

Energy Transition

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HYDROGEN MARKET ENERGY TRANSITION **INSIGHTS** EVENTS LAST WEEK

“Hydrogen Market Is Almost Moving Ahead of Regulators”

Q&A with Alan Hayes, Head of Energy Transition Pricing & Market Data, S&P Global Commodity Insights

How does the hydrogen industry in the Gulf compare to other parts of the world? The potential of hydrogen to decarbonize economies is a worldwide ambition. The way it connects regions comes down to whether one is going to become a producer or consumer, or both. In the Middle East, hydrogen has huge potential to become part of energy producers’ exports. There’s very strong interest to get projects built and go all the way to zero carbon hydrogen production based on renewables. This fits nicely with other parts of the world such as Asia which has very well-known connections with the Middle East in terms of other products like LNG. We can see this kind of relationship between the region and traditional buyers of products from other parts of the world.

How are grey and blue hydrogen fairing versus green as transition fuels? Just because blue hydrogen cannot deliver as much decarbonization as another alternative, should not mean we take that off the table, especially if it can do so in a relatively short timeframe. The Middle East has huge gas resources which can quickly support significant amounts of blue hydrogen and blue ammonia. In Europe, permissions to build a wind farm that can power hydrogen production can take ten years lead time, for which we do not have the timescale to wait.



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Are we seeing progress towards standardization?

There are currently slight variations in terms of regulatory frameworks. In Europe, there is a threshold for the carbon intensity of the production profile. In the US, some of the potential incentives are following a similar pattern to Europe, where tax support can be given. If the lack of progress in standardization does become a problem in stifling the movement of hydrogen between regions, measuring the carbon intensity of the production process can help solve this. When you can make a comparison on that, whether blue being compared with green or comparing blue in this part of the world with another region, understanding the specific carbon intensity of production is a very useful metric to assess price.

How fast can costs of hydrogen production be brought down?

The model that we look at for the development of hydrogen is solar renewables. If we look at the learning curve of that industry and how rapidly it was able to bring down costs, you could apply that to electrolysis for hydrogen. We could see that technology and cost follow a very similar pattern.

How can a price be put on hydrogen without necessarily securing off takers first?

Whether it is blue or green hydrogen, when you get down to the reality of putting money in the ground, project developers need to justify them, and part of that is understanding the price outlook for those products. We publish a very wide range of prices which look at the cost of production based on technology and feedstock on a global basis and using regional inputs to distinguish pricing. For example, we have cost of production for

hydrogen using PEM (polymer electrolyte membrane) electrolysis in the Middle East, but we also have the cost of production for SMR (steam methane reformation). We look at all the technology options and then assess, given the price of gas right now, what does it look like to produce from this production pathway? Given the price of electricity, which is the feedstock into electrolysis, what does that cost of production look like? You can start making comparisons between technologies, but then also make comparisons between those technologies and different regions.

How about shipping as a major part of the price point? The technology of putting hydrogen on a ship is very complicated because the infrastructure does not exist at scale. To go from hydrogen to ammonia is a well-established production technology and moving to low carbon types of ammonia puts no extra burden on the infrastructure. The technology race is between getting hydrogen transported on new ships or converting the hydrogen to ammonia for shipping and then re-cracking that back to hydrogen. There are some significant energy losses in the latter.

Does carbon pricing matter to the progress of the hydrogen market? To make the energy transition sustainable, it must be delivered in a way that governments and citizens understand, and an important way of doing that is by understanding the price of that carbon. There is so much momentum behind hydrogen today that it is almost racing ahead of regulators to some degree.

[FULL INTERVIEW HERE](#)

Building “One Nationally Unified Big Marketplace”: What implications for China’s energy transition?

About 2,240 years ago, in AD 221, the ruler of Qin annexed all his six neighboring kingdoms and proclaimed himself the first emperor of the Qin dynasty, now called China. To build a strong and unified big empire, one of his most significant and lasting endeavors was not just destroying all the defense barriers of the conquered kingdoms, but to unify the calligraphs, road widths, cart tracks, weight and volume measurements, currencies as well as market rules.

More than two millennia later, in 2022, can one imagine that a similar action is being undertaken in the Middle Kingdom? Well, everyone knows China is a very large market for everything with its 1.4 billion population, but few may know that the Chinese market is actually not a unified one. There exist what we call “horizontal barriers”, whereby each of its 31 provinces sets their own rules to protect local manufacturing and vested interests against goods and services from other provinces, and “vertical compartmentations” whereby critical infrastructures such as gas, water, heating and

power are managed by different government agencies, preventing companies operating in one compartment from entering into another, thereby impeding market efficiency.

