



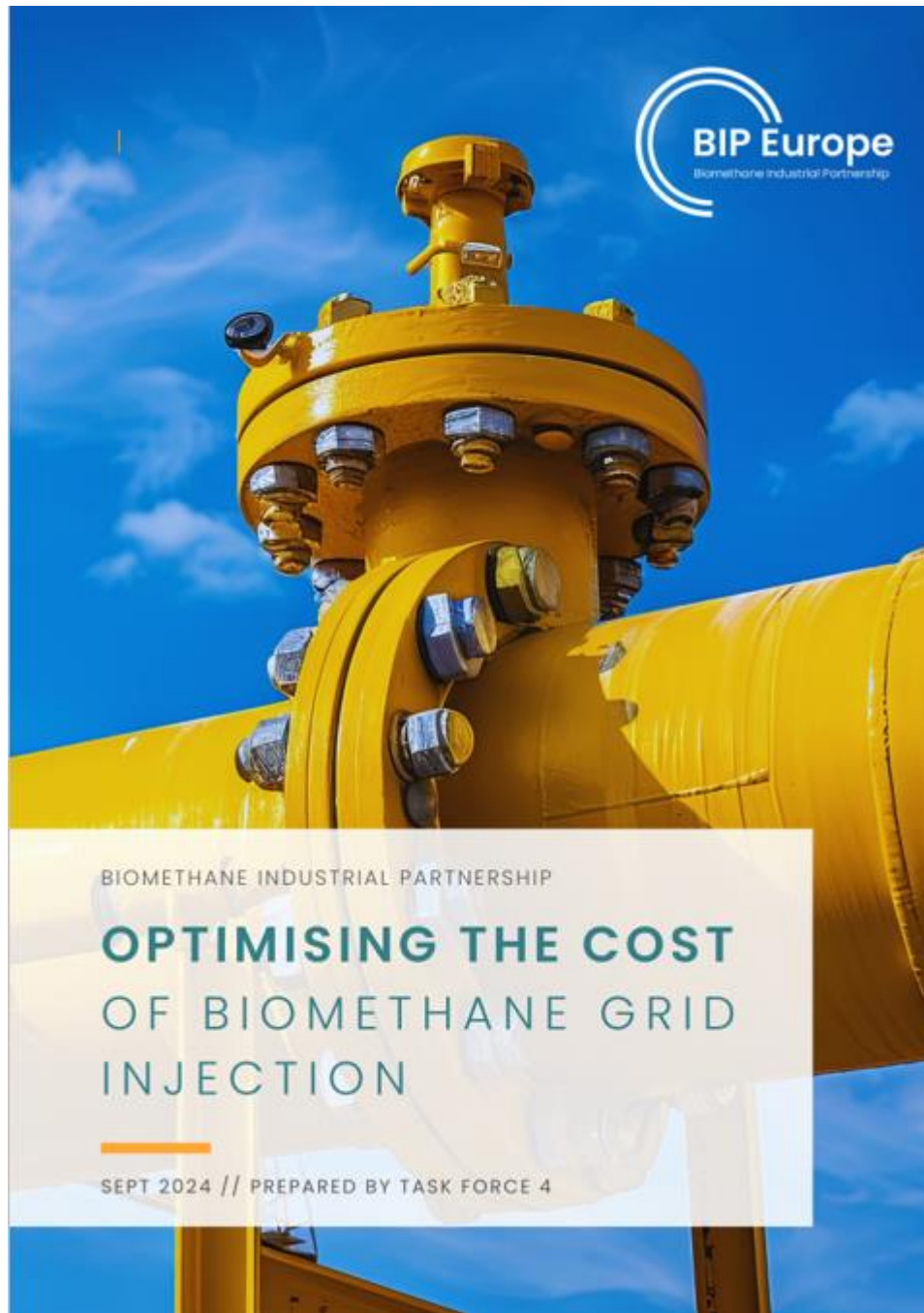
BIOMETHANE INDUSTRIAL PARTNERSHIP

OPTIMISING THE COST OF BIOMETHANE GRID INJECTION

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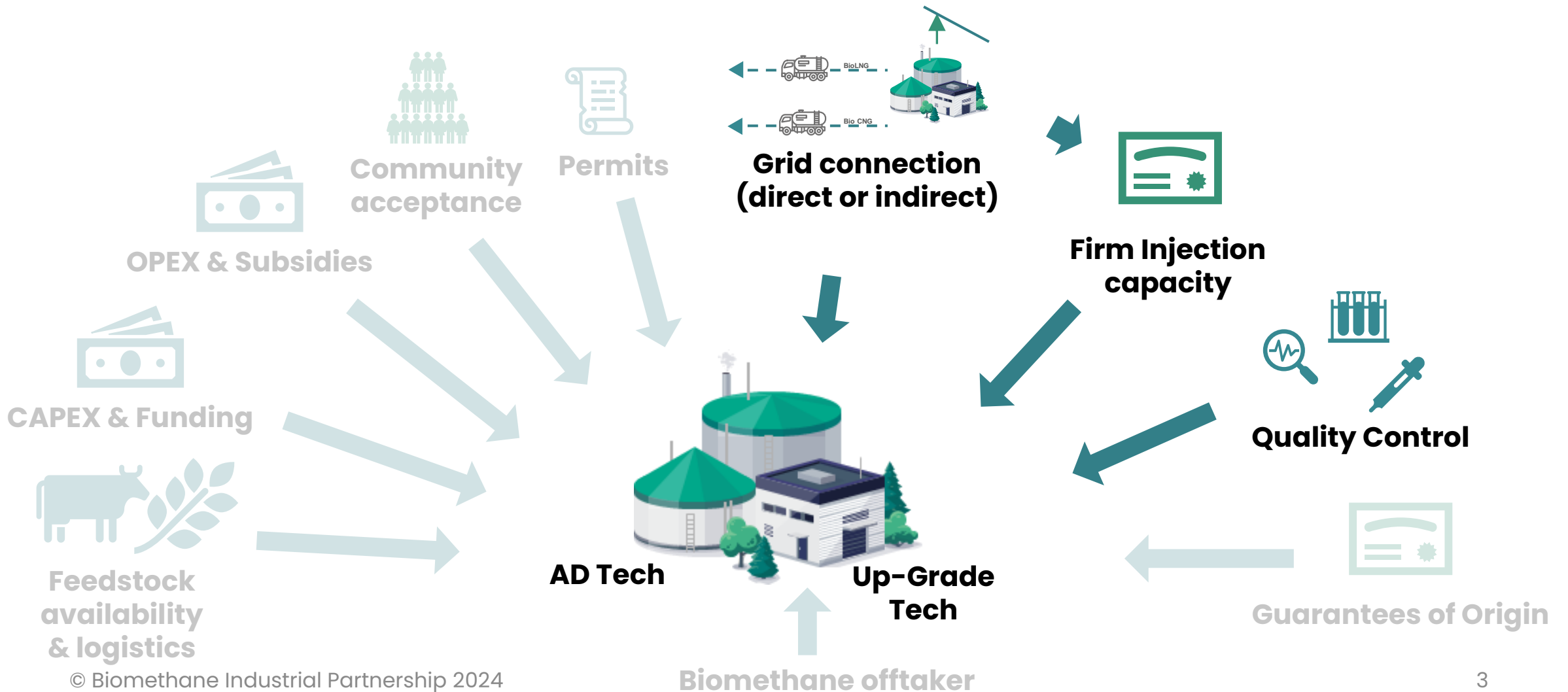
Head of Renewable Gases – Engineering at Floene,
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BIP Task Force 4.4

Optimizing the costs associated with biomethane grid injection and the necessary grid reinforcement, encompassing reverse flow technology and grid extensions

Components of a biomethane project



Firm Injection Capacity



Regulatory Framework & Right to connect

Network availability & reception limits

Connection solutions

Planning to boost biomethane injection

Right to connect and Regulatory Framework



Regulatory Framework

New EU Regulation requires grid operators to ensure firm injection capacity based on connection techno-economic assessment, according to nationally approved criteria

Current regulation is heterogeneous across Europe

Several countries will have to implement the procedures to comply with the new regulation

Procedures should address aspects such as:

