Gas ‘spaghetti’ past prompts Australia cost-cut teamwork

The energy industry in Australia, looking back on an era of waste and profligacy, is now preaching the gospel of thrift and collaboration as it tries to attract more investment in an age of fiscal discipline.
Firms like Royal Dutch Shell Plc are bemoaning the erosion of shareholder value from the go-it-alone mentality during the $200bn splurge on Australian LNG projects over the past decade. Rivals Chevron Corp and Woodside Petroleum Ltd have proposed a massive offshore pipeline in Western Australia, which could be shared by several companies.

That approach contrasts with the “spaghetti junction” of crisscrossing pipelines built in the past decade as ventures approached projects independently, according to energy analyst Martin Wilkes. The hand-wringing and newfound spirit of collaboration come as Australia, on the cusp of becoming the world’s biggest LNG exporter, tries to convince purse-holders

in faraway headquarters to green-light more projects while investors call for more restrained spending.
“Everyone in the industry is feeling the scars from the lack of cooperation,” Graeme Bethune, a consultant with EnergyQuest, said in Adelaide. “They were quite extraordinary circumstances with $100 oil prices driving a slew of greenfield projects. I would hope that egos have been suppressed now. Boards are going to be much more critical on any bullish, go-it- alone proposals.”

Chevron proposed building a massive pipeline that would connect the Scarborough, Thebe and Exmouth fields, which lie hundreds of kilometres off the coast of northwest Australia, to the existing Wheatstone, Pluto and North West Shelf LNG plants, which sit along a 200-kilometer stretch of the coast. The plan would minimize duplication and would have superior economics over individual point-to-point concepts, Nigel Hearne, Chevron’s managing director for the country, said in a speech on Tuesday at the annual conference of the Australian Petroleum Production & Exploration Association.

Woodside, which owns stakes in all three of those LNG plants and in two of the fields, supports the plan for shared infrastructure, chief executive officer Peter Coleman said at the same event in Adelaide.
Collaboration along those lines was missing last decade when energy companies were planning the slate of LNG plants that have been coming online in recent years.
In Queensland, three separate LNG plants built adjacent to each other shared virtually no infrastructure such as jetties and storage tanks. In northern Australia, two gas fields that are connected to each other are being developed in two separate projects, one using a floating liquefaction plant and one using a 900-kilometer (560-mile) pipeline to the shore.

And in Western Australia, gas pipelines splay out west and east from offshore fields, crisscrossing each other as they connect to four different liquefaction plants located on the

mainland and an island. The developments in Western Australia and Queensland cost about $36bn more than they would have if companies had collaborated from the beginning, according to a 2016 study by Wilkes, a Perth-based principal adviser at RISC Advisory.
“Real collaboration happens at the start of projects,” Wilkes said in an interview on Wednesday in Adelaide. “And had real collaboration occurred, you wouldn’t have the spaghetti junction on the West Coast.”
Failure to collaborate eroded shareholder value in the projects, Shell Australia chairwoman Zoe Yujnovich said in a speech at the conference. Australian companies will have to overcome that history to convince investors to fund drilling projects needed to keep LNG plants full.
“Unless we can improve the attractiveness of our projects to investors, the spectre of growing ‘ullage’ in LNG trains may fast become an unmanaged reality,” she said, using an industry term for unused space in a storage tank. “And that is not a situation that will be easily recovered.”

Shale’s Public Enemy No. 1 Says Short the Permian and Eagle Ford

(Bloomberg) — The geologist who earned the wrath of shale drillers a decade ago with forecasts that natural gas was about to run out is now warning that the Permian Basin has just seven years of proven oil reserves left.

Arthur Berman, a former Amoco scientist who now works as an industry consultant near Houston, said the Permian region of

Texas and New Mexico that currently pumps more oil than any other North American field won't last for long. And the Eagle Ford shale about 350 miles (560 kilometers) away in South Texas isn't looking good either.

Berman's grim outlook, based on analyses of reserves and production data from more than a dozen prominent shale drillers, flies in the face predictions from the U.S. Energy Department, Chevron Corp. and others that the Permian is becoming one of the dominant forces in global crude markets.

