



ESF North America 2022

ENERGY & SUSTAINABILITY FORUM

Decarbonizing the Downstream Industry

20–22 June 2022 | Houston

POST EVENT REPORT

HOSTED BY EURO PETROLEUM CONSULTANTS
[EUROPETRO.COM/NORTHAMERICA](https://europetro.com/northamerica)

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INTRODUCTION

The inaugural ESF North America took place from the 20-22 June 2022 at the Westin Oaks Galleria in Houston, gathering the region's refining and petrochemical leaders as they position themselves for a low carbon transition.

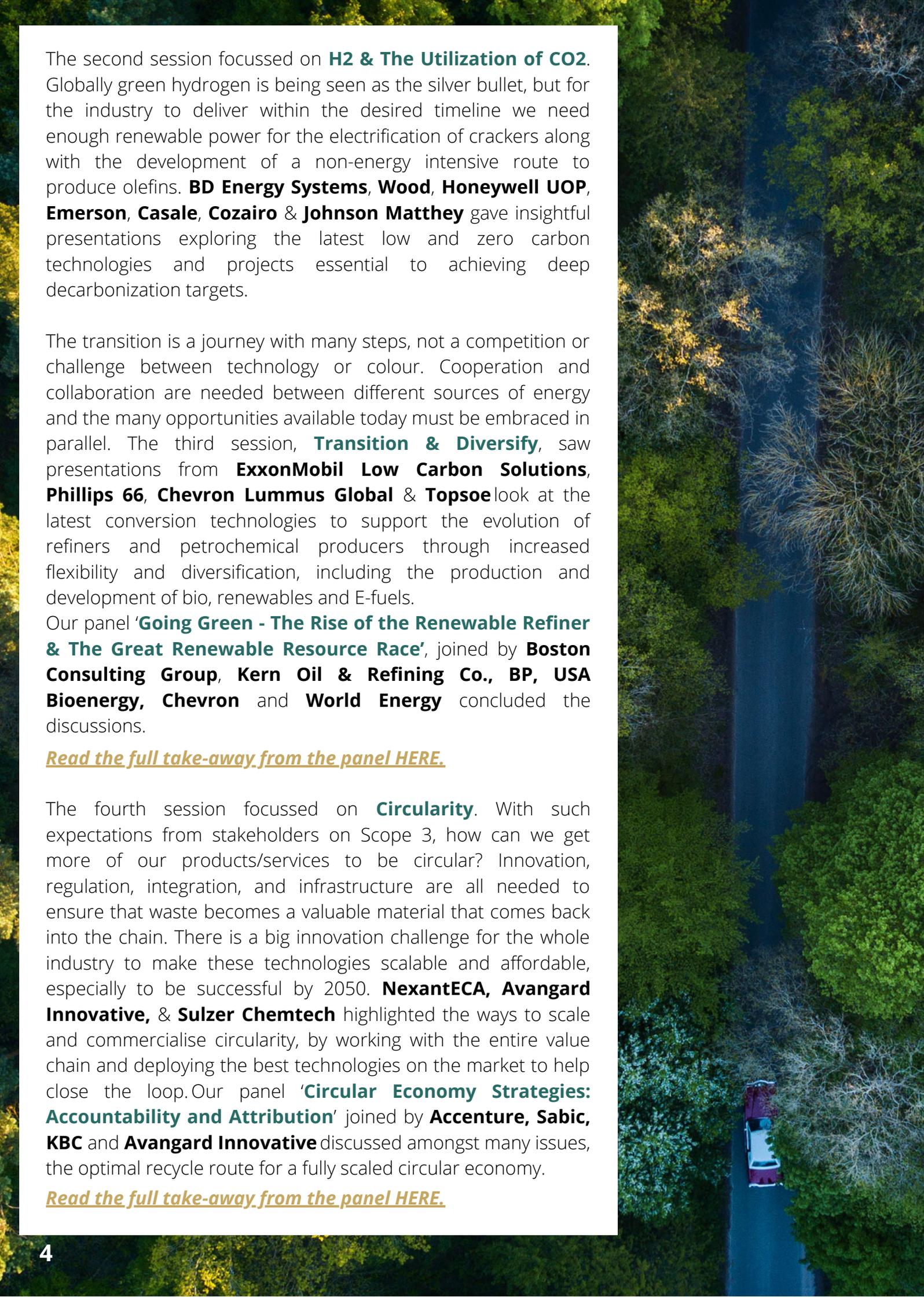
Across three days of interactive panels and seminars, insightful presentations and a variety of networking formats, attendees shared with optimism, case studies, perspectives and the technologies to help drive forward the decarbonisation of the downstream industry.

The conference focussed on four key themes. First, **Decarbonisation Strategies & Deployment**, looking at how the downstream industry can be enabled and supported to move as fast as it can, in the technology directions that's best for them, and wider society. A series of keynotes from **Wood Mackenzie, Shell USA, Inc., Honeywell UOP, Johnson Matthey, Chevron Lummus Global, Aveva** and **KBC** presented the opportunities for refiners and producers to carbon base line their assets, and accelerate the adoption of low carbon technologies and digitalization.

Alongside the presentations were our two keynote panels – first the keynote producer panel **'Pathways Policies and Putting Capital into Low Carbon'** joined by **Phillips 66, Exxonmobil Low Carbon Solutions, Lyondellbasell, Nacero** and **Delek US** and our Technology CEO panel **'The Technological Innovations Driving Net Zero Aspirations'** joined by **Honeywell UOP, ExxonMobil Catalysts & Licensing, Johnson Matthey** and **Wood**.

[Read the full take-away from the panel HERE](#)



An aerial photograph of a paved road that curves through a lush, green forest. The trees are dense and vibrant, with some sunlight filtering through the canopy. A small, dark-colored car is visible on the road, moving away from the viewer. The overall scene is serene and natural.

The second session focussed on **H2 & The Utilization of CO2**. Globally green hydrogen is being seen as the silver bullet, but for the industry to deliver within the desired timeline we need enough renewable power for the electrification of crackers along with the development of a non-energy intensive route to produce olefins. **BD Energy Systems, Wood, Honeywell UOP, Emerson, Casale, Cozairo & Johnson Matthey** gave insightful presentations exploring the latest low and zero carbon technologies and projects essential to achieving deep decarbonization targets.

The transition is a journey with many steps, not a competition or challenge between technology or colour. Cooperation and collaboration are needed between different sources of energy and the many opportunities available today must be embraced in parallel. The third session, **Transition & Diversify**, saw presentations from **ExxonMobil Low Carbon Solutions, Phillips 66, Chevron Lummus Global & Topsoe** look at the latest conversion technologies to support the evolution of refiners and petrochemical producers through increased flexibility and diversification, including the production and development of bio, renewables and E-fuels.

Our panel '**Going Green - The Rise of the Renewable Refiner & The Great Renewable Resource Race**', joined by **Boston Consulting Group, Kern Oil & Refining Co., BP, USA Bioenergy, Chevron** and **World Energy** concluded the discussions.

[Read the full take-away from the panel **HERE**.](#)

The fourth session focussed on **Circularity**. With such expectations from stakeholders on Scope 3, how can we get more of our products/services to be circular? Innovation, regulation, integration, and infrastructure are all needed to ensure that waste becomes a valuable material that comes back into the chain. There is a big innovation challenge for the whole industry to make these technologies scalable and affordable, especially to be successful by 2050. **NexantECA, Avangard Innovative, & Sulzer Chemtech** highlighted the ways to scale and commercialise circularity, by working with the entire value chain and deploying the best technologies on the market to help close the loop. Our panel '**Circular Economy Strategies: Accountability and Attribution**' joined by **Accenture, Sabic, KBC** and **Avangard Innovative** discussed amongst many issues, the optimal recycle route for a fully scaled circular economy.

[Read the full take-away from the panel **HERE**.](#)

KBC NETWORKING EVENING



A Yokogawa Company

An evening of local Texan food, live music and drinks created the perfect atmosphere for networking. KBC hosted the networking function at local Texas restaurant, The Rustic and the evening was a real highlight for delegates.





THE RUSTIC



Duncan Mitchell

Operations | Manufacturing | Strategy | Transformation | M&A | VP | Dire...

Thanks to [Euro Petroleum Consultants Ltd](#) for helping us host this. We had a great time with quality people engaged in real conversation, face to face. Good to get together.

SEMINARS

ESF North America 2022 began with two pre-conference seminars hosted by Wood & Honeywell UOP.