- Management of grid reception capacity – current and foreseen
- Prioritizing of competing biomethane projects
- Guarantee cooperation between DSO and TSO to expand biomethane grid reception capacity
- Establish feasibility thresholds for capacity expansion projects

Cases of success in Europe, where biomethane is well developed or rapidly developing

- France
- Italy
- Denmark
- Germany

Right to connect and Regulatory Framework



Cost of connection

Regulation aspects cover also other aspects that are important in the promotion of biomethane utilization and should be considered while developing the regulation

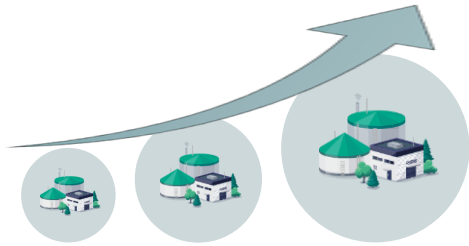
Physical connection to the grid

- Cost of connection usually borne by biomethane project promoter
- Cost-sharing mechanisms are common in countries where a fast increase in the number of connected plants is observed

Other infrastructure modifications required to allow connection (reverse flow, grid reinforcements, etc)

- Funding through approved regulated CAPEX
- Should be subject to feasibility thresholds

Network availability & reception capacity



Plant size tend to increase due to environmental, efficiency and technological requirements



