

A large, abstract graphic on the left side of the slide, composed of several overlapping blue shapes: a large semi-circle, a smaller circle, and a curved band, all in various shades of blue.

# The European Metrology Network for Energy Gases

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EMN Chair

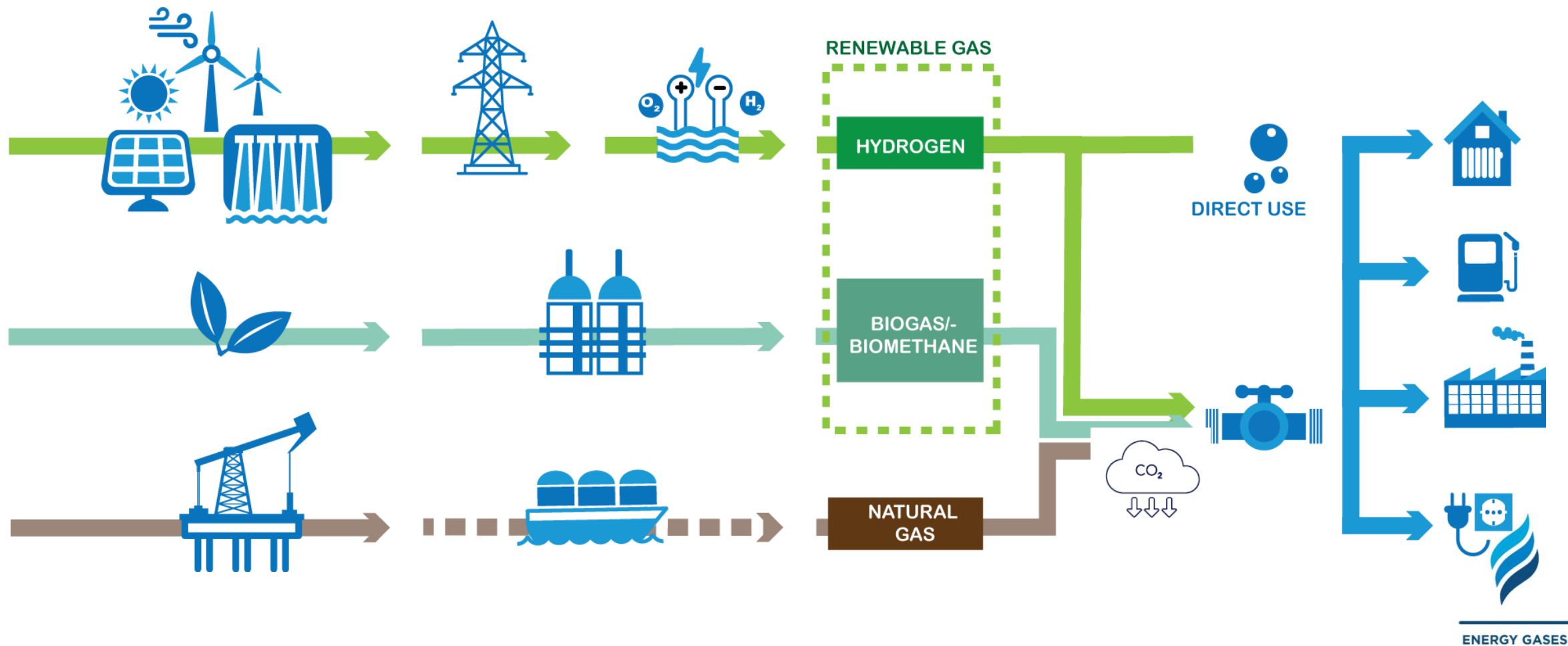
21 March 2023  
EMN Energy Gases workshop

# Drivers

- International:
  - 1.5-degree ambition set under the Paris Agreement
- Europe:
  - Binding target of 55% reduction in GHGs by 2030 compared with 1990
  - Green Deal and “Fit for 55” Package
- Foreseen complex energy mix in the next decades: natural gas, LNG, biogas, biomethane, hydrogen and any future renewable gas