Wood opened the seminar day to discuss **'Enabling a low-carbon Economy in the US: How will you achieve your Net Zero ambitions?'**

Wood's experts took delegates on a decarbonisation journey to address the key solutions to reduce emissions and engineer a net-zero future.



Honeywell UOP kicked off the afternoon focussing on **'A Path Towards Carbon Neutrality: The Future for Refining & Chemicals in the US'** where they discussed a wide range of innovations and digital solutions that are driving the sustainability transformation and helping to create a net-zero future.

Delegates then enjoyed a networking drinks reception kindly hosted by Honeywell UOP.

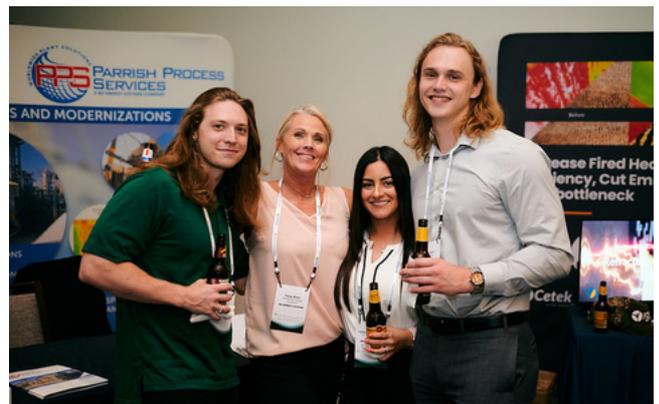


Brittney Drake · 2nd
Business Development Director
2mo · 🌐



Last week, **#TeamWood** participated in the first Energy & Sustainability Forum (**#esfnorthamerica**) located in Houston, Texas. Daniel Carter, Wood's VP of Decarbonization and New Energies, and a team of subject matter experts hosted a **#downstream** focused seminar to an audience of senior industry leaders who were keen to understand the challenges and opportunities to enable a low-carbon economy in the United States.

Congratulations to Wood on another successful event!



#ESFNORTHAMERICA IN THE MEDIA



Gene Gebolys · 2nd
CEO at World Energy, LLC
2mo · 🌐

What an amazing time to be at the intersection of traditional fossil fuels and the integration of low and no-carbon fuels - we are all start-ups now doing things that have never been done before. So much really good work is being done to make meaningful change now.

[Euro Petroleum Consultants Ltd](#)



Craig Harclerode · 2nd
O&G and HPI Business Development Executive at AVEVA (formerly ...
Great conference and very professional and supportive team. Thank you



Arash Hassanian · 2nd
President of Hoover CS | Sustainable Packaging Solutions
2mo · 🌐

Happy to be at the 2022 ESF North America Energy and Sustainability Forum here in Houston. Great conversations around carbon footprint, net zero, and how we can achieve a more [#sustainable](#) future for our [#refining](#) industry. [#esfnorthamerica](#) [#refining](#) [#energy](#) [#decarbonization](#) [#decarbonisation](#)



Nik Weinberg-Lynn · 2nd
Manager, Renewable Energy Projects at Phillips 66
2mo · Edited · 🌐

Excited to be able to present at [#esfnorthamerica](#) Energy and Sustainability Forum: Decarbonizing the Downstream Industry! Presenting on the Rodeo Renewed project as a case study for a renewable energy future and networking with many industry professionals! [Phillips 66 Euro Petroleum Consultants Ltd](#)



Siva Ariyapadi · 2nd
Global Business Manager, Bioenergy at ExxonMobil Low Carbon Solutions
2mo · 🌐

It was great to be able to represent [#exxonmobil](#) at [#ESFNorthAmerica](#) and discuss our efforts in advancing technologies for lower emission fuels. Check out our MTJ announcement at <https://lnkd.in/gnz3aaDz> [#renewablemethanol](#) [#SAF](#) [#aviationfuel](#)

[#kudos](#) Laura McManus, Stefan Chapman for another successful event

Meaghan McCaffrey
Managing Director - Renewables & Emerging Markets a...
2mo · 🌐

I really enjoyed meeting these inspirational women at the [#ESFNorthAmerica](#) conference. [Jane Toogood Gabriella Engelhart Farnham Katie Taylor Ariadna Ruiz Ineke Finlayson](#) [#renewables](#) [#sustainability](#) [#oilandgas](#) [#chemicals](#)



Jeff Guenther · 2nd
Carbon Capture at Honeywell UOP
2mo · 🌐

I really enjoyed speaking about Honeywell Carbon Capture solutions at the [#ESFNorthAmerica](#) conference today! It is a fantastic event filled with industry leading attendees and speakers - and led to many great discussions around [#sustainability](#) and how [Honeywell UOP](#) supports the [#energytransition](#)



Aline Bueno · 3rd+
Chemical Engineer
2mo · 🌐

It was really a great opportunity to attend and see all the incentives on "Decarbonizing the Downstream Industry" through several discussions carried out during the Energy & Sustainability Forum - ESF North America.

Among various of innovations and incentives from the industry, the main takeaway is the collaboration needed to achieve all the challenging net zero aspirations in the industry.

And that starts not only with the fuels producers, technologist providers or governmental policies, but with all of us as community, individuals and consumers of one only planet! Sustainability starts with us!

Thanks to [Euro Petroleum Consultants Ltd](#) for bringing those interesting and needed discussions to Houston.



Christina Romanova · 1st
Events Manager at Euro Petroleum Consultants Ltd
2mo · 🌐

What a team! ⭐

ESF North America has concluded this week and it's been fantastic to see all our delegates in Houston discussing downstream decarbonisation and sustainability.

Special thanks to our sponsors and speakers for their continued support!

Next stop...Kuala Lumpur for ESF Asia...stay tuned!

[#energytransition](#) [#netzero](#) [#ESFNorthAmerica](#)

BASF Refinery Solutio...
17,597 followers
2mo · 🌐

How can the **Co-Processing Renewable and Recyclable Feeds** in the refining FCC be part of the industry carbon neutrality journey? Our own [Mark S.](#) shared the learning at Energy and Sustainability Forum North America. It is a fantastic event filled with many industry leaders, great discussions & learning toward [#sustainability](#). Thank you [Euro Petroleum Consultants Ltd](#) putting this event together.

[#BASFCatalysts](#) [#FCC](#) [#ESFNorthAmerica](#)



Tim Matthews · 2nd
Chief Executive Officer at Cozairo
2mo · 🌐

Terrific opportunity to engage with leaders in the U.S. refining sector and those companies committed to enabling the industry's decarbonization goals at [#esfnorthamerica](#) last week.



Himal Munsif · 2nd
Chevron - Renewable Fuels Manufacturing Strategy
2mo · 🌐

It was an honor representing [#chevron](#) at [#esfnorthamerica](#) on the Going Green panel and talk about our efforts to develop affordable, reliable, and ever-cleaner energy that enables human progress around the world. [#kudos](#) to the panel, the moderator, and Euro Petroleum Consultants for a successful event.



Sam Perry (She/Her) · Following
Global Marketing & Communications Manager at Wood

What an absolute Dream Team! Thank you again for all your help!



Melinda Palmer @MelindaLPalmer · Jun 27

Powerful panel discussion addressing CA's climate change policies to close [#ESFNorthAmerica](#) by @EuroPetro. @KernCleanORC is doing its part to create partnerships that produce an array of lower carbon and renewable fuels to meet the state's diverse energy needs. [#CALEG](#)



Frans Stokman · 2nd

Executive Director Petrochemicals at Cefic (European Chemical In...

Professional team, conference in capable hands !



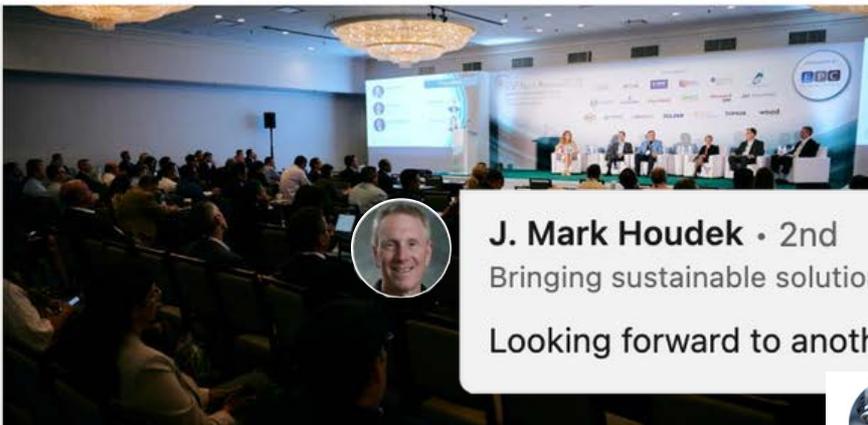
Ed Graham

Vice President Ventures, ExxonMobil Low Carbon Soluti...

