



The biomethane opportunity: *Keys to a bankable business model*

Foro de Hidrógeno y Gases Renovables

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DEAL STRATEGY - KPMG



With you today – Vicente Moros Pérez



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Vicente joined KPMG Spain in 2016 and has extensive experience in the energy transition

Extensive experience in biomethane projects

- +5 Commercial Due Diligences, buy- & sell-side across single assets and portfolios in both Spain and Portugal
- 3 Business plans, from post-COD BP reviews for operating plants to greenfield development
- M&A & portfolio support, from greenfield project portfolios to market-entry and growth strategies for investors entering renewable gases

What we do

- ✓ Strategic planning advisory
- ✓ Commercial DD in M&A transactions
- ✓ Carve-outs and integrations
- ✓ Value creation plan design and execution

Our team



A team of +30 consultants working on +50 projects in the last 3y



Expertise all through the value chain – conventional generation, renewables, grids, consumers and equipment providers



Work for energy corporates (~40%), investors (~40%), suppliers (~10%), consumers (~10%)



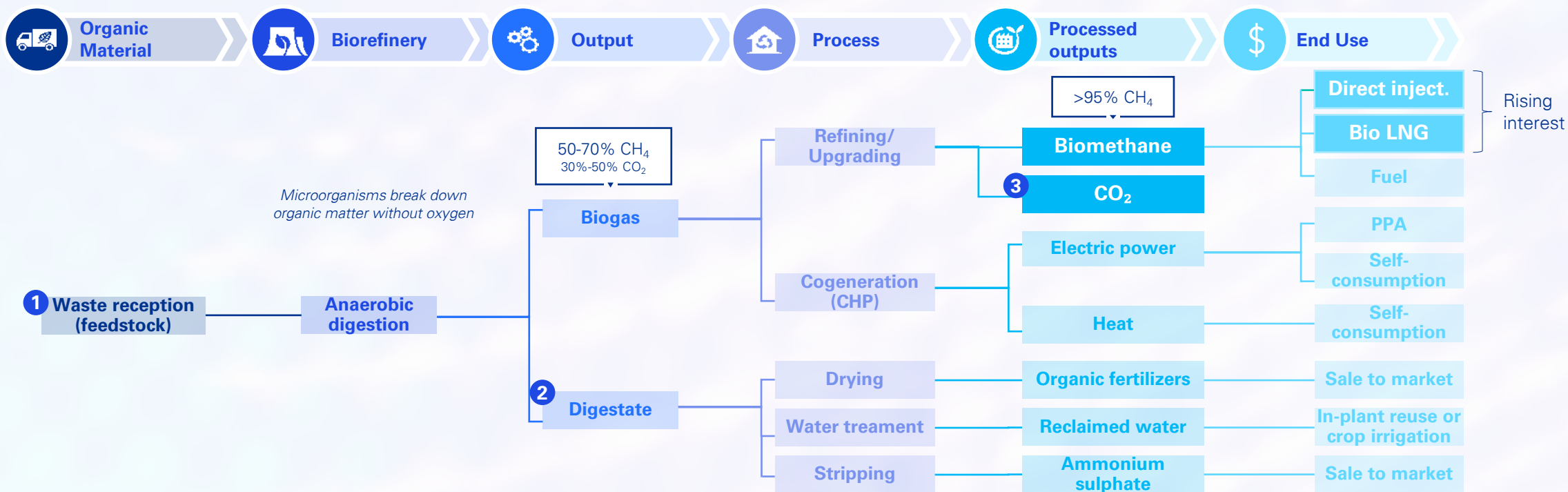
Content:

- 01 Market needs to unlock biomethane based on our experience.
- 02 Biomethane in Spain: State of play and keys to its development.
- 03 8 considerations when analyzing a biomethane opportunity.



Biomethane, a by-product of the anaerobic digestion of organic waste, serves as green energy that contributes to decarbonization and the circular economy

Biomethane value chain



- 1** Runs on diverse organic inputs: manure, straw, cereal residues and agro-industrial waste.

Feedstock mix varies by region, driving yields and permitting

- 2** Digestate, the main by-product, is valorised as organic fertilizer, solid or liquid

End use depends on processing and local biofertilizer demand

- 3** Upgrading separates CO₂ from raw biogas to reach >90% CH₄

Capturing vs. releasing CO₂ is a cost-value trade-off

Source: KPMG Analysis



**Market needs to
unlock biomethane
based on our
experience**

1.



After the last three years of active advisory in biomethane, we have extracted several learnt lessons of what it takes for biomethane to succeed

The building blocks any market needs to unlock biomethane at scale

01

Abundant, secured feedstock

- **Strong resource base:** agricultural, livestock and agro-industrial
- **Long-term secured supply agreements:** the main constraint at scale

02

Regulation that creates demand

- **Blending mandates / quotas:** guarantee the market
- **Guarantees of origin & certification:** to monetize the green value
- **Permitting-friendly regulation:** clear, fast-track rules for project development

03

Bankable, long-term economics

- **Premium on the renewable attribute**
- **Long-term offtake (GPAs):** de-risks revenues and makes the project financeable
- **Returns that attract capital**

04

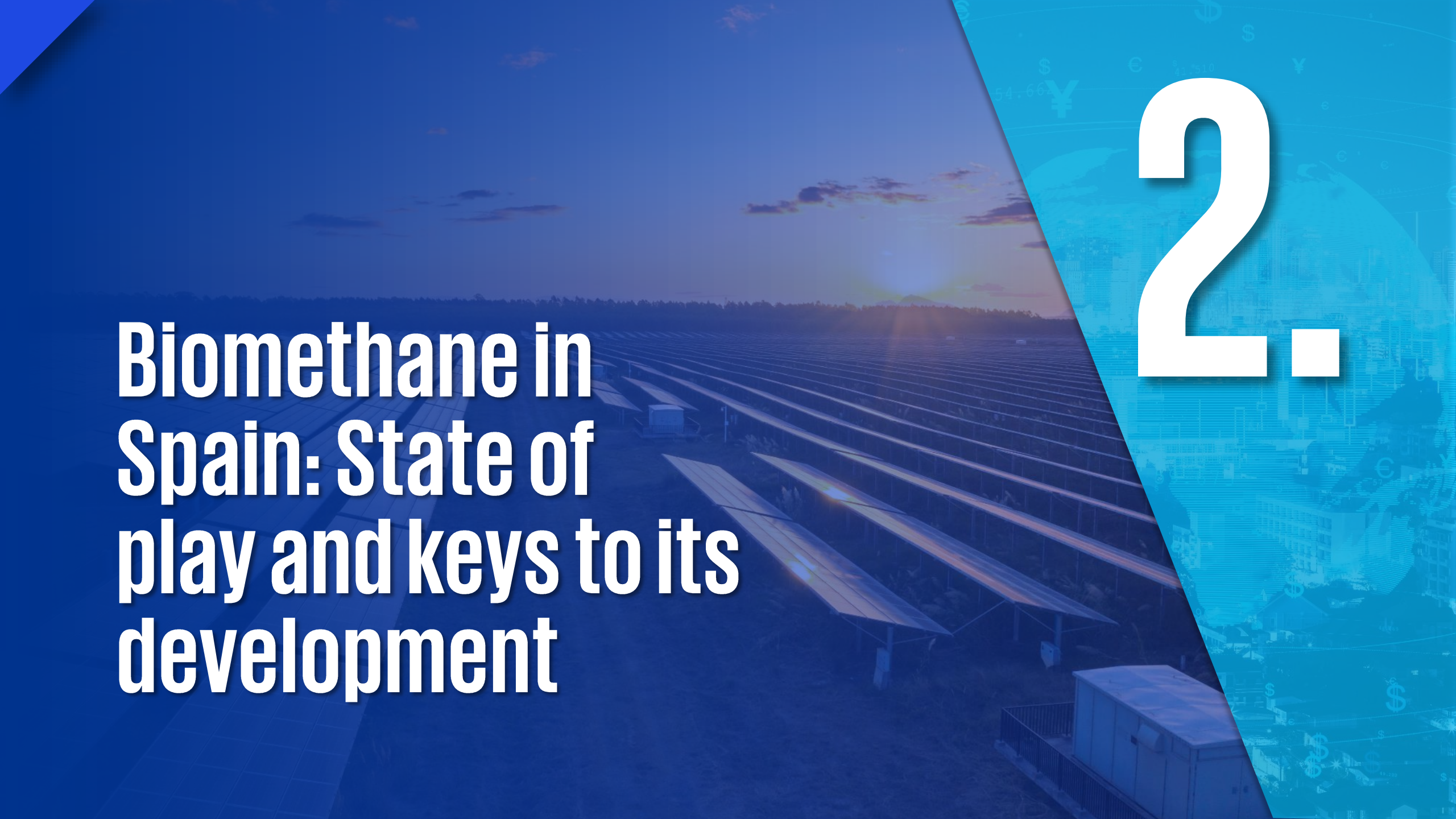
Infrastructure to reach the market

- **Grid injection access** with clear rules
- **Bio-LNG & logistics** where there is no grid
- **Technology & technologists:** proven upgrading and reliable O&M capabilities

05

Capital and capacity to execute

- **Investors & developers with appetite**
- **Real permitting / construction / O&M capacity**
- **Scale / consolidation** to compete

The background of the slide is a photograph of a vast solar farm with rows of photovoltaic panels stretching towards the horizon under a sunset sky. A semi-transparent blue overlay covers the entire image. On the right side, there is a graphic of a cityscape with various currency symbols (dollar, euro, yen) and numbers floating around it. A large white number '2.' is positioned on the right side of the slide.

