



ESF 2021

ENERGY & SUSTAINABILITY FORUM

Decarbonising the Downstream Industry

31st May - 1st June 2021, Paris

ENERGY & SUSTAINABILITY FORUM (ESF) 2021

ADVISORY MEETING REPORT

IN ATTENDANCE

- ALEXANDER BENÖHR, DIRECTOR MARKETS & ENERGY TRANSITION, **AIR LIQUIDE**
- CLAUDIA AMOS, TECHNICAL DIRECTOR, **ANTHESIS**
- ROMAIN ROUX, ADVISOR TO CHIEF TECHNOLOGY OFFICER, **AXENS**
- OLIVIER MACE, BIOFUELS DIRECTOR, EUROPE, **BP**
- RAQUEL CANTON JARA, FUELS-TO-CHEMICALS & SUSTAINABILITY SPECIALIST, **CEPSA QUIMICA**
- DAMIEN VALDENAIRE, SCIENCE EXECUTIVE, **CONCAWE**
- MALCOLM DOUGLAS, **RENEWABLE ENERGY CONSULTANT**
- NATHAN ERGONUL, VP MARKETING FCC, **GRACE**
- SZYMON WALKOWSKI, HEAD OF THE ENERGY EFFICIENCY DEPARTMENT, **GRUPA LOTOS**
- LEON DE BRUYN, PRESIDENT AND CHIEF EXECUTIVE OFFICER, **LUMMUS TECHNOLOGY**
- ROBERT TIEMAN, SENIOR MANAGER SUSTAINABILITY & BUSINESS DEVELOPMENT, **LYONDELL CHEMIE NEDERLAND**
- GERGELY JANCSÁR, HEAD OF SUSTAINABILITY, **MOL**
- MANFRED MANGI, HEAD OF TECHNICAL DEVELOPMENT, **OMV**
- ADRIANA OREJAS NÚÑEZ, INDUSTRIAL & DEEP TECH DIRECTOR, **REPSOL**
- DR. FAHAD A AL-SHEREHY, VP, ENERGY EFFICIENCY / CARBON MGT., **SABIC**
- PANU ROUTASALO, VICE PRESIDENT, **UPM BIOFUELS**
- DANIEL CARTER, BUSINESS DEVELOPMENT DIRECTOR, SPECIALIST ENGINEERING & CONSULTING, **WOOD**
- TOM HEGGARTY, PRINCIPAL ANALYST, ENERGY TRANSITION, **WOOD MACKENZIE**

CHAINED BY:

- TJ CONWAY, DIRECTOR, RESEARCH & ADVISORY, HEAD OF ENERGY TRANSITION RESEARCH, **ENERGY INTELLIGENCE**
- STEFAN CHAPMAN, VICE PRESIDENT, **EURO PETROLEUM CONSULTANTS**

EURO PETROLEUM CONSULTANTS:

- LAURA MCMANUS, SALES & CONFERENCE DIRECTOR
- KAY MITCHELL, SENIOR CONFERENCE DIRECTOR
- CHRISTINA ROMANOVA, EVENTS EXECUTIVE
- SONIA SANCHEZ, PROJECT EXECUTIVE

APOLOGIES:

- SAMAR AL HAMEEDI, VICE PRESIDENT, SUSTAINABILITY, **ADNOC**
- JAMES MACKEY, MANAGING DIRECTOR CCUS, **OIL AND GAS CLIMATE INITIATIVE**
- SÉBASTIEN LEGER, PARTNER, **MCKINSEY**
- OUTI ERVASTI, VICE PRESIDENT, RENEWABLE HYDROGEN AND PTX, **NESTE**
- WALTER MIRABELLA, HEAD OF GLOBAL FUELS TEAM, **SUSTAINABLE FUELS**
- DAVID MARION, VP MANUFACTURING AFRICA, ME, ASIA & PACIFIC FOR REFINING AND PETROCHEMICALS, **TOTAL**

THE FUTURE (LIQUID FUELS) REFINER IN A POST-COVID-19 ERA – EXPECTATIONS AND REALITIES

It is apparent that the future for the refining industry remains uncertain especially when forecasting demand (growth) post COVID-19.

One of the biggest question marks right now continues to be surrounding jet and aviation fuels, if demand has peaked, and how we can expect consumer demands regarding international air travel to evolve over the next few years. The overriding concern was that demand will never return to pre-COVID levels. In fact, during the discussions it was apparent that with the rise of remote working and virtual meeting platforms, going forward there has been an acceptance that business travel will require a new level of justification, thus decreasing demand for international air travel drastically. It was agreed that as a society, we simply cannot, and do not want to work and travel the same way as we did before and will settle on a hybrid happy medium.

By very nature, the future of refining is intricately linked to the future of liquid fuels. There is still intense debate over whether demand has peaked already. But consensus expectations are that demand will peak, and many believe that the COVID-19 pandemic has brought that peak forward by a few years.