2mo · 🗨️

Last week I had the honor to participate on the Key Note Producer Panel at [#ESFNorthAmerica](#), representing [#ExxonMobil](#) discussing pathways to a lower carbon future. Thank you to the panel moderator, Casey Merriman, from Energy Intelligence and my fellow panellists: Heath DePriest - Phillips 66, Jen Jewson - LyondellBasell, Grigor Bambekov - Delek, and Jay McKenna - Nacero

It was exciting to see how the conversation within industry has shifted so dramatically over the past couple years. From 'why' and 'if' to 'how' and 'when'. We have a lot of hard work ahead of us, but it is clear to me the journey has begun now in earnest. The time for the heavy lifting is now. Let's go! [#esfnorthamerica](#)



J. Mark Houdek · 2nd

Bringing sustainable solutions to the Refining, PetChem and Gas in...

Looking forward to another stellar ESF



David Brown · 2nd

Director, Scenarios and Technologies

2mo · Edited · 🗨️

This week, I moderated two panels at [#ESFNorthAmerica](#)— thanks very much to the conference organisers for a super event, especially [Kay Mitchell](#)

A highlight was yesterday's panel: California Dreaming – Taking the Low Carbon Lead with [Tiffany K. Roberts](#), [Melinda Palmer](#) and Shant Apekian. I learned so much from the session and it highlighted the critical role the energy industry can play in planning for / investing in a lower carbon future.

On a personal note, it was superb to re connect with an old friend [Nik Weinberg-Lynn](#) !



John J. Murphy · 2nd

Chief Executive Officer at The Catalyst Group Consulting (T...

2mo · Edited · 🗨️



I appreciated the opportunity to represent The Catalyst Group as a panel moderator of "H2 and the Utilisation of CO2" at the 2022 [#ESFNorthAmerica](#), held last week in Houston. The session, held in two parts, featured in the first part, from left, [Stephen McColl](#), Business Development Manager, Sustainable Technology at [Wood](#); myself; [Daniel Barnett](#), Vice President of Engineering for BD Energy Systems; Julie Valentine (<https://lnkd.in/gGTTXR3u>) Director, Global Refining and Sustainability Measurement Solutions for [Emerson](#); and [Jeff Guenther](#), Project Development Manager, Carbon Capture at [Honeywell UOP](#).

In the second part of the session, I had the privilege of sharing the stage with, from left, [Ermanno Filippi](#), Chief Technology Officer for [CASALE](#); Ram Seetharam (<https://lnkd.in/gT2JEVv3>), EVP Business Development & Technology for [Cozairo](#); and Phil Ingram (<https://lnkd.in/gPCJVqEC>), Senior Business Development, Blue Hydrogen for [Johnson Matthey](#).

Kudos to the [Euro Petroleum Consultants Ltd](#) crew for their inaugural event in North America!

[#esfnorthamerica](#) [#bluehydrogen](#) [#catalysis](#) [#decarbonization](#) [#ccus](#) [#greenhydrogen](#)



Bryan Glover · 2nd

President at Honeywell UOP

2mo · 🗨️

I've really enjoyed speaking on what the journey to [#decarbonization](#) looks like for the refining and petrochemical industry. Great discussions today with so many key players focusing on [#sustainability](#) for downstream! [#ESFNorthAmerica](#)



Eric Zimpfer · 2nd

VP Refining - Cherry Point at bp

2mo · 🗨️

Earlier this week, I was proud to represent bp at the Energy & Sustainability Forum (ESF) hosted by Euro Petroleum Consultants in Houston where we discussed the transition to a lower carbon future in the refining sector. [#bpnetzero](#)



Arash Hassan...

President of Hoover CS | Sustainable Packaging Solutio...

2mo · 🗨️



Happy to be at the 2022 ESF North America Energy and Sustainability Forum here in Houston. Great conversations around carbon footprint, net zero, and how we can achieve a more [#sustainable](#) future for our [#refining](#) industry.

WHAT OUR ATTENDEES SAID ABOUT ESF NORTH AMERICA 2022



We look for events where technology companies and operating companies come together to discuss issues and look for solutions. This event hit both of those marks. The number of follow-ups I have from ESF North America are much higher than I have had from other conferences. Thank you for pulling this type of event together.

ALFA LAVAL

Congratulations on EPC's inaugural event in North America - a success by every measure!



THE CATALYST GROUP



The event had so much interesting information packed in. Speakers were easily accessible...you could easily talk to them between sessions

BP

Fantastic event, your team did a terrific job organizing and executing the conference. It was a very good investment from Cozairo's perspective, the meetings were extremely helpful to set up, and the entire event exceeded our expectations. Great job!



COZAIRO



It was a great conference to build new networks, learn and renew existing contacts in the industry.

BASF

Thank you for putting this together! So much needed and wanted event... It was pleasure to attend, meet, connect, and collaborate with great leaders!



DELEK COMPANIES



Thank you so much for the opportunity to participate in the first ESF North America; it was truly a privilege. Look forward to a welcoming platform for learning, growing, and amplifying California's leadership

KERN OIL

*I thought the topics and speakers were top notch, especially for a first go of it in the States.
I also very much enjoyed being part of the panel*



WORLD ENERGY LLC

VIDEO HIGHLIGHTS

See it with your own eyes



To watch the full video click here 

ESF NORTH AMERICA 2022 IN NUMBERS

- 3** Days
- 190+** Delegates
- 11** Hours of content
- 101** Pre-arranged in-person meetings
- 2** Pre-conference seminars
- 45** Speakers & Panellists
- 127** Speaker questions asked
- 10** Hours of dedicated networking opportunities

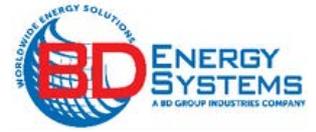
The number of follow-ups I have from ESF North America are much higher than I have had from other conferences.

Thank you for pulling this type of event together.

ALFA LAVAL



THANK YOU TO ALL OUR SPONSORS



PARTICIPATING COMPANIES



KEY SPEAKERS



Aura Cuellar
Vice President,
Energy Transition
SHELL USA, Inc



Ed Graham
VP Ventures
**EXXONMOBIL
LOW CARBON
SOLUTIONS**



Heath DePriest
VP Emerging
Energy
PHILLIPS 66



Jennifer Haley
President & CEO
**KERN OIL &
REFINING CO.**



Jen Jewson
VP, Strategic
Materials &
Sustainable
Solutions
LYONDELLBASELL



Eric Zimpfer
VP Cherry Point
Refinery
BP



Bryan Glover
President & CEO
**HONEYWELL
UOP**



Jay McKenna
President & CEO
NACERO



Jane Toogood
Sector Chief
Executive, Efficient
Natural Resources
**JOHNSON
MATTHEY**



James Ritchie
President
**EXXONMOBIL
CATALYSTS &
LISCENSING**



Gene Gebolys
CEO
WORLD ENERGY



Grigor Bambekov
SVP Business
Transformation
DELEK US



Melinda Palmer
Vice President –
Regulatory &
Public Affairs
**KERN OIL &
REFINING CO.**



German Carmona
President Applied
Intelligence
WOOD



Nick Andrews
CEO
USA BIOENERGY



Dhaval Shah
General Manager,
Corporate
Technology &
Innovation
SABIC



**Nik Weinberg-
Lynn**
Rodeo Renewed
Project Manager
PHILLIPS 66



Himal Munsif
Renewable Fuels
Opportunity
Shaping Mgr.
Downstream &
Chemicals –
Strategy, Planning
& New Energies,
CHEVRON



