### METHANOL INSTITUTE



2024 MILESTONES

### 2024 METHANOL INDUSTRY





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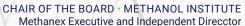
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### **OUR MISSION**

### A WORD FROM OUR CHAIR

Protect · Expand · Communicate

As the global trade association for the methanol industry representing the world's leading methanol producers, distributors and technology companies, the mission of the Methanol Institute is to serve and provide cost-effective value to its membership by:

#### Protecting existing markets is a core function

- Meeting regulatory challenges & driving policy opportunities
- · Promoting best practices across the global distribution chain
- Preventing product misuse

#### Promoting the growth of emerging energy markets

- Marine and Sustainable Aviation Fuels
- Ensuring the methanol industry maintains momentum in key market applications
- Gasoline and Diesel substitution for road transport
- Heating/Power applications: cook stoves, industrial boilers, kilns, gensets, turbines
- Low carbon, renewable and small-scale methanol

#### Serving as the voice of the global methanol industry

- Supporting members during periods of change and amplifying member messaging
- · Maintaining and expanding global stakeholder networks
- Expanding social media presence and use of digital communications/marketing

This edition of Methanol Milestones arrives as I begin my second tenure as Chair of the Methanol Institute's Board of Directors. Having been involved with MI for over two decades and having served previously as Board Chair from 2016-2019, I am honored to again lead the global trade association for the methanol industry and very proud of what we as an industry accomplished in 2023.

2023 was an extraordinary year, as the methanol industry moved to seize the unique opportunity presented by methanol's rise to prominence as a preferred marine fuel of the future. One of the highlights at the start of 2024 was the proclamation by Riviera Maritime Media that "Methanol as a marine fuel emerged as the biggest story of 2023." This sentiment is borne out by the numbers, with well over 260 methanol newbuild vessels on order from the world's shipyards, and methanol further solidifying its place as a mainstream fuel option with vessel orders surpassing those of LNG for 2023.

Beyond shipping, we've seen tens of thousands of methanol taxis sold in China, along with hundreds of trucks, including new hybrid models. Methanol is now fueling cookstoves, industrial boilers, kilns, home heating, gensets, and fuel cell systems. We've also seen a wave of announcements for low carbon, ultra-low carbon, bio and e-methanol production and have included an array of new data tracking these developments on our website. Continuing to grow our presence across MI's digital platforms has been a central focus for our staff team in 2023 as well. Over the last year, MI has also welcomed over 25 new members to the association, and our membership now stands at over 90 companies and organizations.

In this year's edition of Milestones, you will learn more about some of these initiatives as well as additional MI activities. We'll also introduce our 2023 class of new members:

- AIRCELA
- Berge Bulk
- Cardill
- COSCO Shipping
- Farizon
- Green Marine
- Linde
- M2X Energy
- Madoqua
- MSEA Capital

- Nacero Oberon
- PMW Technology
- PTTEP
- PuriFire Labs
- Pyletech Energy

Rolls Royce Power

- Systems
- Royal Caribbean
- Uniper
- VeryOne

In 2024, MI will continue to lead the way in the emergence of methanol as a global marine and on road transportation fuel; work to identify and open new markets and opportunities for methanol around the world; continue to promote our industry's interests before legislators and regulators across the globe; expand our reach via our social media and web platforms; promote methanol safety; and many other important initiatives. The organization and members of the Methanol Institute are making significant contributions to the advancement of the global methanol industry. Together we are looking forward to an exciting 2024, and the Methanol Institute is well positioned to achieve continued growth and success for our industry and each of our member companies.

