



THE 20TH INTERNATIONAL CONFERENCE & EXHIBITION ON LIQUEFIED NATURAL GAS

# LNG2023

10-13 JULY 2023, VANCOUVER, CANADA

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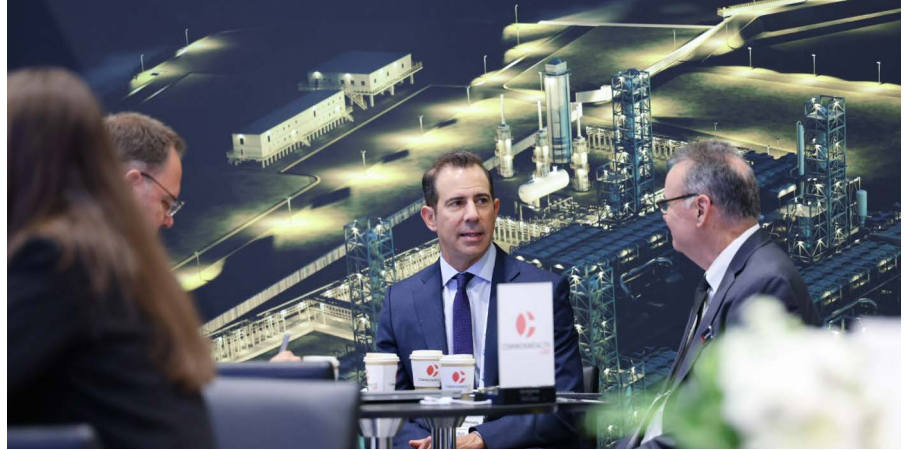
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# Event overview

Welcome to the final day of the LNG2023 Conference and Exhibition! It's been an incredible few days, and as we conclude, we encourage you to absorb every moment, maximise your learning experience and engage in meaningful conversations.

The knowledge, connections, and inspiration you have gained over the past few days will undoubtedly propel you forward in the dynamic world of LNG and accelerate our journey to our commitment to achieve net-zero emissions by 2050.

We have explored the vast potential of LNG, discussed industry trends, and witnessed ground-breaking advancements. Now, on this last day, we have an exceptional line-up to ensure we end the conference on a high note, so make sure to join us in our plenary session, the LNG2023 Conclusions and Looking Towards LNG2026 and the highly



anticipated LNG2023 Closing Ceremony. The ceremony will reflect on the past week and will handover to the next host – Qatar, where a new era of LNG advancements awaits at LNG2026.

Thank you for being part of this remarkable event and let's make this last day a memorable one. We wish you continued

success in all your future endeavours, and we will look forward to welcoming you to LNG2026 in Qatar.

**Let's make the most of this final day together at LNG2023!**

**Discover. Connect. Do Business.**



# Thursday's programme highlights

## LNG2023 | Keynote address

Honourable Danielle Smith, Premier of Alberta and Minister of Intergovernmental Relations for the Government of Alberta is poised to deliver a highly anticipated keynote session at LNG2023. As a key figure in Alberta's government, Premier Smith's insights on the role of LNG in the province's energy strategy will be of immense interest to industry professionals and conference attendees.

**Date: Thursday 13 July 2023**

**Time: 12:15 – 12:30**

**Location: East Exhibition Hall A**

## LNG2023 conclusions and looking towards LNG2026

Don't miss the final plenary session of LNG2023, where the conference's conclusions will be presented, along with a glimpse into the future with a preview of what to expect at LNG2026. Join us as we wrap up this landmark event and set the stage for the next chapter in LNG industry advancements.

**Date: Thursday 13 July 2023**

**Time: 12:30 – 13:30**

**Location: East Exhibition Hall A**

## LNG2023 Closing Ceremony

The highly anticipated LNG2023 closing ceremony takes place today, marking the end of an exceptional week of industry-leading discussions, cutting-edge innovations, and global networking. The finale will also pass the torch to Qatar, the host of LNG2026, where a new era of LNG advancements awaits.

**Date: Thursday 13 July 2023**

**Time: 13:30 – 14:00**

**Location: East Exhibition Hall A**

The closing ceremony of the event will conclude on a delicious note, with a networking lunch that offers attendees a final opportunity to connect, share ideas, and forge lasting partnerships.

## LNG2023 exhibition


Make the most of this final opportunity to engage with the exhibitors, gain valuable insights, and explore the latest offerings on the vibrant exhibition floor. Seize the chance to catch up before the exhibition closes today at 14:00.



# Programme at a Glance

## SUNDAY 9 JULY

- 07:00 - 16:30  
REGISTRATION
- 14:00 - 17:30  
Training Sessions
- 17:30 - 19:00  
Arrival Cocktails  
West Level 2, Ocean Foyer  
and Terrace



**LEGEND**

- **Plenary, Leadership Dialogue, Keynotes, Ceremonies**  
East Exhibition Hall A
- **Registration**  
West Level 1
- **Training Sessions**  
West Level 3
- **Networking Break / Lunch**  
East Ballroom A & B  
West Level 1 & 2
- **Functions**  
*Arrival Cocktails*  
West Level 2,  
Ocean Foyer and Terrace  
*Welcome Reception*  
East Exhibition Hall A  
*LNG2026 Welcome with QatarEnergy*  
West Level 1, Ballroom Foyer  
*LNG2023 Networking Reception*  
West Level 1, Ballroom Foyer
- **Spring Sessions**  
West Level 1, Rooms 118-120
- **Summer Sessions**  
West Level 1, Rooms 121-122
- **Autumn Sessions**  
West Level 2, Rooms 211-214
- **Winter Sessions**  
West Level 2, Rooms 220-222

## MONDAY 10 JULY

- 07:00 - 16:30  
REGISTRATION
- 09:30  
Exhibition Open
- 09:30 - 10:00  
Networking Break
- 10:00 - 11:00  
Opening Ceremony
- 11:00 - 11:15  
LD.01 Leadership Dialogue with Jason Klein, CEO - LNG Canada
- 11:15 - 12:15  
PL.01  
The Effect of Geopolitical Risk and Market Volatility on LNG Commercial Activity
- 12:15 - 13:30  
Networking Lunch
- 13:30 - 14:30  
**Spotlight Sessions**  
SL.03 Measuring Up...  
SL.01 Financing the Next...  
SL.02 Role in Europe's...  
SL.04 Innovation in LNG...
- 14:30 - 15:00  
Networking Break
- 15:00 - 16:30  
**Paper Presentations**  
PP.03 Liquefaction...  
PP.01 Commercial Trends...  
PP.02 Current Dynamics...  
PP.04 Innovations in LNG...
- 17:30  
Exhibition Close
- 18:00 - 19:30  
Welcome Reception

## TUESDAY 11 JULY

- 07:00 - 16:30  
REGISTRATION
- 07:30 - 08:00  
Networking Break
- 08:00 - 09:15  
PP.05 FLNG and LNG...
- 09:30  
Exhibition Open
- 09:30 - 09:45  
Keynote Address
- 09:45 - 10:00  
LD.02 Leadership Dialogue with H.E. Minister of Energy, Qatar; President and CEO, QatarEnergy
- 10:00 - 11:00  
PL.02  
Challenges of a Turbulent Energy Transition
- 11:00 - 11:30  
Networking Break
- 11:30 - 12:30  
PL.03  
LNG's Role in the Energy Trilemma
- 12:30 - 13:45  
Networking Lunch
- 13:45 - 14:45  
**Spotlight Sessions**  
SL.06 Natural Gas...  
SL.08 The Regulatory...  
SL.07 Reconciliation...  
SL.05 Forecast & Appetite...
- 14:45 - 15:15  
Networking Break
- 15:15 - 16:45  
**Paper Presentations and Forums**  
F.02 Repurposing LNG...  
F.03 Advances in Safe...  
F.01 Global LNG Trade...  
PP.06 Canadian LNG...
- 16:45 - 17:45  
Discovery Hub Live
- 17:30  
Exhibition Close

## WEDNESDAY 12 JULY

- 07:30 - 16:30  
REGISTRATION
- 08:30 - 09:00  
Networking Break
- 09:30  
Exhibition Open
- 09:00 - 09:15  
LD.03 Leadership Dialogue with Madam Li Yalan, President, International Gas Union
- 09:15 - 10:15  
PL.04  
Growth of LNG through Innovative Partnerships and Cooperation
- 10:15 - 11:15  
PL.05  
Fuelling the LNG Innovation Agenda
- 11:15 - 11:45  
Networking Break
- 11:45 - 13:15  
**Paper Presentations and Forums**  
PP.09 Solutions for...  
PP.08 Advances in LNG...  
F.04 Decarbonisatio...  
PP.07 Digital Twin Case...
- 13:15 - 14:30  
Networking Lunch
- 14:30 - 15:30  
**Spotlight Sessions**  
SL.10 Interrelationship...  
SL.09 Presentation of...  
SL.11 Enabling...  
SL.12 Increasing...
- 15:30 - 16:00  
Networking Break
- 16:00 - 17:30  
**Paper Presentations**  
PP.13 Challenges of...  
PP.11 Regional Reports...  
PP.12 Import Terminal...  
PP.10 Best Practices...
- 17:30  
Exhibition Close
- 17:45 - 18:15  
LNG2026 Welcome with QatarEnergy
- 18:15 - 19:15  
LNG2023 Networking Reception