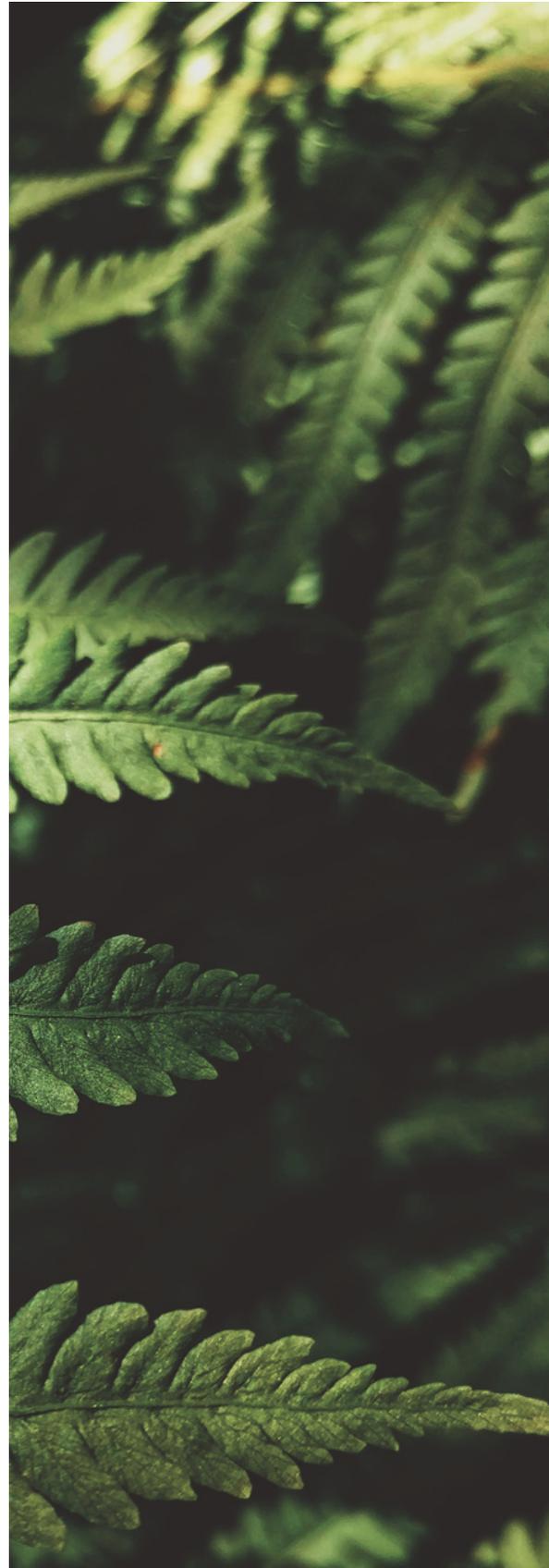
Tiffany Roberts
State Government
Affairs Manager,
Western Region
PHILLIPS 66



Shant Apekian
Vice President,
California Policy &
Strategic Affairs
**WESTERN STATES
PETROLEUM
ASSOCIATION**

PATHWAYS, POLICIES, AND PUTTING CAPITAL INTO LOW CARBON

We kicked off ESF North America with a series of keynote presentations from Wood Mackenzie, Shell USA, Inc & Honeywell UOP and we concluded the opening session with a keynote producer panel comprising of **Health DePriest**, VP Emerging Energy, **Phillips 66**, **Ed Graham**, VP Ventures, **ExxonMobil Low Carbon Solutions**, **Jen Jewson**, VP, Strategic Materials & Sustainable Solutions, **LyondellBasell**, **Grigor Bambekov**, Senior Vice President, Business Transformation, **Delek US** and **Jay McKenna**, President & Chief Executive Officer, **Nacero**. Moderated by **Casey Merriman**, Head, Competitive Intelligence Service, Editorial Director, Western Hemisphere, **Energy Intelligence**, the discussion began by reflecting on the broken policy landscape and escalating demands on the downstream industry to lower the carbon footprint of its operations and products mixes. The industry is facing a dual challenge to combat climate issues whilst providing abundant, affordable and reliable energy to the world. Policy must bridge the gap to help society to achieve its climate goals under the intended timeline, but to date, policy has not delivered. If anything, in the US, energy policy has taken a step back in coherence and direction, and hyperpartisanship will keep it that way for the foreseeable future. Many energy transition decisions have been driven by California's low carbon fuel standard, where there is a submarket of a wider country market. This leads to further disconnects at a systemic level and it can be argued these transformations would be smoother if they were being done at a national level.



KEYNOTE PRODUCER PANEL

So how can the industry find opportunities within this unideal situation? Producers have a responsibility around their scope 1 and 2 emissions but when it comes to scope 3, things get complicated and expensive. One producer's scope 3 emissions are another's scope 1 and so partnerships must be made in order to tackle the issues. Assets should be converted where it makes sense to, and an example was provided of Phillips 66 taking traditional products like needle coke and pushing them into new markets like EV battery production. Industry leaders must focus on decarbonizing where possible and build clear plans towards abatement, highlighting those lower-hanging fruit opportunities. There are still many efficiency opportunities that industry can take advantage of. Whatever the route the refiner decides to take, the decisions must be made quickly in order to be economical rather than waiting far too long before rationalizing capacity as the industry is historically known for.

Whatever the route the refiner decides to take, the decisions must be made quickly in order to be economical rather than waiting far too long before rationalizing capacity

Effective attribution will be critical in seeing action on decarbonization. If facilities and products can be partially decarbonized, then it's possible to attribute that decarbonization to a subset of those products and essentially, note those as zero carbon. It offers a potential to access individuals, companies and other parties that are interested and willing to pay a premium for those products that are differentiated and 'greener'. It's simply not possible to fully decarbonize immediately, and attribution offers the ability to do that in chunks as investments are made in an effort to connect to those parties that are willing to pay for the decarbonization, or support the payment, creating the opportunity to move forward.

Communication throughout the entire value chain is crucial and its key for producers to engage with their customers to understand what they want. It was commented that the typical everyday American consumer is more focussed today on the price they pay at the pump. Whilst many consumers are becoming more conscious to make sustainable decisions, the current inflationary environment may slow this momentum down and ultimately require them to make decisions based solely on price. It's now up to the industry and policy to make renewable energy more cost competitive in order to drive these decisions. Effort must be invested in creating those differentiated products to give the consumer the opportunity to make more sustainable decisions. Coalitions must be made so that industry has the opportunity to work with policymakers and other industries on finding the new sources of energies and make them economical. Where there are policy gaps, partnerships and collaboration become even more critical.



KEYNOTE PRODUCER PANEL

The conversation moved onto hydrogen and how to bring this to scale. The opportunity for blue hydrogen in the US in particular is enormous, and the policy is mostly there. The US Gulf Coast being one area where there are low feedstock costs as well as CCS potential. Emphasis needs to be made on decarbonizing the existing hydrogen industry and there are opportunities to address scope 1 & 2 through fuel switching with hydrogen at an industrial level, which will create opportunities for capacity. Partnerships are also needed here and an example was given of Phillips 66's partnership in Europe with H2 Energy in building a hydrogen refuelling network in Europe, emphasising the need for the right partner, location and technology. Supply chain disruption and policy is creating issues but the demand is there. Producers looking to electrify assets in their plants should also be looking at generating it using hydrogen.

Drawing the conversation to a close, the panellists likened this decade as the transition for the energy transition, the most essential time to get the groundwork in place. However, the missing piece of the puzzle that is often left out is that all these opportunities and technologies inherently use more energy; post combustion capture, generating hydrogen, blue hydrogen, etc which creates more issues for the industry. This further highlights the importance for the entire industry, from established corporations, to start-ups, to policy makers, to work together now in order to ensure rapid deployment.

The challenge in front of us requires companies and individuals to set some aggressive targets to ensure the energy transition can be met in this decade.



CEO TECHNOLOGY PANEL: THE TECHNOLOGICAL INNOVATIONS DRIVING NET ZERO ASPIRATIONS

Moderator Stefan Chapman, Vice President, Euro Petroleum Consultants was joined by James Ritchie, President, **ExxonMobil Catalysts & Licensing**, Bryan Glover, President & CEO, **Honeywell UOP**, Jane Toogood, Sector Chief Executive, **Johnson Matthey** and German Carbona, President Applied Intelligence – Projects, **Wood** for the keynote technology panel at ESF North America 2022.

The discussion started on the topic of decarbonization deployment and how North America can lead in low or lower carbon production. What are the transformation routes we should be looking at? How can we drive decarbonization of traditional refining operations, but at the same time continue to meet our consumer needs?

The panel agreed that the key challenge faced by operators today is finding the right balance in the next steps available to continue to move forward. Factors such as demand and growth for bio based and other types of circular fuels along with the widening aperture of technology is providing more and more options. There are opportunities to move past the limitations of vegetable and animal oils, into other feedstocks. There are developments today with woody biomass being processed into feedstocks that in turn, could be processed in hydroprocessing type systems or even processed directly into catalytic systems like FCC. Ethanol is another option, especially if the US has a general decline in gasoline production, we will still see growth in ethanol globally. Ethanol is something that can have a life beyond just gasoline blending. Petrochemicals present a huge opportunity and depending on refinery configuration, and access to markets, there are significant opportunities to grow quickly in propylene, ethylene, and aromatics.



