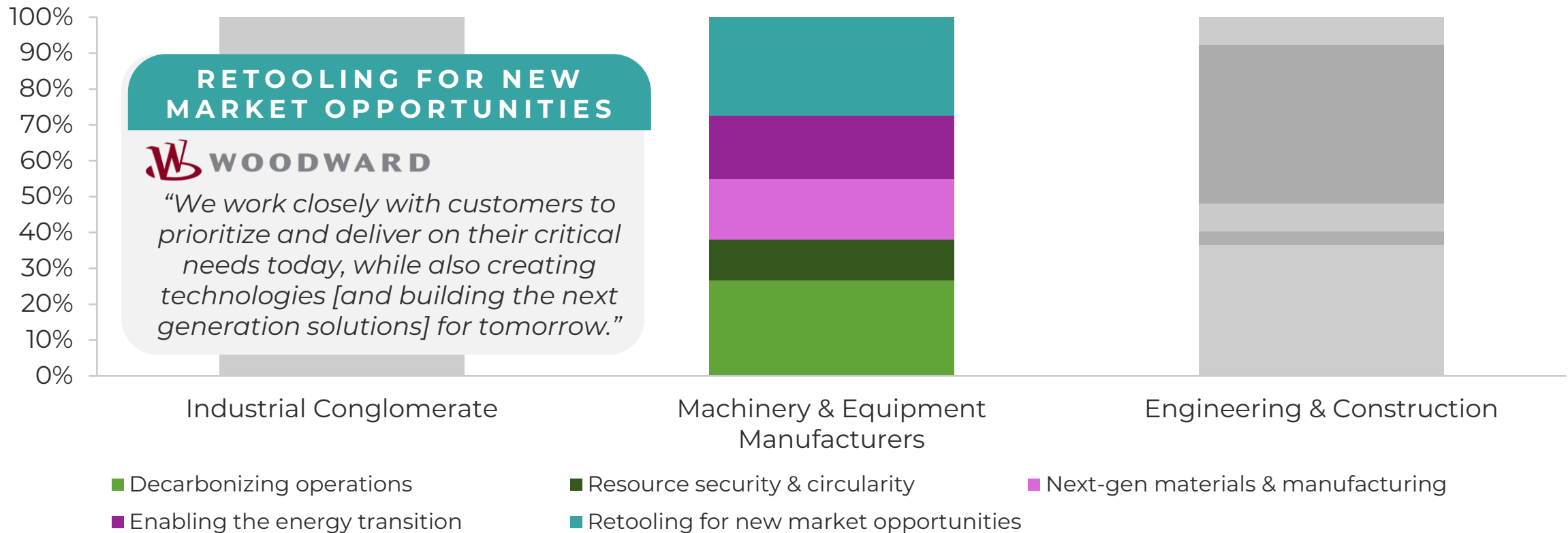
**DECARBONIZING OPERATIONS**

**MITSUI & CO.**

*"We intend to reduce CO<sub>2</sub> emissions...and will aim for further decarbonization over the long term through measures including hydrogen and carbon capture, utilization, and storage (CCUS) applications."*

