

EXECUTIVE SUMMARY

From ambition to action

2022 saw biomethane – also known as renewable natural gas (RNG) – moving from a niche market to a crucial component of global energy and climate policies. Three major trends have converged over the past 24 months that will propel the sector to new highs. First, Russia's war against Ukraine and the global energy crisis it has fuelled have placed **energy security** at the top of the global agenda. In response to these challenges, governments of oil and gas importing countries have accelerated the promotion of renewable energy. This includes the promotion of RNG – a drop-in substitute for natural gas – to improve security of gas supply. Second, the urgency to address climate change is **accelerating decarbonization policies and the move towards renewables around the world.** RNG provides a renewable source of energy, which can be deployed right now, allowing immediate carbon emissions reductions. Third, the focus on **methane emissions reduction** have put the spotlight on RNG as a tool to reduce methane emissions in agriculture and the waste sector, and to enable the creation of circular economies. These new policy drivers are translated into robust policies, such as the REPowerEU plan in Europe, the Inflation Reduction Act in the US, the Metano Zero plan in Brazil, and the recently-announced GOBAR-Dhan scheme in India, which are driving investment and massive growth in the RNG sector.

In addition to these policy drivers, strong market drivers are expanding RNG demand across sectors. RNG is in demand by a wider range of customers all over the world, and its applications are broadening. Cities, major corporations, energy-intensive industrial users, fleet owners, are adopting RNG to move towards a circular economy, respond to the need of their customers for low-carbon products, and rapidly decarbonize hard-to-electrify sectors, amid rising environmental, social, and governance (ESG) concerns. European and North American gas/energy utilities are investing massively in RNG as a key component of their decarbonization policies and clean energy supplies. New applications are emerging, such as the use of RNG to produce clean hydrogen.

The use of RNG in the transportation sector is booming and represented half of the growth in global RNG demand in 2021, boosted by growing demand by large fleet owners and emerging demand in marine transportation. In this sector, RNG can make a real difference: its use to displace diesel can even create carbon-negative emissions as seen in California since 2020. The use of RNG in the European transportation sector is booming (+31% in 2021). The trend is facilitated by the numerous bio-LNG plants now operating and under construction in the region. To continue this strong momentum, policy makers have to take a neutral-technology approach allowing a rapid decarbonization of the transportation sector.

The RNG sector has attracted a flow of money as never before, with deals and capital equity investment in the billions of dollars. European energy majors dominated RNG-related transactions with BP's acquisition of US Archaea (\$4.1 billion), Shell's acquisition of Danish Nature Energy (\$2 billion) and TotalEnergies' acquisition of Poland's Polska Grupa Biogazowa. But it was not only European energy majors that invested into the sector, **2022 saw a flurry of RNG-related transactions by financial investors.** US funds and asset managers have been particularly active, investing in the sector and creating dedicated biomethane business units. Goldman Sachs has established Verdalia Bioenergy to invest \$1 billion in biomethane across Europe, starting with Spanish projects. Macquarie Capital has launched Aerogy. BlackRock has acquired US Vanguard Renewables for \$700 million. The inclusion of RNG in the portfolios of private capital investors and the strengthened commitment of energy majors to RNG speak for the recognition of RNG attributes, its exponential growth moving forward and its status as a key decarbonization method over the decade and beyond.

The global RNG market expanded to almost 6 billion cubic metres (bcm) in 2021, a growth of 20% compared to 2020, driven by growth in Europe and North America. It is estimated at 7.4 bcm in 2022, an increase of 25%. These increases will seem modest when the investments announced in 2022 materialize. **Driven by new policy and market drivers, the RNG market is poised for major expansion over this decade and beyond. With the right policy and regulatory framework, the market could exceed 100 bcm by 2030.**