KEYNOTE TECHNOLOGY PANEL

For North America, carbon capture, either for production through hydrogen or carbon capture from post combustion, is much more realistic than it is in other areas of the world based on the potential availability of sequestration. We can see this growing as an industry with companies starting to provide services for both transporting and ultimately sequestering carbon. The landscape is there to allow producers in North America to begin to go down that path.

There's an interesting possibility for accelerating quite substantially forward, because of the geography and possibilities to also do work in sequestering and storing the carbon, that may bring a different voice to the game, and it's going to be quite exciting how that evolves. Our industry is good at merging great industrial facilities and making sure that we generate products economically and with the least impact possible, but we're going to have get smarter about engaging with our stakeholders.



Moving the conversation on, regulation can be helpful but also hurtful. It needs to be clear, consistent and smart in order to drive the right behaviors. Everyone is starting from different places with different needs, and regulation can help to incentivize behaviors. Today, SAF is getting a lot of play - the airlines are sharing their commitments but they don't want to be uncompetitive with their partners and so regulation can guide them. Regulation can also speed developments up rather than just leaving it to market dynamics. Attribution is a big part - you can point towards your credits and that will help drive the right behavior to get there.

Coastal states, such as California, drive a lot of the low carbon push, but federally more can be done to drive the internal states to accelerate. Pace and approach can also differ, and the panel highlighted that we are in a hare and the tortoise situation with regards to the different expectations and results to achieve. What differences can we see between dramatic step change technology vs. constant smaller steps, especially when tackling carbon intensive processes? As the hare, you would be decarbonizing your existing assets to get some of those carbon emissions out immediately. As the tortoise in this case, you would be investing in long-term sustainable technologies, which are slower perhaps at the start, but will ultimately win. We see a big difference around the world, for example in Europe, the war in Ukraine has been a massive accelerant for energy security with the 'EU repower policy' doubling the amount of hydrogen they thought they could tenure. However, this is not without its challenges - the electrolyzer manufacturers have the technology ready to go but at the moment there are no orders because the projects have to sit in the right system with the appropriate support. Investors are ready to support once it becomes economically profitable. It's a chicken and egg situation - what comes first?

KEYNOTE TECHNOLOGY PANEL



Industrial clusters can be a very powerful way of making change happen by involving other stakeholders such as infrastructure providers, local communities, and potentially, press and NGOs. Communication is key but the whole subject of decarbonization is very tricky because the standards aren't consistent. We don't talk about it consistently and for the average person on the street, it's very difficult to comprehend what's green, what's better, if it's worth the (extra) money? In our engineering industrial space, we are used to taking decisions based on excellent logic, which is difficult to get across.

As a group, we need to be more open to partner with others, create ecosystems and lastly, making sure that the message and logic are clear, rather than just the motion.

The conversation turned to other challenge, not mentioned enough, people. The industry needs to not only attract the new generation into the industry, but also retain them. It's common for today's younger generation to move from one industry to another, whereas previously when you started as a chemical engineer and you continued your whole career as a chemical engineer. The market for talent is increasingly competitive, not only within the sector, but cross industry. Furthermore, we are competing with new types of companies venturing into the energy sector.

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Investments in sustainable technologies have been a big draw for engineers to contribute to future generation and improve the sustainability. Oil & gas is getting a tarnished reputation, and that's a great shame because we need talents to be operating in the space. A challenge faced internally, is how do you continue to energize the people who must help with the transition through conventional ways, because it doesn't happen overnight?

Our industry's pivot to a greater focus on sustainability took place within just a couple of years which will hopefully bring young engineers with their talent and energy to our organizations.

KEYNOTE TECHNOLOGY PANEL



How do we encourage innovative risk-taking with first usage technology in a historically conservative industry? Operators number one priority is always safety with reliability and profitability following. However, today there isn't the time to be as conservative as we were in the past. We can see in the area of sustainability, that paradigm changing a little bit for those non-operators out there trying to sell the technology.

There's a gradient. For example, if you're a petrochemical producer and you've got to make a product to a very detailed spec or perhaps you don't have product, the risk tolerance is not very forgiving. Refiners have tended to be more risk-taking because if the end product is not perfect, you can still blend gasoline. As we get more and more into the sustainability space and renewable fuels, there is a higher tolerance for risk. We are starting with blending a small amount renewable diesel into a large amount of fossil diesel so if the end product is not perfect, it is not the end of the world. Another example is carbon capture, where the concern might be the capture won't be as high as liked, or maybe the energy intensity will be a little bit different, but overall we've started to see a greater tolerance for things, and especially when they're not at the core of what you've got to deliver. If at the core, you're going to be extraordinarily risk averse. When it starts to support the product you are going to deliver (not the pure product), we've seen a lot more willingness to start to take some risks and to try some things. The industry is adapting.

There is a discontinuity. The competition isn't the other refineries as before. We now have new smaller projects coming up, changing the competition landscape. Another observation made is that we see decision making is changing as companies are rapidly evolving. There's quite a bit unknown about how decisions get taken overall plus during a period of enhanced risk. We don't know what the answer is but the more challenged the site, the least likely to sell a new technology. Getting close to your client to understand the real drivers their livelihood relies on helps and may change the technology you choose to go with as well.



It's not only the producers deciding to take a risk, given the financing, it's across the board. Finance must be willing to take a risk with a technology that hasn't been tried. But hopefully financing for more sustainable energy transition related projects will become easier as we go.

GOING GREEN: THE RISE OF THE RENEWABLE REFINER & THE GREAT RENEWABLE RESOURCE RACE

The transition is a journey with many steps. Cooperation and collaboration are needed between different sources of energy and the many opportunities available today must be embraced in parallel. Increasing the volume of renewable fuels produced and marketed is without doubt a key pathway that we continue to see refiners in North America take to cement place their place in a low carbon future. John Florez, Associate Director, Oil & Gas, Boston Consulting Group was joined by Jennifer Haley, President & CEO, Kern Oil & Refining Co, Eric Zimpfer, VP Cherry Point Refinery, BP, Nick Andrews, CEO, USA BioEnergy, Gene Gebolys, CEO, World Energy and Himal Munsif, Sr. Manager Downstream Strategy, Chevron to discuss the rise of bio and renewable fuel production, the longer-term role for conventional refineries and some of the challenges being faced along the way.

Kicking off the discussion, our panellists reflected on how we have seen refineries in North America start their transition to a net zero future, and some of the challenges they're facing on that path. The first point raised was that the term transition is a bit of a misnomer, rather it's an evolution. As put by one of the panellists, "we're on this boat in the ocean, we don't really like our boat, it's a bit dirty, could be cleaner and more efficient, but we're setting fire to the boat before we have another boat" We have to recognize that we're going down a dual path and improve what we have whilst building something new. All projections indicate that we will continue to have fossil fuels, and use existing infrastructure for decades to come.



PANEL DISCUSSION "GOING GREEN"

Looking specifically at the pathways of our panellists' companies. First Kern, one of the last small independent refiners in California producing 1% of the state's gasoline, 2% of the diesel, is a renewable fuel pioneer. Producing renewable diesel since 2009, they co-process tallow through a repurposed hydrotreater. The company exemplifies that dual path, improving existing gasoline and diesel production whilst innovating toward next generation renewables.

It was commented that prematurely cutting investment in hydrocarbons risks crashing the system, and risks people losing the political and social will required to effectuate real change toward renewable fuels. Sometimes the conversation gets too myopic around the carbon and we have to recognize and remember that providing affordable, reliable clean energy should be the overarching goal.



Next perspectives from BP who have recently re-branded from an integrated oil to integrated energy company to reflect the fact that future energy will come from a diverse variety of sources. A refinery should not be seen as one or the other, but both. The world needs energy, our communities need energy and BP will continue to invest in existing assets to make energy in a safe, compliant, reliable and efficient manner.



Expanding further, \$200 million has been invested to lower the carbon emissions of existing operations, but also in new technologies; renewable diesel, and alternate feedstocks. The transition is a journey, a marathon, and as such, refining will continue to be around for a long time.