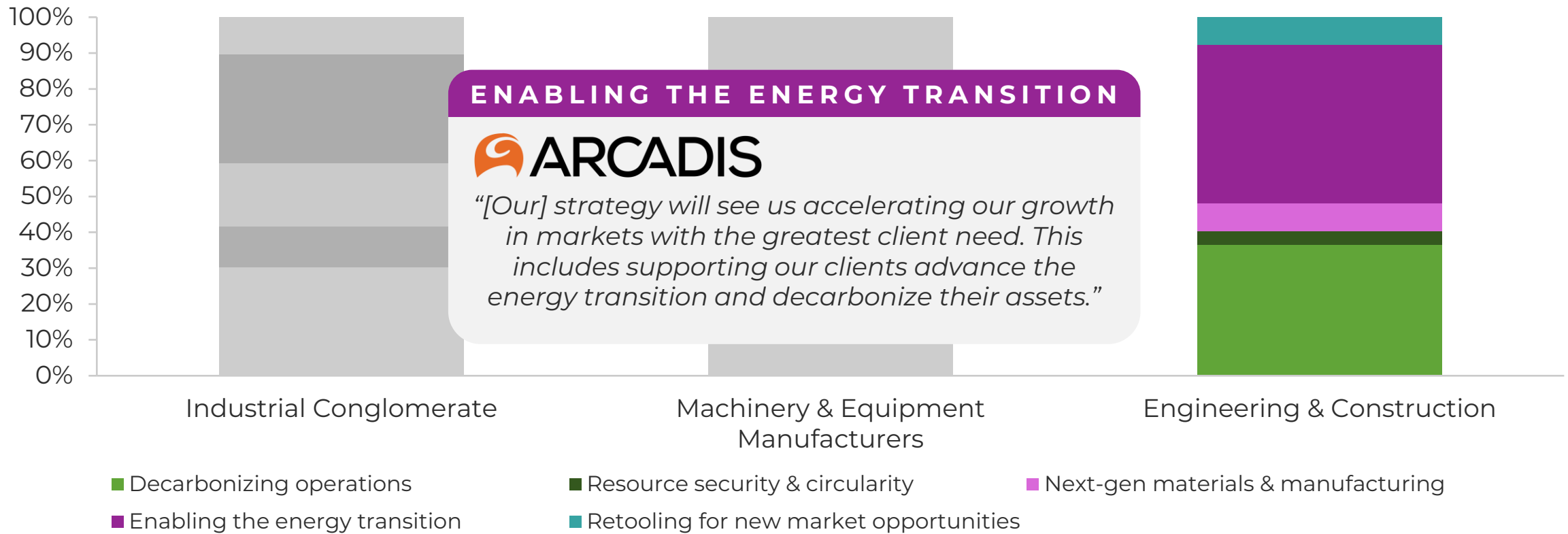
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# DISTINCT PRIORITIES IN SUBINDUSTRIES

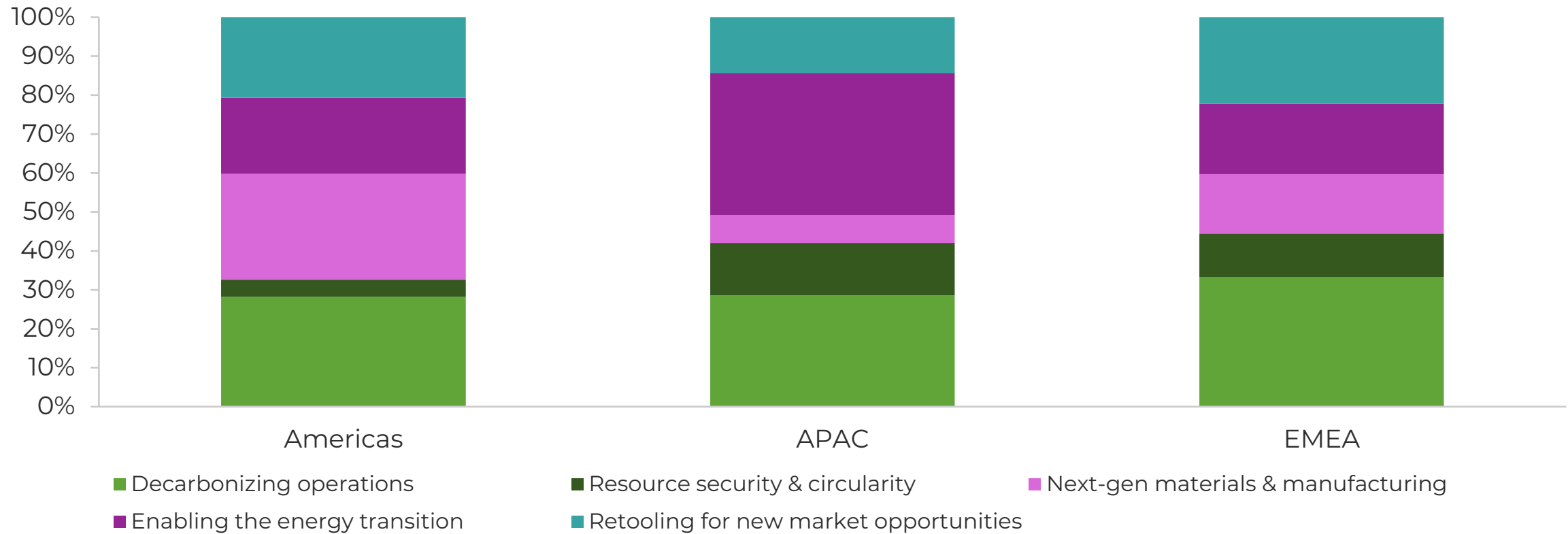
## Industrials Lux Client Priorities by Subindustry