Permian output already exceeds that of three-fourths of OPEC members.

"The best years are behind us," Berman told a gathering of engineers, geologists, lawyers and financiers at the Texas Energy Council's annual gathering in Dallas on Thursday. "The growth is done."

Berman came to prominence as a shale skeptic and peak-oil advocate during the first decade of the new century, when intensive fracking and sideways drilling techniques were just beginning to unlock vast reserves of gas from shale fields in Texas and Louisiana. At the time, his dire warnings that shale gas was mostly hype drew the ire of fracking pioneers including Devon Energy Corp. and Chesapeake Energy Corp.

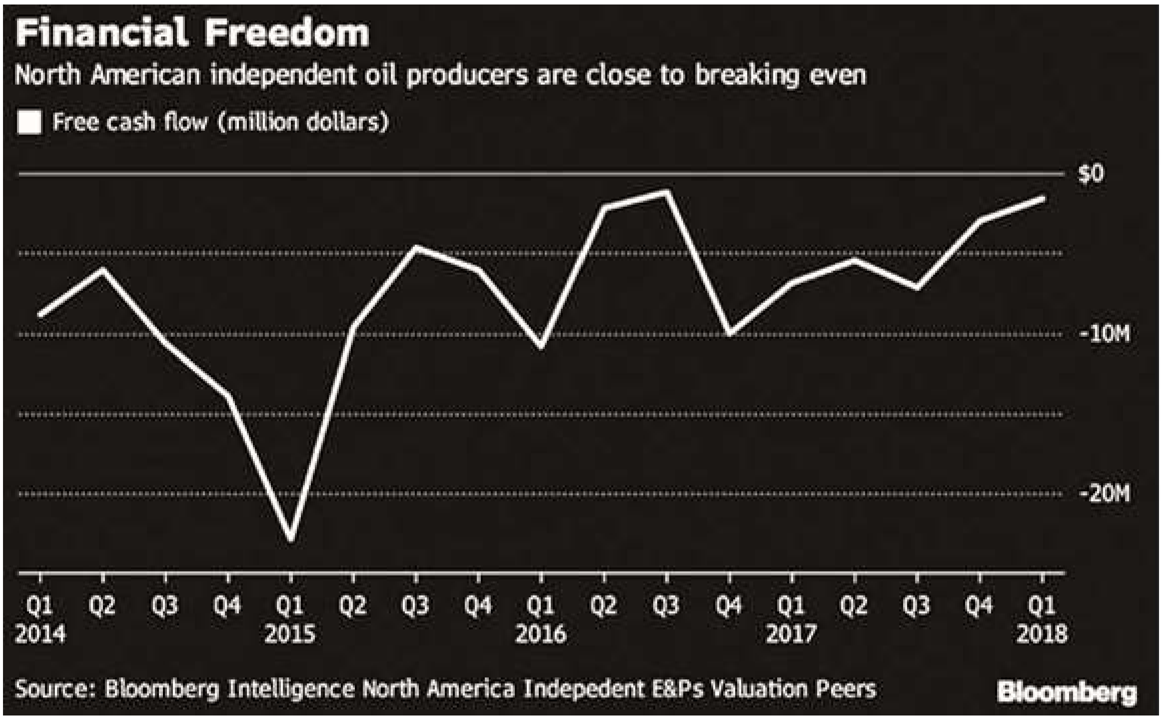
In 2009, Devon's exploration chief Dave Hager – who has since risen to CEO – published an op-ed piece in an Oklahoma City newspaper to refute Berman's thesis. In it, Hager likened shale to a World Series-winning home run and said Berman "is in the stands speculating on whether the slugger is on steroids."

Berman on Thursday said investors banking on shale fields to make major contributions to future global crude supplies will be disappointed: "The reserves are respectable but they ain't great and ain't going to save the world."

Still, he hasn't sold the stock of shale driller EOG Resources Inc. that he inherited from his deceased father "because they're a pretty good company."

His parting advice to the assembled was, "Conserve what you've got, learn to live with less, open your eyes and enjoy the rest of your day." No one participated in the Q and A session.

