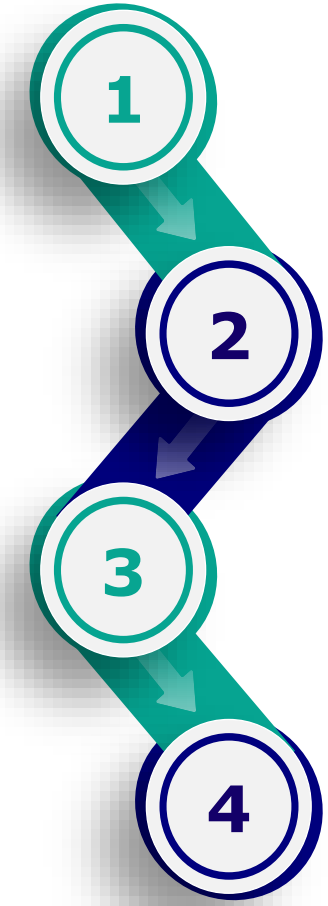
FutureScaleX

CASE STUDY

Forging carbon reduction pathways for natural gas treatment, LNG, and renewable natural gas

futurescalex.com contact@futurescalex.com

Executive Summary – FutureScaleX maps opportunities to conquer fugitive emissions along the entire natural gas value chain.



SITUATION

A global integrated energy company launched a 'low-emission gas' program, looking for solutions to lower the CO2 + CH4 footprint of its gas portfolio in Europe. The program focused on three key areas: liquefied natural gas (LNG), renewable natural gas (RNG), and upstream natural gas treatment.

CHALLENGE

Each sector presented unique challenges and greenhouse gas (GHG) emission drivers, requiring tailored decarbonization solutions. Additionally, the competitive landscape varied significantly, with distinct dynamics between sectors like RNG and LNG.

SOLUTION

FutureScaleX (FSX) developed a sector-specific carbon reduction roadmap. FSX conducted an end-to-end emissions assessment per route, identifying root causes and performing in-depth technology scouting and competitive analysis to recommend technologies best suited for in-house R&D.

IMPACT

- Pinpointed high CO2 intensity nodes in each gas route's value chain.
- Recommended technologies and players to engage for lowering emissions.
- Found common and unique opportunities to improve e-methane, renewable natural gas, and upstream conventional carbon profiles.

Business context

Our client, a global integrated energy company, has positioned natural gas as a critical pillar of the energy transition, increasing investments in LNG, biogas, and e-methane in recent years. However, despite promoting LNG as a cleaner alternative to coal-fired power, the client faces concerns over CO2 emissions across the broader natural gas value chain, which could jeopardize its Scope 1 and Scope 2 decarbonization targets.

To support the sustainable and cost-effective growth of its gas business, the client partnered with FSX to develop a technical pathway for reducing the CO2 footprint of natural gas operations.

Business requirement

To provide tailored insights for its diverse business units, the client tasked FSX with a detailed investigation into the value chains of LNG, upstream natural gas, and renewable natural gas (biomethane and e-methane). Key requirements included:

- Mapping CO2 emissions across the value chain to identify high-intensity nodes.
- Assessing technical solutions to decarbonize these nodes and identifying relevant OEMs for engagement.
- Analyzing the competitive landscape among energy peers and recommending areas for R&D and corporate venture capital (CVC) investment.

To address these specific challenges, FSX developed a holistic and systematic framework that aligned with the client’s decarbonization goals.