# EQUALLY PRONOUNCED REGIONALLY

## Industrials Lux Client Priorities by Geographic Region



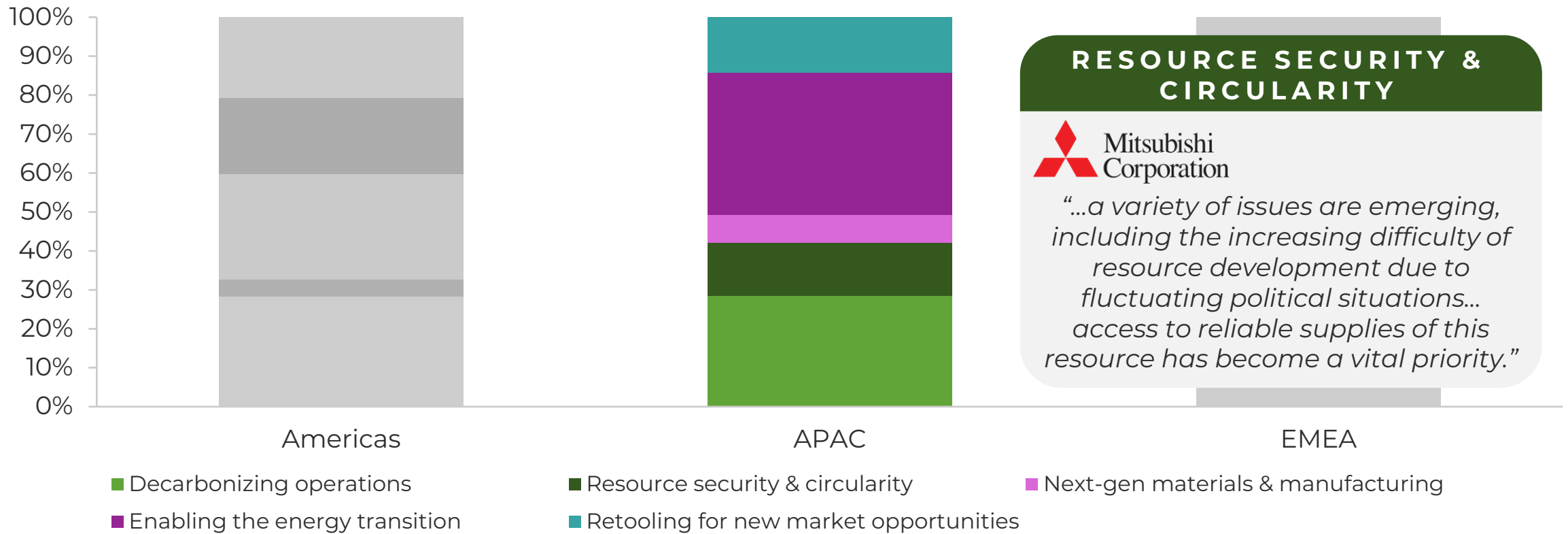
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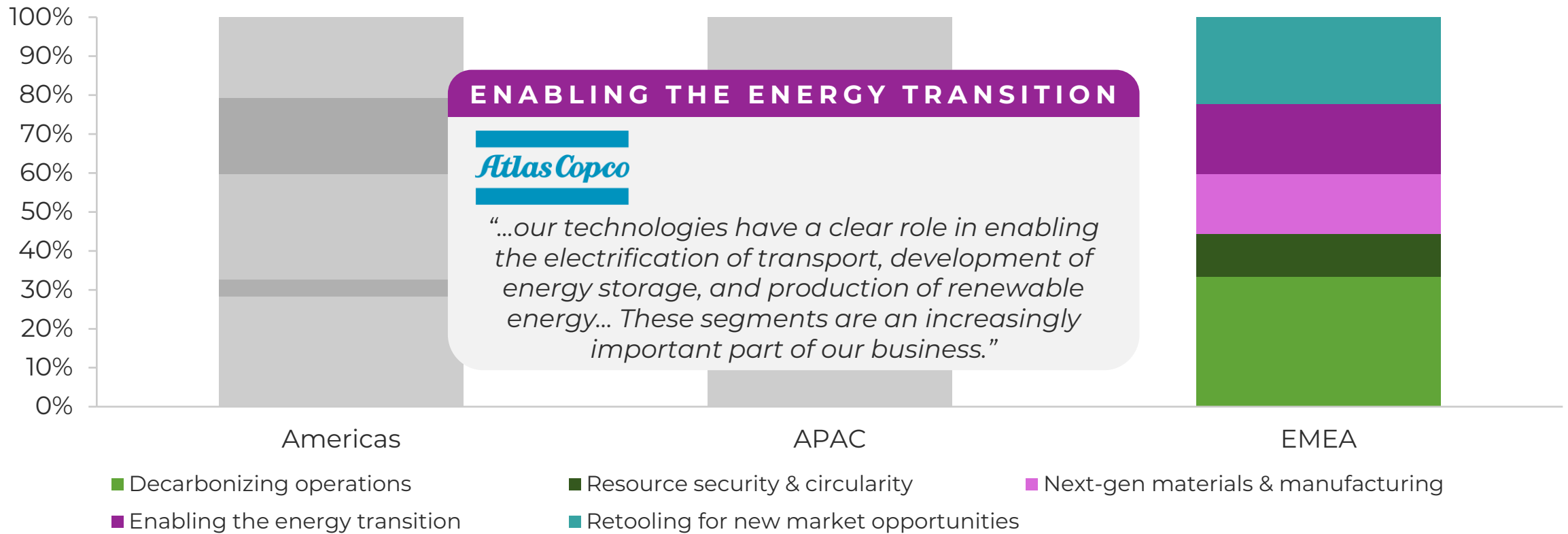
# EQUALLY PRONOUNCED REGIONALLY