Shale's big boost comes with newfound thrift as oil hits $70



The shale boom's back in full swing, with fracking crews the busiest since 2014. The novelty this time around: Oil executives stressing their prudence, along with their production.
The combination of surging output, oil prices at three-year

highs and spending under control means that the shale patch – which has notoriously burnt more cash than it makes as investors bankroll their expansion – got closer to a milestone in the first-quarter: Positive free cash flow. As oil rises above $70 a barrel, the outlook for the coming quarters looks even brighter.

It’s a shift that came with the help of new high-tech well systems, and at the insistence of investors pushing payback over growth. Here are five key takeaways from the first quarter to track moving forward: Production is thriving
EOG Resources Inc and Pioneer Natural Resources Co are among producers that posted record output, while keeping capital expenditures in check.
But how can they keep growing without overspending?

Producers have sought to cut costs since prices crashed more than three years ago, but those efforts can only go so far. It’s mainly better technology that’s allowing them to get more from each well without blowing their budgets.
Pioneer, in a recent presentation, offered insight into how its high-tech wells are delivering at a faster rate, a theme repeated over and over again in earnings calls. Devon Energy Corp said it completed the two highest-rate wells in the Delaware section of the Permian in its 100-year history, helping it to a 20% production boost.

Almost living within their means
Buybacks, dividend increases and a cap on capital expenditures. Oil executives couldn’t keep from crowing about their thriftiness while producing record amounts of product, and how their efforts can be a benefit to both their shareholders, and to continued growth.
The numbers back them up, showing a pretty good rise in free cash flow, starting from the end of 2016.

The oil rally’s flip side: HedgingA big risk facing some producers now is the amount of wrong-way bets on oil prices

that they hold. When crude markets slumped, explorers used hedging contracts to lock in payments for future barrels that could now turn sour as futures trade above $70 a barrel.
Wood Mackenzie Ltd's Andrew McConn estimates top producers will lose $7bn on their hedging contracts in 2018.

The reality on the ground
To make record production a reality, oil-service providers are sending a growing number of fracking crews to shale fields to blast the oil-rich layers of rock with water, sand and chemicals.
But for the service providers, that hasn't translated into better profits yet.
The rush to respond to heightened demand has inflated costs for materials like sand and has triggered transportation bottlenecks and labour shortages. All that has weighed down on their first-quarter results. Schlumberger Ltd, the world's biggest oilfield service provider, and Halliburton Ltd, the top fracker, have both promised investors things will improve. If that means increasing prices for their services, costs will rise for producers.

Russian Oil Giants Get Record Prices, But Not Profits to Match

The price of crude in rubles has surged to an all-time high, but Russian oil producers will miss out on record first-quarter profit because of a rising tax burden.

Investors in Lukoil PJSC or Rosneft PJSC — which is due to publish earnings on May 14 — will probably have to wait until later in the year to see the full benefit of the surge in crude. So far, Russia's government has done a better job of translating record prices into revenues, said Denis Borisov, a director at the Ernst & Young Oil and Gas Center in Moscow.

"The golden rain will likely fall on the companies in the second quarter if key conditions — the oil price and ruble exchange rate — remain in place," Borisov said on Thursday.

The price of international benchmark Brent crude averaged 3,823 rubles a barrel ($67.23) in the first quarter, just a hair away from the previous quarterly record in 2014. It's risen further to as high as 4,881 rubles this month. Yet the price of Urals crude in Russia's currency, net of taxes, was 3 percent lower from January to March compared with the fourth quarter due to higher oil-extraction levies, according to Deutsche Bank AG.

Tighter Burden

Tax costs of Russia’s producers have been rising since last year

The industry also faced a jump in petroleum-product excise tax — an additional support to the state budget to fund road construction that may reach 40 billion rubles this year, according to Finance Ministry’s estimates made last year. However, Russia’s domestic gasoline price increases lagged crude in the first quarter, possibly showing that companies were holding back from shifting part of this burden onto consumers ahead of presidential elections in March, said Ildar Davletshin, an energy analyst at Wood & Co.