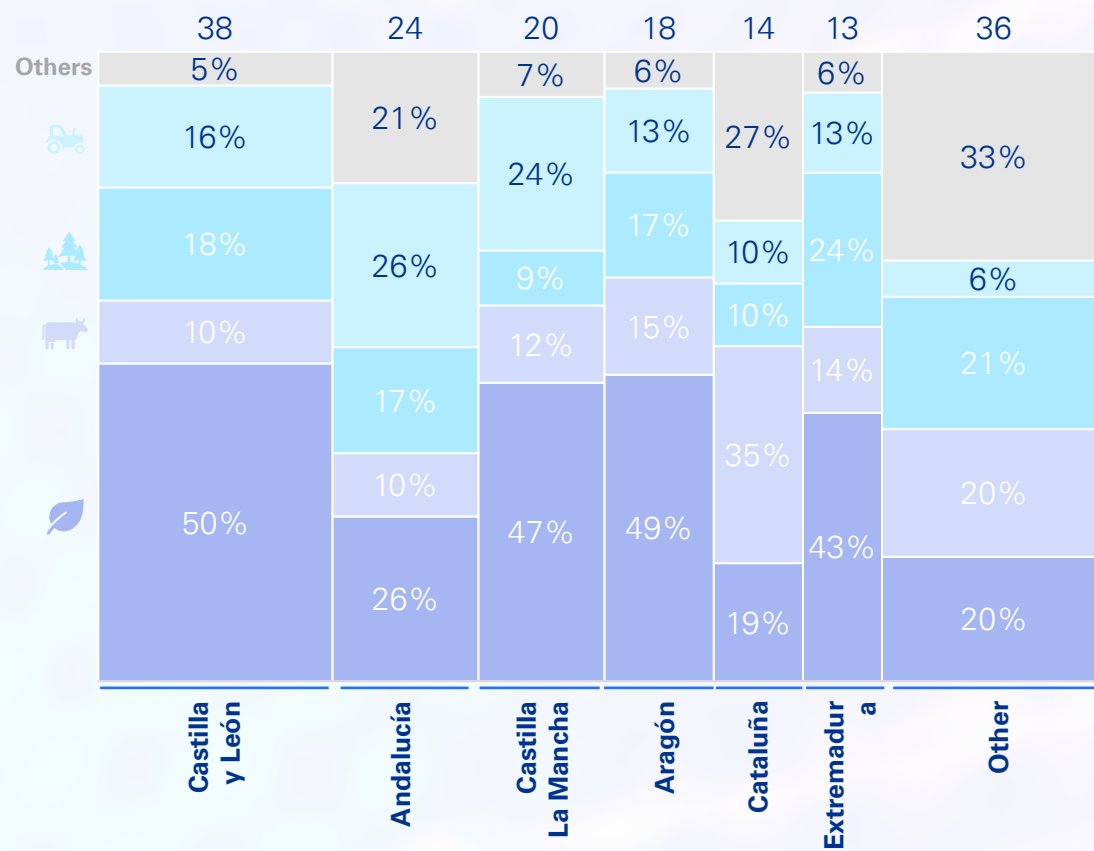
Biomethane in Spain: State of play and keys to its development

2.



Spain's agricultural and livestock strength supports biomethane production and is anchored in four main feedstock types and six core regions

Main types of feedstock in Spain and distribution across main regions (Potential TWh/year, %; 2023)



Intermediate crops

Plant biomass grown between main crops, not for food or feed

59 TWh

Yearly feedstock potential in Spain

320 m³/t

Average yield of dry matter¹

Forest biomass

Organic material like thinnings, logging residues or sawdust

28 TWh

Yearly feedstock potential in Spain

110 m³/t

Average yield of dry matter¹

Livestock farming

Residue including animal manure and slurry

25 TWh

Yearly feedstock potential in Spain

70 m³/t

Average yield of dry matter¹

Agriculture

Biomass including crop residues like straw, damaged crops, and olive pomace

25 TWh

Yearly feedstock potential in Spain

210 m³/t

Average yield of dry matter¹



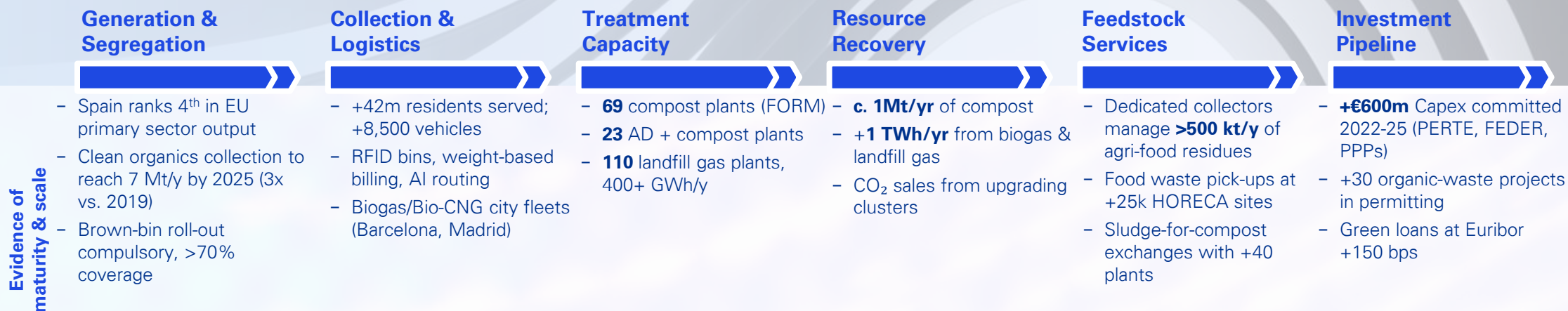
At project level, a predictable feedstock mix is critical—it optimizes output, stabilizes operations, and enables bankable, low-risk business planning

Note: 1. Illustrative biogas yield, assuming a 60% of methane
Source: International Energy Agency; Sedigas; KPMG Analysis



Spain also has a very mature waste management sector, with established players and nationwide treatment facilities—ensuring reliable, widespread access to feedstock

Digestate flow, applicable regulation, and regional fertilizer buyers



Leading players / flagship assets

+90,000 cow farms
+35,000 pig farms
+19,000 poultry farms



Ecocáceres

Humusur



Note: 1. WWTP stands for Wastewater Treatment Plants

Source: KPMG Analysis



Spain is still lagging behind EU peer countries who have enjoyed support incentives in the past – Further development is expected to close the gap in the mid-term

Comparison of the degree of development of biomethane grid projects in Europe (2025)

+ Policy and regulatory backing		Annual injection ¹	Plants to grid (#)	Support levers
	Germany <i>The benchmark market, with strongest support</i>	11 TWh	258 plants	– The benchmark market, with long-term price certainty through feed-in premiums and strong credit value under the THG quota (€600/tCO ₂ e penalty), enabling sustained demand and over 250 plants
	France <i>Mature scheme, moving to auctions</i>	10 TWh	753 plants	– Most mature market by number of plants (>700), supported by generous feed-in tariffs (€60–120/MWh for 15–20 years) and Guarantees of Origin, now shifting gradually to competitive auctions
	Italy <i>Strong momentum from recent reforms</i>	6 TWh	96 plants	– Recent reforms introduced new FIT/FIP schemes and transport credits (CIC), providing €32–65/MWh depending on use; Capex subsidies can reach up to 40%, boosting project bankability
	Denmark <i>Stable framework, no premium tariffs</i>	8 TWh	59 plants	– Stable, cost-covering FIP system (~€50/MWh) without a national mandate; blending is operationally mandated and biomethane benefits from tax exemptions, especially for heating
	Spain <i>Lagging behind, but with export upside</i>	0.4 TWh	26 plants	– Lacked a full support scheme, with only 26 plants to date; however, export potential into premium markets (e.g. Germany) offered short-term monetization while regulation develops