## THURSDAY 13 JULY

- 07:30 - 15:00  
REGISTRATION
- 07:30 - 08:00  
Networking Break
- 08:00 - 09:15  
PP.14  
Innovation in Liquefaction...  
PP.15  
Development in LNG...
- 09:30  
Exhibition Open
- 09:15 - 10:15  
**Spotlight Sessions**  
SL.16 Small and Micro...  
SL.13 The Role of LNG...  
SL.15 Market and...  
SL.14 Progress in...
- 10:15 - 10:45  
Networking Break
- 10:45 - 12:15  
**Paper Presentations and Forums**  
PP.18 New Approaches...  
PP.16 Measuring and...  
F.05 Evolution...  
PP.17 Downstream...
- 12:15 - 13:15  
PL.06  
LNG2023 Conclusions and Looking Towards LNG2026
- 13:15 - 13:45  
Closing Ceremony
- 13:45 - 14:45  
Networking Lunch  
Lunchbox Collection
- 14:00  
Exhibition Close

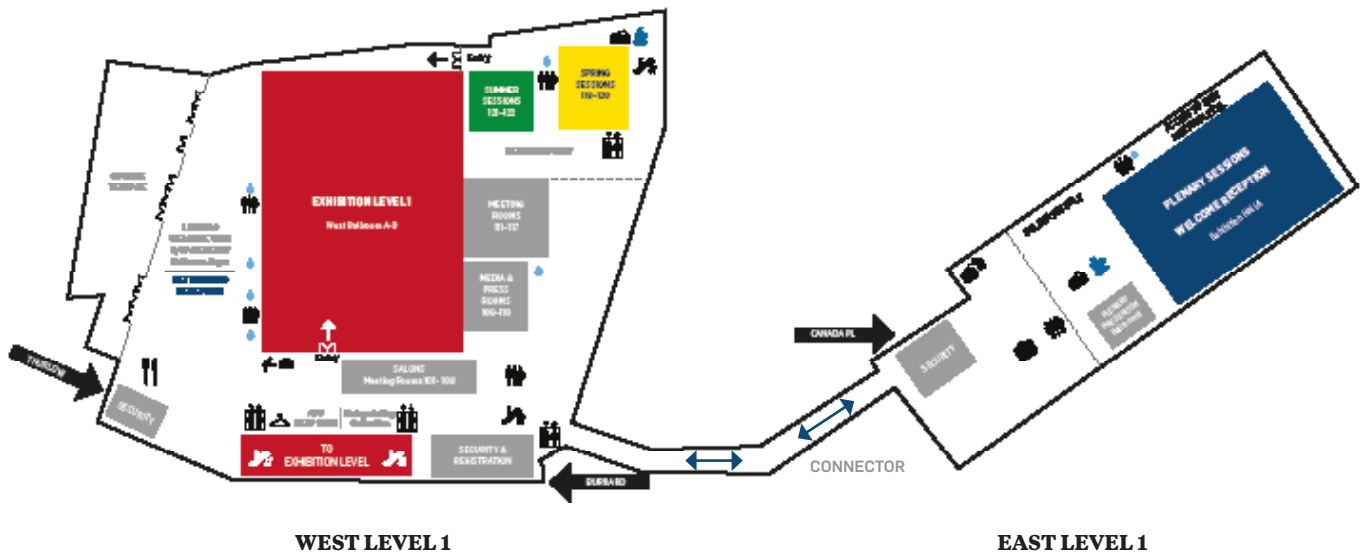
**For the full programme, remember to download the LNG2023 Event App and manage your programme schedule through the app.**

# LNG2023 floorplan

**LEGEND:**

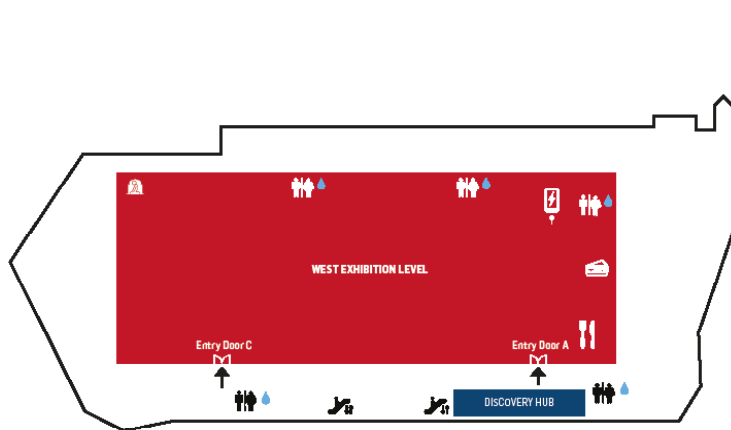
	<b>Water Fountains</b>	SPONSORED BY 
	<b>Bistro</b>	
	<b>Conference Delegate Networking Break</b>	SPONSORED BY 
	<b>Conference Delegate Networking Lunch</b>	
	<b>Cloakroom</b>	

	<b>Luggage Room</b> Open Thursday, 13 July only
	<b>Male &amp; Female Prayer Room</b>
	<b>Charging Station</b>
	<b>Mothers Room</b>
	<b>First Aid</b>
	<b>Toilet</b>
	<b>Lift</b>
	<b>Escalator</b>

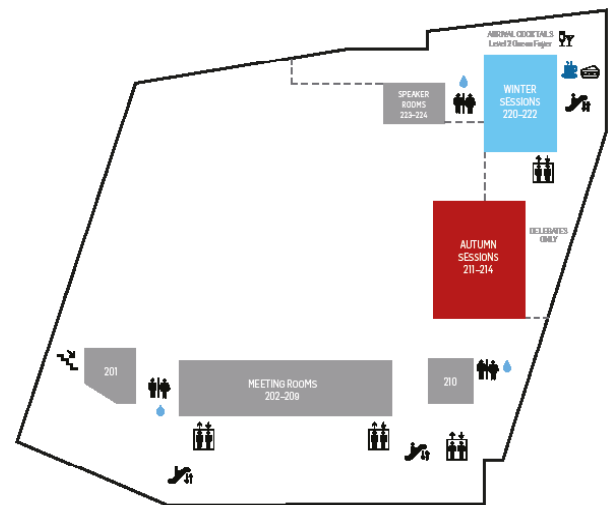


**WEST LEVEL 1**

**EAST LEVEL 1**



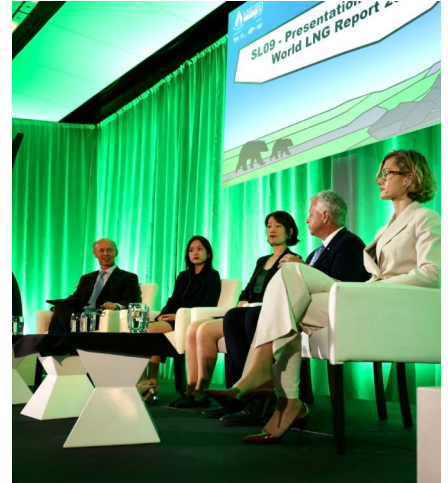
**WEST EXHIBITION LEVEL**



**WEST LEVEL 2**

# Wednesday's highlights

Yet another remarkable day at LNG2023 with the vibrant networking sessions, dynamic discussions, and innovative solutions showcased by industry leaders within the LNG industry.



# Around Vancouver

If you're in Vancouver for a long weekend and want to explore nearby activities, there are several options available. Whether you're interested in outdoor adventures, cultural experiences, or relaxing getaways, there's something for everyone within a short distance of the city. Here are some nearby activities and day trips from Vancouver:

## 1. GROUSE MOUNTAIN:

Visit Grouse Mountain, located just 15 minutes from downtown Vancouver. Take the Skyride gondola to the mountaintop and enjoy breath-taking views of the city. There are various activities available, such as hiking, wildlife viewing and ziplining.

## 2. VICTORIA AND BUTCHART GARDENS:

Take a ferry or seaplane to Victoria, the capital of British Columbia, located on Vancouver Island. Visit the stunning Butchart Gardens, known for its exquisite floral displays. Explore the Inner Harbour, visit the Royal BC Museum, or take a walk through the historic streets of the city.

## 3. WHISTLER:

Head to Whistler, a world-renowned resort town located about a 2-hour drive north of Vancouver. Enjoy outdoor activities like hiking, mountain biking, or zip-lining during the summer months. You can also explore the charming village, ride the Peak 2 Peak Gondola for stunning views, or relax at the Scandinave Spa.

## 4. CAPILANO SUSPENSION BRIDGE AND LYNN CANYON:

Explore the natural beauty of the North Shore by visiting the Capilano Suspension Bridge and Lynn Canyon Park. Walk across the suspension bridge over the Capilano River and explore the park's lush trails. Lynn Canyon also features a suspension bridge, beautiful waterfalls, and swimming holes.

You'll find plenty of peaceful places to relax and recharge before heading back home! We hope you've had a lovely time in Vancouver.



## 5. STEVESTON VILLAGE:

Take a trip to Steveston Village in Richmond, located south of Vancouver. This historic fishing village offers a charming waterfront, quaint shops, and excellent seafood restaurants. You can also visit the Gulf of Georgia Cannery National Historic Site and learn about the area's fishing history.

## 6. BOWEN ISLAND:

Catch a ferry from Horseshoe Bay to Bowen Island, a peaceful island retreat just a short distance from Vancouver. Enjoy hiking trails, visit the local shops and galleries, or relax on the beach. Bowen Island offers a serene escape from the city's hustle and bustle.

## 7. HARRISON HOT SPRINGS:

If you're looking to relax and unwind, consider a trip to Harrison Hot Springs, approximately a 1.5-hour drive from Vancouver. Soak in the natural hot springs, go boating or kayaking on Harrison Lake, or take a leisurely stroll through the picturesque village.

## 8. FORT LANGLEY:

Visit Fort Langley, a charming historic village located in the Fraser Valley, about a 45-minute drive from Vancouver. Explore the Fort Langley National Historic Site, which recreates the 19th-century fur trading post. Wander through the quaint shops, enjoy local eateries, and take a scenic walk along the Fraser River.