Like BP, where policy supports it and where customers demand it, Chevron and many other traditional refiners are looking at alternatives for low carbon initiatives to incorporate in their portfolios through the build of new, or conversion of existing, hydro processing units to execute the HEFA pathway, or co-process in the FCC.

PANEL DISCUSSION "GOING GREEN"



Perspectives from a different end of the continuum were shared from World Energy who have been active in advanced biofuels for 24 years. The industry is experiencing a moment in time in which traditional refiners and integrated energy providers are finding a middle space, with significant value to be found in the synergies. Despite being very different businesses with very different supply chains, and go to market marketing approaches, there is overlap when it comes to regulation and distribution.

Finally, USA Bioenergy, capture and sequester the CO₂ from the process streams of their advanced biorefineries that turn wood waste into sustainable aviation fuel. As a result, the company is able to earn a carbon intensity score of a negative 250 or lower, as well as help the airlines who buy their very clean carbon negative fuel to meet some of their carbon neutrality goals.

Concluding the first part of the discussion it was commented that the societal need is so big we have never faced anything like what we're facing right now. The quality of life of human beings has increased in large part because of fossil fuels. Today, we're trying to imagine a world in which we have all the advancements of fossil fuels without the extremely serious implications of fossil fuels. The challenge ahead of us needs an all-hands-on deck approach, that support us collectively to keep taking the steps that we can take, as fast as we can take them. We have some pieces of the puzzle but the puzzle is not complete yet.



INNOVATION REQUIRES FAILURE

The next question for our panellists was how the different players of the industry can work together, sharing talents or technologies to help the industry as a whole, move forward not only towards decarbonization goals, but also to maintain that low cost, reliable energy supply.

In many states, clean energy has become very elitist, leaving communities behind, echoing the need for an all of the above approach and improving what we currently have. Perfect is the enemy of good and sometimes you have to try things and see how it works out. Innovation requires failure and, as such, collaboration is critical. It's no longer a case of different industries sitting at opposite ends of the table. Whether it's the oil industry or the Agri industry, supported by consistent policy across the board, it's those collaborative, innovative partnerships that will bring those next generation renewable fuels to market.



Today's refiners are no longer simply in the business of providing fuel, but in reducing carbon. Customers today need us to deliver carbon reduction, whether it's through carbon capture to create blue hydrogen or, wind and solar to produce green hydrogen, sustainable aviation fuel, renewable diesel and so on.

A PR PROBLEM



Discussion moved to talent and to what degree the energy transition has helped retain and build the industry's funnel of talent. Not surprisingly today's generation of chemical engineers are not as excited or passionate about working for the oil and gas industry as we saw 20-30 years ago. Steering the conversation towards renewables and the need to decarbonize presents significant opportunities to help attract talent. Touching upon a point made previously, it's not one or the other. Refineries, as manufacturers of energy are part of the solution, that continue to evolve.

Ultimately, it's a PR problem that needs fixing. Negativity fills a communication vacuum, and we need to get better at talking about the industry's key role as part of the solution. Beyond that, today's graduates have a mission driven mindset. Those companies that are mission driven and can articulate their mission clear and effectively will attract the talent.

PANEL DISCUSSION "GOING GREEN"

LIPIDS ARE OVER SATURATED

A lot of focus to date has been on HVO or cooking oil as feedstocks focused on SAF or renewable diesel. Next our panellists considered what other feedstocks, and renewable materials need to be part of the discussion.

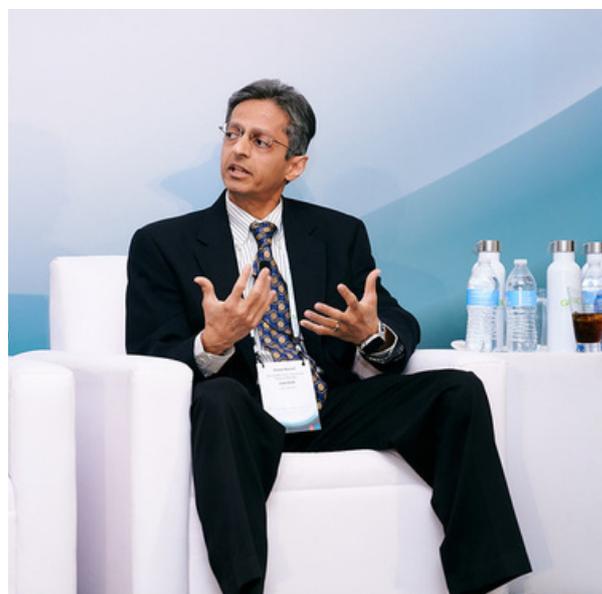
Feedstock values have doubled in the last year or so, and despite the higher prices for buyers, it's positive for the overall aggregated supply of feedstocks. Adding to that, the cure for high prices is high prices which presents an opportunity of innovation for the industry.

Waste to fuels, especially those waste products not being utilized today present a great opportunity for the creation of next generation low or negative carbon intensity fuels.

The challenge for woody and Agri waste is the transportation but we are witnessing some exciting innovations around smaller, more nimble facilities co-located at the feedstock source. Fats and waste oils are what got us to the dance and where we have seen the most progress to date.

Digging deeper into the transportation challenge, in the context of the US, between 2021 and 2026, five times the production of renewable diesel is forecast to come online. Whether it's feedstocks or finished products, the expectation is that it will move from predominantly the Midwest, to policy enabled markets, aka California on the West Coast.

Discussion moved onto policy support. All too often we see policies that don't necessarily make sense to the boots on the ground. We need to build the relationship with the regulators that enable us to shift the conversation to what makes sense policy wise and continue to brand ourselves as the engine that drives the transition, and reinforce that the industry is a big part of the solution.



PANEL DISCUSSION "GOING GREEN"

WHILE THE WORLD NEEDS ENERGY, THERE IS A ROLE FOR REFINERIES

Final conversation of the panel discussed refinery shutdowns, conversions and closures, and to what extent we expect to see the trend continue.

Events of the last three years since the start of the pandemic have been a rollercoaster for supply and demand, and highlighted our vulnerability to energy shocks. Today's strong traditional refining margins have naturally raised questions for the transition but taking a step back from short term gyrations, and looking 5-10 years from now, the only trend we can be certain of is to increase investment in low carbon, it's what our customers want, and our planet needs.



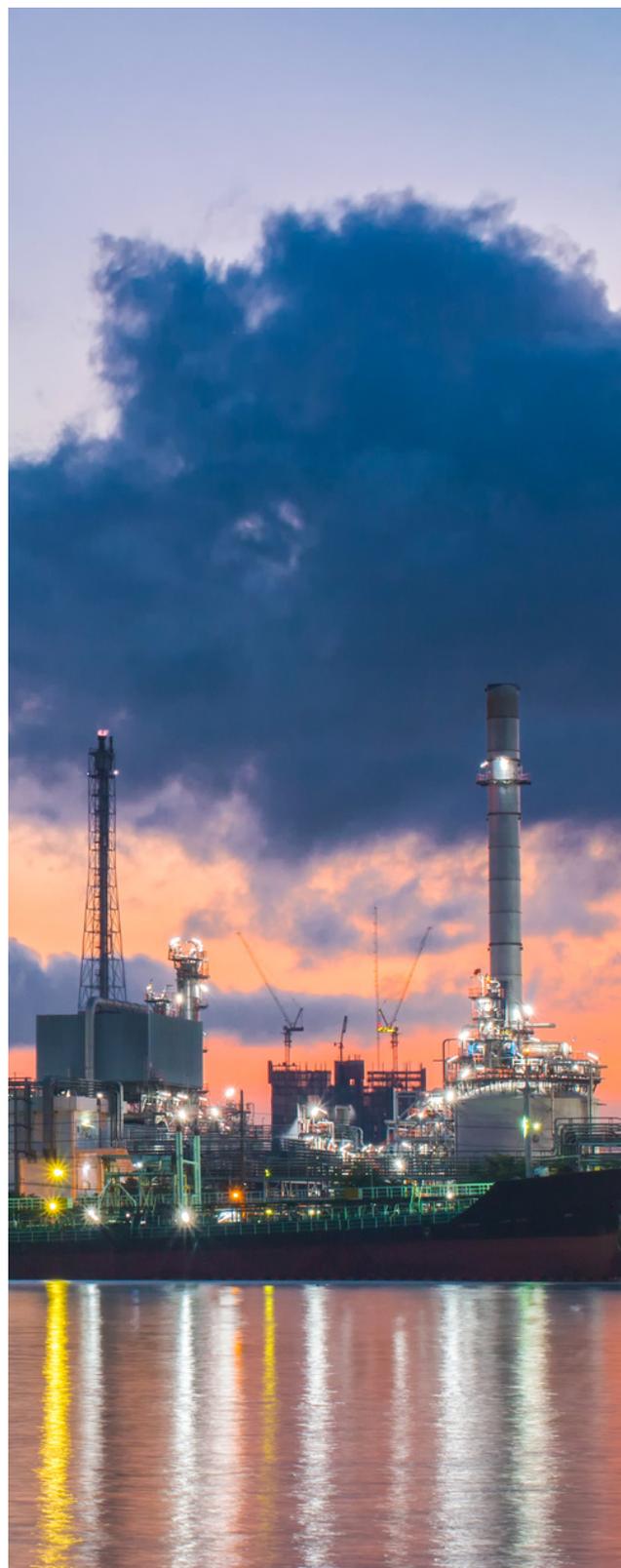
Fundamentally, depending on its footprint and its configuration every refinery is going to have their own view of what their portfolio looks like, and what's right for them. The idea that all refineries are going to shut down or convert away, we don't see. Conversely, the idea that refineries will continue doing exactly what they are doing today and not have to evolve, we don't see.