With demand reeling from the coronavirus crisis, coupled with rising transition hysteria, what 2020 has taught us if nothing else, is that the industry's future has never been so uncertain.

Despite so much uncertainty surrounding the future of the hydrocarbon industry, the reality is the affordability of energy and lifestyle expectations of the world's 7 billion people will continue to drive (some) liquid fuels demand longer-term. However, what is needed is a pragmatic approach, with all options on the table without becoming too ideological and political.

With today's decreasing demand and increasing pressure to provide cleaner energy, more than ever, the downstream industry must work together to convince society of their enabler' role in providing the solutions to the problem, not as the problem itself. The industry needs to be realistic in their aspirations and building their options for the future with the assets they have. We need to get the balance right whereby liquid fuels find a complimentary role in the green deal.

CONVERTING ASSETS AND TURNING WASTE INTO RESOURCE

That moved the conversion onto the opportunities presented from converting smaller, less complex refineries into bio-based renewable plants. Despite helping to meet renewable energy goals, before everyone jumps on the green refinery bandwagon, economic viability vs. divestment remains a dilemma for many. Amongst our advisors, this appeared to be the million-dollar question, with the answer dependent upon a variety of factors including the future of the liquid fuels market, and the speed of electrification. In theory the potential is enormous but in reality, the translation of these aspirations into real projects will see some fall away. It was agreed that when and where the math stacks up, the potential and possibilities in adapting existing units to run on bio feedstocks, even co-processing is enormous.



That brought the conversation onto the next subject of feedstock availability, logistics and infrastructure, all pressing topics for the group. As put by one advisor “with the changing environment offering refiners the new opportunities, if everybody sees the same opportunity, then we are running short of feedstock”.

Refiners are already competing for good quality waste for renewable energy creation. In Europe especially there is a shortage, with many refiners resorting to importing good quality waste, in turn reducing the potential economic and environmental benefits. Waste is becoming a profitable business. Prices are increasingly putting the viability of some refiner's waste to biofuel ambitions and projects at jeopardy. Conversely, others felt that the feedstocks are abundantly available but it's the logistics that needs to be resolved with a lack of infrastructure and small collection points.

CIRCULAR ECONOMY – TAKING THE OPPORTUNITIES FROM CONCEPT TO REALITY

Next conversation turned to an optimistic note for the industry and the subject of plastics circularity. We have witnessed a rise in refiners and petrochemical producers embrace plastic waste recycling over the last year, and amongst our advisors it is certainly a business model being pursued by many of their companies.



Creating a high-yield circular economy at the core of a chemical business strategy not only allows for a closed loop to their products and zero waste, but it also enables the industry to firmly position itself as a part of the solution for the entire value chain.

We heard from a global petrochemicals producer actively involved in driving a Circular Carbon Economy agenda forward. It was noted that the key to realising a lasting and positive impact is collaboration between all stakeholders, both private and public sectors.



In a time of mounting regulatory and consumer pressure, circularity helps reinforces the reality that the industry is an enabler. The world needs and will continue to need fossil fuels and plastics to increase prosperity. It was unanimously agreed that the industry is struggling to get the message across about the role it plays in solving the climate change problem, however circularity holds a new and much needed lifeline.

TECHNOLOGY AND THE TRANSITION



With mounting and increasingly stringent legislation to adhere to, the role of technology has never been so important. The challenges and opportunities posed by decarbonisation do not stop with the producer, with technology companies playing a huge role in the transition.

It was agreed that the industry certainly has the knowledge and skills to succeed. The transition will require significant technology R&D. The downstream industry has the will and the science, but it also requires a guiding hand from the correct legislation – a missing piece of puzzle piece today.

When it comes to the pace of the transition, technology companies are calling for information from their customers to help them create the right technologies, at the right time. As put by one of our advisors, “do we invest to create new technologies for co processing for instance? What is the role of these traditional conversion units in the transition?” once again highlighting that when it comes to energy transition, there is no silver bullet, and we must all work together.



TURNING THE CONVERSATION TO SCOPE 3

Whilst much of the legislation today is focused on scope 1 emissions reduction, it is somewhat immaterial in the context of a refinery and its products, where scope 3 emissions play trump. For many in the meeting, this is where the big challenge, and impact lies.

When it comes to navigating scope 3, this year we have witnessed a string of majors make big strategic decisions to advance these targets. As a growing focus for investors and companies, without doubt policy support will be key to achieving these goals.

A lot of work has been done or is at least underway when it comes reducing the emissions of operations (scope 1 and 2), but the narrative for downstream oil decarbonisation that focuses on Scope 3 and the decarbonisation of the products itself still has a long way to go.

It was agreed that there is no one solution and all players, producers, and consumers in the energy eco system need to play their role in this climate change conundrum. More often than not, scope 3 emissions represent the biggest GHG impact and for that the downstream industry is heavily reliant upon their much wider value chain in making scope 3 a reality.