# General information

## HOUSEKEEPING

At LNG2023, we are committed to making it an enjoyable experience throughout this week and please find below a few useful housekeeping guidelines:

## ACCESS TO THE CONFERENCE AND EXHIBITION

Every time an attendee enters LNG2023 they will be asked to present government issued photo ID at security. This can be in the form of a passport (all nationalities), or driver's license (Canada and United States only).

All attendees, including accompanying persons, are required to wear their badge AT ALL TIMES during LNG2023 - this includes social functions. Attendees will only be able to access the areas of the event relevant to their participation as shown on their badge.

## DRESS CODE

Business attire is requested for attendance at the conference, exhibition, technical tours and all networking functions.

## DOWNLOAD THE APP

The app is an essential tool to help you navigate the event and contains the programme for the week, speaker profiles, exhibition layout, networking features and much more. For any questions on the Event App, our staff at the App Helpdesk would be delighted to assist you. LNG2023 App Helpdesk will be situated at the main event registration located on West Level 1, City Foyer – West Building or email [info@lng2023.org](mailto:info@lng2023.org)

## CONFERENCE REFRESHMENTS

Morning tea, lunch and afternoon tea are provided to all conference delegates. Please see the times and locations in the pocket programme or the LNG2023 Event App. All conference delegates are reminded to wear their badge to access these areas.

Bistros are open in both exhibition levels for food and beverage purchases for

exhibitors and trade delegates. Café 185, located just up from the main registration will also be open for paid purchases.

**All Networking Coffee Breaks are sponsored by:**



## CHARGING STATION

A Charging Lounge is located at Stand 141 in the Exhibition Level Hall.

## PRAYERS ROOMS

Both male and female prayer rooms are located in West Exhibition Hall C. Please refer to Directional Signage for further details.

## MOTHERS ROOMS

A peaceful and private Mothers Room is located on West Level 1, City Foyer. Please refer to Directional Signage for further details.

## WATER STATIONS

Thanks to our Global Sponsor, Tellurian, all conference delegates have been supplied with water bottles which can be filled up at multiple points across the East and West buildings of the VCC. Please see the floorplan for locations.



## PHOTOGRAPHY

The organisers of LNG have professional photographers taking photos throughout the event. These images may be used in post-event reports, case studies, marketing collateral and supplied to industry media. If you do not want your photo to be taken, please advise the photographer.

## MEDIA CENTRES AND PRESS ROOMS

Brought to you by our Global Sponsor, Tellurian, we will have dedicated Media Centres and Press Rooms at the following locations:

**West Building – Room 109 Level 1**

**West Building – Room 110 Level 1**

**East Building – Ballroom B**

**Convention Level**

For media and PR inquiries please visit the Media Team at the Media Centre or you contact the team at [marketing@lng2023.org](mailto:marketing@lng2023.org)



## EMERGENCY PROCEDURES

In case of emergency, please follow the instructions given to you by security and venue staff.

## MEDICAL SUPPORT

First Aid is located on West Level 1 at the entrance of the Exhibition space opposite registration and in the East Building Lobby on convention level.

## LUGGAGE ROOM

A Luggage Room will be open outside Ballroom A in the East Convention Level on Thursday, 13 July for conference delegates leaving Vancouver directly after the conference.

It will be operational between 07:30 and 15:00.

## SOCIAL MEDIA



**ClubLNG**

**ClubLNG**

**ClubLNG**

Connect with us on social media to stay up to date with all event highlights and to share your own LNG2023 experiences.

**Event Hashtag: #LNG2023**

## WI-FI

Wi-Fi is available to conference delegates in all LNG2023 hosted spaces at the Vancouver Convention Centre.

**SSID: LNG2023**

**Password: LNG2023#BC**

# LNG2023 director announces launch of Global Gas Innovation Roundtable

## Joseph Murphy

LNG2023's executive director Mel Ydreos announced on Wednesday the creation of a Global Gas Innovation Roundtable, the goal of which would be to increase understanding of the technology and innovation underway in the natural gas industry.

In a press conference, Ydreos said establishing the roundtable would be the "legacy" of LNG2023.

"The mission of the roundtable is to ensure that governments, policy-makers, multilateral institutions and energy thought leaders have a greater understanding of the technology and innovation underway that will improve performance, environmental and otherwise in the gas sector," Ydreos said.

Innovation is not just about technology, he said.

"It's about commercial innovation, it's about digital innovation and technological innovation," he said. "Our aim will be to ensure that governments around the world are aware of the significant efforts happening in the industry in this area."

Spreading that awareness is challenging, because there are so many developments happening, he said. "And currently there isn't a forum by which we're able to amplify the message around how much innovation is going on."

He drew attention to the launch last year of the [Gas Pathways](#) website, an initiative of CGA Enterprises that is operated and maintained by NGW, and also focused on innovation in the industry.

"It's a platform that actively engages with and amplifies all these things that we're talking about," Ydreos said. "We've been able to organically grow that platform, and we're well on our way to establishing it as the most authoritative platform that deals with innovation in the gas sector," he said.

The roundtable will be different, though.

"We will be guided by an advisory board of the most senior CEO and energy professionals from around the world," Ydreos said. "They will guide the focus of the roundtable and what the roundtable will be doing."

The roundtable will issue regular reports that "clarify what's going on, and hopefully distil and in an easily consumable way, present some of these innovations," he said.

The first of those reports was released on Wednesday, entitled CCUS as a tool for LNG innovation. It explains what carbon capture utilisation (CCUS) and storage involves, and provides four case studies where the technology has been applied. One is in North America, one in Europe, one in the Middle East and one in Australia.

Ydreos noted that as of September 2022, there were only 30 CCUS facilities operating commercially in the world, but there were a further 164 under development.

"So we're starting to see the commercialisation of CCUS and it's going



LNG2023 Executive Director Mel Ydreos

to be very important for the industry, particularly in the future as it manages its emissions profile," he said.

The report notes that there are a further 90 pilot and demonstration CCUS facilities worldwide aimed at improving the technology's efficiency. And it also lists the 11 key CCUS hubs being developed around the world.

"We present the application of CCUS. Where does it make sense? Where does it not make sense," Ydreos said. "It's about being very objective about the application of this technology."

For instance, while CCUS is not a good fit for natural gas transport, it makes sense to apply when it comes to natural gas processing.

"We begin to lay out where the greatest opportunities are for the deployment of CCUS, and then we conclude with advice to government policymakers on how they can support the adoption of CCUS and its commercialisation," Ydreos said.

Discussions are underway with a lot of CEOs regarding the roundtable, and they see its value and are interested in providing their advice, he said.

"We plan to be not only producing reports, but also engaging in major forums around the world in order to push the agenda of innovation, including some digital outreach, to establish the roundtable as a credible and needed roundtable for the energy world," he concluded. 🔄



Enbridge Gas is applying innovative thinking to reducing GHG emissions and contributing to North America's efforts to mitigate the impact of climate change.

# First choice for delivering energy

With the population of Ontario anticipated to grow by 2.2mn people over the next 10 years, natural gas is considered critical to resiliency and meeting heating requirements, and industrial demand has few economic alternatives, says Michelle Harradence, President of Gas Distribution and Storage at Enbridge Inc.

In Ontario the company delivers more than 5.9bn ft<sup>3</sup>/day of natural gas to approximately 75% of all residents — 15mn people — through 3.9mn residential, commercial, institutional and industrial metre connections. Through its ownership interest in [Gazifère](#), one of two natural gas distributors in Quebec, Enbridge provides natural gas to 43,000 customers in the Outaouais region of the province.

“Natural gas is critical to Ontario’s power sector and the province’s economy,” says Ms. Harradence. “It remains the first choice for heating and there is growing demand from the greenhouse and manufacturing sectors seeking to reduce their GHG emissions.”

Through innovation-focused investments in renewable natural gas and green hydrogen production and blending, Enbridge

is playing a leading role in decarbonizing the natural gas system, she adds. The company currently transports 1.3 million cubic feet per day of renewable natural gas and has four renewable natural gas projects under construction and more than 20 in development.

“Investments in green hydrogen production align well with our growing renewable power portfolio, while production of blue hydrogen offers alignment with our vast natural gas pipeline infrastructure and our carbon capture and storage aspirations,” she says.

Enbridge also operates the first hydrogen blending facility in North America and will be a key player in the development of green hydrogen, says Ms. Harradence.

Nearer-term opportunities will see hydrogen blended with natural gas for transportation in existing pipelines, while in the longer term, dedicated hydrogen pipelines will be required.

The company owns the Enbridge Gas Dawn Hub, one of the largest integrated natural gas storage facilities in North America. Strategically located in southwestern

Ontario, Dawn provides shippers with direct access to North America’s major supply basins, including Utica and Marcellus.

With hundreds of buyers and sellers active at Dawn every day, conventional and renewable natural gas producers can access an established market, says Ms. Harradence, marketers, utilities and any other interested parties can buy or trade both conventional gas or renewable natural gas supply and also bring gas into our system from other pipelines.

“At Enbridge, we are bridging to a cleaner energy future,” she says. “Achieving global emission goals requires scaling low-carbon energies, innovation, acceleration of renewables and electricity build-out. Enbridge is leading the way by investing in wind and solar, renewable natural gas, hydrogen, and carbon capture and storage to reduce the carbon footprint of the energy we deliver.”



**ENBRIDGE**  
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**Joseph  
Murphy**



*Freeman Shaheen, President of Chevron Global Gas*

# Strength through regulatory certainty and firm partnerships

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**Freeman Shaheen, President of Chevron Global Gas, stresses the need for regulatory certainty, the ability to attract capital and long-term offtake agreements to avert future energy crises.**



## It really takes capital coming into the market. These assets don't get built overnight.

*Freeman Shaheen, President of Chevron Global Gas.*

The energy industry needs regulatory certainty, the ability to attract capital and long-term offtake agreements to avert future energy crises, Freeman Shaheen, president of Chevron Global Gas, tells NGW.