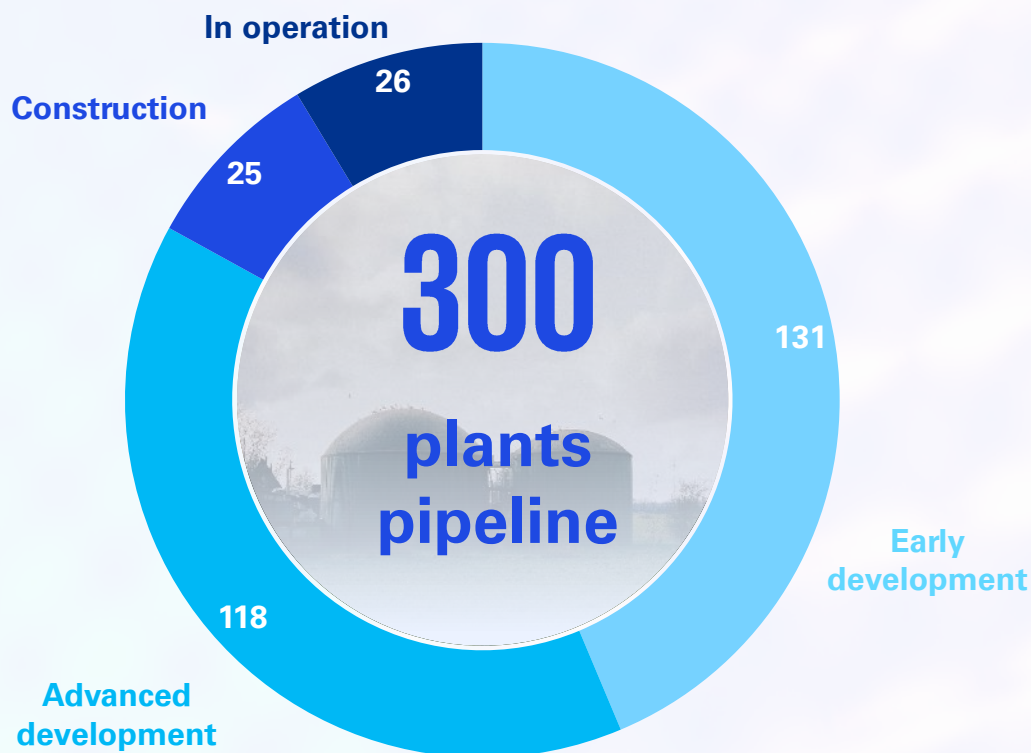
Note: 1. Annual actual injection figure, not capacity

Source: EU Commission; Biomethane Industrial Partnership; Sedigas; KPMG Analysis

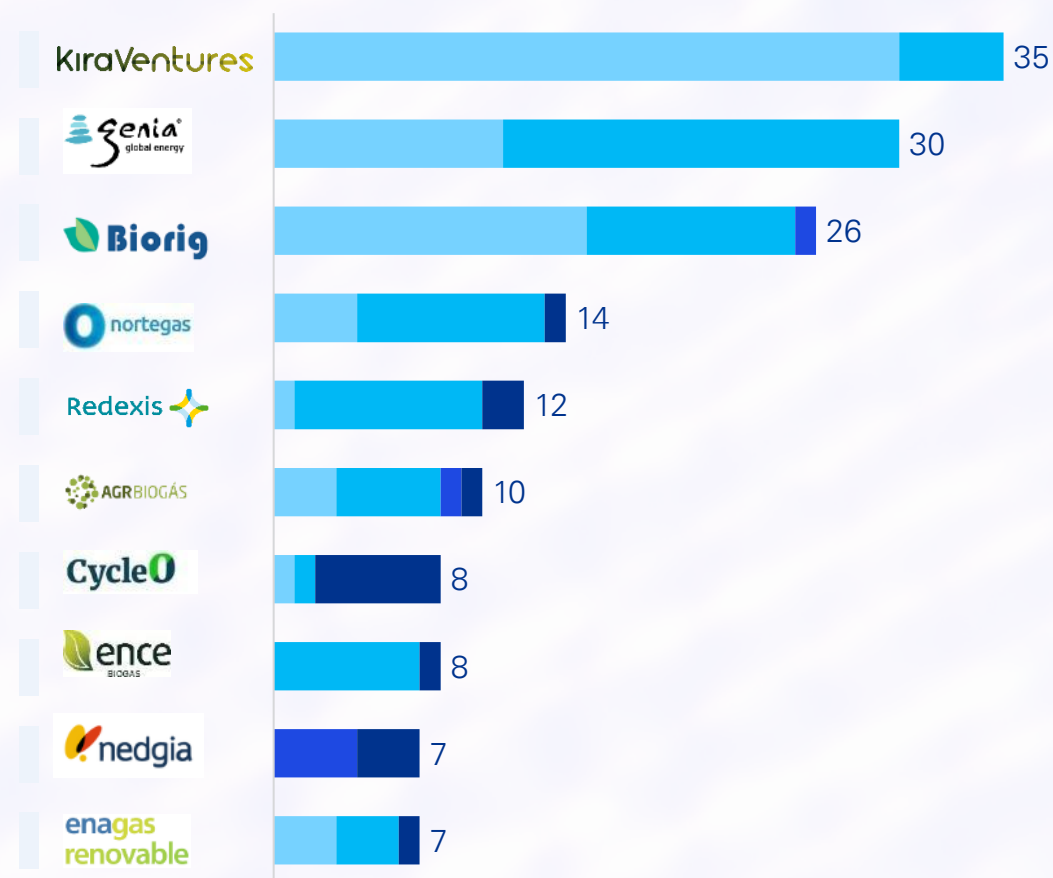


Pipeline maturity is driving investor attention, although a large pipeline of projects is still stalled, pending final permits to advance

Spanish biomethane project portfolio



Portfolio from main developers in Spain^{1,2}

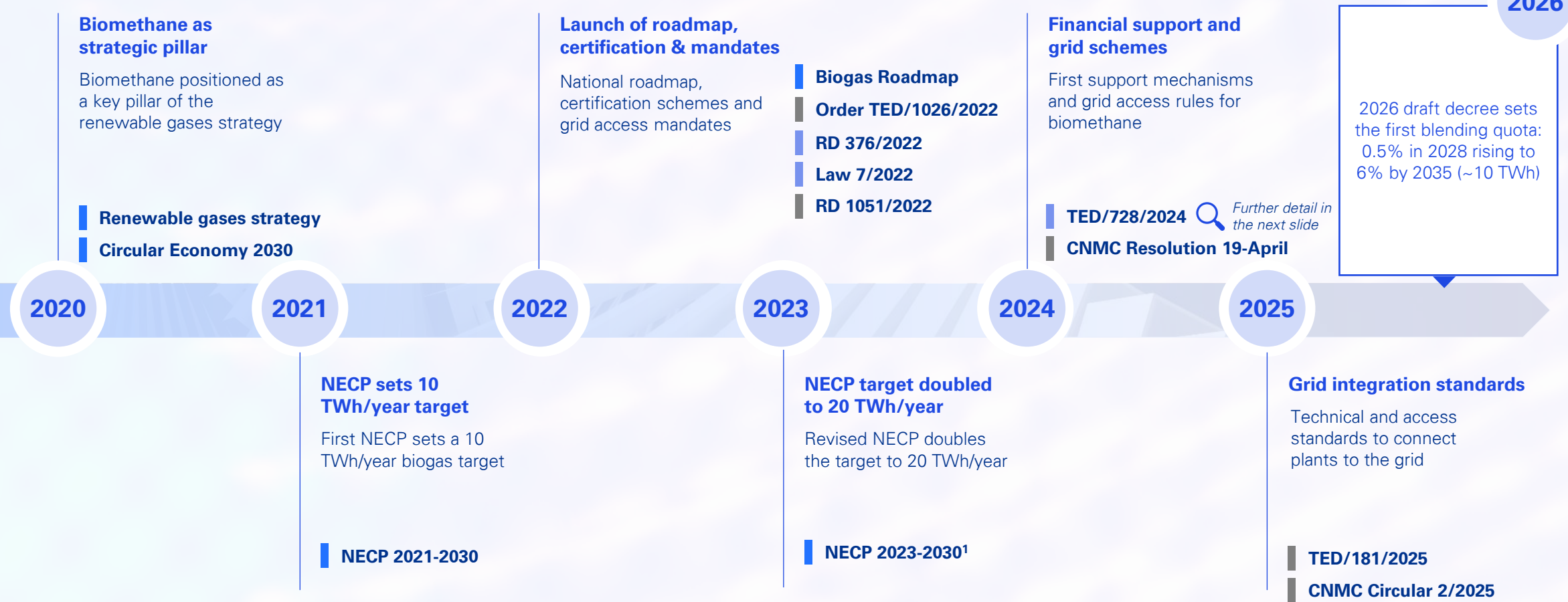


Note: 1. Based on public information on declared pipelines, not stated targets; 2. Kira Ventures figure comprises 20 plants of JV kamBIO and 15 of JV with Moeve. Genia's figure contains 19 plants of JV with Repsol
Source: Sedigas; Gasnam; Company information; KPMG Analysis



However, in recent years, Spain has established a comprehensive framework for biomethane, including the regulatory building blocks for future incentive mechanisms

Evolution of Spanish biomethane regulation



Source: MITECO; CNMC; KPMG Analysis



Compliance schemes ultimately determine the willingness to pay — with the highest-penalty markets setting the benchmark for biomethane pricing

Biomethane willingness to pay by final customer cluster^{1, 2}

	Final consumer cluster	Willingness to pay (2027)			Compliance mechanism	Future outlook
		Energy molecule ³	EUA ⁴	Other premium		
Price + -	 Transport (Draft RD + Order TED 728/2024)	c.32 €/MWh	×	~130 €/MWh	Compliance via certificates (CTA-A in Spain from 2026, THG in Germany already active)	↑ Peak 2027-30, compression post-2031 as new advanced supply enters
	 Maritime (EU)	c.32 €/MWh	~15 €/MWh	~10-12 ⁵ €/MWh	EU ETS (mandatory) + FuelEU Maritime penalty on the non-compliant energy split	↑ Premium widens to as the FuelEU target tightens to -6 % in 2030 and -14,5 % in 2035
	 Industry (EU)	c.32 €/MWh	~15 €/MWh	×	EU ETS savings achieved by avoiding carbon allowances (EUAs)	↗ Expected growth - especially among ETS-covered sectors aiming to decarbonise
	 Residential heating	c.32 €/MWh	×	×	Purchase of voluntary Guarantees of Origin (GOs) to certify renewable origin	→ Flat - no binding obligation or strong price signal
Biomethane pricing is set by the marginal buyer — currently transport, driven by certificate schemes. Other sectors may gain relevance as regulation expands						