# Energy Gas Transition



# How can metrology support the energy gas transition?

## Need

Ensure the compliance with quality, efficiency, safety requirements

Ensure fair energy gas exchange between countries and trade

## Challenge

Reliability and robustness of measurement results to address the energy transition beyond national boundaries and beyond a single technology

## Solution

European coordinated effort to interface and collect stakeholder needs and to address these needs in the most efficient way at metrological, standardization, and policy level

# European Metrology Network for Energy Gases

# European Metrology Network for Energy Gases



Under EURAMET

Official start: February 2019

19 NMI/DI members in 2022

Chair:	Annarita Baldan (VSL, NL)
Vice-chair	David Learmonth (TÜV NEL, UK)
Secretary	Marcel Workamp (VSL, NL)
Steering Committee	Karine Arrhenius (RISE, SE) Henri Foulon (LNE-LADG/ Césame E., FR) Heinrich Kipphardt (BAM, DE) Arul Murugan (NPL, UK)



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# EMN for Energy Gases Fact Sheet



**Mission:** To provide the world's leading metrology network comprising experts in the field of measurement science to **drive forward innovation** and to **accelerate decarbonisation and emissions reductions** within the energy gas industry in Europe

- **Act as European metrology knowledge center** for energy gases
- **Facilitate energy transition** by coordinating measurement research based on stakeholder needs
- **Boost access** to metrological services and calibration facilities

- Focus on metering and use of energy gases: conventional fluids and fluids related to (emerging) renewable/ sustainable energy sources, including CCUS
- Cross-cutting character:

Gas composition	Calorimetry
Certified Reference Materials	Particles
Flow	Humidity
Temperature	Material data
Pressure	Material testing



