



# Outlook for biogas and biomethane: Prospects for organic growth

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# Key questions

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- What role do low carbon gases play in a low carbon energy transition?
- What are the market prospects for biogas electricity and clean cooking?
- Where and how is biomethane used in the IEA's long term scenarios?
- Which key benefits of biomethane can drive market growth?
- What conditions need to be in place to realise biomethane's potential?

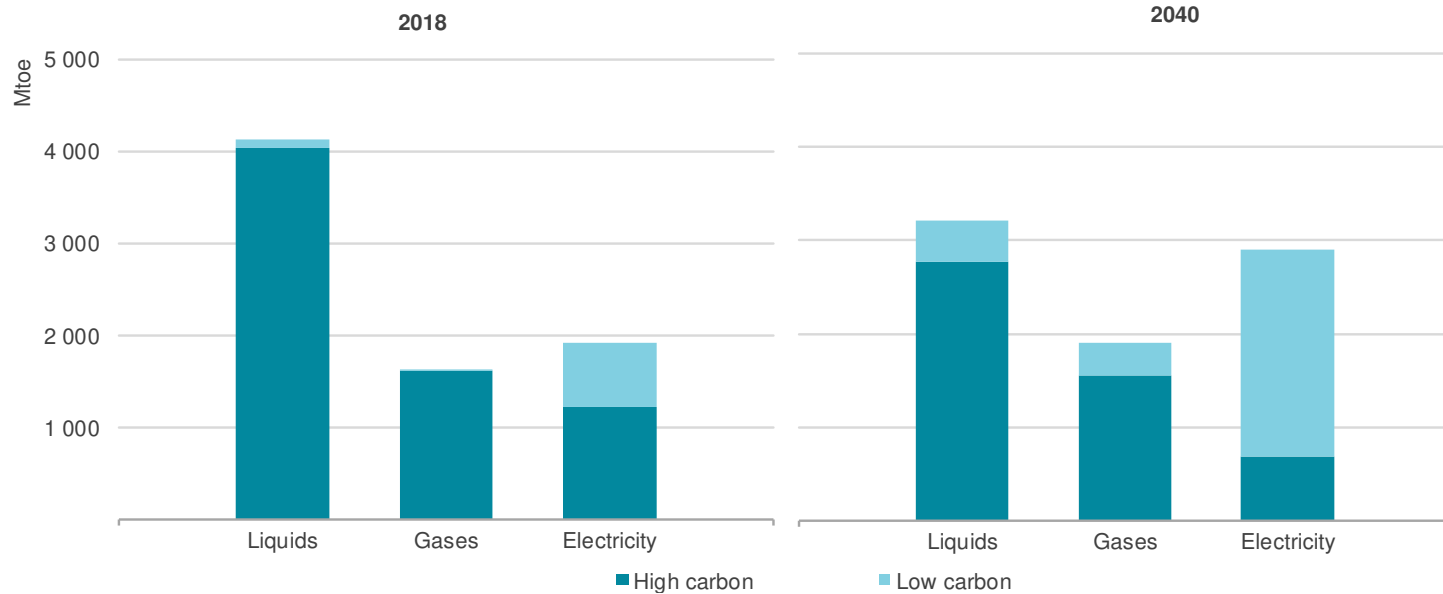
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## World Energy Outlook scenarios:

- Stated Policies Scenario (STEPS): provides an indication of where today's policy ambitions and plans, including national policy announcements and pledges, would lead the energy sector.
- Sustainable Development Scenario (SDS), which fully meets global goals to tackle climate change, improve air quality and provide access to modern energy.

# A low carbon energy transition goes beyond just electricity...

Final energy consumption by carrier in 2018 and 2040 in the Sustainable Development Scenario

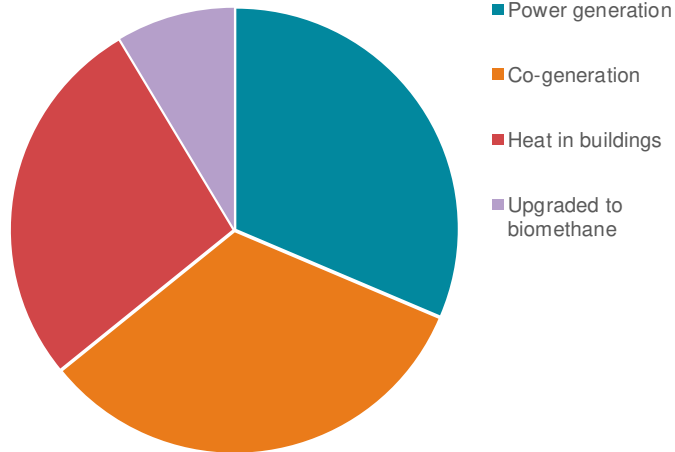


Liquids and gases still account for the majority of energy consumption in 2040, and a higher penetration of low carbon energy carriers such as biomethane and green hydrogen is needed.