#### 2024 METHANOL INDUSTRY

### in focus



In addition to our continued growth in membership, MI accomplished a great deal across a wide range of activities in 2023. Some highlights include:

- The launch of a number of new policy focused member-driven working groups which will oversee our advocacy and public policy efforts in Europe, the Americas, and with the International Maritime Organization.
- The expansion of our staff with the hiring of Business Development Manager Desmond Loo in Singapore, and Kjeld Aabo as a Senior Advisor for Maritime Transport.
- The launch of a GHG Accounting Task Force which has undertaken a series of workshops led by consultancy Hinicio.
- · Continued support for methanol fuel vehicle standards in China.
- Increased support of events including our successful marine exhibit at NorShipping.
- Continuous collaboration with partner organizations such as eFuel Alliance, Renewable & Low Carbon Liquid Eurogas and the Coalition for Renewable Natural Gas, Fuels Platform, and the American Chemistry Council.
- Policy Committee establishes EU Working Group, Americas Working Group, and IMO Working Group
- Global Fuel Blending Committee renamed to Road & Aviation Committee
- MI professional staff present at more than 60 global events
- · Brussels office organizes series of "Methanol Talks" with key EU stakeholders
- MI joins Silk Alliance and Port of Rotterdam/Port of Singapore Green Corridors of Shipping
- MI lobbied the Ministry of Law and Renewable Energy India on R&D Roadmap for Green Hydrogen Ecosystem in India that mentions methanol more than 50 times
- · Methanol safety workshops for cookstoves held in China
- MI promotes lighting of methanol-fuelled cauldron at Asian Games
- More than 700 LinkedIn posts with over 2.4 million impressions
- Member of Renewable and Low Carbon Value Chain Alliance (RLCVA), the expert group of the European Commission

















#### Preparing ForThe Challenges Ahead

2023 could fairly be called the year that Methanol went mainstream, with new Methanol-capable vessel orders ahead of those for other dual fuel ship types, according to classification society DNV.

DNV's Alternative Fuels Insight platform logged 298 ships with alternative fuel propulsion ordered in 2023 — an 8% increase year on year – and a further 298 vessels booked for retrofitting to enable them to run on alternative fuels.

Methanol saw a sharp increase in orders to 138 putting it just ahead of LNG at 130, DNV said. It is interesting to note that the 138 vessels that are methanol-capable excludes orders for methanol carriers though is skewed heavily to container ships, followed by bulk carriers and car carriers.

It's good news for an industry still coming to terms with decarbonization and the IMO's ambition of net zero carbon emissions from shipping by 2050 but is not cause for complacency.

If anything, the scale of the challenge ramps up now. We are not yet at an inflection point, but we know what needs to happen next. Methanol bunkering options are increasing as the green corridor concept takes hold, albeit with an urgent need for more capacity. Filling those bunker lines means more production of conventional, blue and renewable methanol, either as blended "drop in" biofuels or a "neat" standalone fuel.

#### Policy and Regulation

Whether or not one believes that last year's COP28 meeting had a positive outcome for shipping, the maritime industry's pathway was already established – both at global and regional level – with emissions regulations set to grow progressively tighter.

The call by the CEOs of leading global container shipping lines for an end date for fossil-only powered newbuilds certainly grabbed headlines – the operators also urged IMO to create the regulatory conditions to accelerate the transition to renewable fuels.

Incoming IMO Secretary General Arsenio Dominguez made clear that implementing the revised IMO strategy was critical to progress at the next MEPC meeting this year. "We are already carrying out the impact assessment on the fleet and on States in order to provide the necessary information and that will lead us to those measures that will be adopted by 2025 and implemented in 2027," he said.

Conclusions from COP 28 suggest that fossil fuel use in general will be reduced across most industries in the coming 25 years, but maritime is in some ways further along this track simply because vessels operate for 20-25 years and so all new ships must be of a compliant design today. Shipping will require a strong policy driven framework that supports the economic viability of lower carbon vessels and which can make net zero a reality.

This framework should address the certification of actual emission of all fuels rather than relying on default values, this would serve to unlock contributions of existing low-carbon fuels, ensuring swift near-term progress as the renewable fuel supply reacts to policy signals and ramps up supply. The large-scale production ramp-up and delivery of sustainable alternative fuels capable of addressing the needs of shipping is contingent on a framework that fully recognizes the contributions of carbon capture and utilization as several key energy carriers are sourced from captured and re-used emissions.