## Industrials Lux Client Priorities by Geographic Region



# EQUALLY PRONOUNCED REGIONALLY

## Industrials Lux Client Priorities by Geographic Region





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# LUX CLIENT PRIORITIES FOR INDUSTRIALS INNOVATION LEADERS

# DECARBONIZING OPERATIONS

*Propelling operations toward zero-emissions and zero-waste with innovative technologies and processes.*

Zero-emissions operations are essential for both **future-proofing** capital-intensive assets and **extending operational life** in the face of regulations.

Develop a robust decarbonization roadmap combining near-term **retrofits** with long-term investments in **transformational** technologies.



“

*How are companies in hard-to-abate sectors integrating **decarbonization technologies**?*

”

“

*What emerging technologies in **low-carbon heat** will address high-temperature and waste heat recovery?*

”

# DECARBONIZING OPERATIONS

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## INNOVATION IN ACTION

In 2024, **ArcelorMittal** received environmental approval for its EUR 1 billion project to build a 2.3-Mtonne/y **green hydrogen direct reduced iron plant** and a 1.1-Mtonne **hybrid electric arc furnace** in Spain.

# RESOURCE SECURITY AND CIRCULARITY

*Ensuring access to critical minerals, raw materials, and water through innovative and circular technologies and processes.*

Future resource availability is under threat due to geopolitical tensions and supply constraints — ensuring raw materials supply is key to **operational stability**.