New plants tend to be located farther away from the network

Or

Where there is no network

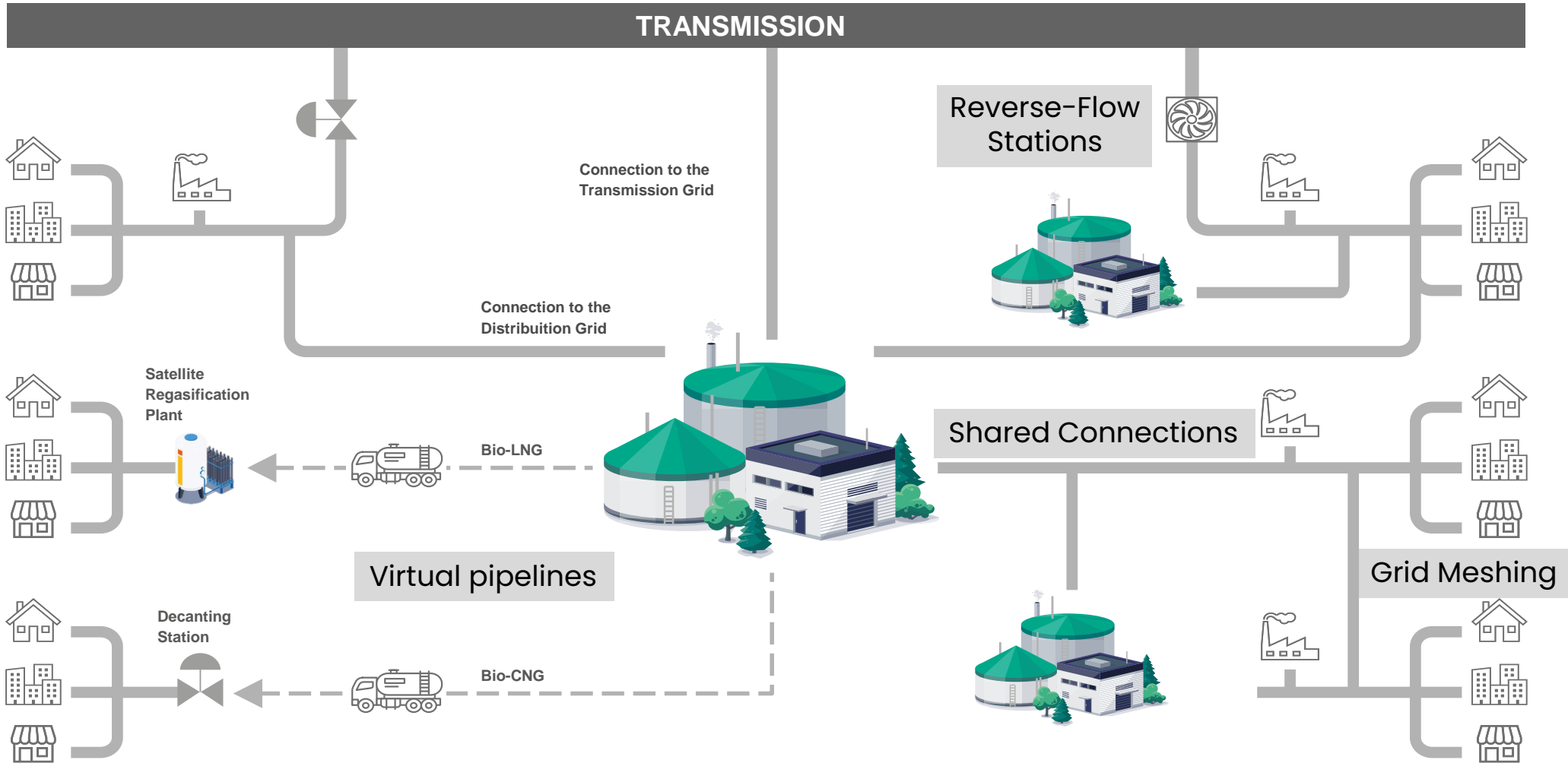