The truth is going to be somewhere in the middle. Each company, each refinery, must come up with their own view of how they best make the transition and how they do this whilst continuing to provide, in a responsible way, our communities with the energy that they need. Ultimately while the world needs energy, there is a role for refineries to play.



CIRCULAR ECONOMY STRATEGIES: ACCOUNTABILITY AND ATTRIBUTION

Rick Perez, CEO, **Avangard Innovative**, **Dhaval Shah**, General Manager, Corporate Technology & Innovation, **SABIC** & **Todd Jaco**, Vice President, Business Development, **KBC** joined us to discuss the important issue of creating a circular economy. Moderated by **Paul Bjacek**, Principal Director, **Accenture**, the discussion began by setting the scene regarding the pressing issues facing the chemicals industry today. Looking at the eight major thermal plastics, 43% are going into non-durable and single use applications. With ambitious targets for the US & Europe to be fully recycled by 2040, the industry is under immense scrutiny. Media mentions of the plastics waste issue has increased by 66% over the past two years. Much of the talk is around non-durables, but even durable materials have their downfalls. Today the majority of recycled materials from cars is steel and the rest goes into landfill. In Wyoming, a 'wind turbine graveyard' (a landfill full of used blades) creates a shocking reality of the scope of the problem. Furthermore, in the US, the organic matter going into landfill (food waste, yard waste, plastics, rubber & textiles) each year is the oil equivalent of 800k-900k barrels per day, about the same level as Oman's crude oil production.



PANEL DISCUSSION "CIRCULAR ECONOMY STRATEGIES"

With this in mind, our panellists began to address the question of what a truly circular economy means. Instead of considering waste as bad for the economy, it must be made into a valuable input into the processes and activities of other participants in the economy. The goal is to minimise or, in an ideal state, reduce to 0, the use of non-renewable materials and resources, and society must move in this direction now. Sabic launched its TRUCIRCLE initiative with five components to enable that vision including: products that inherently have a design for reuse and recycle, chemically recycled products, mechanically recycled products, products that use bio-based feedstocks and business model and value chain innovation that is required in order to make this happen. It will not be an easy journey and requires society to completely change its system, from putting everything to nothing into landfills.



Repurposing plastic is the most efficient way to reach mechanical processing goals of achieving a 75% reduction in carbon footprint. Whilst the technology is available, the sorting process is the most crucial and speed is still needed to take the inorganics out of the material. Mechanical recycling has the best LCA and should always be attempted first. The next level would be pyrolysis or depolymerization for condensation. The final option when nothing else is possible, is to gasify to syngas, converting it to methanol, ethanol or other products.

The biggest challenges for enabling the circular economy are a mix of regulations, consumer behaviours, and infrastructure. The regulations help incentivize the capital flow into the infrastructure but the vision should be redesigning products so that they are easily recyclable. Many issues still arise from the collection, sorting and processing at the front end but there are technologies out there that allow industry to better process materials on an industrial scale. Today it's not possible to take an extremely comingled plastic stream and pyrolyze it, so the importance of the sorting process was echoed throughout the discussion as crucial. Any specification for sorting plastics has to look at the heteroatoms coming from the material so that hydrotreatment works effectively and downstream units are not contaminated. Polluting the system makes it infeasible and therefore uneconomical. Every waste company has their own rules depending on the sorting capabilities they have, which needs to be standardised.



PANEL DISCUSSION "CIRCULAR ECONOMY STRATEGIES"



Comparing to other regions such as South Korea, who have an extremely efficient recycling system, supported by laws that make it a punishable offence by fine if you are caught disposing of something that has been defined as a recyclable or revivable material. It's a systemized approach throughout the entire country and the region has built collection systems to take material to centralized facilities to benefit from economies of scale. The numbers are impressive, reaching an overall recycling rate of 60%, thanks to cooperation and collaboration. However, many in the waste management industry would argue that it's cheaper to put all the waste together and then segregate it with advanced integrated models. Although this reduces the number of applications the materials get recycled into, it's much more effective from a cost perspective. This is the dilemma that society is facing, pay the higher cost and increase consumer awareness, in turn leading to higher recycling rates, or opt for the economically optimal solution?



Large petrochemical complexes typically process feedstock in the range of several million tonnes a year. As industry moves to this new world of plastics pyrolysis or bio-based materials, by definition these are more distributed. Looking at large cities for example Houston, the typical numbers that plants can aggregate are 100-200k tonnes a year, a stark contrast that makes the logistics of collecting all these materials and processing them extremely difficult. It creates the question of, is it better to gather plastics and transport to a common large plastic pyrolysis plant or have mini pyrolysis units located near waste sites? The answer is, it's a balance. Taking all materials to a large plant may be easier in terms of the process and costs but it's unethical when trying to reduce carbon footprint. Locations need to be considered in this aspect as certain terrain might make it more challenging to handle transporting materials, building pipelines or building collection facilities. There may be places where smaller facilities make more sense but moving towards large scale facilities is overall the best option.



PANEL DISCUSSION "CIRCULAR ECONOMY STRATEGIES"

Producers must take risks and escape their comfort zone in order to succeed in today's turbulent environment. An example was provided of Sabic partnering with start-up company Plastic Energy to provide pyrolysis oil that is put into chemically recycled polyolefin products in Europe. For a large corporation, negotiating a few 1000 tonnes with a small company that had no previous track record of success, takes a big leap of faith, which is crucial for producers to do now in order to meet the challenge ahead.

Finally discussing a role for blockchain, and the opportunity to assign and track carbon intensity and credit to the end of the value chain could be very valuable, and where we see the industry going. However, what is the value of the carbon credit today?

Producers must take risks and escape their comfort zone in order to succeed in today's turbulent environment.



CALIFORNIA DREAMING: TAKING THE LOW CARBON LEAD

As ESF 23 moves to California, the state leading the US' energy transition, Tiffany Roberts, State Government Affairs Manager, Western Region, Phillips 66, Melinda Palmer, Vice President – Regulatory & Public Affairs, Kern Oil & Refining Co and Shant Apekian, Vice President, California Policy and Strategic Affairs, Western States Petroleum Association joined David Brown, Director, Scenarios and Technologies, Wood Mackenzie to reflect on how California has responded to some of the state and federal level climate goals, to consider how it will balance short term affordability with the need to balance long term decarbonization objectives and discuss policy recommendations for the state to advance its decarbonization agenda.

AN EVOLUTION OF CLIMATE POLICY

Firstly, looking at how California's energy industry has responded to climate goals. There is a lot of history with the state's role in climate policy, where the first targets were passed in 2005. Over time there has been an evolution in the conversation around climate policy, to which the industry has responded in an evolutionary way.

In 2006 when AB 32, (the Assembly Bill 32/California Global Warming Solutions Act) was passed, there was a lot of ambivalence about what the targets actually meant, and a lot of ambivalence about the role of markets vs command-and-control (CAC). Over time the industry has become more accustomed to the distinction between markets and command and control approaches to climate policy, highlighted by the industry's support of the cap-and-trade reauthorization in 2017.