Develop a **comprehensive resource strategy** that integrates circular processes to secure critical minerals and technologies that utilize entirely new alternatives.



“

*How can advances in **industrial wastewater management** recover valuable materials?*

”

“

*What **battery recycling technologies** are enabling recovery of high-quality battery materials?*

”



# RESOURCE SECURITY AND CIRCULARITY

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## INNOVATION IN ACTION

In 2024, **Glencore** bolstered its commitment to **battery recycling** technology developer **Li-Cycle** to strengthen its long-term access to critical minerals for its global metal and trading and refining business.

# NEXT-GEN MATERIALS AND MANUFACTURING

*Integrating cutting-edge materials and processes to enhance functionality, performance, and reliability.*



---

**Global competition** and **customer demands** are driving the need for next-generation materials and tech-enabled R&D.

Determine whether to **build in-house capabilities** or **leverage external partnerships** to accelerate R&D efforts.

“

*Which innovations in **thermal management materials** driving change in sectors like EVs and data centers?*

”

“

*How are companies incorporating **quantum technologies** into their R&D roadmaps?*

”

# NEXT-GEN MATERIALS AND MANUFACTURING

*Integrating cutting-edge materials and processes to enhance functionality, performance, and reliability.*



**Global competition** and **customer demands** are driving the need for next-generation materials and tech-enabled R&D.

Determine whether to **build in-house capabilities** or **leverage external partnerships** to accelerate R&D efforts.

## INNOVATION IN ACTION

**Honeywell** is leveraging its collaboration with **Quantinuum** to integrate **quantum technologies** into its solutions to enhance sensitivity, accuracy, and response time to meet customers' needs in oil and gas, aerospace, and utilities.

# ENABLING THE ENERGY TRANSITION

*Empowering and leading the energy transition by delivering essential solutions and technical expertise for future energy systems.*

Industrials companies are uniquely positioned to provide **key solutions** and **infrastructure** for the energy transition.

Prioritize investments and R&D in **specialized equipment** and **components** tailored to these emerging technologies.



“

*What role does **low-carbon combustion** play in the future energy system?*

”

“

*How can industrials companies accelerate the development and deployment of **novel nuclear power generation**?*

”



# ENABLING THE ENERGY TRANSITION

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Industrials companies are uniquely positioned to provide **key solutions** and **infrastructure** for the energy transition.

Prioritize investments and R&D in **specialized equipment** and **components** tailored to these emerging technologies.



## INNOVATION IN ACTION

In 2024, **Schneider Electric** signed a memorandum of understanding with **Terrestrial Energy** to provide its suite of energy management, automation, and digital twins solutions for Terrestrial Energy's **molten salt reactor**.

# RETOOLING FOR NEW MARKET OPPORTUNITIES

*Leveraging core expertise to develop disruptive technologies that will grow existing markets and expand into adjacencies.*

Responding to **changes in customer demands** and **shifts in market dynamics** are key to capture growth — and stay relevant.

Build customer relationships and **retooled offerings** that align to **long-term customer strategies**.



“  
*What automation and precision equipment will be required to enable scalable **synthetic biology** processes?*”

“  
*How are current market trends in **sustainable aviation fuel** indications of changes of equipment and infrastructure?*”

# RETOOLING FOR NEW MARKET OPPORTUNITIES

*Leveraging core expertise to develop disruptive technologies that will grow existing markets and expand into adjacencies.*

Responding to **changes in customer demands** and **shifts in market dynamics** are key to capture growth — and stay relevant.

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## INNOVATION IN ACTION

In 2022 and 2023, **Wärtsilä** unveiled two multi-fuel engine platforms designed to operate on diesel or LNG today, while offering the flexibility to adapt to **ammonia** or **methanol** in the future.

