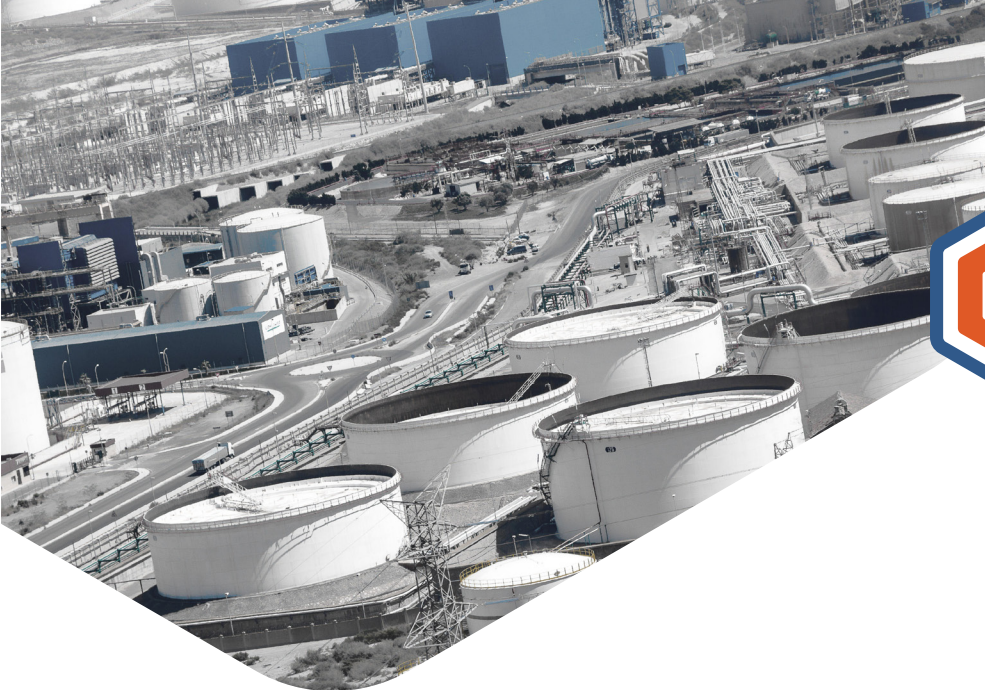




EKONA™

Evaluate methane pyrolysis as a commodity hydrogen pathway.

info@ekonapower.com

Industrial Hydrogen

A LOW-EMISSION OPTION FOR INDUSTRIES INCLUDING AMMONIA, METHANOL, PETROCHEMICALS, AND REFINING

Industrial hydrogen is the largest source of hydrogen demand today and will remain a foundational industrial commodity. While end-use demand is evolving, hydrogen's role as a high-volume, price-sensitive industrial input is not.

Today, most industrial hydrogen is produced via high-emission pathways such as steam methane reforming (SMR). Lower-emission alternatives often depend on high electricity availability, volatile power pricing, or carbon capture and storage (CCS) infrastructure, all of which introduce additional cost, complexity, and execution risk.

As regulatory frameworks increasingly define hydrogen by emissions intensity, commodity supply chains face a structural challenge: delivering hydrogen that is both cost-competitive with SMR and compliant with clean hydrogen standards, across regions and at industrial scale. Achieving both — without dependence on electricity-intensive systems or carbon dioxide (CO₂) transport and CCS infrastructure — remains difficult for most pathways.

INDUSTRIAL HYDROGEN REQUIREMENTS

For hydrogen to function as a viable commodity under current and emerging conditions, production pathways must meet a narrow set of simultaneous requirements.



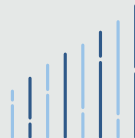
COST COMPETITIVENESS

Hydrogen must remain cost-competitive with SMR across regions to be viable in commodity markets



EMISSIONS COMPLIANCE

Lifecycle emissions must meet jurisdiction-specific thresholds for clean hydrogen



INDUSTRIAL SCALE

Continuous, high-volume production (e.g., ~20 tpd) is required to serve established demand



INFRASTRUCTURE ALIGNMENT

Must integrate with existing industrial infrastructure; hydrogen transport and CCS networks are limited or costly in many regions



OPERATIONAL RESILIENCE

Requires predictable supply with minimal exposure to feedstock, power, or logistics volatility



Challenges with existing hydrogen pathways

EACH COMMERCIALLY AVAILABLE HYDROGEN PRODUCTION PATHWAY HAS STRENGTHS AND LIMITATIONS.

Steam Methane Reforming (SMR) remains cost competitive but carries significant lifecycle greenhouse gas emissions.

SMR + CCS can reduce emissions but introduces additional cost and depends on access to carbon capture, transport, and sequestration infrastructure.

PEM Electrolysis can produce low-emission hydrogen but is highly sensitive to electricity pricing, power availability, and grid emissions intensity.

Ekona's methane pyrolysis pathway

Methane pyrolysis offers an alternative approach by producing hydrogen with low GHG emissions, large-scale electrification, or reliance on carbon capture, transport, and storage infrastructure.