As China nowadays focuses more on domestic market to pursue economic growth, due to both the pandemic and the decoupling with the west, its policymakers have turned their attention to remove domestic trade blockages to ensure an unimpeded flow of products and service inside this big marketplace. This is the purpose of the “Opinion on Accelerating the Construction of a Nationally Unified Big Marketplace” (the Opinion), released on March 25, by the Central Committee and the State Council.

This Insight China report sheds some light on its implications and potential repercussions to the country’s clean energy transition.

[VIEW FULL REPORT HERE](#)



“GCC’s Decarbonization Drive Can Bring Down Energy Costs”

Q&A with Ramzi Hage, Principal of Strategy&, Part of PwC

Will the GCC renewables outlook continue to be positive? The scale of the projects in the region are massive, with projects ranging from 300GW to 400GW. The long-term forecast shows very ambitious new energy targets, mainly driven by Saudi Arabia with around 60 gigawatts by 2030. The UAE has plans for 9GW by 2025 and 50% of that production in the long term will come from clean energy. Qatar is also setting up a new energy strategy which will have significant targets considering its system size. These are massive scale capacities being introduced to the system in one shot as compared to what is typically seen in the US and in Europe where capacities are around 50MW to 150MW.

How attractive are these projects for financing opportunities? Financing is a key differentiator and a big part of the renewable energy cost because the module price is the same around the world. If we are achieving low cost of energy, whether it is in wind or solar, it means that we are getting very low-cost financing in these projects. The availability of green funds can further propel these renewables. Financing is not a challenge for this region.

How are net zero ambitions being translated into action in this region? They are moving in the right direction, especially in the UAE and Saudi Arabia. They have committed to achieving their net zero targets by 2050 and 2060 respectively. The second step is developing a comprehensive strategy, wherein partnerships will play a key role. There are several elements to these strategies that must be considered. First is the technology that will enable decarbonization, how they are interlinked with other sectors, and where they will be deployed. It is also important to address whether they will abate today or tomorrow, as some technologies are already commercially viable while others are not. The third aspect is the policies and measures put in place to drive differentiated moonshots. This refers to the technological big bets that the UAE and Saudi Arabia need to focus on to drive their ambitious targets, such as green hydrogen. Should they double down on R&D for green hydrogen to make it more cost efficient?

Engage, engage, and engage. We have seen many environmental strategies developed around the world on paper, but which did not engage with stakeholders for buy in and never get implemented. We need to build the proper mechanisms that establish collaboration and buy in between the various stakeholders to implement strategies. Putting proper

governance in place can attract various stakeholders. They need to feel involved and have a sense of ownership and that their constraints and limitations are understood.

What’s the outlook for hydrogen in the region? Hydrogen will develop here as part of a journey. It will involve building a hydrogen economy, producing the hydrogen, and setting up the proper infrastructure and shipment routes to its target markets in Europe and Southeast Asia. With Europe planning to introduce carbon taxes on imported products, any export of steel or aluminium from this region with a high carbon intensity, will be at a higher cost. We see blue hydrogen helping in this regard in the short term, with green then coming into play, as domestic industries adopt the technology to produce cleaner products for export. The region has significant competitive advantage when it comes to low-cost green hydrogen production, given the very low-cost renewables and the massive availability of land that can be leveraged. We forecast the price of green hydrogen to be around \$1.5 per kilogram by 2035 which is extremely low compared to grey and blue.

How do you see the current oil prices and the situation in Europe impacting the pace of the energy transition? The energy transition is only going to accelerate. Countries that are mostly affected by the current energy crunch are doubling down on their green investments as we have seen Germany and the UK showing more aggressive plans on renewable energy penetration. If you look at international companies, they are shifting their portfolio investments into renewables, electric vehicles, charging stations, and hydrogen. These are driven by shareholder demand and market growth. What is happening is a doubling down on the whole energy transition.

Where are national oil companies in today’s conversation? National oil companies are embracing the energy transition, realizing that it complements rather than hinders their business, specifically blue hydrogen. At the end of the day, the region is the lowest cost producer of oil. They are already developing plans and piloting assets around blue and green hydrogen, and they are also going to expand beyond that in the future to make sure that their portfolio becomes diversified as well as meeting energy transition requirements.