#### Interest Across the Sectors

The strong preference for Methanol by containership operators was a feature of last year, with newbuildings announced and approvals in principle granted by classification societies. Among the highlights was the AIP granted by Korean Register for a methanol dual-fuel retrofit design for a 16,000 TEU containership operated by Hyundai Merchant Marine.

But container lines are not the only operators committed to Methanol. COSCO's shipping arm has ordered two very large ore carriers which will have methanol dual-fuel propulsion in addition to featuring energy-saving equipment. Its tanker shipping unit also placed an order for six methanol dual-fuel vessels with first delivery expected end-2026. Orders have been placed by China Merchant Energy Shipping for eight pure car and truck carriers, with a further four PCTCs ordered by Wallenius Wilhelmsen.

Parent COSCO Group teamed with State Power Investment Corporation Limited, Shanghai International Port Group and China Certification & Inspection Group to develop a green methanol industrial chain which will comprise the production, transportation, refuelling, and certification of green methanol as bunker fuel.

In the booming offshore market investor JP Morgan has taken options on four vessels contracted with Norway-based Ulstein Werft to build two methanol-ready commissioning service operation vessels (CSOVs) for windfarm operations. Orders for two vessels with two-plus-two options were originally placed by Bernhard Schulte Offshore, with all now declared.

The orderbook for methanol fuel engines has in the last two years increased far beyond expectations. Both two and four stroke engines burning methanol are now in service and many new projects are proof that the maritime world wants methanol, and that methanol will continue to be an important fuel for the marine market.

To date, 192 two-stroke engines of two main designs and with power output between 8 MW and 80 MW have been sold in the maritime market. The majority of orders in 2023 were for larger container vessels requiring large engines and for each ship, three to five auxiliary engines are also needed.

For example, the world's first carbon-neutral containership the Laura Maersk operates on three methanol dual-fuel engines with one MAN Energy Solution two-stroke engine for propulsion, and two HiMSEN four-stroke, medium-size engines for the vessel's APU load. HD Hyundai has now received orders for 177 methanol-powered engine units for a total of 42 ships. In addition to new orders for new vessels, several container shipping companies have made orders to retrofit Methanol fuel engines on existing ships, with OEMs reporting a growing number of projects for methanol conversion. In October, Maersk selected the Zhoushan Xinya shipyard south of Shanghai to transform the 15,282 TEU Maersk Halifax to methanol operation, the first of 11 retrofits. Market experience with Methanol since 2015 and its ease of storage contribute to making the conversion process simpler and easier.











#### **Ports and Corridors**

Developments at the world's largest bunkering port last year will likely lead to methanol bunkering operations becoming increasingly commonplace. The Maritime and Port Authority of Singapore recently issued an Expression of Interest which invites parties interested in supplying methanol as a bunker fuel at the port to submit their proposals by the end of February 2024.

This is a development MI applauds and we are working to support the port authority's initiative to help the international shipping community decarbonise.

Singapore's Maritime and Port Authority is actively developing plans to incorporate methanol into its bunkering pool and is anchoring two of the largest green corridors globally, including the Port of Rotterdam to Singapore Green Corridor and the Silk Alliance Green Corridor, which spans from Shanghai to Singapore. Together with partners, MPA is working to demonstrate proof of concept that can underpin the transition and be scaled up progressively over time.

In Japan, Maersk, together with the City of Yokohama, and Mitsubishi Gas Chemical have signed a Memorandum of Understanding for the development of green methanol bunkering infrastructure at the Port of Yokohama. The bunkering facility will be located at APM Terminal's Minami-Honmoku container terminal.