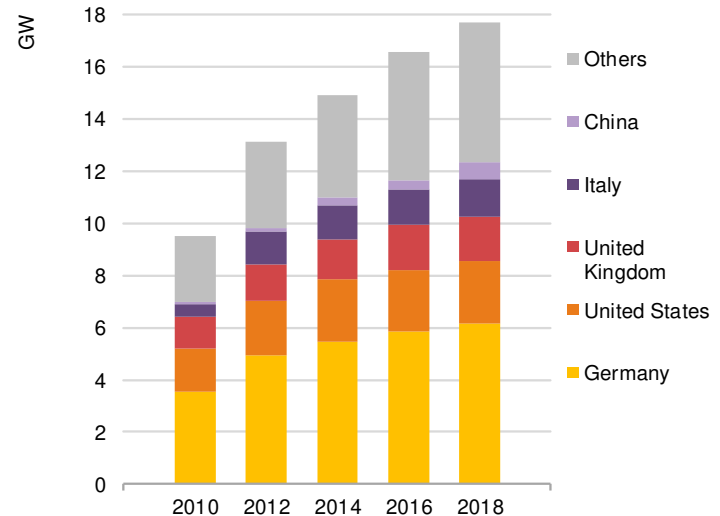
# Most biogas today used for electricity, but this could soon change

## Current consumption of biogas and power sector deployment

Biogas consumption by end use, 2018



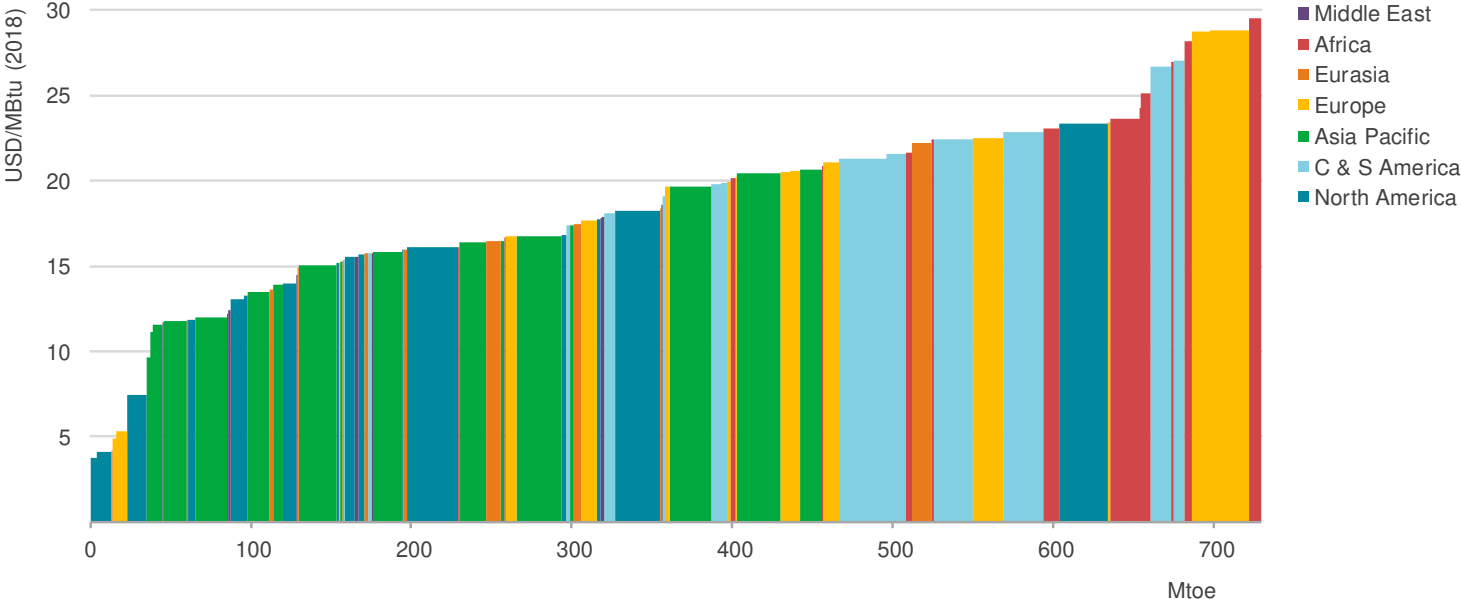
Biogas installed power generation capacity, 2010-18