The revenue of state-run Rosneft, which pumps more than 40 percent of Russia’s oil, could have hit a record of 1.73 trillion rubles in the first quarter, according to Renaissance Capital. However, it expects net income to drop 19 percent from the fourth quarter to 81 billion rubles.

Rosneft plans to start its first-ever share buyback program this quarter, spending $2 billion over three years. That means investors will also be closely watching cash flow. Renaissance Capital expects the company to generate 75 billion rubles in the first quarter, almost 16 percent lower than a year ago, Bloomberg calculations show.

Several of Rosneft’s peers are planning or implementing buybacks as a way to share the rewards from rising crude prices with investors. Lukoil announced a five-year repurchase scheme worth as much as $3 billion back in January — four months before Rosneft. The move boosted the stock’s appeal to investors and helped close the gap in the market value of the rivals.

For 2018 as a whole, Lukoil and Gazprom Neft PJSC are expected to post big gains in net income, according to analysts surveyed by Bloomberg. Rosneft’s cash flow should more than double to some 550 billion rubles, which is enough to cover interest payments, dividends and as much as half of the planned share purchases, Davletshin said. Another Rosneft plan – to cut its debt by 500 billion rubles this year – may need proceeds from selling non-core assets, he said, a move the company is already considering.

Still, the size of the tax burden remains a risk, particularly as Russia forms a new government. President Vladimir Putin’s administration will soon lay out targets for the economy and budget for his fourth term. While the state has promised to avoid significant changes in oil taxes this year, Prime Minister Dmitry Medvedev said this week that Russia will need at least 8 trillion rubles in additional spending to fulfill its plans

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Europe Awakens for LNG to Rival China as Own Gas Runs Out

Europe is starting to steal some of the limelight from China's booming liquefied natural gas demand as imports pick up after several lackluster years.

Europe and China will be comparable in significance as importing regions in the coming years, Cheniere Energy Inc. said, citing data from Wood Mackenzie Ltd. That follows "absolutely phenomenal" growth in China last year, Andrew Walker, vice president for strategy at the company that pioneered the transformation of the U.S. shale boom into global exports, said in Amsterdam.

China's LNG consumption leapt 42 percent last year to almost match European imports, which climbed 20 percent. Whereas the Asian nation needs the fuel mostly to replace dirtier coal, Europe needs it to offset rapidly declining domestic production.

The re-emergence of Europe as an LNG market has caught the eye of the coming wave of U.S. fuel producers. Venture Global LNG, Inc., which is developing export terminals in Louisiana, sees Europe as "one of the biggest surprises," it said at the Flame conference in Amsterdam.

Europe's location may give it an edge over generally higher-

priced markets in Asia when it comes to attracting the increasing volumes produced in the Atlantic. North America and Russia were seen providing most of the new supply from 2025 to 2030, according to a poll at Flame.
Demand growth in China and South Korea, the second and third biggest LNG importers, will cool during the rest of this year after continued expansion through April, according to Cedigaz, a Paris-based industry research group. With less appetite also from Japan, the biggest buyer, northern Europe will step in to balance the markets, Cedigaz's secretary general Geoffroy Hureau said at Flame.

U.K. supply this summer may be low but the Netherlands will see a pick up as it rushes to offset lower own production and higher demand for storage, Nick Boyes, a senior gas and LNG analyst at Axpo Trading AG, said by email. France will also need more for storage, he said.

The Netherlands is taking the lead also because of lack of storage demand in Britain after the closure of the Rough facility. The Dutch market is so hot that the country's Title Transfer Facility hub will be the main reference for LNG trading in the next three to four months, Ruben Tomas, lead LNG trader at Germany's Uniper SE's commodity unit, said on a panel.

"We see a well-supplied Atlantic Basin this summer" as Russia's Yamal LNG and U.S. projects fill the market with cargoes, Axpo's Boyes said. Trinidad & Tobago and Angola are also boosting supply, while demand in southern Europe and Egypt is declining, he said.

While the usage rate of LNG terminals in Europe was just 23 percent last year, things are looking up, according to Arturo Gallego Diaz, head of LNG trading and operations at Centrica Plc.

"There are more and more people looking at northwest Europe as an opportunity to deliver volumes that are produced in the

Atlantic basin,” he said.