Increasingly expensive connections

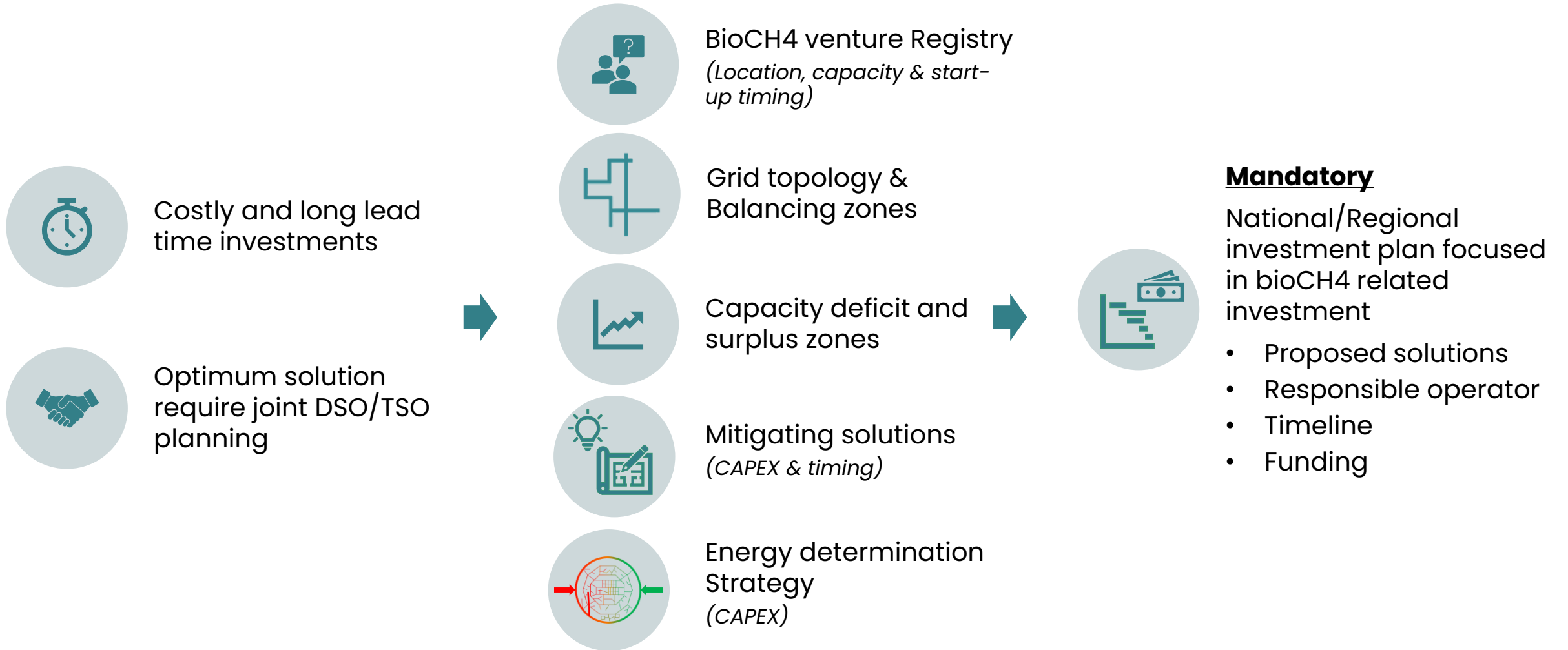
Insufficient reception capacity

Unfeasible connection