Higher generation costs than other renewables and changes to policy frameworks challenge prospects for electricity only biogas systems, with more long term growth potential in biomethane production.

# Biomethane has significant untapped potential

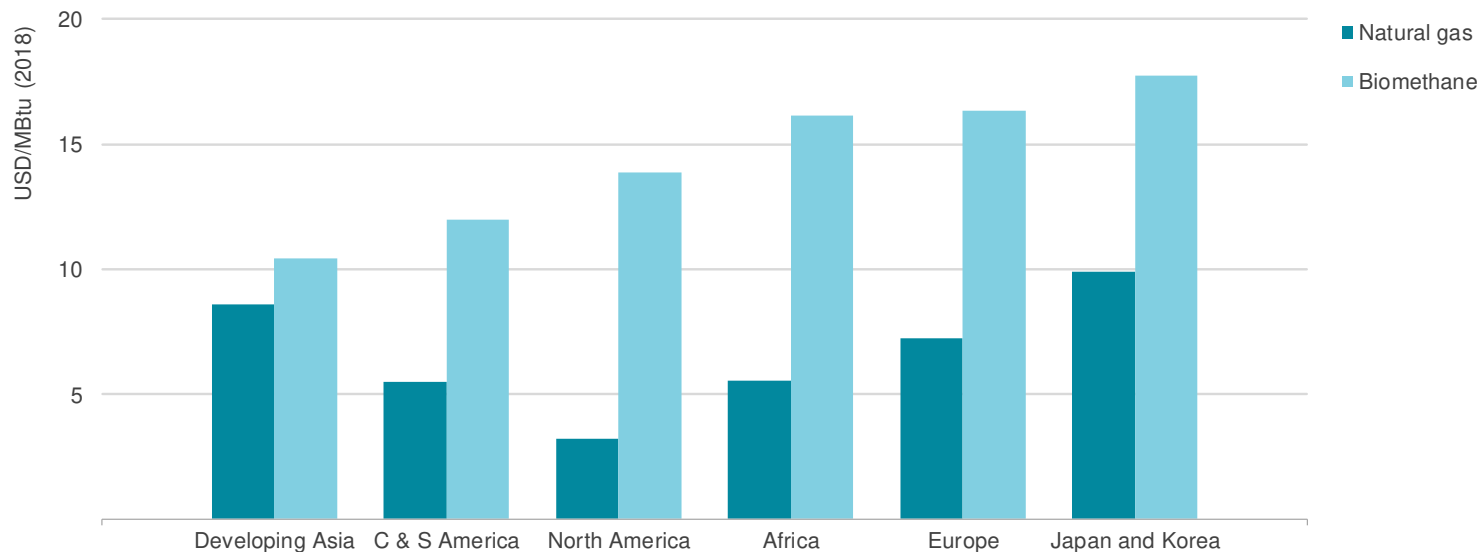
Cost curve of potential global biomethane supply by region, 2018



Feedstock resource potential exists for biomethane to meet >20% of current natural gas demand. The largest resources are found in the Asia Pacific region.