Declining production in the North Sea and the Dutch Groningen field as well as the closing of coal plants in Europe have a “big impact on LNG production” and are “a very big demand surprise,” Venture Global LNG Chief Commercial Officer Tom Earl said at Flame. The company recently signed a supply contract with Portugal’s Galp Energia SGPS SA.

‘Fairly Stable’

Creditworthy counterparts, liquid hubs and physical demand help make Europe attractive for LNG, according to Gallego Diaz.

Uniper expects “fairly stable” demand for gas in Europe, while seeing growth in gas-to-power and potentially transport, said Gregor Pett, executive vice president for market analytics.

Russia, Europe’s biggest gas supplier, sees higher demand for its pipeline gas, undermining the region’s efforts at diversification, according to Sergei Komlev, head of the contract structuring and price formation directorate at Gazprom PJSC’s export unit.

While Russia will continue to pipe natural gas to Europe in competition with LNG, both can co-exist, the Centrica and Uniper executives said.

“I don’t think they exclude each other,” Uniper’s Pett said. “Everyone has a place.”

UK could face court action over air pollution after EU warning: ‘We can delay no more’

Proposals made on Tuesday are ‘not substantial enough to change the big picture’

Nine European countries including the UK could face legal action if they fail to make progress on reducing air pollution, the EU’s top environment official has warned.

The intervention came as legal air pollution limits for the whole year were reached within a month in London.

Brixton Road, Lambeth, has seen levels of pollutant nitrogen dioxide exceed average hourly limits 18 times so far this year, the maximum allowed under European Union air quality rules.

Inaction by national governments over the issue prompted the European Commission's environment commissioner, Karmenu Vella, to warn of legal action after talks with ministers from nine EU countries including Britain, France, Germany, Spain and Italy – all of which regularly flout the bloc's air quality standards.

"Every year, an astonishing number of citizens' lives are cut short because of air pollution," Mr Vella said.

"We have known this for decades, and the air quality limit values have been in place for almost as long.

"And yet, still today, in 2018, 400 000 people are still dying prematurely every year because of a massive, widespread failure to address the problem."

He continued: "The deadlines for meeting the legal obligations have long elapsed… we can delay no more."

Poor air quality caused by vehicle emissions, industry, power plants and agriculture is known to cause or exacerbate asthma and other respiratory problems.

Air pollution also has significant economic impacts, increasing healthcare costs, reducing employees' productivity and damaging crops, soil, forests and rivers, according to the European Environment Agency's latest annual report.

It has taken the London longer to reach the air pollution limit this year than last year when legal levels were breached less than a week into the new year.

But while campaigners welcomed action by London Mayor Sadiq Khan to tackle pollution, they warned the relative delay in reaching the limit this year could be down to weather conditions dispersing the dirty air.

Environmental groups called for the Government to take urgent steps, including creating and funding clean air zones in pollution hotspots across the UK where 85% of areas still break air quality rules which should have been achieved in 2010.

Government estimates suggest compliance for levels of nitrogen dioxide, much of which comes from road transport, particularly diesel, will not be met until 2026.

The most recent data shows that around 7 per cent of the urban population within the EU was exposed to fine particulate levels higher than the EU-stipulated limit in 2015.

If the stricter World Health Organisation limits are applied, that rises sharply to 82 per cent.

The countries represented at Tuesday’s summit have been given ten days to submit new proposals for meeting EU air quality standards regarding particle levels.

In Mr Vella’s opinion, the proposals offered by the nine offending countries were “not substantial enough to change the big picture”.

He insisted that the only way to avoid court action was to take “all possible measures without delay”.

Reacting to the outcome of the summit, ClientEarth lawyer Ugo Taddei said: “Commissioner Vella was evidently unimpressed.

“The European Commission should now follow this blatant inaction through to its legal consequences and trigger court actions without further delay.

“The people of Europe have waited long enough to breathe clean air.”

EU Commission warns members it will get tough on pollution

BRUSSELS (Reuters) – The European Commission said on Tuesday it would get tough on air quality and penalize members that breached EU rules on pollutants such as nitrogen oxide and particulate matter.