[FULL INTERVIEW HERE](#)

INSIGHTS

Protracted Volatility: Russian War on Ukraine Reshapes Energy Markets



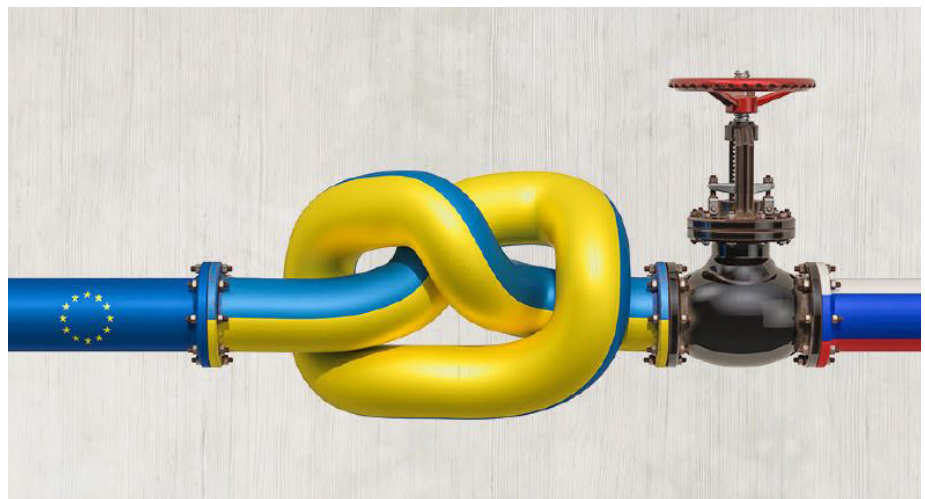
Dr. Cyril Widdershoven
Senior Consultant - Energy, Security & Investments
Strategy International

Global energy markets are trying to find their footing even as the full impact of the Russian invasion of Ukraine on security and energy markets remains unclear. Initial fears of a Russian natural gas blockade of European markets have not yet materialized. However, Moscow is now facing increasingly stringent Western sanctions on its economy, targeting both Russian elites and the country's military. At the same time, discussions are ongoing regarding the implementation of an EU 6 Sanctions Package, which would potentially suspend or terminate Russian exports of energy and petroleum products to the European Union.

Discussions inside European centers of power are heating up, but a clear and unanimous vote will be necessary to produce a real European sanctions regime capable of hitting Russia where it matters: the hydrocarbon sector. Thus far, several EU members have had cold feet or explicitly opposed the package, as was the case with Hungary. Meanwhile, Bulgaria and Germany's economies are highly dependent on Russia and they are afraid of a severe economic downturn if sanctions are imposed. The remaining EU members are largely in favor of the new package, even those that would take an economic or financial hit as a result. In Brussels and other European capitals, moral considerations and long-term geopolitical strategies are the decisive factors, as the West prepares to confront Russia's aggression with unprecedented fervor.

Missing Direction

that even in this bull market, bears are still around, hiding in plain sight. According to financial data reported by the top 10 oil and gas companies, it is



clear that fundamentals will continue to drive hydrocarbon sector growth worldwide. Profit margins, net profits, and dividends will promote high visibility and interest from investments, pension funds, and sovereign wealth funds (SWFs). Contrary to popular belief, as crude oil markets become more visible and mediagenic, natural gas and liquified natural gas (LNG) will become attractive, due to their rising prices, LNG shortages worldwide, and Western interest in natural gas as a transition fuel.

Both oil and gas subsectors remain very strong, but risks lie ahead. Although Arab producers, especially the likes of Aramco, ADNOC or QP, have been able to ride the wave, most NOCs and IOCs face mounting geopolitical and geo-economic risks. As some have already warned, the most significant and overlooked risk at present is the continuing lack of investment in up- and downstream oil and gas at the global level. If this is not addressed very soon, the market will head towards a long-term price spike, leading to potential demand destruction, even with Aramco or ADNOC's multibillion projects.

Transformed Markets

The Ukraine crisis is completely reshaping geopolitics and has led to new alliances. From a Western standpoint, the Ukraine crisis has been a wake-up call on many overlooked issues, such as EU security, internal cooperation, the EU's role in the world, energy security, and the energy transition. Russian president Vladimir Putin's actions have removed internal instability in the EU and NATO. After Obama's soft-power democratization push and Trump's anti-NATO positioning, a unified Europe has returned with a force. There are no longer concerns about the possible demise of NATO; on the contrary, it is expanding, as demonstrated by Sweden and Finland's current membership applications. EU discussions with possible new member countries, such as Albania, Serbia, Turkey, and especially Ukraine, will be fast-tracked whenever possible. Putin's strategy for Moscow has significantly backfired given Europe's dramatic policy changes following its previous addiction to cheap Russian energy supplies.