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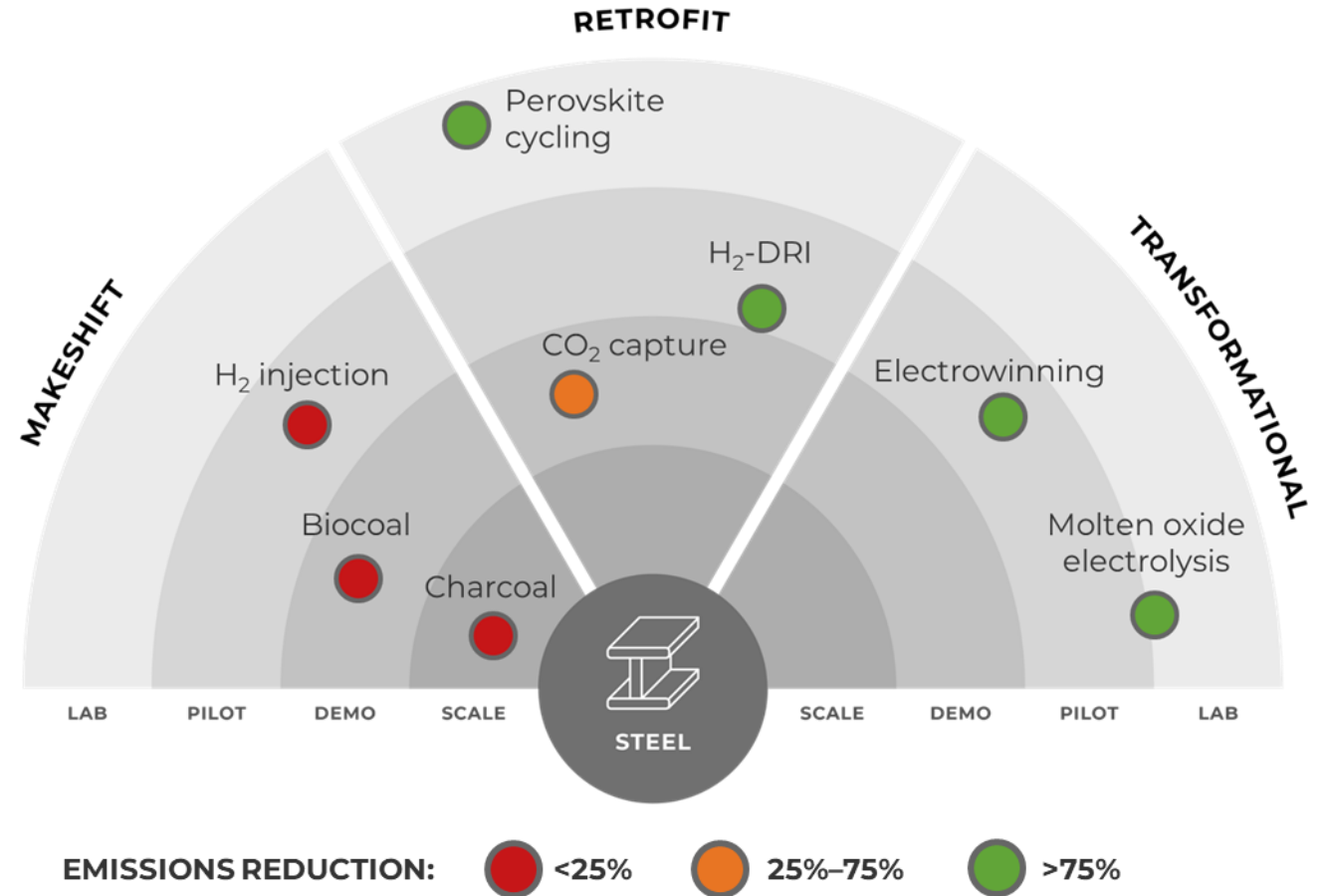
# CAPITALIZING ON THE NEXT ERA OF INDUSTRIALS INNOVATION

# TECHNOLOGY PORTFOLIO

## Building dynamic and agile technology roadmaps

Leverage cross-functional expertise to develop adaptable technology platforms that evolve with market demands.