# Engagement with key stakeholders

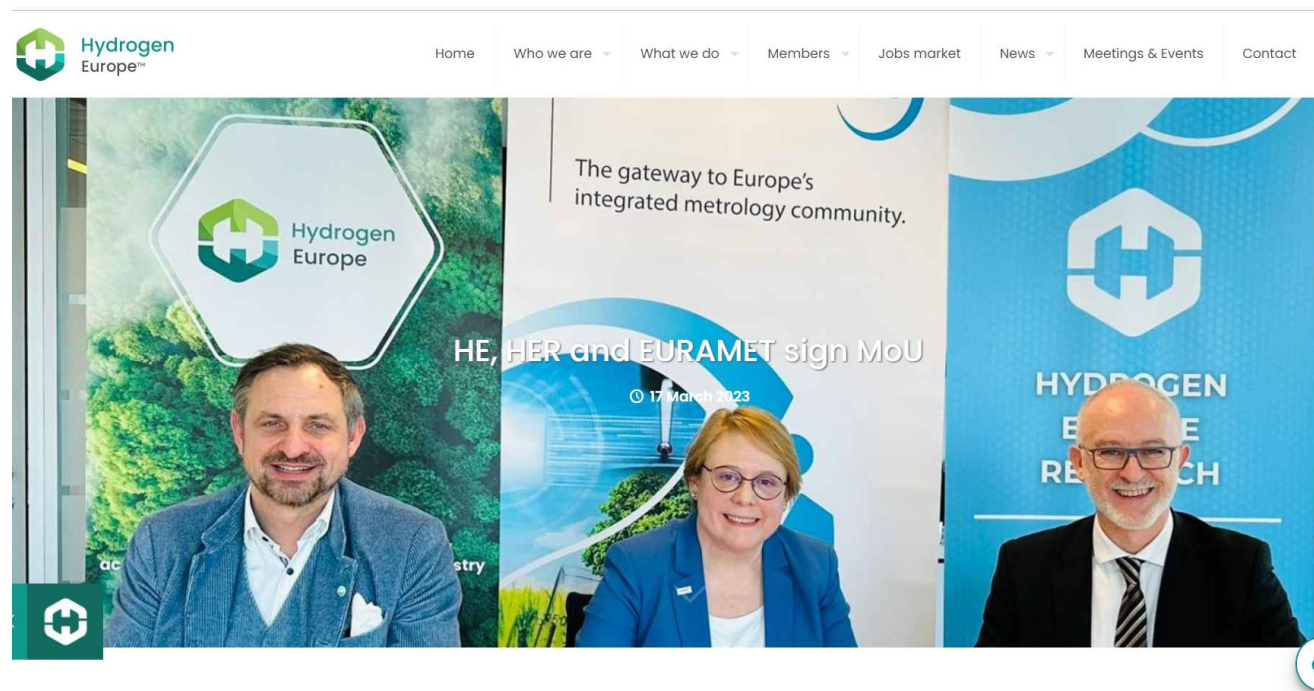


## EMN for Energy Gases holds formal liaison with European Gas Research Group

*The two bodies will strengthen their collaboration to enhance energy gas research*

EURAMET has signed a formal liaison with the European Gas Research Group (GERG) on 16 November 2022.

The European Metrology Network (EMN) for Energy Gases, operating under EURAMET, which has been established to share knowledge and support measurement science for energy gas applications across Europe, will be collaborating with GERG across a number of key areas.



# EMN Strategic Research Agenda



- SRA published on EMN website (2<sup>nd</sup> revision 09/ 2022)
- Based on stakeholders' consultation via workshops, dedicated meetings and public survey
- Focused on measurement needs covering energy gases (natural gas, LNG and LBG, biogas and biomethane and hydrogen) and carbon sequestration (CO<sub>2</sub>)
  - **Decarbonising natural gas**
  - **Decarbonising industry**
  - **Energy transport and storage**
  - **Cleaner fuel for mobility**