FULL ARTICLE HERE

Energy Transition Changes the Game for Energy Companies in the Middle East



Raja Atoui
Partner, Bain & Company Middle East and Grant Dougans
Partner, Bain & Company Washington DC

Energy executives evaluating capital investments in fossil-fuel infrastructure hear two very different narratives about the future. On the one hand, pricing levels and the demands of the market signal the need for new capital investment in the energy system. On the other, energy companies are under pressure from investors, regulators, and other stakeholders to throttle investments in fossil-fuel infrastructure, to help put the world on an emissions path consistent with a 1.5°C temperature rise from preindustrial levels. Much of the discussion on fossil-fuel assets is binary. That is, they're either vital to prosperity or unacceptable given climate change. In spite of this uncertainty, executives still need to make investment decisions on energy infrastructure, based on the economics of each project. Increasingly, a top concern is the risk of stranded-asset costs: that a power plant, refinery, oil well, or other assets won't continue to operate through its useful life due to changes in policy or economic shocks. This is no small change, but rather a fundamental reshaping of the rules that have guided energy infrastructure investment for more than a century.

Management teams are reimagining their investments in traditional energy assets, despite uncertainty about future returns or terminal value. When combined with a sound energy transition strategy, companies can navigate risks associated with individual projects and build the right assets for the coming years. But the time to start managing stranded cost risk is now.

Leading players are implementing five key actions to reduce the overall risk of a given project.

- Rather than focus on a pipeline of new projects with long useful lives, companies will increasingly look for ways to extend the lives of existing assets, or invest in assets with a more modular capital profile, that is, one that allows them to invest in segments rather than all at once.

- When approving investments or determining depreciation, companies will want to take into account the risk of stranded assets.
- Where possible, companies should design assets in ways that anticipate their conversion to lower carbon use. These designs may cost marginally more up front, but when policy is uncertain, the ability to keep assets running in a net-zero future creates more value over time and reduces the assets' risk.
- Shorter life spans for assets imply revisiting traditional design specs; they don't have to be designed to last forever. Many energy companies have thrived on their engineers' abilities to push the limits of what can be achieved safely.
- Many energy projects make money either on long-term, locked-in agreements or based on market movements. Long-term agreements earn an attractive return on capital, but the market model offers the possibility of higher and quicker returns, along with some pricing risk. A blended approach can help accelerate returns and mitigate risk.
- Stranded-cost risks will vary widely for different assets of any given company, which must have a concrete understanding of the individualized risk profile for any particular investment.
- Project assessment always requires scenarios, but the level of uncertainty is rising. The risk of stranded costs means that management teams will need to focus more on mission-critical capital projects that offer rapid returns.
- An asset that might strand in year 25 of 30 represents a small risk of stranded costs (and the ultimate write-down) relative to a long period of value creation for customers and shareholders. An asset that strands in the 10th year of a 30-year plan represents a significant write-down risk with much less value creation potential. For this reason, assets with shorter life spans are less risky than those with longer life spans.
- An asset that can be converted to a lower-carbon use or sold is more valuable than one that can only be shut down and written off.

Consider the project as a part of an evolving portfolio

For companies that need to maintain and invest in fossil-fuel infrastructure, managing the risks of stranded assets could become more challenging every year. They'll need to manage this risk as part of a broader strategy to evolve the business and sustain a compelling proposition for investors.

Companies will want to tune their capital-allocation approach to the needs of their investors. Two groups of investors to pay particular attention to might be considered "green capital" and "gray capital." Green capital investors focus on ESG metrics. Some place carbon budgets on their portfolios, which can limit the availability of the capital they manage. These investors will look to management for signals that the company is serious about the energy transition, even as they make investments in fossil-fuel assets that may become stranded. Gray capital investors, by contrast, are less focused on ESG topics and more comfortable taking risks on fossil-fuel assets. This group is taking on a growing share of investment in fossil-fuel infrastructure.

All investors, whether green or gray, are likely to increase their reliance on ESG metrics and ingest vast amounts of data to identify which companies are best situated to generate returns from the energy transition. Scrutiny on management teams will increase, particularly on management's ability to decide whether to invest in assets with a risk of stranding, and for which reasons. This is a relatively new issue, but one that management teams at energy companies will have to contend with for the rest of their careers. The field is changing rapidly, and no one can be certain how policy and investor sentiment will evolve. Developing the skills to make these assessments and the flexibility to adapt based on shifts in policy, investor sentiment, or other conditions will be critical for success.

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Dr. Oliver Weinmann

Managing Director, Vattenfall Innovation GmbH &
President, German Hydrogen Association (DWV)

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