THE XCALIBER™ REACTOR PLATFORM

INTEGRATED

Co-produces hydrogen and ASTM-grade carbon black within a single system

FLEXIBLE

Deployable using existing natural gas supply and industrial infrastructure

SCALABLE

Designed for repeatable, industrial-scale deployment across geographies

EFFICIENT

Minimizes requirements for water, new pipelines, and dedicated renewable power

RENDERING:
20 TPD XCALIBER™ PLANT

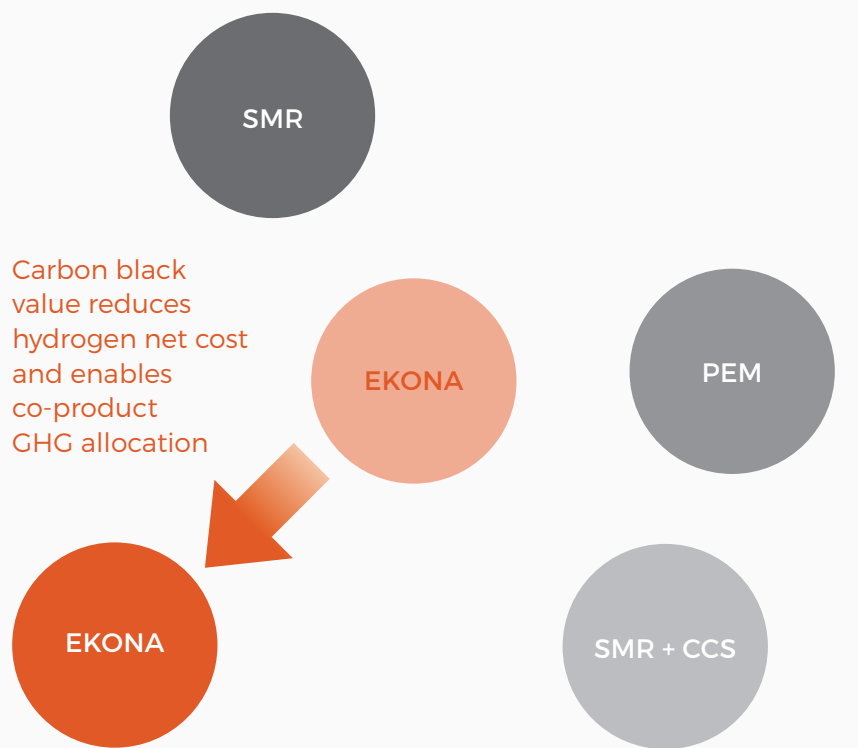
Comparison with conventional and low-emission hydrogen

Ekona has developed a commercial-scale design package and techno-economic model to evaluate how Ekona's xCaliber methane pyrolysis platform performs in a Canadian industrial use case, with integrated production of ASTM-grade carbon black.

EKONA DELIVERS LOW-EMISSION HYDROGEN THAT'S COST-COMPETITIVE IN COMMODITY MARKETS

- Valuable ASTM-grade carbon black co-product reduces net hydrogen cost and GHG emissions through co-product allocation
- Net levelized cost of hydrogen production competitive with cost of commodity hydrogen
- Low lifecycle emissions can meet North American clean hydrogen standards
- Avoids dependence on large-scale electrification or CCS infrastructure

GHG INTENSITY (KG-CO₂e/(KG-H₂))



H₂ PRODUCTION COST (\$/(KG-H₂))

Assumptions

- Results reflect a commercial-scale system (~20 tonnes per day), aligned with industrial applications
- ASTM-grade carbon black is produced and sold as a co-product
- Emissions are allocated across hydrogen and carbon outputs
- CCS pathways do not include additional transport or storage constraints

EKONA: NATURAL GAS -> CLEAN HYDROGEN
SMR: STEAM METHANE REFORMING
PEM: GRID ELECTROLYSIS HYDROGEN
CCS: CARBON CAPTURE & STORAGE



Explore the underlying industrial hydrogen analysis

Detailed technical and regional assumptions underpinning this summary are available on request.



Evaluate methane pyrolysis as a commodity hydrogen pathway.

Connect with Ekona to explore how methane pyrolysis performs under commodity market conditions. info@ekonapower.com

ABOUT EKONA

Ekona develops clean hydrogen and clean carbon black solutions for industrial deployments. Our xCaliber™ methane pyrolysis platform leverages existing natural gas infrastructure to produce low-emission hydrogen and clean carbon black at scale, supporting cost-effective decarbonization across energy intensive industries and materials markets. ekonapower.com

USE CASE SCOPE, LIMITS, AND KEY ASSUMPTIONS

This use case is a summary-level representation of Ekona's industrial commodity hydrogen analysis. It is intended to illustrate the operating context, economic considerations, and emissions performance of methane pyrolysis under a defined set of assumptions. A more detailed technical and economic assessment, including full modeling inputs and region-specific results, underpins this summary and is available separately.