Note: 1. Assuming current price dynamics and the RED III transposition as of July 4, 2025 ; 2. In transport markets, value is driven by certificates, not the physical molecule, with bundled deals typically traded at a premium; 3. Fossil gas price, ranging around €30-40/MWh; 4. EUA value (~€60-90/tCO₂e avoided); 5. FuelEU Maritime penalty: 2,400 €/t VLSFO-eq applied only on the non-compliant energy split; 6. Voluntary, very low premium (GO ~€1-3/MWh)

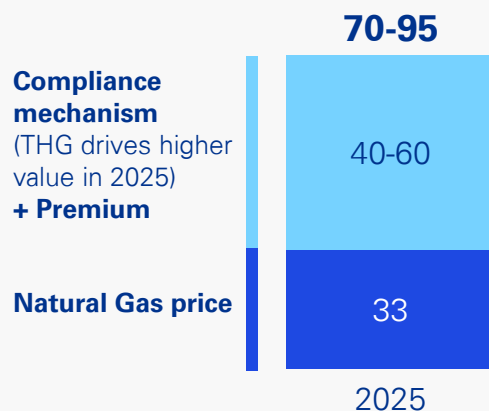
Source: Desktop research; KPMG Analysis



Under current regulatory schemes, and looking ahead, prices may peak by 2026–30, with a second wave driven by maritime schemes (FuelEU) and rising EUA prices

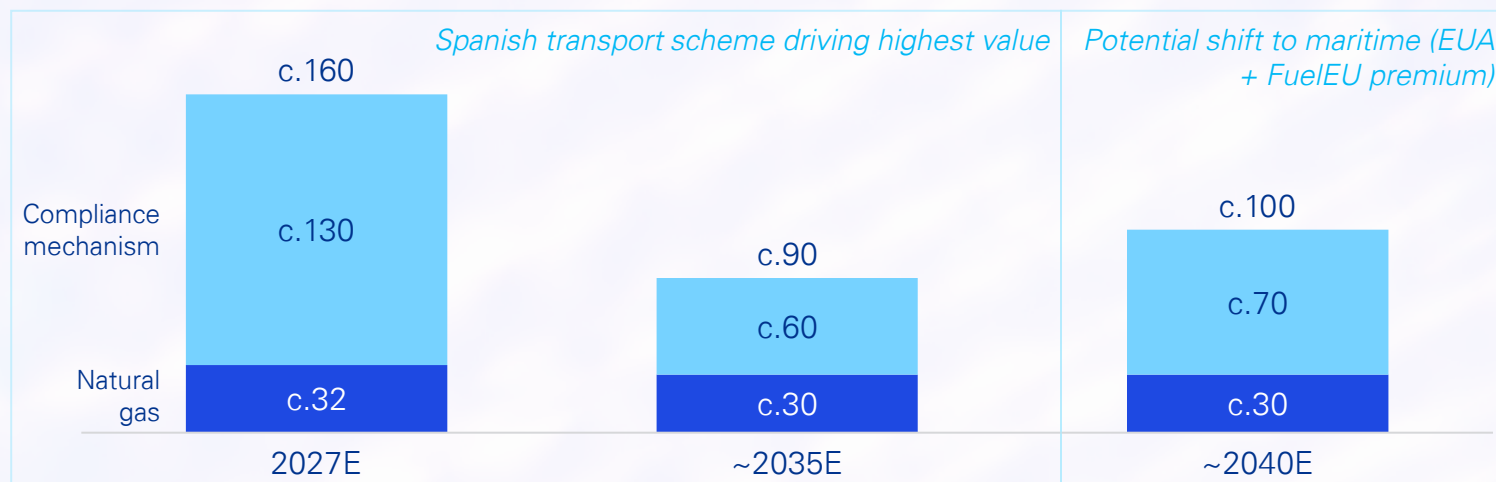
Biomethane prices comparison (€/MWh; 10-year GPA price today, 2027E, 2035E, 2040E)^{1, 2}

GPA 10-year fixed price



Today: GPA prices are typically based on the price of grey gas plus the expected cost of compliance (currently driven by the German THG scheme), with an additional premium as buyers anticipate rising CTA prices and seek to lock in supply early

Expected one-year spread



2026–30 | Demand shock, sharp premiums

The 4 % transport quota starting 2027 triggers a supply gap in CTAs. Prices may spike to €1 300–1 600/CTA (~€120–140/MWh), before softening from 2028 as supply ramps up

2031–35 | Tight balance, gradual easing:

New biomethane, ethanol and HVO capacity adds ~0.3–0.4 M CTAs/year. Premiums expected to ease to €50–70/MWh, but the market remains structurally tight

Post-2035 | Long-run floor and ceiling:

Maritime rules support a €90–100/MWh floor (bio-LNG). Over time, falling hydrogen and e-fuel costs set a price ceiling around €90–100/MWh

Note: 1. Assuming current price dynamics and the RED III transposition as of July 4, 2025; 2. Figures expressed in real 2025 euros (no inflation adjustment applied)

Source: Aurora Research; Baringa; IEA; EnerData; Desktop research; KPMG Analysis



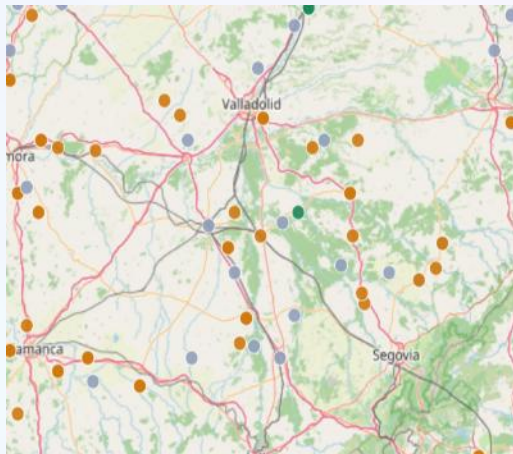
8 considerations when analyzing a biomethane opportunity

3.



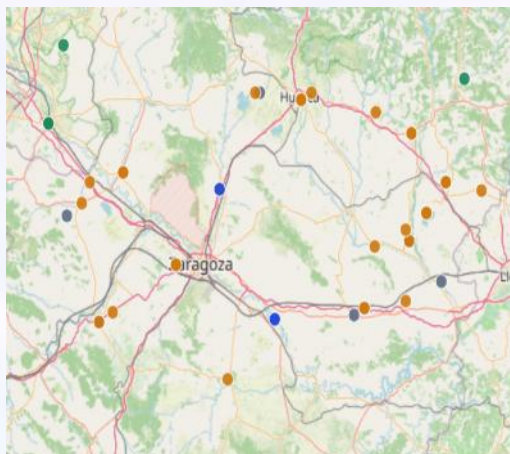
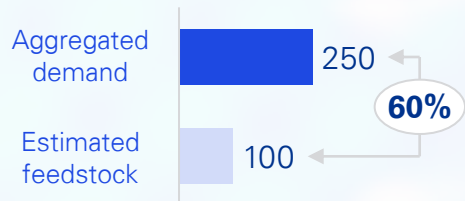
As development clusters in feedstock-rich areas, competition skyrockets – Only early movers will secure required resource base

Feedstock battlegrounds: high competition, scarce resource



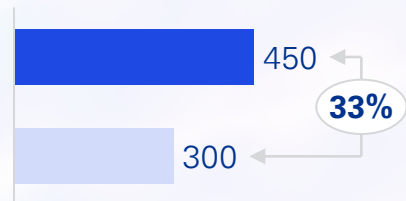
- Broad feedstock base attracts developer positioning

Feedstock is 2.5x oversubscribed



- Dense manure basin backed by gas and logistics infra

+10 projects competing for the same feedstock basin



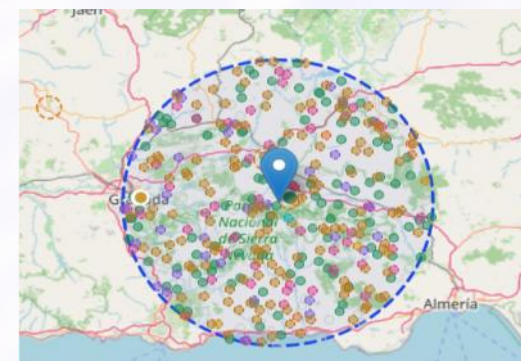
Feedstock strongholds: successful lock-in cases