The FSX solution framework

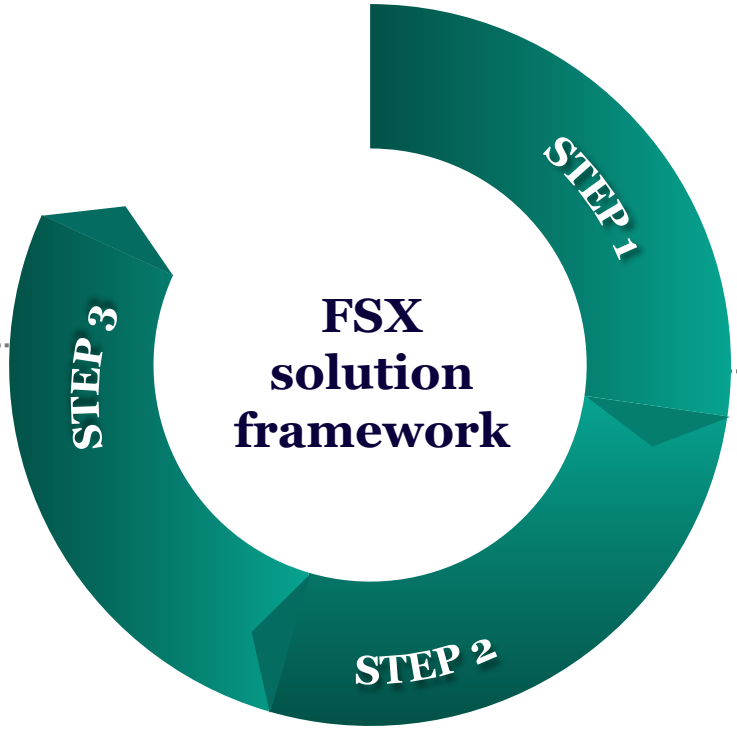
FSX utilizes a 3-step process to conduct technical feasibility, peer benchmarking, and partner ecosystem development

Start-up & collaboration analysis

- **Partnership ecosystem:** Assess various joint ventures, technology partnerships, led by utilities in natural gas
- **Startup engagement**: Identify collaborations of energy companies in LNG, gas treatment, e-methane startups
- **Market Approach**: Analyze research collaborations with universities and grants provided to academic institutions

Technology scouting & benchmarking

- **Tech universe:** Develop solution universe for high CO2 intensity value chain nodes for different natural gas routes
- **Tech screening:** Identify promising solutions by assessing startup and R&D investments, academic research, and patent literature
- **Benchmark**: Compare positioning of client against competing peers; identify areas of agreement, areas of disconnect



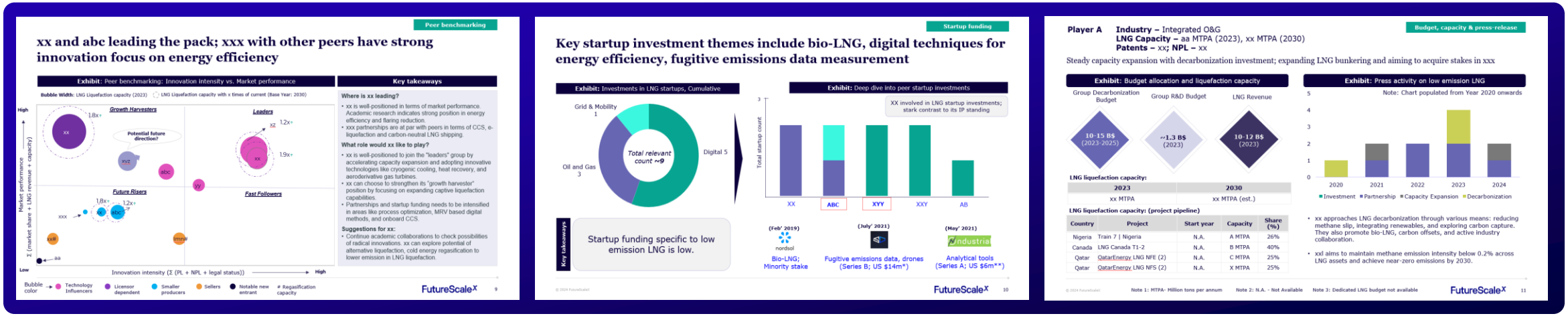
Emission landscaping & peer identification

- **Natural gas CO2 emissions:** Foundational study of emissions in LNG, RNG, and e-methane
- **Value chain nodes mapping:** Identify nodes in the value chains of different natural gas routes as primary root causes for CO2 emissions
- **Competitor universe setup:** Screen energy and industry peers who are direct competitors to the client and are active in natural gas

