

EXECUTIVE SUMMARY

Despite the pandemic and its impact on supply chains and fuel demand in the transportation sector, the RNG sector has been resilient. **Global RNG production was up 20% in 2020 to 5 billion cubic metres (bcm)**. It has more than doubled since 2015. There were 1,161 biogas upgrading facilities operating in the world at the end of 2020, with a production capacity of 800,000 Nm³/h (or 6.7 bcm/y), ensuring healthy growth going forward. The market remains dominated by Europe (2.85 bcm produced in 2020), but the United States, which became the world's leading producer in 2019, ahead of Germany, continues to register significant growth (1.42 bcm produced in 2020). In other regions, biomethane production is still limited (0.6 bcm collectively), but is taking off in Brazil, Canada, China and India.

2021 and the beginning of 2022 saw **events that will profoundly and durably impact the biomethane sector**:

- At COP26 in Glasgow, more than 100 countries signed the **Global Methane Pledge** to collectively reduce methane emissions in the energy, agriculture and waste management sectors by at least 30% by 2030. Global economies also strengthened their decarbonisation policies with 90% of the global economy now covered by Net Zero Emissions (NZE) commitments. The focus on methane emissions is a game changer for the biogas/biomethane industry. Fully deployed, anaerobic digestion (AD) could deliver 50% of the Global Methane Pledge. Together with efforts by the oil and gas industry and policies to tackle emissions in the oil and gas systems, a growing number of governments across the world are adopting methane emissions reduction policies that recognize the double climate benefit of AD/RNG, alongside its key role as a catalyst for circular economies across multiple sectors. The adoption in March 2022 of a Zero Methane program in Brazil – a signatory of the Global Methane Pledge – is a key illustration of these new policies.
- Russia's invasion of Ukraine has heightened the issue of **security of supply**. With **elevated energy commodity prices**, several countries around the world are reassessing the role of RNG in their energy mix. Indeed, RNG provides a near-term solution to insulate economies from high energy prices and to increase security of supply as the technology is available now for full deployment of the sustainable potential. On 8 March 2022, the European Commission released the **REPowerEU plan** to reduce the dependency of the European Union on Russian energy imports, starting with gas. Among the actions proposed by the Commission, Europe will scale up its biomethane production to 35 bcm/y by 2030, diversifying away from Russian gas supplies. Europe's sustainable biomethane potential is amply sufficient to deliver the goal and stakeholders in the sector have already drawn plans to reach the target. This is nevertheless a step change from current production, which will require **EU and national policy makers to affirm clear political support for the sector and to promote investment in the sector**. Surging energy commodity prices is also accelerating the deployment of RNG in a number of fossil fuel importing countries, such as Brazil and India, to displace high-priced oil and diesel imports.

Combined with these strong policy drivers, market drivers are also expanding RNG demand across sectors.

- **RNG is in demand by a wide range of customers** all over the world, such as cities, major corporations, industrial users, large fleet owners, and gas utilities. This demand is driven by the need to rapidly decarbonise hard-to-abate sectors, as well as the highly developed gas grids in North America and Europe, amid rising environmental, social, and governance (ESG) concerns.
- **The use of RNG as a transport fuel is leading demand growth**, driven by regulations to incorporate a growing percentage of biofuels in the transportation sector. Global use of RNG in the sector reached 2.2 bcm in 2020, up 26% over 2019. In this sector, RNG can make a real difference: its use to displace diesel can even create carbon-negative emissions as seen in California.
- **The production of hydrogen is emerging as a new outlet for RNG**, either through RNG injection into the grid and its use in refineries, or through reforming of RNG in small-scale, decentralised steam methane reforming (SMR) units. Several projects to produce bio-hydrogen are under development across the world. In the US, there is increasing demand for these small-scale, on-site, decentralized hydrogen production solutions for fuel cell applications in transport and industrial applications. In Europe too, there are several demonstration plants to produce hydrogen or derived products from biomass and wastes. There are important potential interactions and synergies between RNG and green hydrogen deployment, requiring cohesive policies across hydrogen and RNG industries.