# Biomethane competitiveness varies by region, Covid-19 a challenge

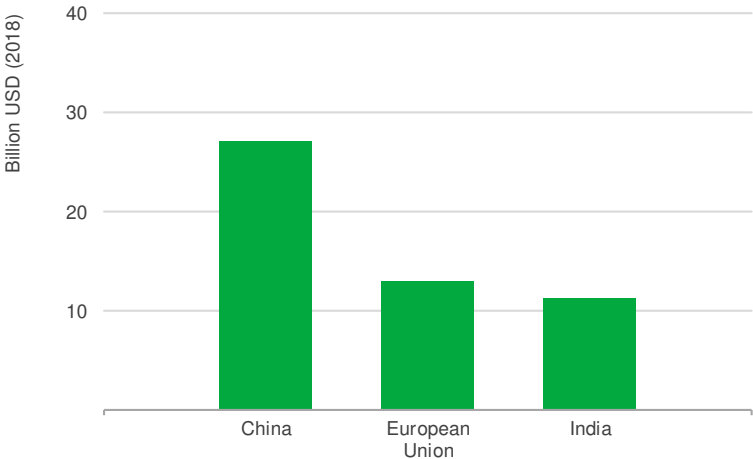
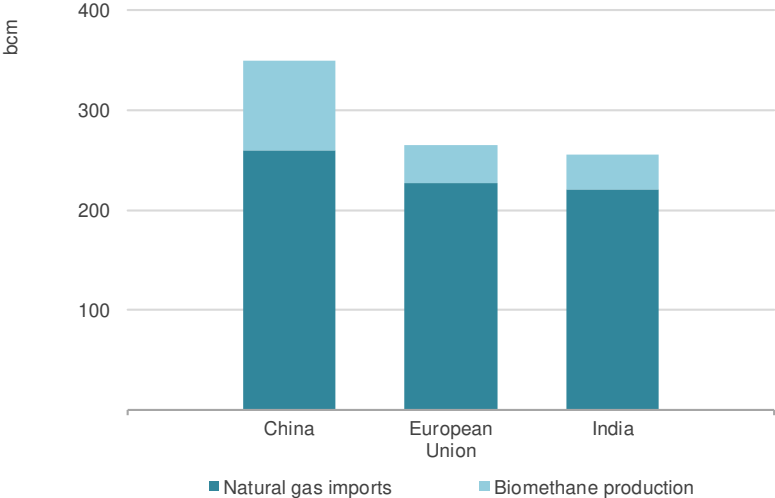
Cost of using the least expensive biomethane to meet 10% of gas demand and natural gas prices in selected regions, 2018



Biomethane competitiveness is supported in natural gas importing Asian countries with abundant low cost feedstocks. Although low gas prices from Covid-19 increase biomethane's cost premium.

# Biomethane can help to mitigate dependence on imported fuels

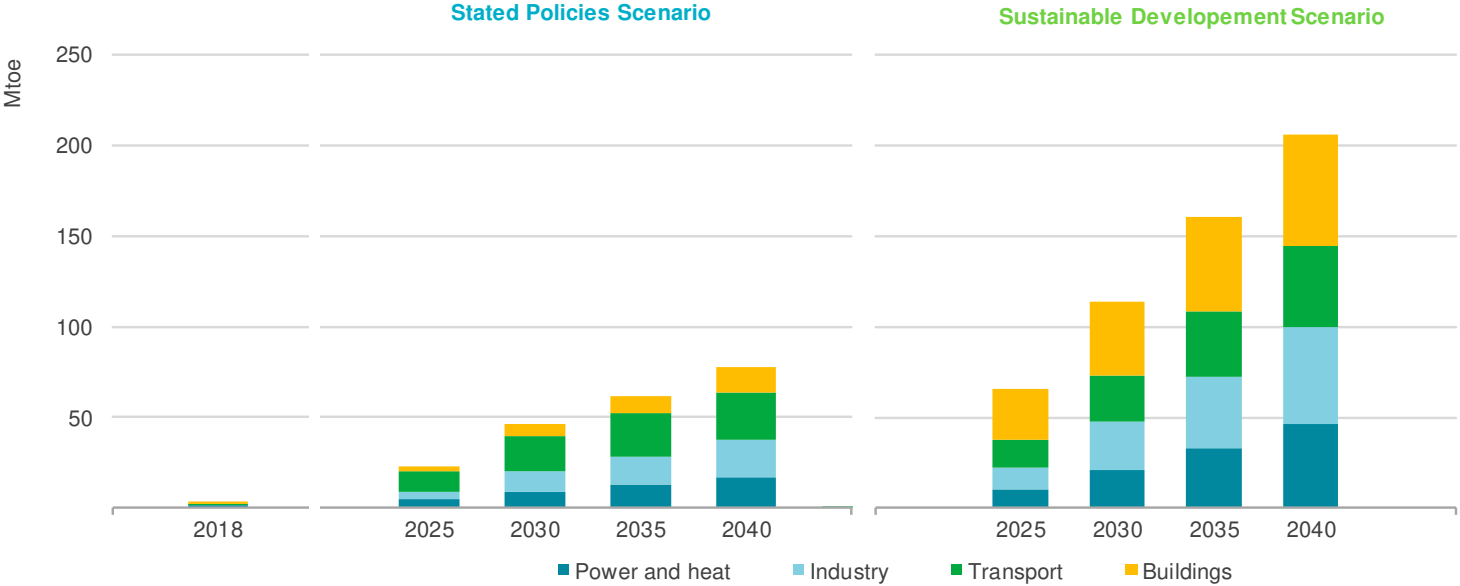
Natural gas imports and biomethane production in the SDS, 2040 (left) and import bill savings from biomethane (right)