PANEL DISCUSSION "CALIFORNIA DREAMING"

California has some of the most ambitious goals and regulations in the world which came on thick and fast; AB 32, LCFS, Cap-and-Trade, Truck and Bus, Off-Road Vehicle & Equipment. This layering of multiple regulations and policies in quick succession certainly threw the industry in at the deep end. Policies and goals continue to be pushed as the state looks to go further, faster. Shifting the conversation from goals to compliance, and from the what? to the how? key questions today include "how do we comply?", "how do we do it in a cost-effective manner?" and "how do we do it in a technology neutral manner?"

ALL OF THE ABOVE APPROACH

As California, the US, and the world faces an energy affordability crisis, discussion turned to the options for California to balance short term affordability with medium term decarbonization. Rather than ask what options does California have, instead we have to ask what is California open to? Is the state open to an all of the above approach underpinned by the idea that the common enemy is fossil carbon, not the industry itself? The industry has existing talent and infrastructure that can be part of the solution. There are incremental benefits still available by improving and cleaning up existing assets and processes through carbon capture, efficiency, and waste heat recovery etc.



Looking specifically at some of the options, conversation turned to California's openness to CCS. Despite the state being very progressive when it comes to climate change, far ahead of many in many ways, when it comes to CCS, California is far behind. The state is struggling to put in place the policy and legal frameworks to actualize it. A lot of the pushback is not policy. The regulators and public understand its importance and key role to achieve climate goals. There is not one scientist or academic institution that doesn't say you can get to 2045, 2050 without significant investment in CCS, however the political barriers are still too great.

Exacerbating this is California's environmental justice community. The EJ movement came out of California, which the state is very proud of. Despite their value and legitimate issues, they have gone to the extreme on a lot of the climate issues, putting enormous pressure on policymakers and the administration, ultimately stifling progress moving forward. One of the main reasons why CCS policy is not moving forward is in large partly through the opposition of that community.

Discussion moved to the Biden administration and recently announced \$9.5bn of government funding for the development of at least four regional H2 hubs. What's the appetite for hydrogen development in California? Specifically in Kern County, it has a rich wealth of resources, positioning it as an energy leader, both in terms of oil and gas, but also renewable energy which supports the creation of one or more of those hubs to continue to grow the rich renewable resources and carry it forward. California is a diverse state in terms of its population and resources, which requires a diverse set of solutions to meet its energy needs.

PANEL DISCUSSION "CALIFORNIA DREAMING"



Reflecting on what California can learn from its Europe counterparts who, like California, have robust and aggressive decarbonization goals, the main take-away is the need for an ‘all of the above approach’, and not just to talk about it, but demonstrate it. There is a role for renewable diesel, a role for hydrogen, a role for traditional fuels and so on. Regulators have a tendency to put their finger on one technology, but there is no silver bullet.

Digging further into the point around the need for a diverse set of solutions, market demand for liquid fuels will remain for some time, which lacks recognition. Even under CARB’s, the most aggressive electrification scenario that California will ban the internal combustion engine in 2035, analysis continues to show strong liquid fuel demands well into the future.



As put by one panellist, “the main thing is keeping the main thing, the main thing”. Why are we doing any of this? Why does any of it matter? To improve the lives of our residents, and their public health, and make energy more affordable and resilient. If we lose sight of that as we’re moving forward, we’re not keeping “the main thing the main thing”.

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WALKING THE WALK

The need for pragmatism and clarity, heavily dependent on policy was a clear take-away of the discussion. What needs to be done from a policy perspective to see some of those goals advanced? As put by one of the panellists, "we need to walk the walk". Taking CCS as an example, the industry needs three P’s. First permitting certainty, which applies not just to CCS projects, but all conversion, and greenhouse gas reduction projects. Today, no company or developer will invest without that level of certainty on the permitting side. Second, the legal framework on pore space rights requires a legislative fix. Despite the issue in itself is not political, it’s become such a hot button issue that it has become politicized, stifling progress. Finally, pipeline, and making sure that the infrastructure is there for those who want to invest (in CCS projects). Furthermore, a credit system, to ensure appropriate credit for emission reduction (whether LCFS or cap-and-trade) needs to be in place to pursue the projects.

FROM THE BOTTOM UP

Discussing approaches to planning in more detail. Often enough, the state has already set the table, that requires the industry to reverse engineer towards the answer. We need to change the way that we come to the table and instead build from the bottom up, and look across the board to evaluate all of the different opportunities for reducing emission reductions from a technological perspective, a sectoral perspective, and build it through analysis and optimization.

Discussing the LCFS specifically. Does the creation and management of its goals need to be re-imagined? As we see more renewable fuels come online, the electrification credit in the programme muddies the waters. Bifurcating electricity and electricity credits associated with transportation would be a good direction to continue to incentivize the production of those fuels.

Over time we have seen a shift in opinion of the LCFS. Today there is a recognition that there are opportunities for different fuels, and different technologies and the LCFS is a tool to ultimately achieve climate goals in a more equitable and technology neutral way. It highlights that there is more than one path to where we're trying to get to.

Moving forward, the LCFS will continue to drive innovation, not only in new technologies and new feedstocks, but by forcing the industry to look at efficiencies in the different processes along the way. Drawing the discussion to a close, the clear take-aways and conclusions were the need for a scoping plan of priorities backed by an all of the above approach that recognizes the potential contribution of all technologies.

Better recognition that policy design impacts consumers and impacts the price at the pump is required. A climate policy that is affordable, and equitable will move the ball forward

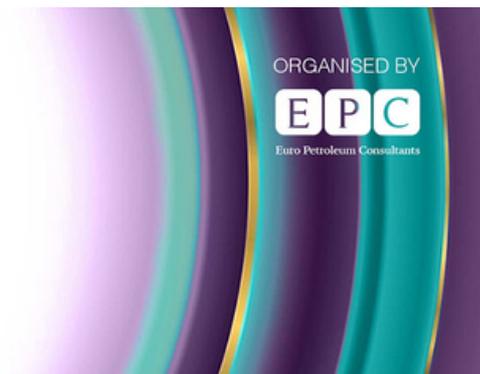
We must be open to innovation, and open to all solutions. Science must drive policy as opposed to policy trying to drive the science.



See you next year in California

UPCOMING ESF EVENTS

JOIN THE CONVERSATION AT OUR UPCOMING EDITIONS



As the net zero momentum gathers pace, Asia's refiners and petrochemical producers have started laying the groundwork for the development of their decarbonisation roadmaps, whilst continuing to balance its rising energy demand, population growth, and strive for increased standards of living.

The region's operators, with their own unique set of challenges presented by the transition, must act now to embrace the opportunities available to reduce both scope 1 and 2 emissions to carbon baseline assets and move up the value chain away from traditional fuels and deeper into petrochemicals.

Following the success of ESF Europe, North America and MENA, ESF Asia, taking place from 30th November – 1st December in Kuala Lumpur, is the latest in our global series of conferences, firmly cemented as the dedicated regional meeting place for downstream oil & gas leaders to network and knowledge share in the context of decarbonisation and sustainability.



Global energy dynamics and the growing momentum for the energy transition is putting the Middle East region, traditionally heavily reliant on hydrocarbons, under increased pressure. There are many opportunities for the region to thrive in the era of the energy transition with its natural geology and abundance of low cost and low carbon resources. Today success is no longer just measured on safe and profitable operations, but also the delivery of energy and operational efficiency whilst demonstrating a commitment to ESG and maximising in-country value and circularity.

As the region looks to diversify, ESF MENA will support the collaborations, discussions, and development of a sustainable energy future in which the Middle East's downstream industry continues to play a leading role.



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As the race for Europe's 2050 climate neutrality accelerates, the role that the oil and gas downstream industry plays in ensuring these goals are met efficiently and affordably advances. Europe has the opportunity to re-industrialise, achieve security of supply, and sustainable supply as it adapts and embraces the solutions and routes to decarbonise whilst becoming energy independent. Despite the unprecedented change and challenge upon us, there are lots of opportunities. Now more than ever, the downstream industry must come together to find and leverage synergies and partnerships in order to be at the forefront of delivering this transition.

Industry leaders will convene in Amsterdam from the 20th - 22nd February 2023, to accelerate the energy transition through the collaborations, discussions, and development of a sustainable energy future in which Europe's oil and gas downstream industry continues to play a leading role.



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As North American refiners and petrochemical producers position themselves for a low carbon transition, and with no silver bullet to achieve net zero, the industry must form a coherent approach to take advantage of all opportunities. The challenge to invent new technologies, new supply chains, new value chains and new markets has never been so complex.

Leading industry experts will gather in California in June 2023 at the only conference dedicated to downstream decarbonization in refining and petrochemicals.

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