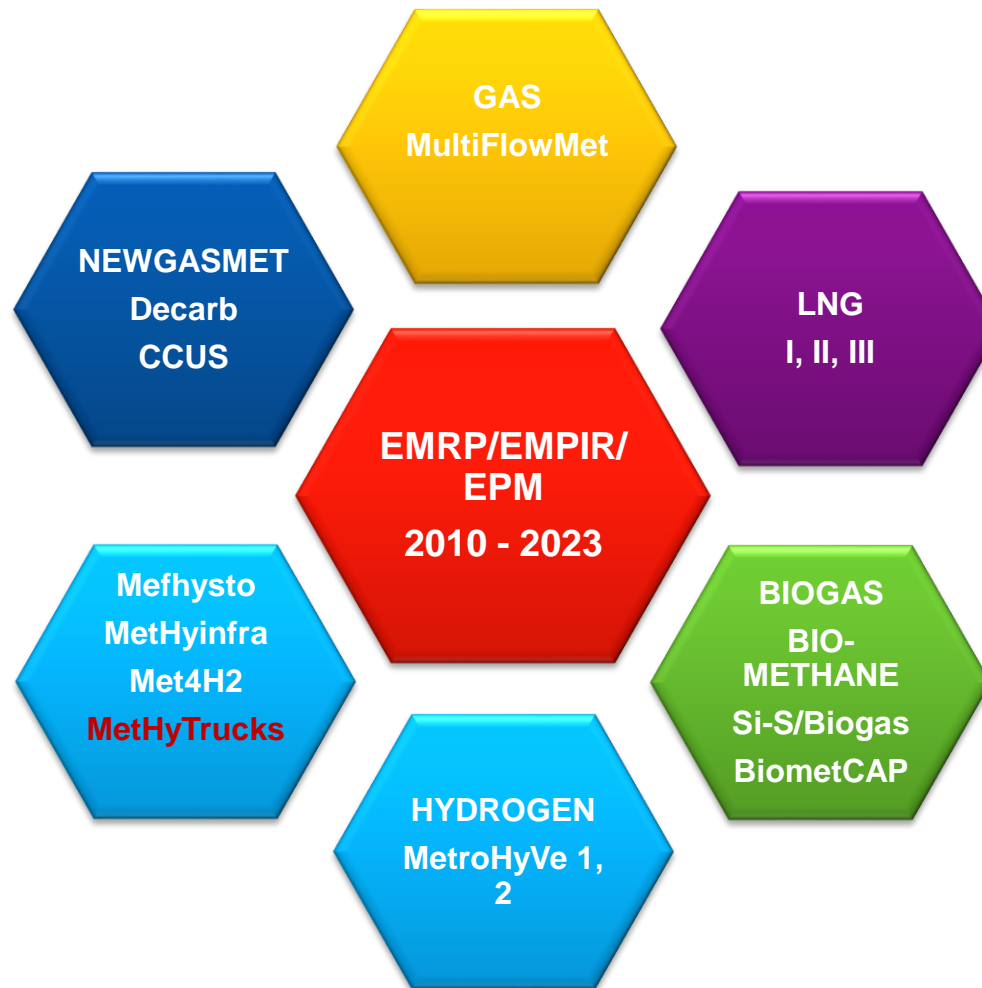
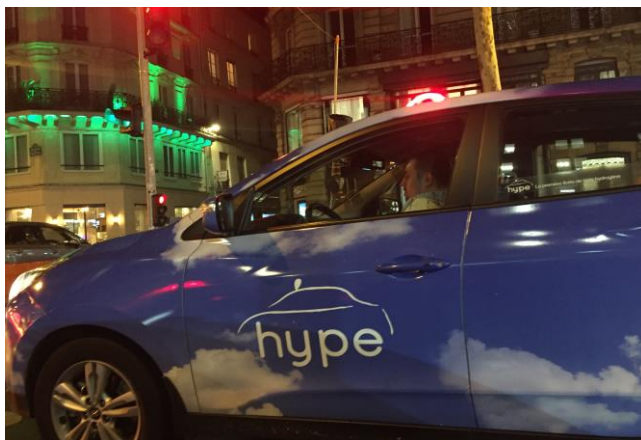
## Objective:

Facilitate new projects in Research & Innovation and collaboration with industry and other research parties





# European Metrological Research in Energy Gases - Portfolio



# Example - Hydrogen fuel cell vehicles 1

Hydrogen fuel cell vehicles can play an important role in the challenge of meeting EU's 2050 climate goals

Lack of available measurement standards to ensure fair billing at Hydrogen refueling stations (OIML R139)