Every additional billion cubic metres of biomethane produced in China or India could save over USD 300 million on fuel import costs.

# Effective policies can see biomethane grow across all sectors

Global biomethane demand in the STEPS and SDS by sector

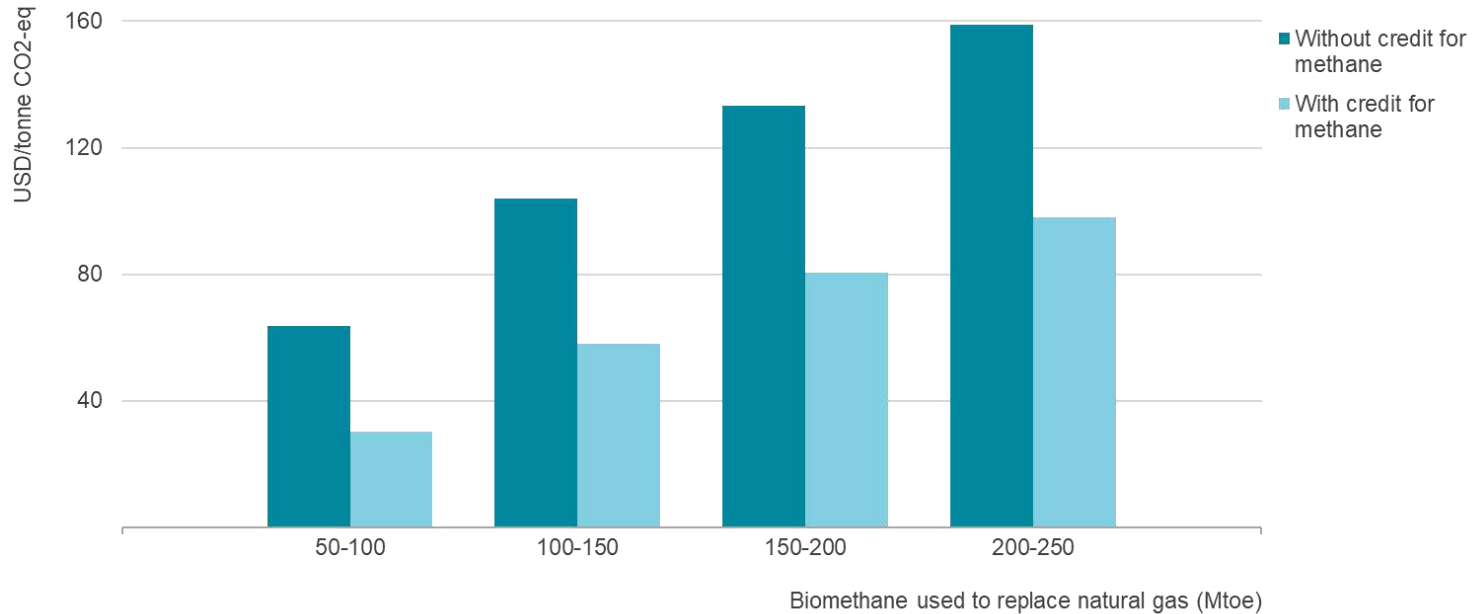


In an ambitious decarbonisation scenario like the SDS biomethane makes key contributions in hard to abate sectors such as high-temperature heating and road freight, and delivers wider societal benefits.