Even before COVID-19 rocked global energy markets, the natural gas industry saw capital drying up as uncertainty weighed over the future demand for gas during the energy transition. And the situation was further exacerbated while the pandemic hit, Shaheen says.

As economies exited lockdowns post-pandemic, though, demand for oil and gas soared but there was insufficient past investment in supply to cover it, resulting in price spikes, he says. Then came the war in Ukraine, creating further volatility, particularly as Europe lost most of its pipeline gas supply from Russia and had to scramble for LNG to replace it.

To prevent further volatility, what the energy sector needs “regulatory certainty and partnerships – those partnerships look like capital investments with long-term offtake investments,” Shaheen says.

Prior and even during the pandemic, an increasing number of major financiers were announcing plans to scale back support for hydrocarbon projects. While responses vary across the world, Shaheen believes that “an important lesson has been learned that oil and gas has a key role to play for decades to come.”

“It will take decades to make the world greener, and investing in gas today will help in that pursuit by displacing higher carbon intensity coal,” he continues. “We’re also working to make gas cleaner,” he notes, pointing to Chevron’s efforts in the Permian basin, where it is increasingly monitoring methane emissions by deploying and scaling advanced detection technologies, as well as using renewables

where possible to power its operations.

“I’m really proud to see how things have evolved in my 30-year career. I see this energy around the way we’re making the production much cleaner,” he says. “We’re proud of what we do, and I think it has a key role to play in the world, a very responsible role. There are many developing countries, markets and people that haven’t experienced the safety, security and reliability of energy and the prosperity that’s associated with it. And they deserve that.”

### Building up an LNG base

Asia has a very disciplined approach to long-term LNG contracting so they weren’t so susceptible to spot price spikes seen over the past year, he notes. “Europe is now moving towards those longer-term commitments, and we’re also seeing more discussions about regulatory certainty and streamlining processes.”

Is Chevron setting up as a global LNG supplier? “We’re contracted for more liquefaction volume out of the US. We’ve got a joint venture operation with Angola LNG that can deliver to Europe. We’re also working on assets in Equatorial Guinea which we picked up in the Noble deal,” Shaheen says.

Chevron made a “bold move” to expand its geographical focus with the acquisition of Noble Energy in 2020, in the midst of the pandemic. The deal worth \$5bn gave Chevron a position in the gas-rich East Mediterranean, including operatorship of the Leviathan and Tamar gas fields off Israel, as well as the as-yet-undeveloped Arophidite gas field off Cyprus. Planning is underway for potential LNG exports from these assets.

The company is also continuing to

optimise its Western Australian LNG operations, he says.

“We really do believe that gas leads to a lower carbon future, especially by displacing coal,” Shaheen says. “It really takes capital coming into the market. These assets don’t get built overnight. It takes three to four years to get trains up and running. Further capital when there are low-carbon technologies employed such as at Gorgon LNG, so a long-term offtaking commitment is needed from customers to support this.”

Chevron has now emerged as the biggest producer in the Permian basin, and is eager to link that supply with global markets. Last year it contracted 4mn mt/yr of liquefaction coming out of the US while it also provides supply to the LNG producers. Those LNG exporters can enjoy cleaner gas that has been produced without routine flaring and regular methane monitoring, Shaheen says.

“And that means a lot, especially to the Europeans. Often their first question is how is your gas cleaner?” he says.

On the benefits of US gas, both in terms of cost and environmental impact, Shaheen notes that the country, which only 15 years ago was expected to become the biggest importer of gas, is now on track to becoming the biggest exporter.

“It has a vast, low-cost resource base and the skills, and it takes the right types of partners and long-term contracts to realise the US investment portfolio, he says.

Hitting back against concerns about hydraulic fracking, Shaheen says he’s very proud of the way the US is producing and supplying the market while doing it more cleanly and with more responsibility. He points to new initiatives gaining momentum such as MiQ, Equitable Origin and Project Canary that certify the gas as responsibly-sourced. 🔥



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# Most Americans favour natural gas

**Joseph Murphy & Monte Stewart**

Natural gas has a bright future in the US and globally despite some efforts to hinder its production and phase out its use, says the president of the American Gas Association.

In an interview with *NGW* at the LNG 2023 conference, Karen Harbert said politicians are getting onside with voters who prefer the fuel as a means of cooling their homes on hot summer days and heating them during frigid winter conditions.

“Twenty-five states have passed legislation prohibiting the banning of natural gas use,” she said. “So, that’s half of the country and more than half the throughput of natural gas. Policymakers, based on input from their constituents and voters, have spoken. There’s other states that are considering the same thing.”

In a recent AGA poll, natural gas received 76% approval rating, while only 5% were against it and 12% had no opinion, said Harbert.

She noted that a court struck down a proposed ban in California, and the decision is reverberating across the country. And, in Eugene, Oregon, the city council has scrapped a planned November plebiscite on an ordinance to ban gas as a power source in new low-rise buildings. The move resulted due to concerns about the ban’s legal validity.

Harbert said politicians are starting to listen to people who want a choice when it comes to power sources. President Joe Biden could be more supportive of the natural gas sector but the industry is moving at the pace at which it believes it can deliver energy safely.

“I think back to different global pinch points in global tension and global crises,” she said. “American industry has always stepped up to the plate in one way or another. We had the Marshall Plan. We marshalled all the things we needed to do to actually expedite the production

of weapons, when we needed to do that. This is another inflection point. This time, it’s the energy industry that has stepped up to prove that it can be a big part of calming global tensions, and doing good service to our allies. And, I think that is changing the conversation.”

The Biden administration realises that natural gas and LNG, in particular, are important components in responding to the crisis in Ukraine. As a result, the American government is prepared to do what is necessary to support natural gas and LNG production, she said.

“I don’t think you’re going to see the Biden administration come out with a full-throated embrace of natural gas,” said Harbert. “That is not what the president ran on. He ran on a very climate-focused agenda. Sure, but things change, right? He didn’t anticipate a war in Ukraine. He didn’t anticipate a pandemic, where we came through for everybody in America to be able to stay at home and change the energy dynamic completely. We were no longer supplying energy to buildings downtown because [office workers] weren’t there. It was then 24/7 At home, and we figured that out.”

“So, I would like to see the industry get more credit, but that’s not what they’re looking for. They’re looking to stay in business and supply their customers.”

She said it is essential to have natural gas and LNG available to supplant coal plants, put countries outside of North America on a lower emissions trajectory and address energy poverty in those nations.

“Because if you don’t address energy, poverty, they’re going to continue to use the most affordable, dirtiest fuel possible, and we have to figure out how to address that,” she said. “Natural gas is the solution.”

When it comes to the pace of



American Gas Association President Karen Harbert

permitting, pipeline builders are more frustrated than LNG facility developers. In the next five to seven years, she said, the US, Canada and Mexico were set to add 80mn tonnes/year of LNG to the global market.

“I mean, [LNG] could be the best green solution to climate change, ever,” she said. “And No. 2, it’s going to do a lot for the competitiveness of the US – and it’s the right thing to do.”

International Energy Agency forecasts of a drastic decline in natural gas are not impeding investment, she said. Producers are showing capital discipline and investors are playing catch-up in wake of a COVID-19 pandemic-induced decline.

“We’re less in balance in terms of supply and demand than we would like, but we’re not out of balance – that’s important,” said Harbert. “The other side of the equation is, the LNG facilities are becoming more modern, and modularised, which means they’re going to be more efficient and cost-effective to produce and they’ll be able to [be built] faster. And that will draw demand, which will obviously draw production. So, it’s a cycle there.”

Harbert does not expect financing efforts to be impeded by energy company shareholders’ concerns about environmental and social governance. She said natural gas and LNG producers will seek to reduce emissions throughout the supply chain.

“There’s an economic incentive, there’s an environmental imperative and a customer expectation,” she said.

As a result, producers will be able to offer profitable investments to corporate finance committees under a favourable investment timeline between now and 2050.

“We’re going to be there and we’re going to be turning a profit – and we’re going to be growing,” said Harbert. 🌟

# Time to act now on carbon capture: Saipem

**Joseph Murphy**



In the roadmap to reach net zero emissions, carbon capture is a mature technology that can definitely support hard-to-abate industries, given the lack of alternatives for addressing their emissions, Richard Surprenant, business development manager for carbon capture solutions at Saipem, tells *NGW*.

The carbon capture technology has been around for decades but has undergone an evolution with the introduction of advanced solvents, says Surprenant. Saipem has developed its own unique enzymatic technology, which uses a potassium carbonate, that rapidly accelerates capture compared with conventional amine-based methods.

“Our technology is unique in that it uses enzymes to catalyse a specific reaction within carbon capture, which is the hydration and dehydration of CO<sub>2</sub>,” he says.

Saipem’s CO<sub>2</sub> Solutions technology uses the same carbonic anhydrase enzyme that humans and all living organisms use during respiration. Flue gas passes through the solution, and is then hydrated and transported to the second column and then the CO<sub>2</sub> is stripped out in a very pure form.

“This chemistry doesn’t have any of the drawbacks of amine-based technology. It’s non-toxic, it’s non-volatile, it’s inert to contaminants and it’s also

regenerated at low temperature – a unique feature,” he says. “This reduces the environmental footprint and the energy footprint of carbon capture.”

For some industries such as cement manufacturing, paper production and steelmaking, CO<sub>2</sub> is the only feasible choice for decarbonisation, Surprenant stresses. In the case of cement making, for example, most of the CO<sub>2</sub> that is emitted does not come from the fuel that is used, but the fact that rock is being decarbonised.

“These hard-to-abate industries need to get aggressive in adopting carbon capture because they have no other option,” he says.