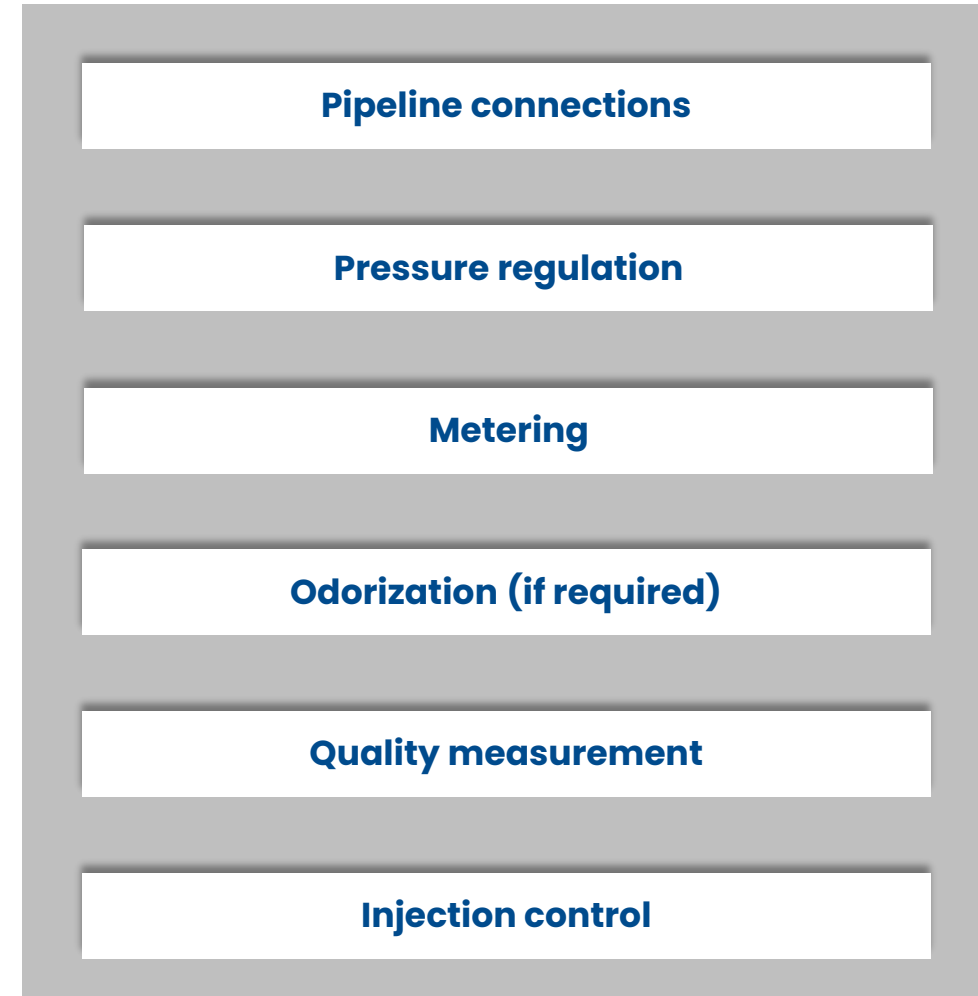
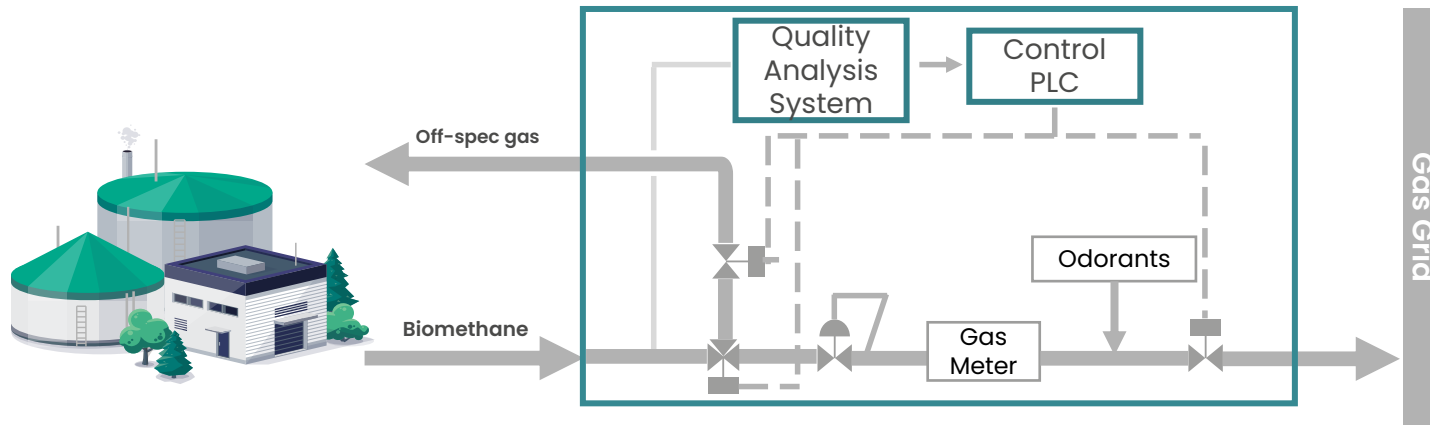
Boosting Grid Capacity – Solutions