The Commission estimates that 400,000 people die every year as the result of airborne pollution, and targets introduced for 2005 and 2010 are still being exceeded in 23 of 28 EU countries.

After a meeting with the environment ministers of nine countries which face legal action because of air quality problems, including the bloc’s largest economies Germany and France, EU Environment Commissioner Karmenu Vella said his patience was running thin.

“The deadlines for meeting the legal obligations have long elapsed, and some say we have waited already too long, but we can delay no more, and I have made this very clear to ministers this morning,” Vella told a news conference.

He added that while countries had made some suggestions during the meeting, air quality standards would still be breached well beyond 2020 unless new measures were taken.

“In our exchange, there were some positive suggestions, but I have to say that at first sight, these were not substantial enough to change the bigger picture,” Vella said, adding members had until next week to improve on their proposals.

The EU Commission can take countries to Europe’s top court if they breach EU law. Poland as well as Bulgaria have already faced legal action over air quality issues.

Rethink Gas for the Future EU

The degree to which Europe increases its use of gas will depend on the regulations put in place, on the efficiency of the emissions trading system and on the ability to prove the benefits brought by its use

This year Europe is facing a real winter, and many European households keep themselves warm with natural gas. Gas consumption in power generation is also growing and is a strong backup for the increasing levels of intermittent renewable energy. All told, more then a fifth of energy consumption in the EU comes from the use of gas. According to the Agency for the Cooperation of Energy Regulators (ACER) gas demand in 2016 rose by 7 percent compared to 2015, reaching 4962 TWh (terawatt hours). Gas is a cost-effective part of Europe’s energy mix, as the global market is well supplied and prices remain competitive with other fuels. The International Energy Agency (IEA) in its “Global Gas Security Review 2017” notes that natural gas is the cleanest and least carbon intensive fossil fuel and that it is expected to play a key role in the transition to a cleaner and more flexible energy system. In its World Energy Outlook’s central scenario, the IEA anticipates that natural gas will be the only fossil fuel that will maintain its share in the energy mix in the coming decades. The EU is an integral part of an increasingly globally interconnected gas market, but its own production, while significant, in 2016 supplied only 27 percent of demand, with a resultant huge reliance on both pipeline and LNG importation.

An efficient and liberalized interconnection
A clear asset of the European gas industry is its infrastructure network. Gas pipelines, distribution networks, LNG import terminals and underground storage provides necessary flexibility to the European energy system's variable seasonal demand. After 30 years of progressive liberalization an interconnected gas market has emerged and continues to develop in the EU. A good indicator of this is the fact that 75 percent of its gas is priced to within EUR1/MWh of the gas trading hub in the Netherlands. Also significant gas flow fluctuations are accommodated smoothly, and that results in market participants being flexible in their response to changing market fundamentals. Developments in the LNG market, such as new supply routes like the Southern Corridor, additional interconnections in the internal energy market and new focused legislation have fundamentally improved the EU's supply security. The fact that Russia has increased its market share to 34 percent doesn't create worries, because this increase is happening in the competitive environment created by the third energy market legislation package. New gas discoveries close to the EU's borders in the eastern part of Mediterranean and the final investment decisions made for the production from these sites provide an additional guarantee for a secure gas supply. Still the question is asked whether gas is a transition or destination fuel? Some voices are calling for an urgent phase-out of all fossil fuels, including natural gas.

On the positive side, while methane can leak if not properly handled from well to wheel, natural gas is the fossil fuel that emits the least greenhouse gases—about half the CO2 produced by burning coal if properly produced, transported and used. Gas is also well placed to supply back-up to intermittent renewable electricity because of its flexibility and short start-up times. Because of these qualities gas is sometimes referred to as a renewables best friend.

Nevertheless, on the negative side, natural gas is a fossil fuel that emits substantial amounts of greenhouse gases—with the risk that venting, flaring and leaking can more than offset gas advantages. According to Climate Action Tracker, full lifecycle emissions, including the fuel chain and also the manufacturing of energy conversion technology, implies emissions in the range of 410-650 g CO2 eq/kwh for combined cycle plants as the most effective combustion plants.