OPERATING La Calahorra

Early positioning in an underserved feedstock basin

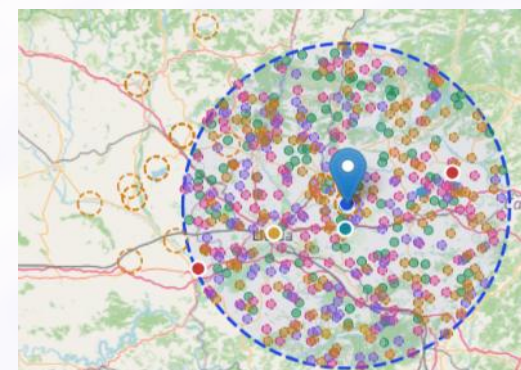
- Sole large-scale offtaker in a low-competition basin
- Long-term access to ~288 kt/y of feedstock within 30 km



UNDER CONSTRUCTION La Sentiu de Sió

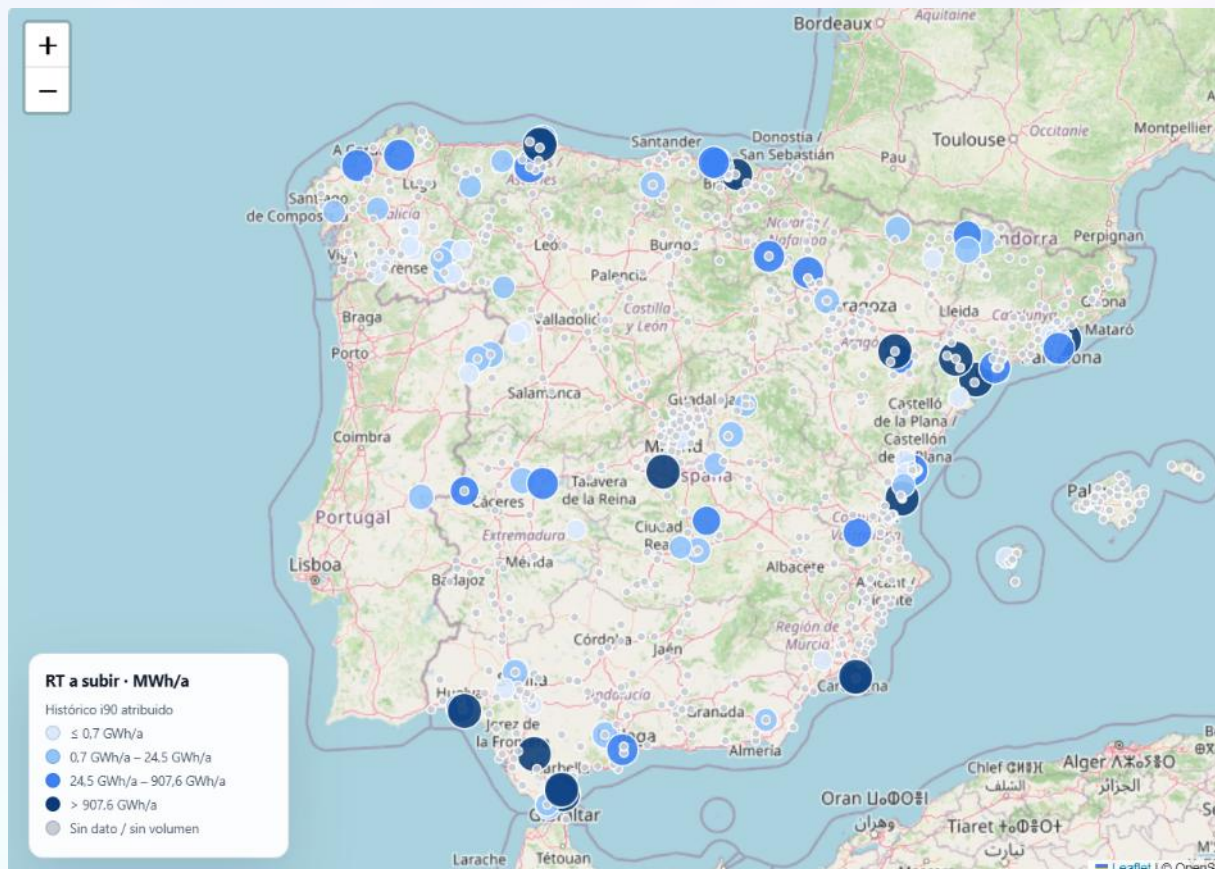
Securing first-mover advantage in a highly competitive basin

- Locked feedstock before competing projects reached FID
- Structural leadership despite intense local competition



Power grid access is becoming a critical competitive differentiator for biomethane projects

Real-data examples of constrained power grid nodes in Spain (May 2026)



Key implications of power grid constraints:



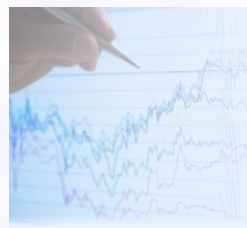
Grid access is increasingly scarce:

- > High-quality locations are often associated with constrained substations



CHP provides an alternative:

- > Off-grid CHP can unlock projects where export capacity is unavailable



Not every project qualifies:

- > CHP only creates value when plant scale and GPA economics compensate for the lower biomethane output

Note: 1. Assumptions taken Biomethane run rate: 100 GWh/y; Feedstock intake: 150-200 kt/y; Feedstock type: mainly manure; Availability: ~92% availability (h/y); Digestate: 90-95% of input mass; 2. NVZ stands for Nitrates Vulnerable Zones

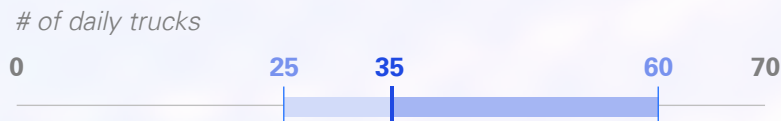
Source: Redeia; KPMG Proprietary Tools; KPMG Analysis

Plant design and operations remain undervalued strategic levers – yet they increasingly define asset competitiveness and long-term value

Illustrative operating benchmarks for a 100 GWh/y plant

Daily truck movements

Liquid content



Feedstock storage (d)

Arrivals variability



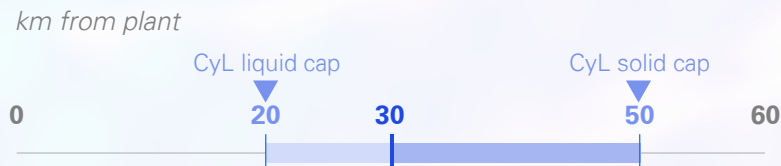
Digestate storage (m)

Agro windows



Catchment radius

Competition + regulation



Actions to keep operating fluctuations under control

Keep logistics asset-light — but control the loop

Outsource transport at 25–35 daily movements, keep scheduling control and use feedstock–digestate backhauls.

Buy operational resilience, not excess storage

A 5–10 day buffer absorbs normal disruption; more storage ties up capital and erodes yield.

Secure the digestate outlet before scaling the plant

4–6 months of storage is production insurance; secure landbank and offtake, or treat it.

Manage catchment as a margin boundary, not a fixed radius

c.20–30 km for liquids and c.50 km for solids; go further only for energy-dense or gate-fee feedstock.

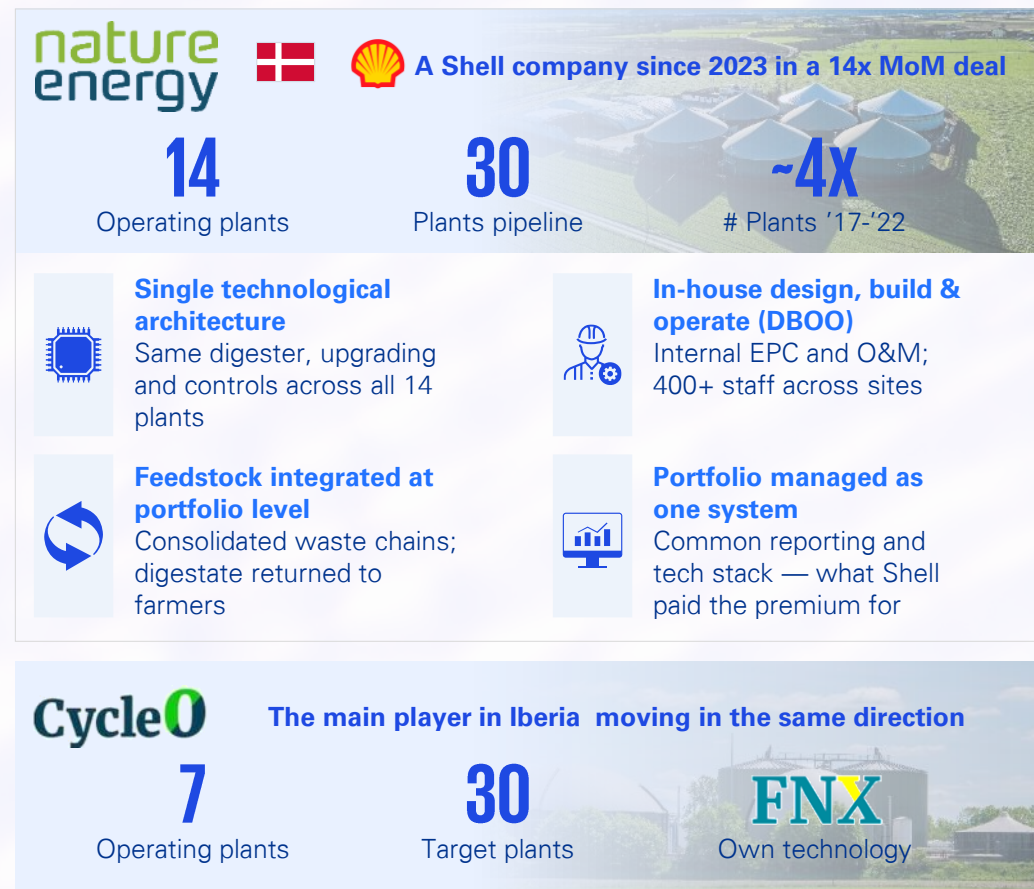
Note: 1. 100 GWh/y plant, 150–200 kt/y feedstock (mainly manure); NVZ: Nitrates Vulnerable Zones
Source: Desktop research; KPMG Analysis