Planning to Boost grid capacity



Biomethane Injection Station



- Fiscal Metering Skid contains: gas meter, volume conversion device, pressure and temperature transmitter. All this equipment has to follow " *Measuring Instruments Directive 2014/32/UE(MI-002)*"
- For the quality of biomethane, each countries have drawn up their own regulations and standards, starting from the EU legislation EN16723-1 "Specifications for biomethane for injection in the natural gas network"

Quality Measurement of Biomethane

Quality measurement of Biomethane is made for **two reasons**:

1. Calorific value of the Biomethane for energy injection determination purposes
2. Compliance with quality requirements that are related with safe utilization - prevention of health hazards and burning characteristics as fuel



There are 2 types of analysis

- ✓ **Continuous**, performed with a fixed, site-mounted analyzers
- ✓ **Non-continuous**, performed by sampling gas from the field and analyzing it in a laboratory

Quality Measurement of Biomethane

Non-continuous analysis:

Volatile Organic Silicon (Si), Carbon Oxide (CO), Ammine, Hydrogen, Ammonia (NH₃) Total Fluoride (F), Total Chlorine (Cl), Oil and Dust

Continuous analysis:

Composition

Usually measured via Gas Chromatograph certified according to OILM R 140: methane (CH₄), carbon dioxide (CO₂) and Oxygen(O₂). Other hydrocarbons, if calorific value correction is required.

From these, the calorific value, specific gravity and Wobbe Index can be calculated

Usually measured for safety reasons and pipeline corrosion via dedicated analyzers: H₂O Dew Point and H₂S

We also noted in few countries other Sulphur components normally present in Natural Gas (such as Total Sulphur, Carbonyl Sulfide, Mercaptans) are required as a continuous measurement.

Quality Measurement of Biomethane

Foreseen paths to reduce connection costs

1) Monitoring of Sulphur Compounds

If H_2S in the Biomethane is below the defined limit, it's certain that other Sulphur compounds will comply with the defined limits. Therefore, a reasonable approach may be to maintain continuous H_2S analysis and to measure the other Sulphur compounds through lab analysis.

2) New quality analysis technics

Chromatography, although a proven technology, is expensive – both in CAPEX and OPEX – and operationally complex.

New technics – e.g., inference analyzers – capable of performing most of the indispensable determinations concerning biomethane quality measurement, are less expensive, simpler to operate and approved according to OIML R 140.

Not suitable for all situations, these type of analyzer systems deserve being considered when ordering new injection skids.

3) Harmonization of European quality specifications for biomethane

Working on a harmonized European regulation of the quality of biomethane, would facilitate acceptance across Europe and may lead to standard quality measurement solutions and avoiding a patchy environment with efficiency gains and cost reduction.



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**Thank you for your
attention!**

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