How to look at this contradiction? From one side, the use of gas leads to good public acceptance, a vibrant internal market and extensive infrastructure, all of which could provide for Europe's future energy system. From the other side gas leads to greenhouse gas emissions that aren't consistent with the fight against climate change. Industry wants policymakers to avoid picking winners in the fuel mix and instead focus on setting frameworks for fuels to compete on the basis of the three objectives: sustainability, affordability and security of supply.

Renewables increasingly in focus

Today the EU is clearly focused on the promotion of renewable energy. In 2015, renewable energy contributed 17 percent to total final energy consumption. There are indications that the stated objective of 20 percent of renewable energy in the EU's energy mix will be reached by 2020. The European Commission in the "Clean energy for all Europeans" legislative package proposes an objective of 27 percent of the renewable energy share in total final energy consumption by 2030. The International Renewable Energy Agency (IRENA) in February 2018 published a study "Renewable energy prospects for the European Union." It concludes that the EU could double the share of the renewable energy in the energy mix from 17 percent in 2015 to

34 percent in 2030 with existing technologies if the right enabling framework is established. The study emphasizes that all EU countries have the cost-effective potential to use more renewables and that to achieve this goal a yearly investment of USD 73 billion would be required. But even using all this renewable potential a majority of the energy supply in 2030 will be provided by fossil fuels. IRENA's model shows that gas will be the most used fossil fuel in 2030, but the presence of coal will still be strong.

The EU, which accounts for about 10 percent of global GHG emissions, is firmly committed to fighting climate change under an ambitious reading and implementation of the Paris Agreement. The target is to cut the EU's emissions by 80-95 percent by 2050, and that change requires that the EU's electricity, transport and heating and cooling sectors be carbon free by that time. Achieving such objectives while reusing part of the existing infrastructures and changing much, but not all, of the existing energy system suggests that the strategy has to mobilize all existing assets in the most efficient way possible.

Blue gold as the route to low carbon transition…
Gas offers substantial potential to replace higher carbon emitting fuels to work in partnership with renewables to satisfy energy demand and flexibility needs. Increased electrification will drive some change in the role of gas in the energy mix and increased coordination between power and gas will be required to ensure the most efficient interaction to deliver baseload and peak energy demand.

For a successful future of gas use it is important that carbon pricing and trading are put on the right track. The revision of the EU Emission Trading System (ETS) for the period after 2020 anticipates that sectors covered by the ETS have to reduce their emissions by 43 percent compared to 2005. To this end the overall number of emission allowances will decline at an annual rate of 2.2 percent from 2021 onwards. This is a considerable increase from the existing phase, where an annual decline rate is 1.74 percent. We could expect a considerable increase in carbon prices, accelerating departure of coal use in the EU. Also, for gas as a fossil fuel carbon capture, usage and storage will be important. Demonstrating that all of this could be economically implemented and supported by an appropriate regulatory framework and favorable public opinion is crucial for the long-term future of natural gas use.

An interesting and promising avenue for the future of gas is decarbonization by increased use of renewable (green) gas. Renewable gas—biomethane and hydrogen notably—can be transported in existing gas pipes, even if with some adaptations. This would be at a fraction of the cost to carry the same amount of energy in the form of electrons, a ratio as much as one to ten in favor of gas. There is also clear political support for renewable gas. A good example is the recent announcement by France's President Emmanuel Macron to support green gas production with a fund of 100 million euros. Macron has also promised to remove some administrative bottlenecks related to this project. Actually France's energy transition law has a very ambitious target to provide 30 TWh from renewable gas in final energy consumption by 2030. Some experts believe that with appropriate support, the ambition could be even greater.

The EU has some experience in producing and using biomethane and hydrogen, but it is fair to say that there is a long way to go before renewable gas becomes a significant part of the energy mix, as volumes of biogas and biomethane have been very modest. In 2015 EU member countries—most notably the northwestern countries—produced biogas equivalent to less than 20 bcm of natural gas, thereby covering a mere 4 percent of total EU demand for gas. Only in Germany, which accounts for half of total EU production, can this be considered a significant resource at this stage. For reasons of cost and technical constraints, only a small part of the gas thereby produced has been injected into the natural gas grid, most of it being used to produce heat and power locally. To understand how ambitious objectives could be in the years to come, one must consider a variety of bottlenecks in the production, transport, storage and application of renewable gas.