Portfolio standardization materially increases operating performance and exit value—but only if embedded before individual projects start diverging

Actions to protect portfolio value through standardization

- **Lock technology choices before the portfolio scales**
Standardize the digester, upgrading technology and control systems before individual projects evolve independently
- **Own the build and the operation — in-house or via JV**
Retain engineering and operational capabilities to preserve know-how and execution consistency across the portfolio
- **Manage feedstock at portfolio level**
Leverage regional sourcing, framework agreements and integrated digestate management to reduce procurement risk and operating costs
- **Manage the portfolio as one system**
Standardize KPIs, reporting, traceability and operating processes to maximize operational and transaction value

Illustrative examples of successful portfolio standardization



Note: 1. MoM stands for Money-on-Money multiple; total proceeds to investors divided by total equity invested
Source: Nature Energy; Cycle0; FNX; KPMG Analysis

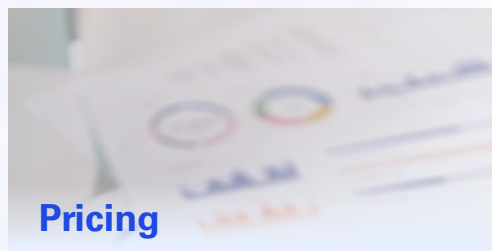
Most business plans overestimate feedstock security by treating availability as bankable supply, despite MoUs requiring substantial strengthening before financial close

Key contractual areas to strengthen feedstock MoUs before financial close



Volume commitment

- Feedstock volumes, tolerances and seasonality
- Indicative agreements with local suppliers (LoIs / MoUs)
- Substitution baskets and anti-diversion clauses on the waste stream
- Supplier change-of-activity and availability-reduction protections



Pricing

- Base-case feedstock economics (gate fee vs. purchase price)
- Price/cost mechanics linked to feedstock quality and rejection rates
- Cost allocation for logistics, storage and unloading incidents
- Remedies and price adjustments for feedstock deficits or non-conformities



Quality

- Minimum feedstock specifications (moisture, organic matter, impurities)
- Binding logistics assumptions
- Acceptance protocol and rejection criteria (Sampling protocol, etc.)
- Delivery obligations and unloading responsibilities



Traceability

- Eligible feedstock and sustainability certification (RED III / ISCC-EU)
- Documentary consistency across contracts, technical memos and permits
- Documented chain of custody and traceability records
- Contractual remedies for loss of eligibility (double-counting, registry rejection)

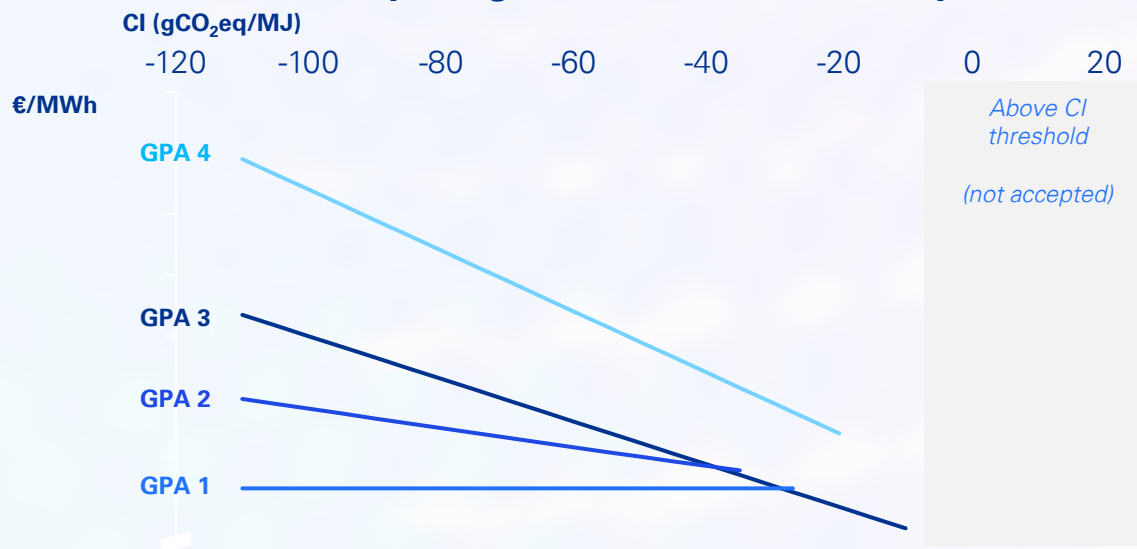
►► The gap between indicative supply agreements and bankable feedstock contracts is significantly larger than most business plans assume; Availability is enough for an investment committee. Security is what lenders finance

Typically covered in early MoUs

Typically required before financial close

CI will remain a key driver of biomethane value, although achievable levels are largely determined during project development

Illustrative BPA pricing structures from market precedents

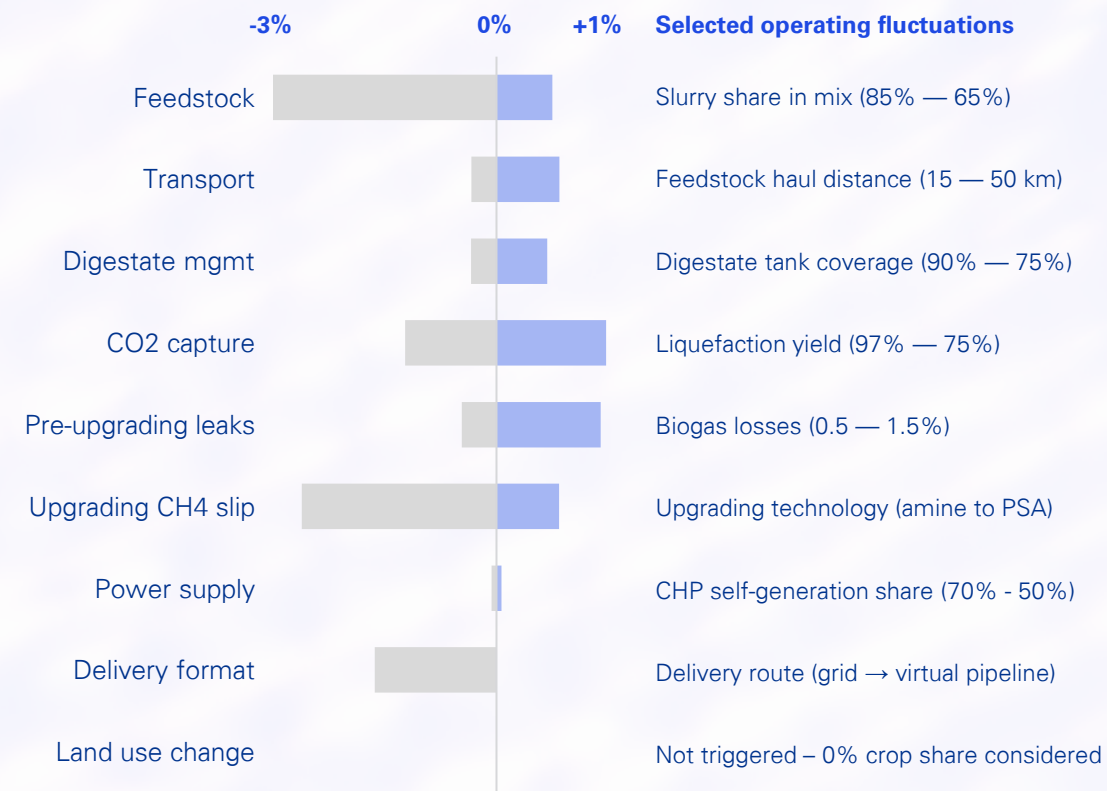


Common contractual fields:

Product & certificate	Long-term commitment	Sustainability compliance	Development contingencies
Biomethane/bioLNG	5-10 yr tenor	ISCC/REDcert	FID, COD & permitting conditions
PoS/GoO	Volume obligations	CI requirements	

Sensitivity analysis of GPA revenues based on CI (€/MWh)¹

Operating fluctuations can compress revenues — i.e. by ~10% in this example — or breach the BPA's CI eligibility threshold in combined scenarios



Note: 1. Uses illustrative GPA 1: €95/MWh base, CI anchor –40, slope €0.30/g, threshold –10 gCO₂eq/MJ. The shown values the upside and downside ones that create the range between both.