Developments by major region

Biomethane is in full swing in the EU. The REPowerEU plan calls for 35-bcm of biomethane produced by 2030, a 12-fold increase compared to current production. Since the publication of the plan, **significant progress has been made towards achieving the 35-bcm target.** The Biomethane Industrial Partnership (BIP) was launched in September 2022 to support the achievement of the 35-bcm target, and to create the preconditions for a further ramp-up of its potential towards 2050. In February 2023, the European Parliament endorsed regulation to make

the 35-bcm target binding and adopted new rules to facilitate biomethane integration into the network. Policy makers in EU member states are preparing national biomethane strategies and regional mapping of highest production potential areas. Funding from the European Recovery and Resilience Facility has enabled the first calls for projects. Gas/energy utilities, energy majors, financial investors are investing massively in the sector. The market for Guarantees of Origin certificates is maturing and a voluntary European scheme was launched in June 2021 to foster cross-border trade among EU countries. Biomethane national markets across Europe are quite heterogeneous, but all countries have or are in the process of adopting new regulation and financial incentives to support biomethane development. **In terms of production, Europe is leading the global RNG sector.** European production grew 20% to 3.4 bcm in 2021, driven by growth in France and Denmark mainly. It is estimated at 4.2 bcm in 2022. RNG represented only 1.2% of EU gas demand (which fell sharply in 2022), but in some countries this share has already reached 30% to 40%. In terms of number of production facilities, **France leads the world with 514 RNG facilities at the end of 2022.**

The US RNG sector is set for an explosive growth, driven by the passage of the Inflation Reduction Act (IRA). The IRA is a game changer for RNG: it creates fiscal support to biogas for all end-uses and extends credits for alternative fuels in transportation. While most RNG developed to date has been in response to policies encouraging the vehicle fuels market, **additional demand from non-transportation sectors is poised to drive massive growth in RNG demand.** **Natural gas utilities and large natural gas users have begun to purchase RNG** to decarbonize their supplies and end products to comply with ESG commitments. California has adopted the first RNG standard in the country: 12% of demand by core customers will have to be supplied by RNG by 2030. In terms of production, the US has reinforced its leading position, accounting for more than a quarter of global production. Production increased to 1.7 bcm in 2021 and an estimated 2 bcm in 2022. In **Canada**, the small biomethane sector (0.2 bcm produced in 2021) is **entering an exponential growth era.** Demand will be driven by the launch of the **federal Clean Fuel Standard (CFS) in July 2023** and strong utility demand to comply with **RNG mandates at provincial level.** Stakeholders 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. Boosted by IRA's fiscal incentives and other supportive policies, **North American RNG production could see a seven-to-ten-fold increase by 2030.**

China has adopted its **14th Five-Year-Plan (FYP) on renewable energy**, which includes high targets for renewables, including RNG, in view of achieving its dual carbon strategic goals. Combined with the rural revitalisation strategy and the strong focus of China's policy on energy security, the still undeveloped RNG sector (an estimated 0.25 bcm produced in 2021) is expected to register **an accelerated development** during the 14th FYP period (2021-2025) and reach **20 bcm/y by 2030.** The growth will be facilitated by improvement in policy support, better grid access to the network, and the participation of big players in the sector. The 14th FYP plan provides for the **industrialization of the sector and for a diversification of RNG uses** to accelerate the decarbonization of the energy system and that of gas supplies.

India, which is striving to reach the ambitious SATAT goal of 5,000 bio-CNG plants by 2023-24, representing 21 bcm/y of RNG production, has just launched a **new support scheme for the sector.** Combined with an **investment of \$1.2 billion**, the new scheme will enable the building of 200 RNG plants. Overall, there are now 3,800 bio-CNG projects proposed across the country. Bio-CNG production is expected to surge in response to these new policies, also boosted by the urgent need to **reduce dependence on high-priced oil imports**, a huge market demand with **booming sales of NGVs**, and growing investment by large domestic and foreign corporations.

Brazil's commitment to reduce methane emissions combined with the energy crisis, growing dependency on fuel imports and shortage of fertilizers, have **raised the importance of biogas/RNG in Brazil** as part of the short- and medium-term solution for the decarbonization of key sectors of the national economy. The **Metano Zero** program will boost biogas/biomethane production and will greatly contribute to methane emissions reduction. The **carbon market** that also includes methane credits was launched in 2022. **Private and public investment in biomethane is booming.** RNG production is still in the maturation phase (0.3 bcm produced in 2021), but the Metano Zero program, new financing schemes and tax exemptions targeting biogas and biomethane, and certification of biomethane will catapult RNG production to new highs. **Production could exceed 10 bcm/y by 2030.**