Saipem has undertaken more than 70 pre-combustion carbon capture projects – whether for syngas or hydrogen production, and is bringing that expertise for the post-combustion projects. The company recently announced a partnership for large-scale carbon capture projects with MHI that employs amine technology but at a mature scale. Meanwhile it is advancing its enzymatic carbon capture technology for small and medium emitters with modular plants.

Carbon capture technology can be used to capture up to 90-95% of CO<sub>2</sub> that is emitted, depending on the concentration of CO<sub>2</sub> in the emissions, Surprenant says. In the same or a boiler or a process

furnace, for example, the 90-95% capture rate is achievable. The concentration of CO<sub>2</sub> in emissions and the scale of projects also determines the cost.

Surprenant says recent policy developments in the US such as incentives included in the 2022 Inflation Reduction Act (IRA) and the 45Q carbon capture tax credit favoured the development of carbon capture. He notes that Canada is now trying to match this level of support with various national policies and provincial policies, including in Alberta, British Columbia and Quebec.

Over in Europe, Saipem has been able to tap European research funds to improve its carbon capture technology through the ACCCESS initiative. Surprenant also hails the EU’s incoming carbon border adjustment mechanism (CBAM), which encourages industrial suppliers outside of the bloc to adopt carbon capture as well.

In terms of what more policy makers could do, he stresses that there should no longer be an “optionality” for industries to adopt carbon capture, and regulation needs to enforce this. “We don’t have the luxury of time, and if we want to reach net zero we need to act now” he said “We need to quickly reach a situation whereby all economic development from now on must deploy carbon capture when needed.” 🌱





# 2022 the “most turbulent year ever” for natural gas: IGU

## Dale Lunan

The International Gas Union (IGU) on Wednesday released its 14th annual World LNG Report at the LNG2023 Conference, and called 2022 the “most turbulent year ever” in the history of global gas markets.

But LNG demonstrated “essential value as a flexible, reliable, available energy resource for a secure energy transition.”

Global gas markets, which were already tight in the 2021 post-Covid period, were pushed into a major supply crisis on February 22 when Russia invaded Ukraine, the IGU said in its report. In the wake of that military incursion, pipeline imports of Russian gas were cut, leaving a structural supply deficit in continental Europe that led to a scramble to restore energy security, and prices rose sharply.

But in a later session at LNG2023 discussing the IGU report, Sharmaine Ang, global LNG engagement lead for S&P Global Commodity Insights, said price volatility in the world’s gas markets preceded the invasion, and were clearly evident as the winter of 2021-2022 progressed.

“In terms of the significance of this new paradigm, I can think of three different aspects,” she said. “Firstly, the globalisation of LNG trade, secondly, the increased need for financial hedging

of physical LNG cargoes, and thirdly, it shone a light on potential areas of improvement for how LNG term contracts can be priced and structured.”

On the globalisation front, 2022 demonstrated how LNG flows were able to better react to changes in prices in given markets, Ang said. European markets were paying a bigger premium than what was available in north Asia, and the market responded to that by increasing cargo deliveries to Europe.

US producers alone managed to ratchet up exports to Europe to 55.2mn tonnes, a 148% increase from 2021, despite the loss of output from the Freeport LNG facility in Texas in June, the IGU report said. For all of 2022, US LNG volumes accounted for 44% of European LNG imports, while Europe took 65% of all US LNG exports.

Later in the session, Tatiana Khanberg, the IGU’s director of strategic communications and membership, noted that this “financial muscle” exhibited by European LNG buyers left less well-heeled buyers priced out of the market and had impacts beyond fuel markets, reaching into manufacturing and fertiliser production, which were also affected by the high prices.

“To make the point, the impact of the crisis we have experienced was certainly felt most heavily by the most vulnerable

populations, and in Asia, that was very much evident last year,” she said.

In the longer term, beyond 2026 and even through 2030, the world will continue to grow – with steady 1% to 2% population growth continuing – and those people deserve energy, said Freeman Shaheen, president of Chevron Global Gas in Houston, told the IGU session.

“What is clear to us is that we need to be cleaner, so when I say that oil and gas will continue in the short-, medium- and long-term, it has to continue cleaner,” he said. “We’re doing a lot at our company: in the Permian, we no longer flare routinely; we’re monitoring methane, we’re keeping it in the pipe and using a third party to monitor that; we’re using renewables in our operations.”

The world will need affordable, reliable and ever cleaner energy, he said, and “gas will get us there.”

But Xi Nan, senior vice president of gas and LNG markets at Rystad Energy, stressed caution before jumping wholeheartedly into a new energy reality.

“I want to stress that when prices were very low, we said now we are transitioning to much cleaner energy, but now, when prices are very high, we say we need to have gas,” she said. “I think we need a bit longer term to see what we really need in the energy system.” 🔥

# LNG industry to withstand future geopolitical turmoil

**Monte Stewart**

The LNG industry will be able to withstand future global geopolitical turmoil in Asia and other parts of the world.

That was the message Wednesday from project developers during a panel discussion on the Inter-relationship between geopolitics and LNG trade flows at the LNG2023 conference. Panellists contended that global supply is sufficiently diverse and versatile to avoid long-term problems.

And, industry players and customers do not need to worry about Qatar, Australia and the US currently dominating the market.

"I would say it's not a problem," said Andrew Barry, Exxon Mobil's vice president of global LNG marketing, who also chairs the company's LNG market development group. "When you look at other commodities around the world and the diversification of those commodities, the diversification of the supply within the LNG business is strong and it's healthy.

"Yes, you've got the major three players, and you have a discussion of the stability of the three of those, which I'd say is very strong, and then you've got the combination of the other countries that are also bringing a level of diversification and security."

The global market also benefits from multiple private project owners within the top three countries, said

FutureEnergy CEO Andy Calitz.

"The number of players without the involvement of a state oil and gas company means huge diversity," said Calitz.

As a result, there is "no group think and no collaboration" among producers in Australia's key LNG regions, and the same holds true for "ultra-competitive" players on the U.S. side of the Gulf of Mexico.

"The only one of the (Big 3 countries) that really acts as a single entity is Qatar," said Calitz.

Currently, 20 countries produce LNG, and Canada is slated to become the 21st nation to do so when the Shell-led LNG Canada project, scheduled for 2025 delivery, comes on stream.

Russia and Malaysia round out the top five LNG suppliers, following Qatar, Australia and the U.S., while China, Japan, Korea, India, Thailand and Vietnam rank as the biggest purchasers, said Calitz.

A former head of LNG Canada, he wonders what might happen to the LNG market if Donald Trump becomes the U.S. president again and LNG tariffs resume, China does something in relation to Taiwan or Russia goes "more rogue" after it invaded Ukraine and cut off Europe's access to a key natural gas pipeline. But he expressed confidence that no long-lasting disruptions to the LNG market will occur, because the

top sellers and buyers are investing in economic ties with each other.

"At worst, one will begin to see a clear policy on diversification. The lesson from Europe is: Diversify," he said.

"Over the past year, we have had something of a geopolitical explosion in Europe, with the brutal and illegal war prosecuted by Russia against Ukraine," said Jonathan Stern, a distinguished research fellow at the Oxford Institute for Energy Studies, who moderated the session. "This has fundamentally changed gas flows, probably forever. Certainly, in my view, we will never see Russian pipeline gas anywhere close to what it was prior to the war. And that has given us a completely different geopolitical landscape."

But, according to the panellists, the LNG industry, which has access to 600 ocean-going carriers, demonstrated its ability to adapt quickly following Russia's pipeline block. Hence, the panellists do not believe geopolitical problems in Asia will have long-term consequences on LNG trade in the region.

"I've got confidence that if something happens, there'll be a rebalance, there'll be a movement of different supply, and that will be short term, rather than a long-term fundamental," said Calitz.

But his and the other panellists' confidence sharply contrasted with an





# Lower carbon world will still need natural gas

**Elsie Ross**

Natural gas will play a key role as the world transitions to lower carbon energy, panel members told a session this week on the challenges of a turbulent energy transition.

“The challenge that we have is our ability to balance affordable, reliable and ever-cleaner energy,” said Nigel Hearne, executive vice-president, oil, products and gas at Chevron.

“For policy makers, that means being pragmatic and balanced about how we think about economic prosperity, energy security and protecting the environment.”

For Meg O’Neill, CEO & managing director, Woodside Energy Ltd., an Australian LNG producer, a fuel such as natural gas offers the potential to help people living in energy poverty while responsibly tackling greenhouse emissions.

Fiscal stability and regulatory certainty are key to ensure that can happen, she said. “We are being challenged in courts all around the world on progressing our projects and these are opportunities that would bring energy

that is much needed for sites all around the world that are crying out for safe and affordable energy,” said O’Neill.

Enbridge Inc. is spending billions of dollars on capital projects and having that permitting certainty is critical, said Greg Abel, president and CEO of Enbridge Inc. “And it’s not on a local level ...but on a global level — consistent environmental regimes working from sector to another.”

All three companies are working with new technologies that will help them reduce their emissions with both Enbridge and Woodside interested in carbon capture and storage which Abel suggested is not really a transition. “And I think we are going to continue to find ways to weave new technologies into everything that we are doing,” he said.