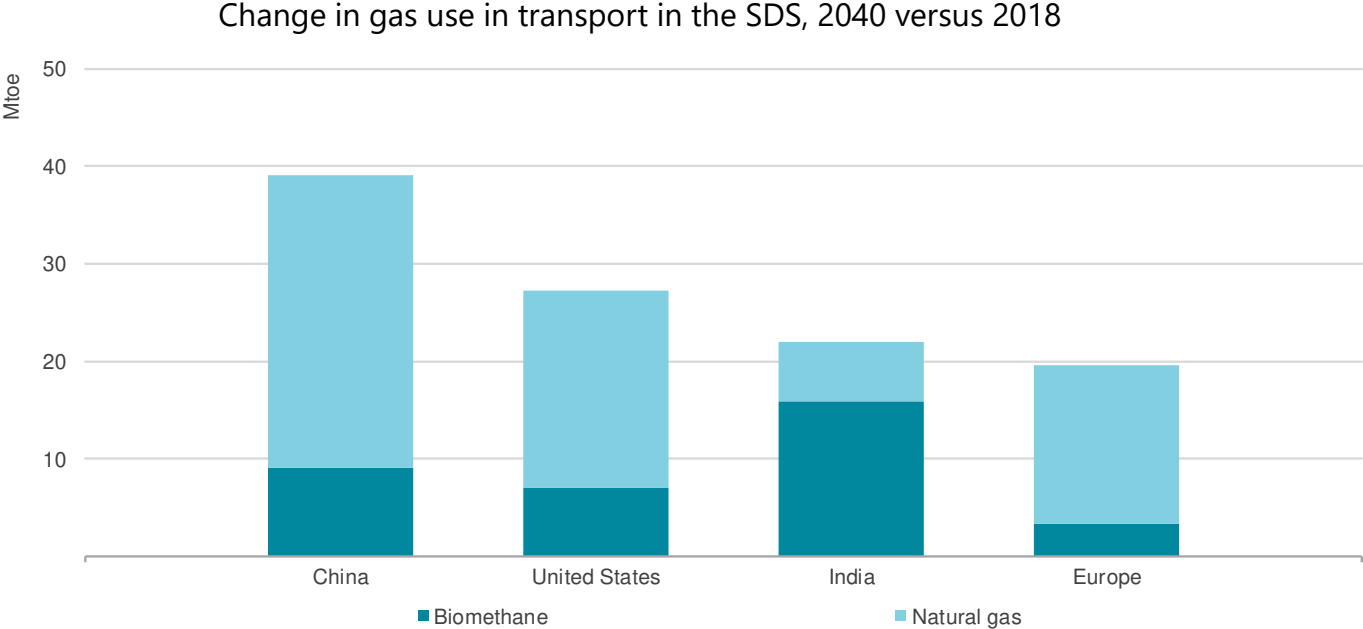
# Avoided methane emissions can be incorporated into policy design

Global marginal abatement costs for biomethane to replace natural gas, 2018



Producing biogas and biomethane avoids methane emissions from the decomposition of feedstocks, policies that valorise this could dramatically improve deployment prospects.

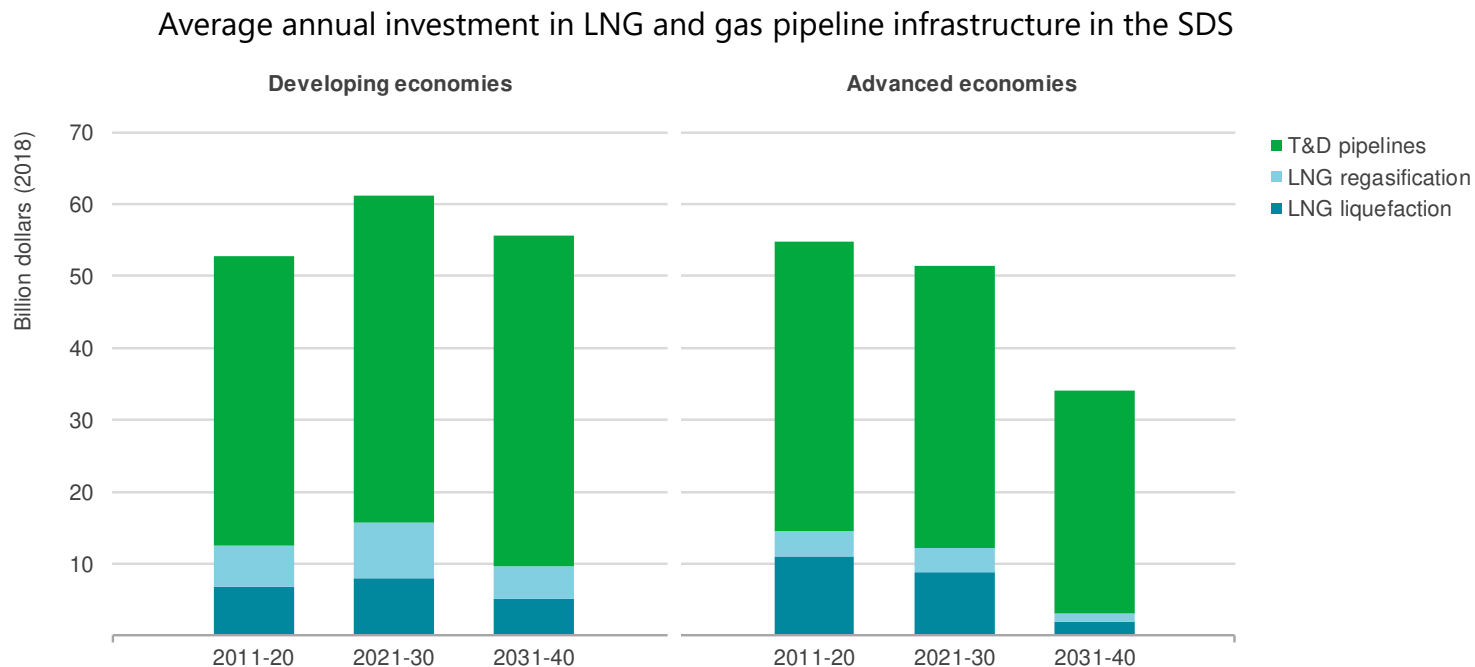
# Biomethane can play a key role in certain transport modes