### The Lux Decarbonization Radar: Steel

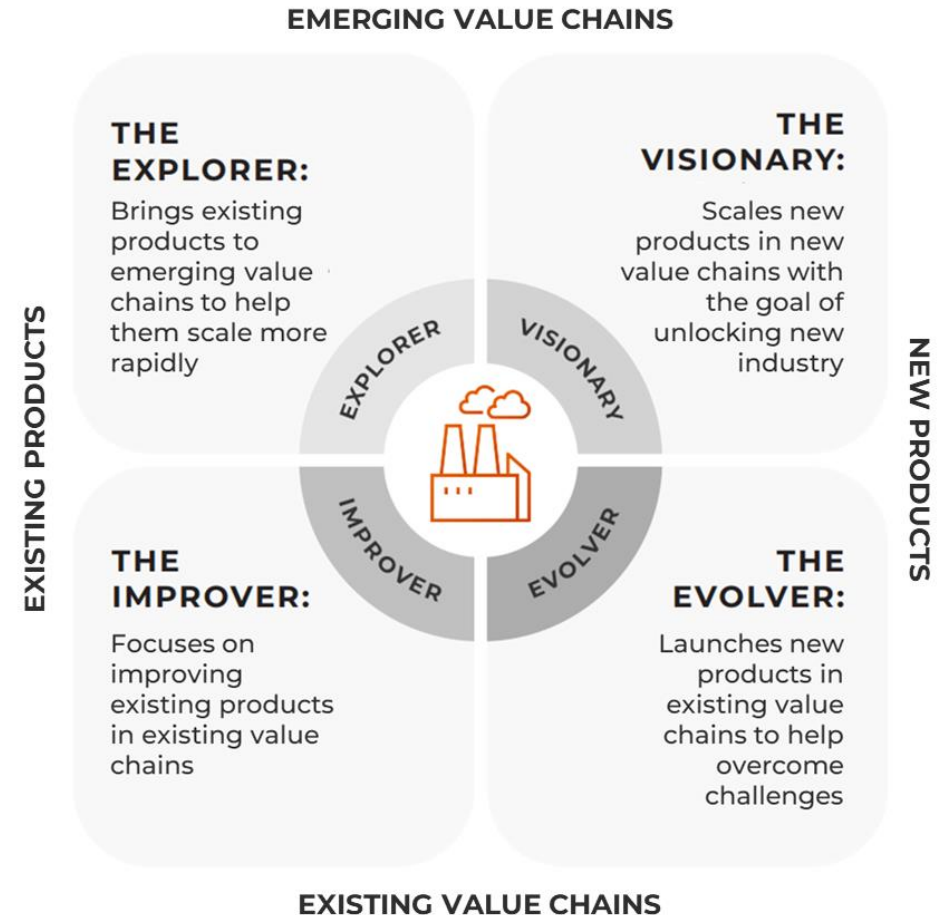


# OPPORTUNITY ASSESSMENT

## Benchmarking to identify innovation gaps and opportunities

Uncover hidden opportunities and assess your innovation priorities and technology strategies with industry peers.

### The Lux New Business Opportunity Framework





# FOSTER YOUR ECOSYSTEM

## Fostering a collaborative ecosystem across the value chain

Share expertise, mitigate risks, and build the infrastructure necessary for industry-wide innovation — compete and differentiate on the product.





# THANK YOU

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[questions@luxresearchinc.com](mailto:questions@luxresearchinc.com)

# ABOUT LUX

Our mission is to advise leaders about commercially viable science and technology to enable sustainable innovation. We deliver research and advisory services to inspire, illuminate, and ignite innovative thinking that reshapes and grows businesses. Using quality data derived from primary research, fact-based analysis, and opinions that challenge traditional thinking, our experts focus on finding truly disruptive innovations that are also realistic and make good business sense.

The “Lux Take” is trusted by innovation leaders around the world, many of whom seek our advice directly before placing a bet on a startup or partner — our clients rely on Lux insights to make decisions that generate fantastic business outcomes. We pride ourselves on taking a rigorous, scientific approach to avoid the hype and generate unique perspectives and insights that innovation leaders can’t live without.



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