… And the near future is in biogas

To start with what already works, sufficient knowledge and techniques are presently available to produce biogas from landfills and sewage mostly using anaerobic digestion technology. CO_2 needs to be removed from produced biogas and other purification must be carried out to get biomethane that meets the necessary standards to be injected into the natural gas grid. Such upgrading is, of course, costlier if applied to the relatively small volumes available from given farm or landfill. The gasification of woody biomass could produce higher volumes and help scale up installations, but so far such technology is still used only in pilot projects.

A lot of expectations are put on producing renewable gas from renewable electricity. The surplus of intermittent solar and/or wind energy could be stored in the form of hydrogen by running at least part of such surplus through electrolyzers. Today, such a surplus translates into negative prices in the wholesale power market. Doing so on a large scale is being considered in connection with large North Sea offshore-wind projects. Breakthroughs are still needed, however, in power-to-gas technologies, as electrolyzers able to work intermittently are presently costlier to build and operate. The significant capital costs also need to be spread over enough hours and days of operation to make the per gas-unit cost acceptable.

Renewable gas could be transported by trucks, dedicated pipelines and the EU-wide natural gas grid. It would be especially convenient to use the existing grid for transporting renewable gas. Hydrogen can be injected into the natural gas grid, but it influences combustion behavior and materials integrity, which sets limits. Also, a higher flow rate is required to meet demand, because hydrogen’s volumetric energy density is substantially lower than natural gas. As for biomethane, its injection is less constrained than that of hydrogen, provided that gas quality checks have been carried out. Today each EU country has established its own limitations, and regulations related to injections of hydrogen can differ widely even between neighboring coun-tries. Challenges also exist when one envisions the storage of significant volumes of renewable gas, notably hydrogen. Methanization can then appear as an attractive alternative, as hydrogen can also be turned into methane when combined with CO_2, and this does away with technical constraints regarding transport and use. The challenge then arises as to which sources of CO_2 would be acceptable and/or preferable to produce biomethane.

Biomethane could substitute natural gas in almost every sector and application. In industry, renewable gas could serve both as an energy source and a feedstock. It could be used for residential sector heating. By contrast, hydrogen today is used mostly in industry. A hydrogen-driven economy will therefore require a more pro-found transformation. In mobility the potential use of renewable gas is substantial with the exception of air transport. While some countries have developed very significant fleets of gas-powered vehicles, in many others use of renewable gas in transport is hampered by the lack of refueling infrastructure. The interesting breakthrough for the use of renewable gas could come with decreasing costs for hydrogen fuel cells vehicles.

The decarbonization of the gas sector could develop step by step. In this respect certificates, whether Guarantee of Origin (GoOs) certificates for green gases or CO_2 certificates used as offsets could play a role in facilitating acceptance and lowering costs. Altogether, it is correct to say that measures to promote renewable gas are relevant to all elements of the gas value chain.

A key role in Europe’s energy economy

Gas–both natural and renewable– clearly has a place in Europe’s future energy economy. The part of it in the EU’s energy mix will depend on political frameworks put in place, from the efficiency of an improved emission trading system and from the gas industry demonstrating the benefits of gas use in decarbonized energy system. It is difficult to speculate about the part of gas in the EU’s energy mix by 2050. We could try to extrapolate the results of the aforementioned study by IRENA: “Renewable energy prospects in the European Union.” At the level of 27 percent in the EU’s energy mix by 2030, fossil fuels will have a share of 62 percent. The part of natural gas from this share is roughly 40 percent and that would mean 25 percent for natural gas in the energy mix. Renewable gas could grow in the period to 2030 to 8-12 percent from the current 4 percent level of natural gas consumption. With the growth of the renewable component of the energy mix, fossil fuels will decline, but the part of natural gas in the fossil fuels is increasing. All this could bring an increased share of gas in the EU’s energy mix.

Andris Piebalgs

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