Source: Desktop research; EU Lex; EBA; KPMG Analysis

Effective by-product management is critical to minimise its burden and can potentially turn a cost into revenue

Main biomethane subproducts per ton of feedstock

Digestate

~980kg

- > The CO₂ fraction contained in the biogas from digester is separated in the upgrader
- > This biogenic carbon dioxide can be used in greenhouses or in synthetic fuels production

Biogenic CO₂

~14kg

- > The CO₂ fraction contained in the biogas from digester is separated in the upgrader
- > This biogenic carbon dioxide can be used in greenhouses or in synthetic fuels production

Impurities

~0.03kg

- > This group contains mainly H₂S trace and siloxanes removed in the upgrader
- > Removed for protecting equipment and meeting biomethane specs, have no commercial value

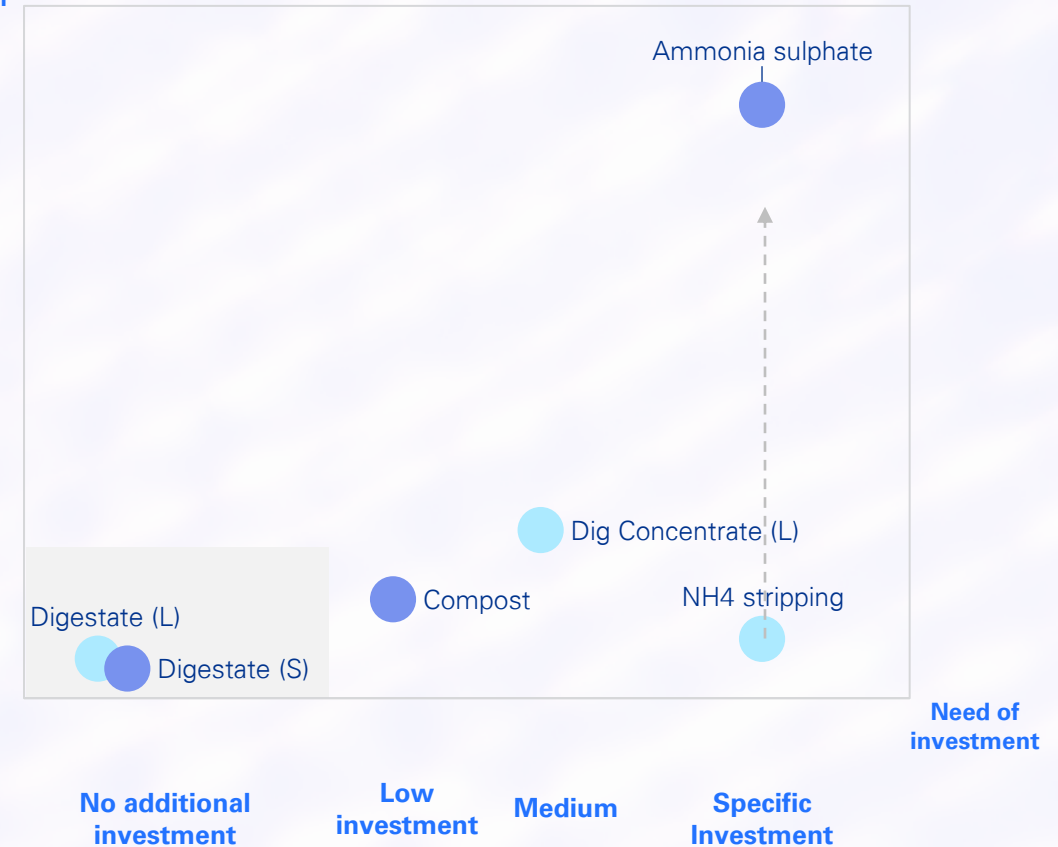
Digestate management options: price and investment level

Potential value capture (€/t)
~€300/t

~€20/t

~€10/t

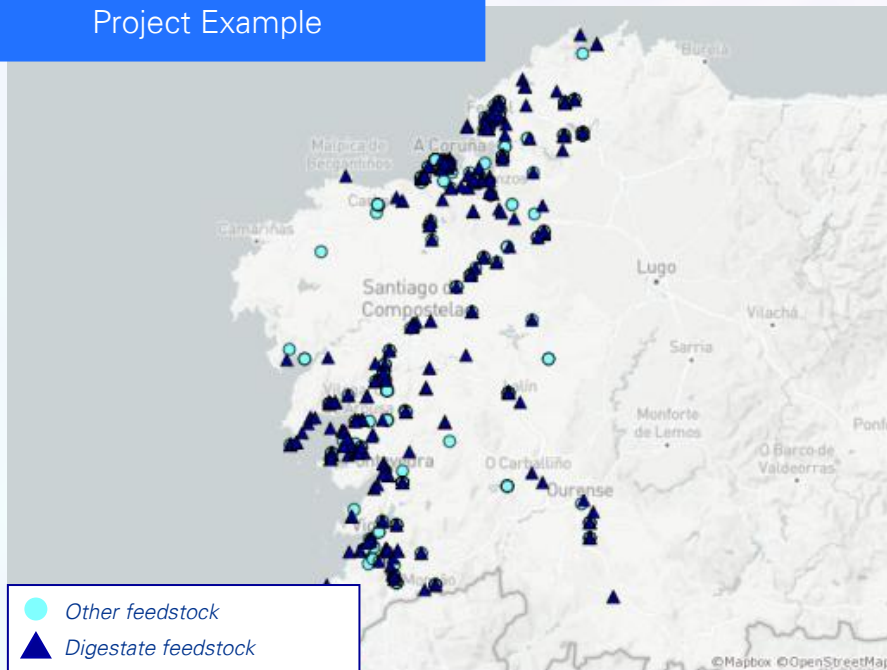
~€0/t



Spatial analytics emerge as a powerful tool for identifying the best location to maximize the returns on a biomethane project

Example: Geolocation of feedstock producers in Galicia

Project Example



Source: KPMG Analysis

Spatial analytics – Methodological approach (project example)

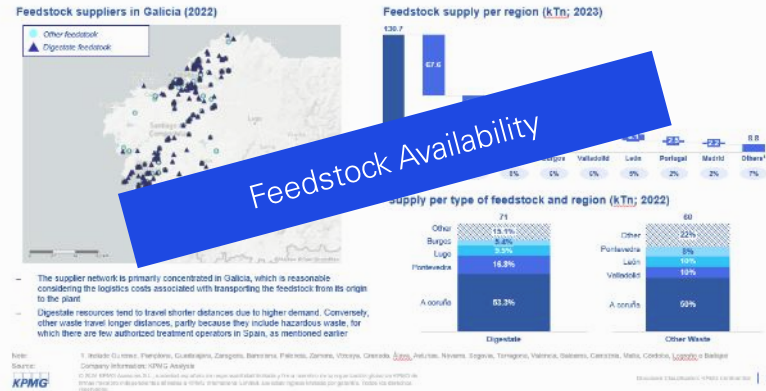
- 01** Geoposition feedstock sources and identify the respective types
- 02** Estimate the potential feedstock (available info, regression)
- 03** Geoposition the injection points of natural gas transport network
- 04** Representation of 20 and 40km radii around geopositioned points
- 05** Identification of 'honey spots' based on volume and distance

It is important to conduct an analysis of feedstock availability, considering the existing supply and potential demand, including other projects

Example of analysis for biomethane project

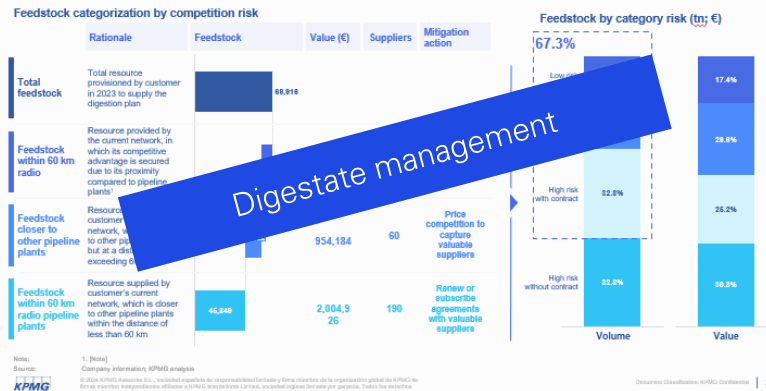
02. Competitive advantage and robust business model

2B Customer's suppliers network is mainly concentrated in Northern Spain, which is consistent given the impact of logistics costs on margin per tonne



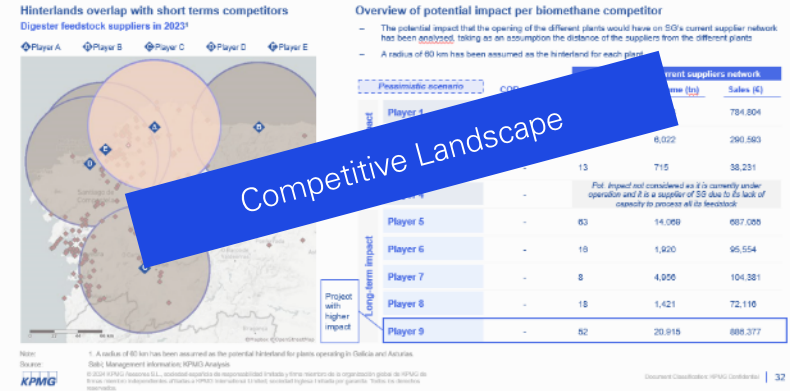
02. Competitive advantage and robust business model