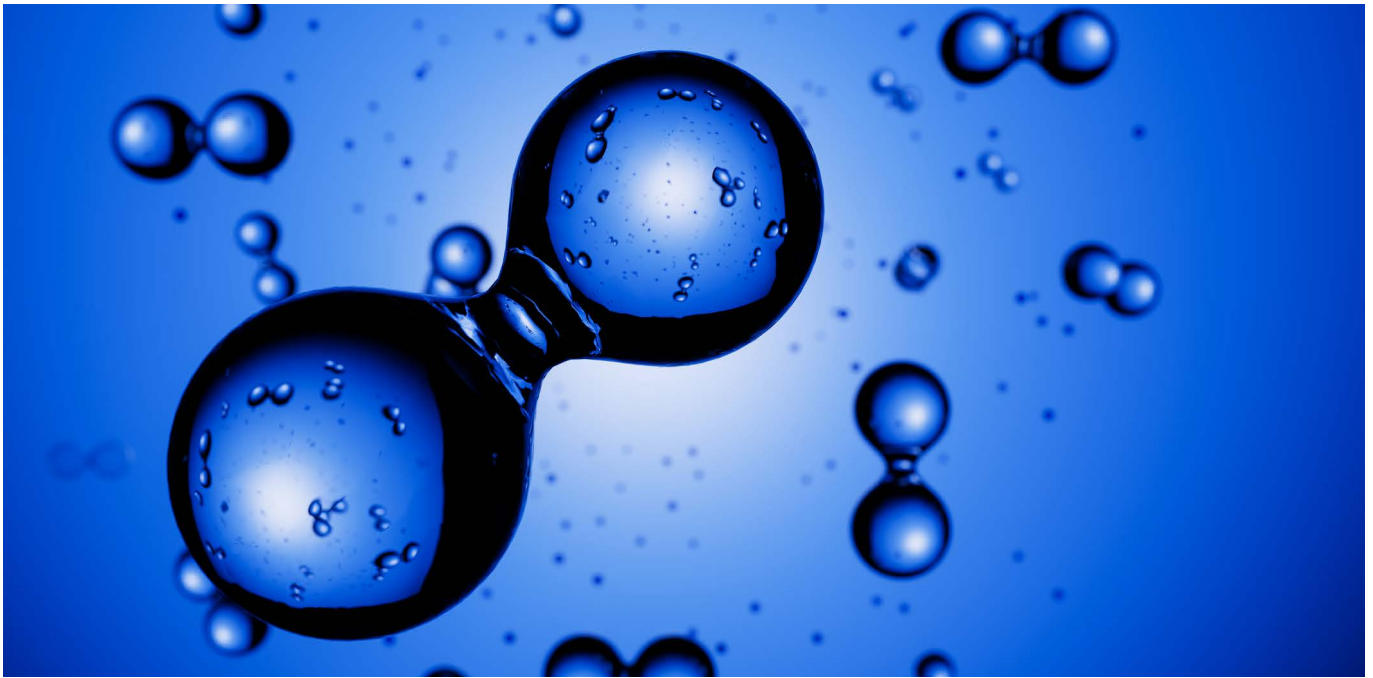
Hearne said he was most excited about the integration of technology which he believes will be important.

However, “I am confident of one thing: there is no one company, no one country, no one technology that will meet these ... aspirations and our climate aspirations,

he said. “We should stop differentiating one technology from another and work at integrating all technologies.”

There are also 508 renewable natural gas projects in North America, including half which are already operating, another quarter under construction and another quarter in financing, said moderator Karen Harbert, president and CEO of the American Gas Association. “We are way ahead of where we thought we would be, that’s the pace and the scale that the industry is capable of deploying.”

The industry also will see collaboration in different ways, said O’Neill. “In the upstream world we work in a number of traditional joint ventures but as we think of some of those new technologies and new partnerships, it’s going to require different commercial roles and different partnering arrangements and it’s going to require collaboration,” she said. “I think there will be some real opportunity for commercial innovation to accompany the technology innovation.”



# LNG industry provides template rather than asset base for hydrogen/ammonia

**Ross McCracken**

Repurposing LNG assets for future hydrogen or other low carbon fuel use has been a hot topic of recent times, and in some cases a justification for investment in new gas infrastructure. However, speakers at LNG2023 in Vancouver, Canada, presented a rather different picture of the crossover between new and old liquified fuels.

According to Juancho Eekhout VP Business Development, Sempra Infrastructure, hydrogen and/or ammonia facilities will come in addition to LNG infrastructure, in part reflecting an expectation that LNG demand will endure, certainly beyond the point at which hydrogen and ammonia production starts to scale up.

However, there are important synergies both in terms of the way in which the new markets are likely to develop and where.

Eekhout said LNG production sites typically have the same electrical connections, supply chains and export infrastructure needed for hydrogen and ammonia trade. Likewise, Austin Knight, VP Hydrogen Chevron, said that in terms

of infrastructure, resources and customer base, hydrogen/ammonia closely mapped existing LNG production and consumption, pointing to a strong case for co-location.

Richard Voorberg, President, Siemens Energy North America said the LNG industry's modularisation and its ability to raise project finance provided important lessons and outcomes, which should be applied to the nascent markets for hydrogen and ammonia. He said these fuels were not in competition with LNG, but necessary elements of a diverse set of technologies needed to deliver a low carbon future, one in which LNG would continue to play a major role.

## Ammonia first, hydrogen second

Assessing how the market will develop, Tracey Lothian, Vice President, Low Carbon Solutions, ExxonMobil Asia Pacific, pointed to the need for close

producer/customer coordination and end-to-end supply chains, which she sees as the genesis of future trade in hydrogen/ammonia as international energy commodities. This would closely mirror longstanding producer/consumer collaboration in the LNG market.

All speakers agreed that international trade was likely, but that it would take time to emerge, and all saw ammonia as quicker to market than hydrogen. International trade will be driven by an enduring need for energy imports in a wide range of consuming countries. A market for ammonia would develop faster because the fuel is already traded and has existing direct end-uses without further transformation, which makes it more economic.

Policy is likely to prove the critical factor in what the speakers called the 'activation' stage, pointing to the US Bipartisan Infrastructure Law and the Inflation Reduction Act as creating a supportive framework for market development. 🌱



# GHG response critical for LNG industry

**Elsie Ross**

A collaborative approach between companies and regulators will be key as the LNG industry responds to the growing demand to address greenhouse gases, a session on how regulatory forces are shaping the LNG industry heard this week.

“It’s really about the survival of LNG products for years to come,” said Yaoyu Zhang, general manager global LNG and new energies at PetroChina International in Osaka.

“All business organisations are under pressure to manage their operations associated with GHGs and especially for LNG developers it’s almost become a licence for them to operate,” he said.

“We are the suppliers to the market but to address this balanced energy transition as we call it we have to be able to pull all levers – supply side, demand side- to make that shift happen,” said Zhang. “Until then, we really need to understand what is needed in different parts of this value chain and what sort of regulatory policies and support we need to facilitate those changes.”

In the US, where LNG is under pressure

from customers to cut greenhouse gases, LNG operators are working with the government taking a “common sense” approach to regulations, said Charlie Riedel, executive director, Center for LNG which represents the large LNG players.

That’s better than the government “just sort of working” to assign a prescriptive approach which would then limit technologies the industry could be using that might be more effective than the regulations put in place, he said. “It’s that honest conversation and dialogue and I think it has to be a collaborative approach,” said Riedel.

“If we don’t take that collaborative approach, you wind up with something that’s overly prescriptive and probably not actually solving the problem.”

LNG producers have to listen to what their customers are saying for their environmental goals while also balancing their own domestic environmental goals in greenhouse gases, he said. “It’s not just at the point of liquefaction that we are trying to address, it’s at the point of combustion. And if we’re not doing both of those things,

I don’t think that we’re really achieving the goal of regulating greenhouse gases effectively.”

As the LNG market continues to grow, it’s important for the companies to demonstrate their environmental and social resilience, said Philip, Mshelbila, managing director and CEO for LNG Nigeria. Liquefaction accounts for six to 10% of greenhouse gas (GHG) gases from LNG and with the exports expected to be exported to China, the environmental impact is hard to ignore, he said.

For its part, Nigeria LNG has been demonstrating its willingness to reduce its carbon footprint as one of the largest carbon neutral shippers of LNG.

While the carbon market is still new and there is little money to be made, “it is our social responsibility and is an investment by our company to society,” he said.

In the future, GHG intensity is going to become a key metric for LNG developers, traders and societies and the company takes that seriously, said Mshelbila. “Better to do it now and act fast.” 🔥



# Weak Asian LNG demand likely to see robust long-term recovery

**Ross McCracken**

The energy crisis in Europe drew LNG away from Asia last year, leading to a reduction in regional LNG imports. This year many analysts forecast a rebound in the key Chinese market as Beijing unwound its restrictive Covid-19 policies. However, the rebound proved short-lived, according to Lynnsey Yuqian Lin, Analyst, Global Fundamentals and Corporate Research, Cheniere Energy.

Weak Chinese industrial gas demand was exacerbated by a slow domestic real estate market and limited export orders from key markets in North America and Europe, she said at the LNG2023 conference in Vancouver, Canada.

The great majority of factors remain bearish for the Chinese economy, according to Yuqian Lin. The real estate sector is struggling and export order levels remain low. She added that spot LNG prices may have fallen from recent highs, but still remain too steep for gas-fired generators and other domestic Chinese gas buyers, limiting Chinese purchases

in the LNG spot market.

However, in the next few years, Chinese LNG demand is likely to return to its pre-pandemic growth trajectory, Yuqian Lin said, pointing to the huge build out of gas infrastructure approved under Beijing's most recent five-year plan. The government's desire to increase gas' share of the energy mix and the likelihood that domestic gas production will grow no quicker than it has in recent years, suggests Chinese LNG import demand will return to its former robust levels of growth.

## LNG demand gap to grow in south and southeast Asia

It is not just the Chinese market which underpins high-growth forecasts for Asian LNG demand. Gen Kunihiro

of Mitsubishi Corp. points to a major import gap emerging in South and Southeast Asia. The region is expected to see 22% growth in population by 2050, adding some 500 million people. At the same time, domestic gas production across the region is in terminal decline, Kunihiro said.