**Note:** 1 Mtoe = 11.63 TWh = 41.9 PJ.

Reduced barriers to providing fueling infrastructure means captive fleets and road freight are key deployment opportunities for biomethane in transport.

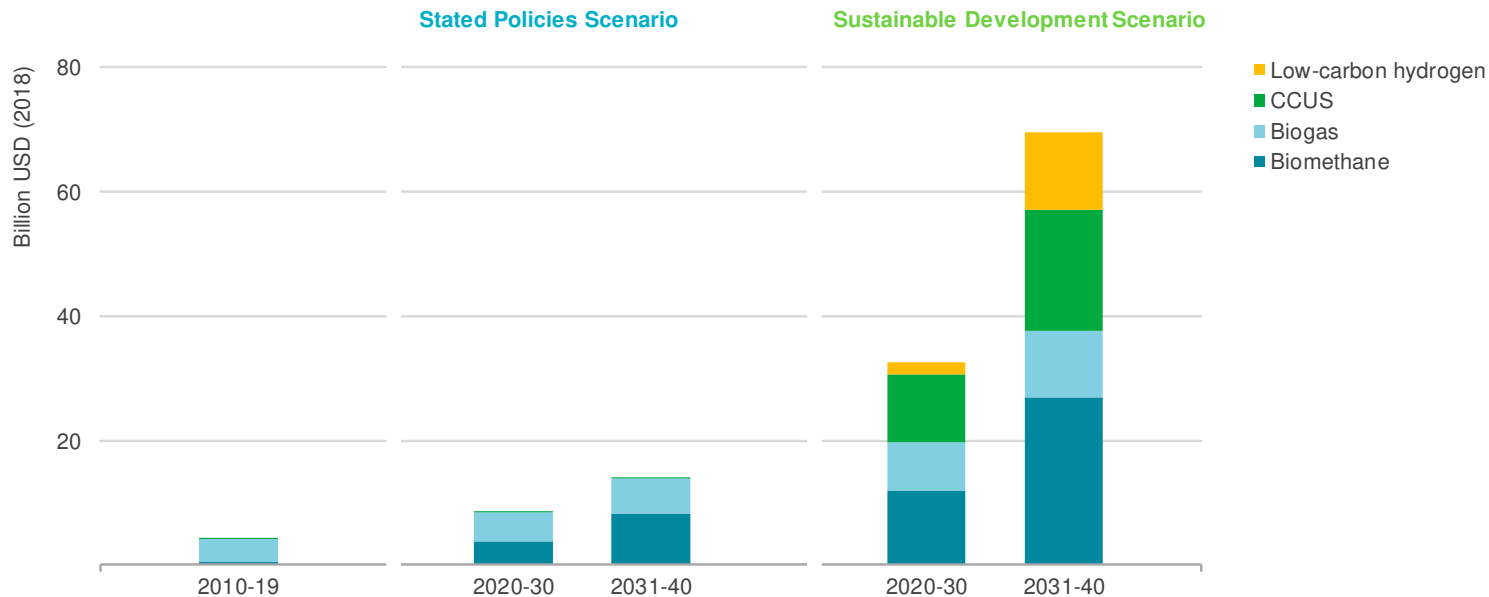
# Gas infrastructure crucial to biomethane deployment potential



Growth of biomethane and low-carbon hydrogen provides a way to future-proof investment in gas infrastructure.