- **Energy majors accelerated their investments in the RNG sector last year.** The most striking development in 2021 was the adoption of clean initiatives by Chevron, which has doubled down its efforts towards RNG on the US market. Investment by energy majors in the sector is significant as majors will enable the RNG market to scale up dramatically, RNG production costs to decrease, and RNG to expand its global reach.
- **RNG is attracting new sources of capital.** There is a growing trend towards the financing of RNG plants and related infrastructure by **private equity investors**. In addition, to tackle the financial challenge of reducing global methane emissions, international and national financial institutions are supporting projects through both technical assistance and project finance. The **first biogas guarantee fund in the world** has been launched to accelerate biogas and biomethane investments in Brazil.

Driven by these policy and market drivers, **the global biomethane market is set for a once-in-a-lifetime growth over this decade and could reach 100 bcm by 2030.**

Major developments in 2020/2021 by region

Europe is leading the global RNG sector. There are now 21 European countries producing RNG. The number of biomethane plants has doubled over the past five years, showing the fast development of the sector. Recent growth has been driven by Denmark, France, Italy, the Netherlands, and the United Kingdom. While the electricity sector drove the initial growth of the sector, hard-to-abate sectors are now the focus of support policy. The use of RNG in the transportation sector is booming (+30% in 2020) driven by EC and national mandates to incorporate a growing share of biofuels in the sector. The trend will be facilitated by the many bio-LNG plants now under construction in the region. The market will also be aided by the launch in June 2021 of the European Renewable Gas Registry (ERGaR) Certificates of Origin Scheme. Today, the share of RNG in the EU gas grids is less than 1% on average but it is already significant in the Nordic countries (20-30%). It is expected to reach 11% on average by 2030.

In the United States, strong growth has continued despite the pandemic and reduced fuel demand in the transportation sector, the dominant outlet for RNG. There is a current shift in feedstocks from landfill gas to dairy farms, which get strong regional incentives due to their high GHG emissions reduction potential. Applications beyond the transportation sector are emerging. Gas utilities have started to provide RNG to their customers; synergies with the emerging clean hydrogen market are being developed; adoption of RNG in the transportation sector is also expanding beyond the Californian market. Under the SMART Initiative, which aims to reduce methane emissions from current emitting sites, the US RNG Coalition foresees **the number of RNG facilities to reach 1,000 by 2030** (157 units at the end of 2020). In **Canada**, the small biomethane sector (0.16 bcm produced in 2020) is entering an exponential growth era. **Near-term growth will mainly be driven by provincial green quota mandates in British Columbia and Quebec** and by the launch of the federal Clean Fuel Standard. Stakeholders in the sector have called for a green quota at the federal level combined with a carbon offset mechanism to tackle methane emissions that, if adopted, would give a strong boost to AD/RNG and deliver high CO₂ and methane emissions reductions by 2030.

Given its huge feedstock potential and growing energy needs, Asia is the most promising market. Today, RNG is still in the early stage of development. In China, despite investment by the central government, the market has not developed as expected (0.18 bcm produced in 2020). **China has announced a 20 bcm/y target by 2030.** The dual carbon target and the development of a circular economy, notably in the context of the rural revitalization, will spur growth in the sector and lead to an acceleration of biomethane production, the industrialization of the sector and a diversification of biomethane applications. **India is moving towards its ambitious goal of building 5,000 RNG plants by FY24, corresponding to a production of 21 bcm/y.** To speed up the building of bio-CNG plants, the government took several initiatives in 2021 to remove the barriers encountered by project promoters. New regulation to facilitate the injection of bio-CNG into the grid is a key milestone, as well as expedited financial assistance to new projects. There are now 2,745 bio-CNG projects proposed across the country. A boom in bio-CNG production is expected, also boosted by the urgent need to reduce dependence on high-priced oil imports. In **Southeast Asia**, the production of bio-CNG is expected to grow, mainly to address sustainable production in the palm oil industry.

In **Brazil**, RNG production is taking off (0.21 bcm produced in 2020). The Zero Methane program, new financing schemes and tax exemptions targeting biogas and biomethane, and certification of biomethane will **catapult RNG production to new highs**. Investment in biomethane is booming, also driven by the huge biomass and organic waste potential, the opening of the gas market, and requirements to reduce high-priced diesel imports.