He forecasts that gas generation capacity in south and southeast Asia will increase two and half times by 2050. Industrial gas use will also expand, leading to a doubling of gas consumption across the region overall. This is being accompanied by a lack of supply-side investment. Spending levels in the upstream oil and gas sector have not returned to pre-pandemic levels, Kunihiro said.

With domestic gas production declining, even increasing levels of investment in renewables will be insufficient to meet the region's energy demand growth. As a result, LNG imports from outside the region will have to fill the gap, he said. 🔥



# Chinese companies see energy crisis benefit for LNG importers

**Ross McCracken**

Chinese companies see the European energy crisis accelerating the energy transition, freeing up LNG for Asia

Over the last 18 months, Chinese companies have been at the forefront of signing offtake deals for new LNG projects. Chinese LNG imports fell sharply in 2022 as prices rose, abruptly ending a longstanding upward trend, which saw the country temporarily become the world's largest LNG importer.

However, the energy crisis has not diminished the country's thirst for the fuel. The crisis is seen as a temporary aberration, which is unlikely to affect the long-term development of the LNG industry. It could work well to China's advantage.

According to Chinese delegates at the LNG2023 conference in Vancouver, the European energy crisis is accelerating the region's energy transition, which,

over the medium-term, will see European gas demand fall, freeing up LNG volumes for Asia. At the same time, it is encouraging new investment, in which China is playing a key role, strengthening future supply.

The Chinese delegates also expressed more uncertainty about how Chinese LNG demand will evolve than normally assumed by their western colleagues at the conference. Certainly, it is expected to rise. They see natural gas demand growing over the next 20 years. Domestic production will also rise, but it will not close the import gap.

However, the volume of LNG imports depends on a range of factors. First, major new gas pipelines are under discussion, they said, not just with Russia but with the states of Central Asia. Russian gas currently has nowhere to go,

and China can expect to be a beneficiary, as it has been from the construction of the Power of Siberia gas pipeline.

Second, Chinese gas demand will be tempered by the speed of the country's own clean energy development. China already has more wind, solar and hydro power than any other country in the world, as well as an active nuclear new-build programme. It is not the European or US energy transition on which the LNG market should keep an eye, but the dynamism of the Chinese transition, they suggest.

Third, the coal-to-gas switching policies which had such an impact on Chinese LNG imports pre-Covid have largely stopped, "the government is not pushing so hard, we still have coal," one delegate said, who did not wish to be identified. 🔥

# Complex energy markets require complex partnerships

**Dale Lunan**

The explosive growth of LNG markets in recent years, compounded by the increasingly urgent need to decarbonise, has forced oil and gas companies to create multi-stakeholder partnerships to ensure continued growth, delegates at LNG2023 heard Wednesday.

At a session titled Growth of LNG Through Innovative Partnerships and Cooperation, panelists were unanimous in their assessment that industry today is much different than it was as recently as five years ago.

The challenges, skills, processes and layers of collaboration needed today are far more complex than they used to be, TC Energy CEO Francois Poirier said.

“In the old days, if you were good at engineering and construction and you could raise money, you would be successful,” he said. “But as we all know, uncertainty is the enemy of investment.”

To eliminate uncertainty, companies have had to increase their competencies to influence policy and regulation, Poirier said, noting that for TC Energy, that needs to be done across three national jurisdictions – Canada, the US and Mexico – in which it has active operations.

But collaborations and cooperation are also needed closer to home, he said, offering the example of the Shell-led LNG Canada export project, which will be supported by Coastal GasLink, a TC Energy subsidiary that is building the pipeline that will deliver feed gas to LNG Canada.

“Policymakers and regulators don’t differentiate the ecosystem around a project,” he said. “There’s a liquefaction facility and a pipeline – they view them as a single effort, which means we need to work very closely with our customer to make sure the degree of engagement we’re undertaking with indigenous rights holders and the policymaker is very closely co-ordinated and is consistent.”

Paul Marsden, president, energy for EPC contractor Bechtel Energy, said any collaboration with stakeholders is better the earlier it is formed.

“We all do our best when we get involved early in the project,” he said. “The actual process for undertaking energy projects hasn’t changed. But what has changed is that they are getting bigger, they are getting harder.”

And energy projects, particularly gas projects, are evolving beyond the natural

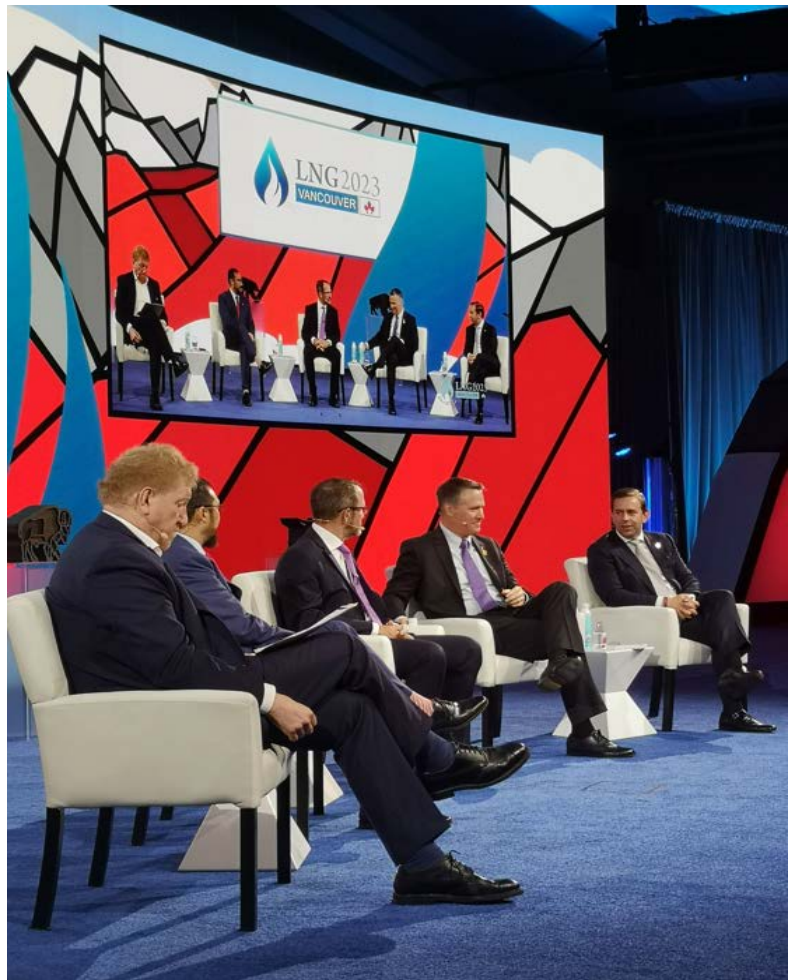
gas projects that are familiar to many in the industry, said Cederic Cremer, executive vice president for LNG at global major Shell.

“We have all had to change our frame of mind about what the gas business is,” he said. “It will always be pipeline gas and methane, and it will be that for quite some time, and it will also be other, lower carbon gases, whether that’s hydrogen or ammonia or even synthetic gas. But methane and oil will be here for quite some time – we need to be able to decarbonise those.”

And governments too, have had to change how they view energy projects, said Stuart Young, Minister of Energy and Energy Industries with the government of Trinidad & Tobago.

“We have had to learn to work, to really listen, and to find a way to move forward,” he said, noting that it’s no longer enough for policymakers to pay attention only to those who elect them.

“It is very easy for people out there who have the responsibility to take positions and say you have to shut down fossil fuels,” he said. “But gas is here to stay, it is going to be here well beyond 2050.”





# LNG lawyer touts benefits of short-term offtake contracts



Jason Bennett, chair, global projects department, Baker Botts L.L.P.

## Elsie Ross

The time may have come for the LNG industry to dispense with some of the long-term offtake contracts which have traditionally been required to enable projects to proceed, a top LNG lawyer told the LNG2023 conference on Tuesday.

“The need for that long-term offtake is what really slows down projects all over the globe,” said Jason Bennett, chair, global projects department, Baker Botts L.L.P., the world’s largest LNG law firm.

He was part of a panel examining commercial trends across the LNG value chain.

In the past 10 years there has been a huge run-up in liquefaction numbers, to about 370mn tonnes/year with a long-term trend in LNG supply to match, he said. Most of the offtake was backed by long-term contracts with creditworthy offtakers, with about 90% carrying terms of 15, 20 or 30 years and, most recently, 27 years, Bennett said in a paper.

“The assumption for normal markets like a fruit market is that there’s a deep liquid pool of suppliers and purchasers so you have buyers and sellers who are going to be out there,” he said. “The fruit vendor doesn’t have to have a five-year contract to sell fruit in order to be in business.”

Bennett said what had sparked his paper is that projects are beginning to look at early [pre-commercial] cargoes and assigning some value to them in project financing. “You’re also seeing a lot of equity offtake and some credit for unmarketed cargo,” he said. “The real

question is how far this can be pushed.”

Bennett’s merchant LNG project is not about merchant LNG projects which buy natural gas and then sell it. “What we are talking about is liquefaction facilities developed without significant reliance on long term offtake contracts with credit-worthy buyers.”

It doesn’t have to be the whole project, said Bennett, who is looking at 3-4mn tonnes in a nine- or 10mn-tonne project. Some projects could be 100% contracted but with contractual volumes of two to three years.

“Instead of launching a facility with 10 or 15 years of LNG sales, you launch with 7mn tonnes, have 15 years of offtake, 3mn tonnes have five years of offtake and after that there’s no confirmed sale.”

The message to the projects and the banks is that “you’re looking to the market for the rest of the return.”

Large LNG players with credit worthy balance sheets already are taking more equity and if Europe is any indication “it’s totally flexible,” he said. That means that someone took the credit risk to obtain the cargo and now will take it wherever they like in response to market circumstances.