# An attractive investment landscape critical to grow low carbon gases

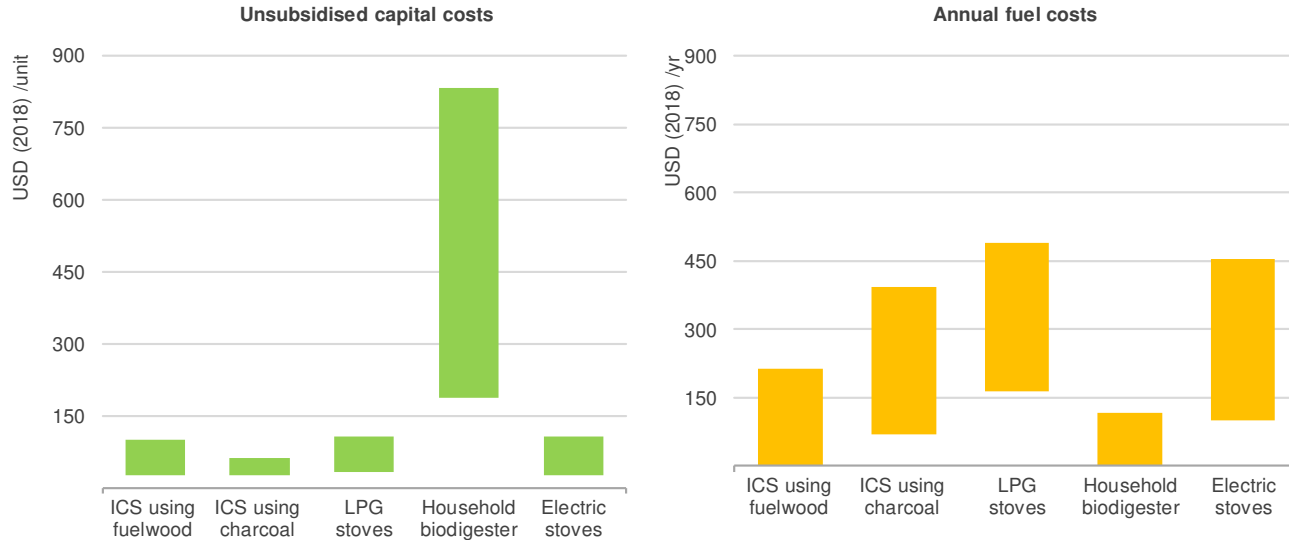
Average annual investment in low-carbon gas by scenario



New business models and access to financing are crucial to scaling up markets for low carbon gases. Biomethane and biogas represent the largest chunk of low-carbon gas investment in the SDS.

# Biogas a crucial clean cooking option for developing economies

Global ranges of spending for different clean cooking technologies in developing economies, 2018



**Notes:** ICS = Improved cook stoves. Electric stoves are considered for households connected to the centralised grid or minigrid.

**Sources:** IEA analysis based on data from Politecnico di Milano (2016), World Bank (2014) and Hivos (2019).

The upfront costs of biogas digesters are an economic barrier to deployment, despite payback periods as little as two years. Spurring take up requires well-designed development assistance programmes.

# Conclusions

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- Biogas and biomethane have a key role in a low carbon energy transition, especially in hard to abate sectors, and as a means of clean cooking in developing economies.
- Future market prospects are likely to be stronger for biomethane production than biogas electricity.
- There is huge untapped resource potential to scale up biogas and biomethane production.
- Higher prices than natural gas mean policy design is crucial to expanding the industry.
- Biogas and biomethane offer wider benefits like waste management and enhanced security of supply, and cannot be judged solely on their cost relative to alternatives e.g. natural gas.
- Prospects are also linked to wider investments in gas infrastructure and the financing landscape.

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To download the report and see key findings: <https://www.iea.org/reports/outlook-for-biogas-and-biomethane-prospects-for-organic-growth>