**EMPIR MetroHyVe projects 1 and 2**  
(2017 – 2023)

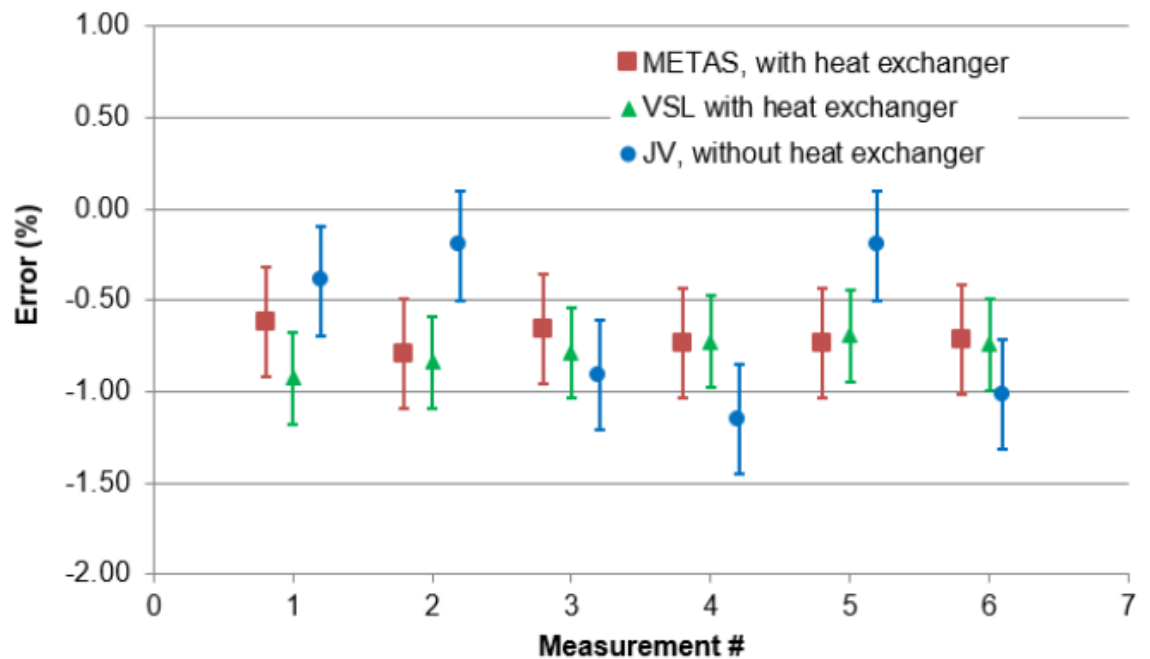


# Example - Hydrogen fuel cell vehicles 2

Traceable gravimetric standard for hydrogen (in support of OIML R139)



*Credit VSL, Total Energies*



Comparison of gravimetric standards for in nitrogen 50 bar - Error of the transfer standard for all laboratories.

*With kind permission of METAS, JV, VSL*



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# Example - Biomethane conformity assessment

- EN16723: quality specifications of biomethane and upgraded biogas to be compatible with appliances of end users (households, industry)
- Lack of traceable measurement methods
- Lack of measurement standards and certified reference materials

## BIOMETHANE project (2017-2021)

Traceable measurement methods fed into ISO standards developed by ISO/TC193/ WG25 Biomethane

Parameter	Unit	Limit values <sup>a</sup>		Test method (Informative)
		Min	Max	
Total volatile silicon (as Si)	mgSi/m <sup>3</sup>		0,3 to 1 <sup>b</sup>	EN ISO 16017-1:2000 TDS-GC-MS
Compressor oil		c		ISO 8573-2:2007
Dust impurities		c		ISO 8573-4:2001
Chlorinated compounds		-	d,e	EN 1911:2010
Fluorinated compounds			d	NF X43-304:2007 ISO 15713:2006
CO	% mol	-	0,1 <sup>f</sup>	EN ISO 6974- series
NH <sub>3</sub>	mg/m <sup>3</sup>		10	NEN 2826:1999 or VDI 3496 Blatt 1:1982-04 NF X43-303:2011
Amine	mg/m <sup>3</sup>		10	VDI 2467 Blatt 2:1991-08