2C Meanwhile, it could be possible to secure 67% of its digestate feedstock through logistic competitive advantage, price-based strategy and supply agreements renewal



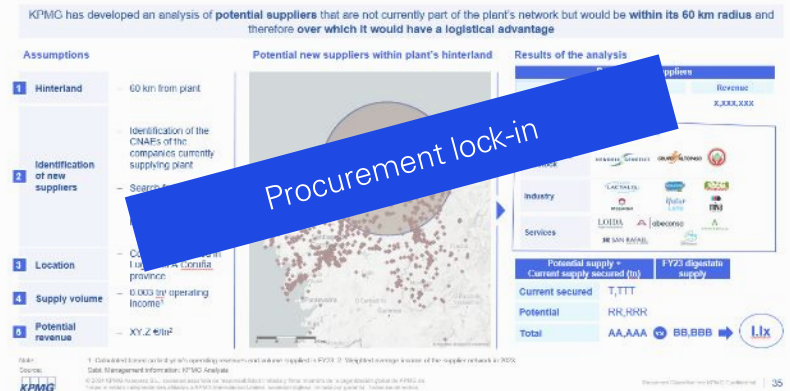
02. Competitive advantage and robust business model

2C Opening of new plants nearby may lead to overlaps with customer's hinterland, resulting in a potential loss of its logistical competitive advantage



02. Competitive advantage and robust business model

2C Thus, it seems that outside its supplier network, the plant would have within a 60 km radius more than x times the resources it currently utilizes at the digestion plant



Comparing their hypothesis data with other portfolios of similar size, so that inconsistencies or particular situations in certain projects can be detected

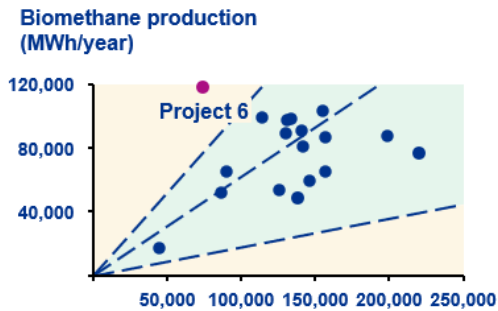
Example of benchmark data comparison

CDD PROJECT
ILLUSTRATIVE
EXAMPLE

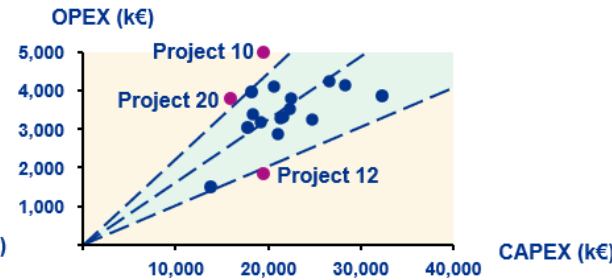
Project KPIs analysis

Vendor
benchmark

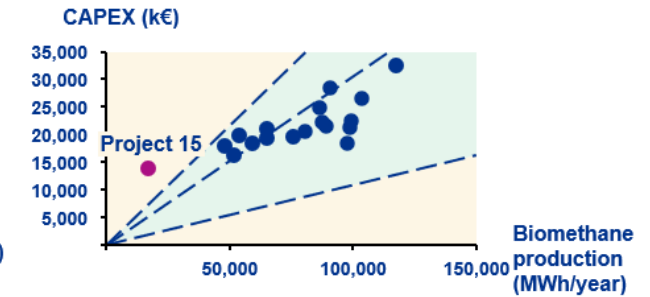
Biomethane efficiency (MWh/Tn feedstock)



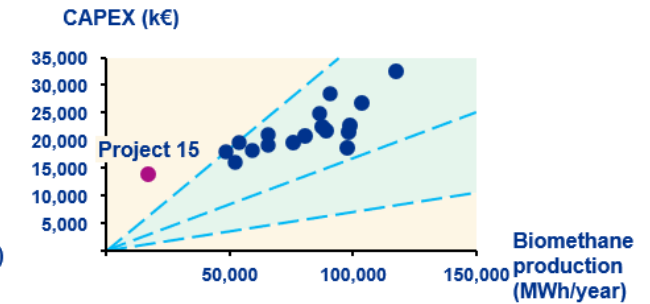
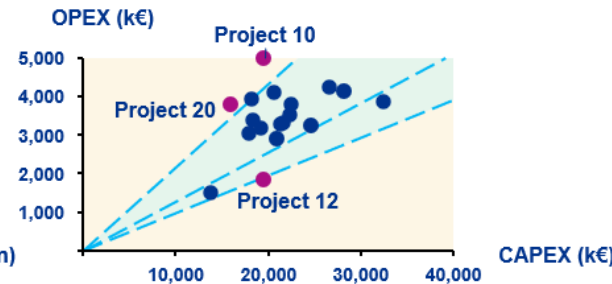
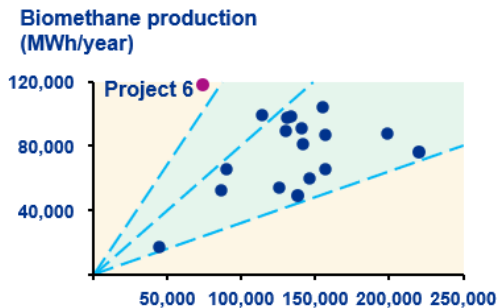
OPEX/CAPEX (%)



Capex per GWh (€/GWh produced)

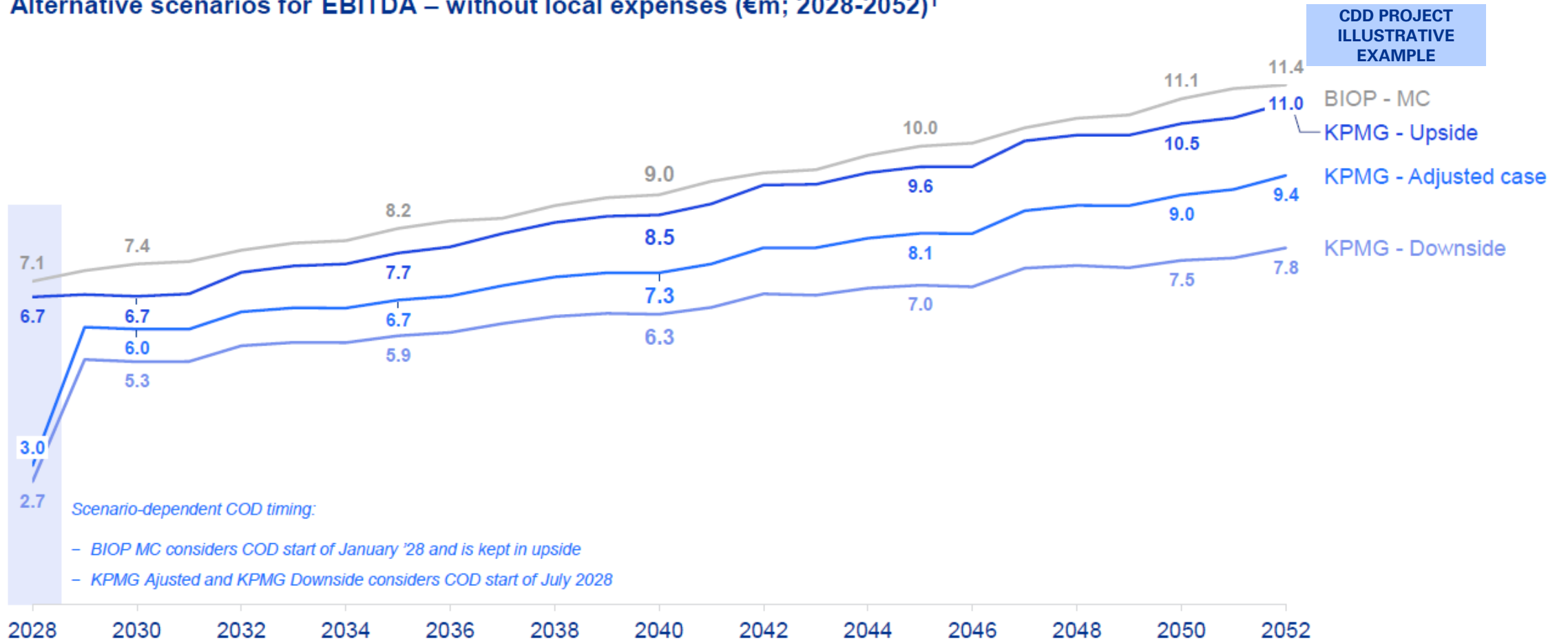


KPMG
benchmark



To later adjust the assumptions to more realistic scenarios, always on a project-by-project basis

Alternative scenarios for EBITDA – without local expenses (€m; 2028-2052)¹



Note: 1. None of the scenarios take into account the potential bottlenecks in plant that may jeopardize production levels

Source: Company information; KPMG Analysis

Source: KPMG Analysis



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