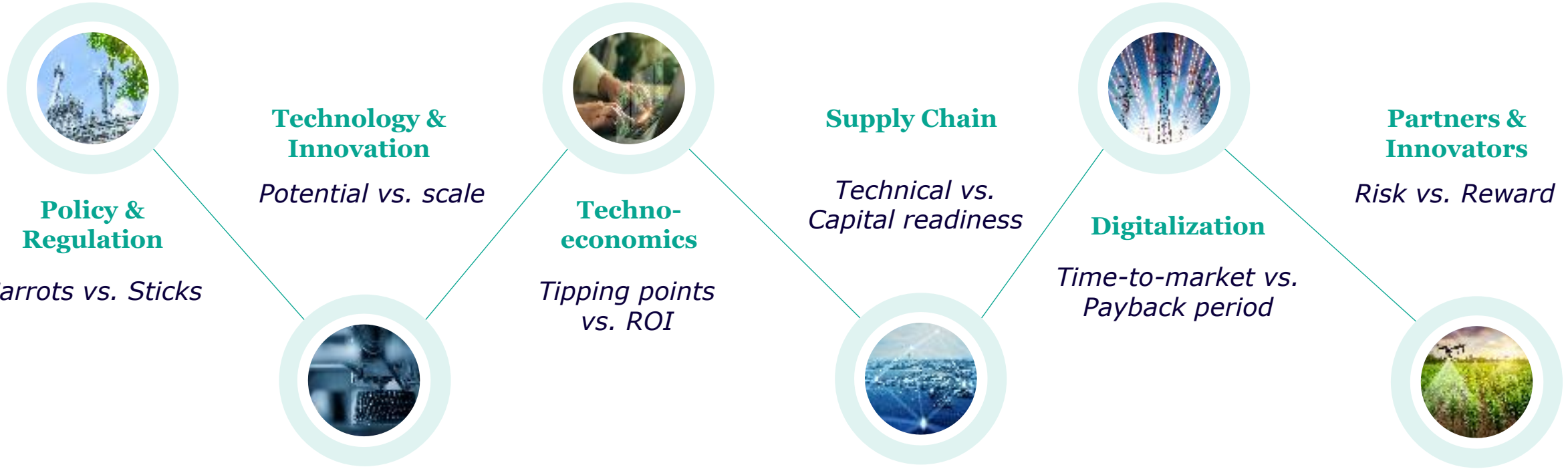
Impact

- Delivered a detailed CO2 reduction roadmap for each natural gas pathway: upstream gas treatment, liquefied natural gas (LNG), and renewable natural gas (RNG).
- Conducted an in-depth analysis of emerging trends and competitor priorities across the natural gas value chain, highlighting R&D spending, startup partnerships, and project pipelines.
- Identified hypercompetitive technology segments, underexplored white spaces, and opportunities for targeted R&D investment.
- Evaluated collaborations among energy players and key stakeholders, providing best practices for establishing ecosystems to support innovations such as e-methane.

Sample output



Methodology: The FSX Sustainable-Growth-as-a-Service™ Methodology



Connected, systems-level thinking to identify the tipping points and solutions that matter.

Are you ready to grow sustainably?

At FutureScaleX, we believe that the future of business lies in sustainable growth. Our six-lens methodology is more than just an approach—it's a movement towards a more resilient and sustainable future.

FutureScale^{x}

Connect with us.

To request more information such as a meeting, demo, trial, or referral, please visit our website: www.futurescalex.com or email contact@futurescalex.com

Mumbai

Floor 8th, Plot 368, Vivaria Tower
Bhandarkar Rd, Matunga Phul Market,
Mumbai 400019 India

futurescalex.com

contact@futurescalex.com

Singapore

1 North Bridge Road, #18-06 High Street Centre, Singapore, 179094

futurescalex.com

contact@futurescalex.com

Amsterdam

Transistorstraat 31, 1322 CK
Almere, The Netherlands

futurescalex.com

contact@futurescalex.com

Boston

44 School Street, Ste. 505
Boston, MA 02108 USA

futurescalex.com

contact@futurescalex.com