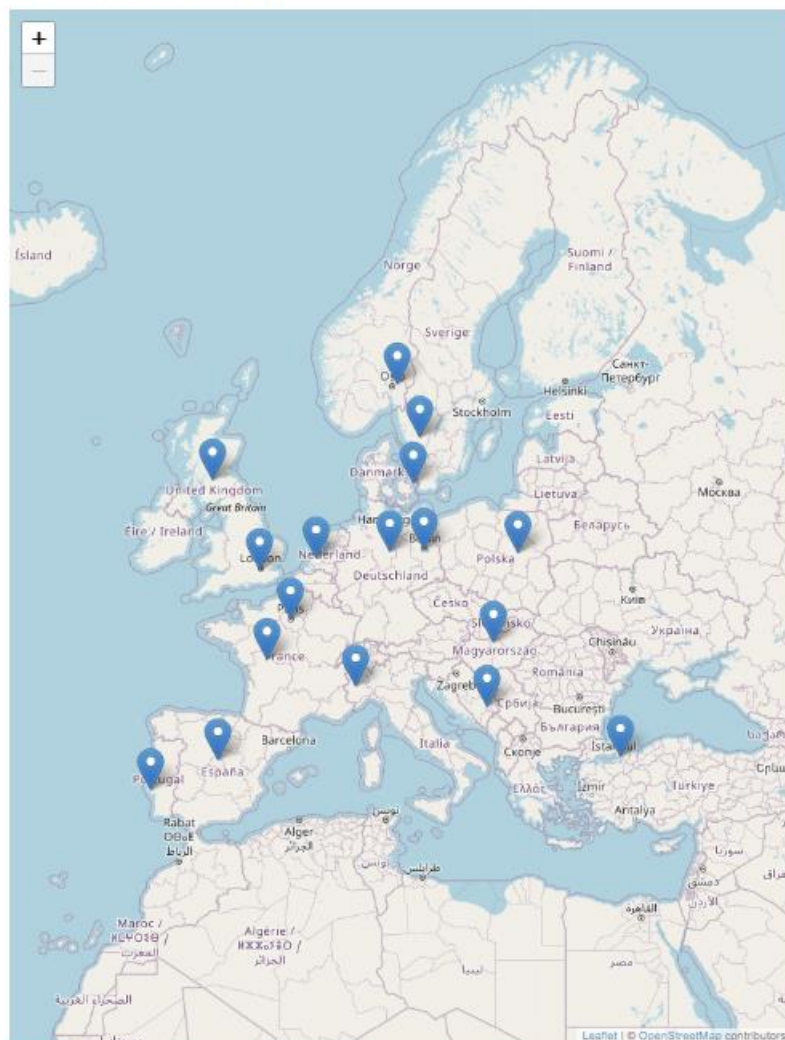
Extract from EN16723-1:2016



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# Measurement Service Platform

Search for a service



Choose what you want to see on the map:

## Gases

- CO2 ☐
- Hydrogen ☐
- H2NG ☐
- Biogas / Biomethane ☐
- LNG/LBG ☐
- Natural Gas ☐

## Services

- Training courses ☐
- Sampling for gas analysis ☐
- Interlaboratory comparisons ☐
- Speed of sound ☐
- Material data ☐
- Material testing ☐
- Calorimetry ☐
- Density (direct) ☐
- Flow ☐
- CRM ☐
- Gas Analysis ☐
- Humidity ☐
- Temperature ☐

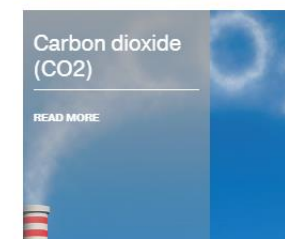
17 Ergebnisse

- Overview of the metrological services in Europe
- EMN for Energy Gases website

[www.euramet.org/energy-gases/](http://www.euramet.org/energy-gases/)

## European Metrology Network for Energy Gases

This network provides measurement science expertise to society and industry to support the implementation of the energy transition to renewable gaseous fuels. Addressing fundamental challenges to establish renewable gases as a fuel source and energy vector is a vital step in striving towards environmental sustainability. By bridging the gap between end-user communities and acting as a central nucleus for measurement science activities, the EMN for Energy Gases will help to establish and facilitate a reliable, safe and diverse energy network.



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# Highlights



# Conclusions

- Call to action for addressing climate change and energy transition in Europe and worldwide
- European Metrology Network for energy gases established with focus on sustainable energy gases and decarbonization
- Role of Metrology and related research projects to develop measurement methods and standards in support of the energy gas transition



Interested in becoming stakeholder ?

More info:

EnergyGases@euramet.org

[www.euramet.org/european-metrology-networks/energy-gases/](http://www.euramet.org/european-metrology-networks/energy-gases/)