THE GREAT 2030 EV SWITCH - A VISION BECOMING REALITY

Underpinning much of the discussion was the uncertainty over the future of liquid fuel demand, aggravated by an expected permanent post COVID-19 behavioural shift and demand destruction for aviation and transport fuels. This coupled with the (perhaps overly optimistic) 2030 EV switch is a challenging time for today's refiners.

There was no dispute from the discussions that electrifying transport, especially in Europe is a top priority in the move to a lower-carbon future, but questions surrounded the share of the vehicle park that electric will make up over the next 10 years without the infrastructure and economics in place.

Poland was shared as an example, where the government's overly ambitious aim set out in 2016 to have one million electric vehicles on the road by 2025 has already been scaled back to 600,000 electric and hybrid vehicles by 2030. The continued lack of monetary incentives, vehicle production, infrastructure and (domestic) charging make even these revised targets look sceptical.

Post COVID-19, expectations are that we cannot and will not travel the same way for many years to come. Affordability will continue to play a major role in the rate of deployment, and while EVs still remain more expensive than the internal combustion engine, come 2030, consumers are not going to abandon their cars. The reality is that the fate of a 2030 switch will be dictated by the economics.

When it comes to the transposition of RED II into legislation, whilst the picture may be getting clearer, there is still a lot of uncertainty. For those in Europe there is the question of whether the rest of the world will follow suit. With RED II just affecting the EU, the industry is calling for harmonisation and a pragmatic approach.

So, while Europe continues to be the driving force for electrification, concerns were expressed from the group about how the region's downstream industry will be protected if the rest of the world does not follow suit?

While universally accepted that it is essential to respond to the climate change challenge, it was evident from the discussion that there is no single and simple conclusion to feed and decarbonise our diverse energy needs. While there is a lot of effort going in to take Europe towards "carbon neutrality", this will have little or no impact on emissions without a global approach, supported by robust legislation.

CCUS AND HYDROGEN - THE LOW CARBON TEAM?

At the front and centre in the quest to net zero is carbon capture, utilisation and storage (CCUS) and its role in the impending energy transition.

Amongst the group some viewed CCUS as critical and agreed that it will be here to stay at least for the medium-long term, when and where applied in the correct site and market. However, it was noted that CSS alone is not sufficient to achieve net zero but combined with CCU, will play a key role in enabling the industry to realise their ambitions of reducing emissions. As such our advisors were keen to understand the most promising utilisation approaches to CCS and CCU.

While CCUS investment and development is happening, several challenges hinder its adoption. For one the legislative and regulatory frameworks are underdeveloped, with the advisors pointing out that globally carbon taxes are not consistent enough to provide the necessary incentives to invest, inhibiting the largescale and widespread deployment of CCUS in the immediate future. Success requires an integrated play once again reiterating a common theme that the industry requires harmonisation and a global, pragmatic approach in its quest for net zero.

Turning to hydrogen, without doubt it has surged up the priority for the industry, taking almost a primary position in decarbonisation efforts.

Our advisors agreed it certainly plays a key role in the “fuels of the future” picture and the opportunities it presents should be embraced as quickly as possible, building from existing assets whilst keeping liquid fuels as complimentary in achieving the goals that the green deal has put on the table.



Today there are some expectations that green hydrogen will become competitive with blue hydrogen (the latter of which employs SMR) in the not-too-distant future. As such the downstream industry should start looking at hydrogen coming from PVs through electrolysis as the market is growing rapidly. For refiners to reduce their carbon footprint, the industry should start thinking about using concentrated solar power to produce steam. It was stated that during the next 10-15 years the industry should develop SMR processes based on biofuels/hydrogen.

CCUS AND HYDROGEN - THE LOW CARBON TEAM?

The Middle East was shared as an example whereby PVs are now considered to be the cheapest source of electricity in the region reaching 1.5 cents/kW. The resulting excess energy is driving the production of Green Hydrogen.

The conversation continued around hydrogen limitations. Despite its potential as a next generation fuel, the current cost of green hydrogen is extremely high. Hydrogen costs in general (of any shade) need to come down enough to begin revolutionizing the global energy system. Next hydrogen mobility. It is still extremely hard to distribute as well as store.

A key question raised was, how to develop a viable business case around green hydrogen? Do we need an interim phase with "blue" hydrogen (produced by gas with pre-combustion CCS or CCUS) to scale up and develop the infrastructure before moving to large-scale green hydrogen? Blue hydrogen has a significant role to play over the coming years. The 2020s will give us important indications of how quickly hydrogen can become commercially viable on a large scale.

Whether it's blue or green, it was agreed that there is plenty of room for the different colours of hydrogen. But once again in finding the optimal role for hydrogen, the regulation needs to narrow.

The final conversation moved onto ammonia which has been gaining momentum as a candidate to carry and store hydrogen as well as an option for maritime transport. Speculation arose as to whether ammonia is the most efficient way to carry hydrogen, and if so, how the hydrogen that is required for ammonia will be produced?

#ESF21 will cover all of these topics and more, with two engaging days of strategic discussion and technical immersion - check out the full agenda [here](#).