Bennett said he believes this can become a governor of how fast the LNG industry can grow as there are a limited number of players willing to do merchant LNG and there’s a lot of LNG demand that doesn’t look like a 10-year market.

At the same time, there’s considerable LNG demand interested in a more open

spot market that would look more like a fruit stand where they could buy LNG on a 90-day rolling programme, he said.

Bennett believes more markets would begin turning to that model because if they are going to look to LNG to meet energy security needs, they want to make sure there’s an adequate supply which means there’s a need for more LNG available on a merchant basis.

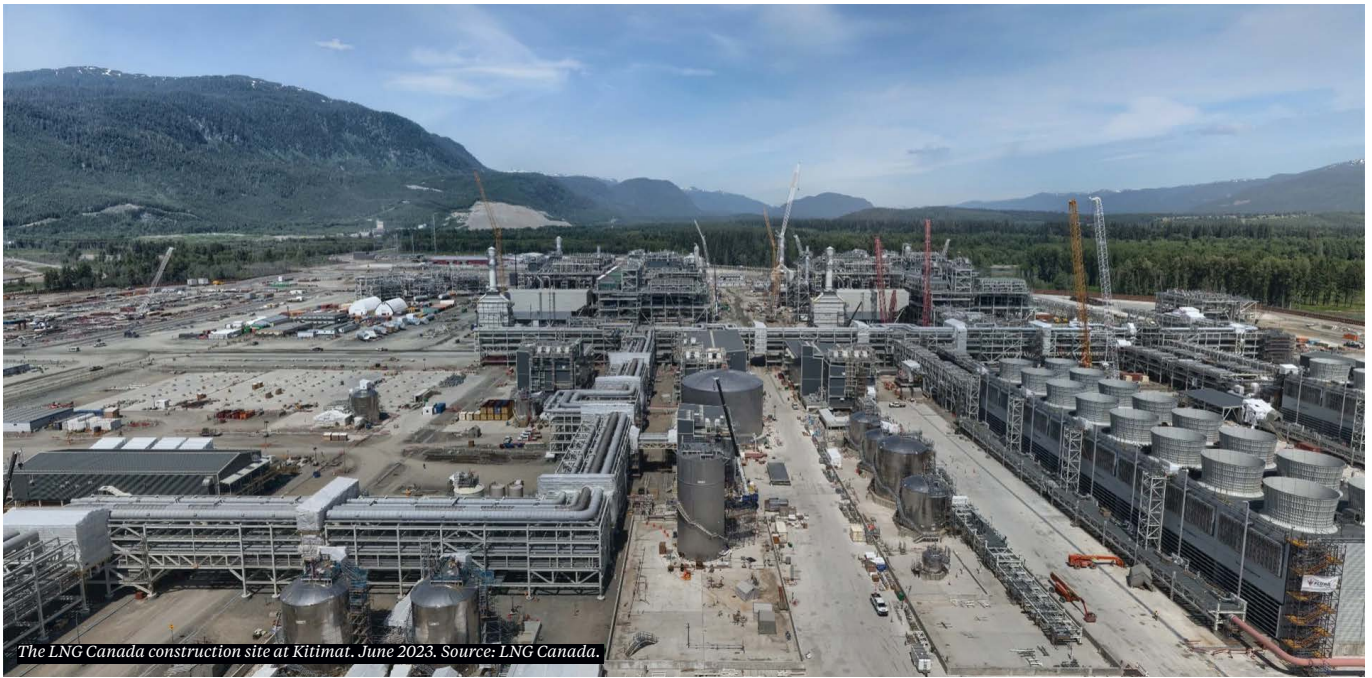
For Bennett, a key advantage of such a market would be that for the first time there would be a transparent global market backed by financial trading. For example, a project could put 4mn tonnes up for auction on a 90-day rolling basis. Any LNG in that area could be pushed into the market which would grow rather quickly, he said.

“What you are seeing is the market shifting to believe there’s a gap,” said Bennett. “When you see owners take a lot of equity LNG from a project, they fundamentally believe there is a long-term cost differential between the cost of that commodity and the long-term market.”

He said in his practice he is seeing a lot more appetite for equity LNG. “This tells me that there is a belief in the U.S. that cost-plus LNG has a future in the long-term market.”

There are lending constraints, though, as bankers are not known for moving quickly and being willing to take risks, said Bennett.

He also pointed out that 10 years ago, 5mn tonnes of LNG accounted for a significant share of the global market but now that’s only 1.5%. 📈



The LNG Canada construction site at Kitimat, June 2023. Source: LNG Canada.

# Canadian LNG has lower carbon footprint than elsewhere, says project developer

## Monte Stewart

Canada is capable of producing LNG that has a much lower carbon footprint than quantities purchased from other markets, says a Canadian LNG project developer.

If Canadian LNG had been on the water in 2022 as Russia natural gas supply to Europe slumped, a drastic increase in emissions generated from Asian coal-fired power plants could have been avoided, said Charlotte Raggett, president and CEO of Rockies LNG, as she presented the findings of a paper during the LNG2023 conference on Tuesday.

Raggett said 130 GW of electricity were added in Asia as a result of the increase in coal-fired power.

“So that 130 GW represents roughly two times Canada’s total emissions,” she said. “If that had been Canadian LNG, we could have reduced the emissions

footprint of that coal-fired power generation by half – 600mn tonnes/year, which is just short of the entire CO<sub>2</sub> emissions of Canada.

“So, just to put that in perspective, we could have avoided Canada’s worth of emissions if we had had more LNG on the water.”

Rockies LNG, a group of natural-gas producers, has partnered with Western LNG and the Nisga’a Nation on the proposed Ksi Lisims LNG project in northwestern British Columbia. The project is one of many proposed for the northwestern B.C. region, where LNG Canada is also developing the first Canadian terminal slated to begin operations in 2025.

Raggett said LNG reaching Asian markets from Canada would generate much lower emissions than quantities coming from the U.S. If U.S. LNG added to the

market over a three-year period had been produced in Canada, it would have resulted in about 40mn tonnes/year of fewer emissions hitting the atmosphere, she said.

“It’s a real opportunity, I think, to put more Canadian LNG out there, because of carbon performance and the challenges getting it there,” she said.

She noted that LNG developers and natural-gas producers in northwestern B.C. are capitalising on many factors that help reduce emissions, including access to a renewable power grid or, if projects are too far away from it, carbon capture and storage; widespread access to federal and provincial databases covering all emissions; large-diameter pipe and specific emissions-reduction targets.

“All of the tools in the toolbox are being used,” she said. 🔥



# Environmental performance and efficiency not mutually exclusive

**Elsie Ross**

LNG operators and natural gas producers can not only reduce their carbon footprint but save money through improved efficiencies with use of new technologies, an LNG2023 session heard Wednesday.

“Efficiency is very important,” said Alberto Matucci, VP of gas technology equipment at Baker Hughes. Its latest model gas turbine, for example, is the first one designed specifically for LNG facilities and results in an immediate 30% reduction in emissions, he said. “It’s very powerful because it shows how even available technology and solutions can help us make some pretty substantial inroads.”

Electrification, including modularised solutions with electric drives, especially if renewable power is available, said Matucci. “You could have a carbon-free solution by having electric drives.”

“There is a lot available, there is a lot that we can do, and we are doing but there also is a lot that has to be explored in the area of technology and our company is fully committed to that,” said Mohamed Syazwan Abdullah, managing director and CEO of Malaysia LNG Group of Companies (Petronas).

Petronas is focused on efficiency because about 10% of gas that comes into an LNG plant is consumed as fuel and even an improvement of one percent is “a lot of gas,” he said.

The company is working on operating

the plant using digital technology and has seen a 3-5% reduction in the power required to operate the plant. For an operating facility, “that is a huge gain,” said Abdullah.

The company uses imported renewable power not only to save fuel but to turn it into LNG. That is the kind of efficiency we are focusing on.”

On the upstream side, Michael Rose, president and CEO of Tourmaline Oil Corp., Canada’s largest natural gas producer, said his company runs the only gas plant scale testing centre for methane in the world, in partnership with NGIF, the University of Calgary and Perpetual Energy Inc. It is running about 45 experiments for new technologies at one of its plant sites. “It’s a bit like a space station but we are making progress.” Between 2018 and 2021, Tourmaline, which also exports LNG via the U.S. Gulf, reduced its net methane emissions by 25 percent while growing production by 30 percent.

In terms of technology and increased efficiency, Tourmaline can now drill a North Montney horizontal well and get it in ground ready to produce in seven days compared to the 25 days the first well took in 2006, he said, describing the rotary steerable technology as a game-changer.

“It’s amazing the way the costs have come down but parallel to that we

have got all our rigs off diesel and onto natural gas and that accomplishes a huge emissions reduction,” not only in CO<sub>2</sub> but other emissions as well, said Rose.

Matt Watson, VP of energy for Environmental Defence Fund (EDF) said that addressing methane emissions across the supply chain from flaring, venting and leaks could drive phenomenal reductions today — and cheaply. “This is the issue that hits the sweet spot of that energy trilemma . . . affordability, security of supply and climate all at once.”

An EDF-commissioned analysis of 60 regions around the world directly connected to the global gas trade found that within two to three years, with a positive NPV, created a supply equal to about 60% of the gas supply that Europe was importing from Russia prior to the invasion of Ukraine, he said. “There is a tremendous amount of supply that we can bring on and these are the cheapest emissions you will ever get just by focusing on methane.”

Watson said there is a need for rigorous, science-based monitoring, reporting and verification (MRV) and LNG operators ought to be pushing their suppliers to report their emissions through the Oil and Gas Methane Partnership process. “When that is being done, the market will begin to reward the better operators and give the poor operators the economic treatment they deserve.” 🌱

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