In the EU, Equinor is supplying bio-methanol on a mass-balance basis from its existing plant in Norway to Laura Maersk, the first methanol dual fuel feeder vessel which entered service at the end of 2023. Meanwhile OCI Global is providing bio-methanol to Xpress Feeder Lines for their fleet hitting the water in the first half of 2024.

Taiwan's Evergreen which ordered a slate of dual-fuel ships last year has signed a memorandum of understanding with the Port of Shanghai to develop the supply of green methanol bunker fuel to its ships. Shanghai International Port Group will handle the physical supply and bunkering services for the dual fuel ships as part of a broader strategy to develop a comprehensive green methanol industry chain.

Shippers and container lines alike are backing Hong Kong government plans to develop the city as a regional bunkering hub for next-generation ship fuels to retain existing business and lure back lost container volumes. The initiative was laid out in the government's action plan on maritime and port development published in December and follows comments by the port's leadership team. Globally, out of the 30 ports now capable of offering methanol bunkering, five are in China.

#### **Increasing Fuel Supply**

The increasing demand is a signal well noted by producers, who are working to bring onstream additional volumes of methanol, using existing natural gas-based assets, recycling CO2, incorporating green hydrogen or renewable electricity and exploring carbon capture and storage.

'Because conventional methanol can also be burned on the new vessels, owners do have the opportunity to blend blue and green methanol with grey as production ramps up and 'dial in' the desired carbon intensity and price point they are looking to achieve.

In 2022, the Methanol Institute was tracking more than 90 projects globally, with announced projected production capacity exceeding 8 million tons by 2027, and we are seeing the number of projects and capacity plans increasing dramatically. As of April 2024, the database tracks over 140 renewable methanol projects globally, with a total capacity of 17 million metric tons by 2027 and 21 million tons by 2029.

For example, Spanish energy major Cepsa partnered with Maersk affiliate C2X to build a green methanol plant in Huelva, Spain at an estimated cost of up to \$1.1bn. On completion, the plant will produce 300,000 metric tons of green methanol annually, making it one of the largest facilities of its kind in Europe. The new capacity is expected to significantly bolster Spain's green energy infrastructure while also contributing to the region's economic growth. In the US, OCI Global announced it would double its green methanol production capacity at its Texas facility to 400,000 tons of green methanol per annum, citing the increasing demand from the maritime industry as a key driver.

'It will be important to adopt a transition approach that facilitates the contribution of conventional, blue and green fuels towards targets for low carbon and for net carbon neutral emissions'



European Atlantic ports are set to play host to a variety of pilot schemes exploring the use of hydrogen and methanol for shipping and port vehicles alike. Led by the EnergyLab Technology Center, the E3.43 million HYDEA project brings together 11 private and public partners from Spain, France, Ireland, and Portugal to drive the use of technologies based on green hydrogen.

#### Into the Future

So what does 2024 have in store for Methanol as a marine fuel? The signs are certainly positive; methanol provides a practical, implementable pathway for the maritime industry in terms of timescale, regulation and fuel production. The technology is in place: proven, approved, and straightforward to implement in practice.

More broadly, there remains the need to extend the net zero carbon toolset to onboard carbon capture, but this is true across the industry. Supply chain maturity must accelerate for owners to have full confidence that product will be available in volume – this includes production and supply in ports as well as seaborne cargoes and more green corridors.

As the IMO develops its own GHG lifecycle guidelines this year, it will be important to adopt a transition approach that facilitates the contribution of conventional, blue and green fuels towards targets for low carbon and for net carbon neutral emissions. A market mechanism will ultimately be essential and is something industry needs to work together to promote. In the meantime, we will continue to provide the support the industry needs, from newbuilding and retrofit decisions, informing regulation and policy and promoting the infrastructure that can enable the energy transition.



**Stakeholder Engagement:** Undoubtedly, the year of 2023 was significant and fruitful for MI's Beijing Office for public affairs. Kai Zhao represented MI in a number of important industrial events including: the 2023 Industry Green Development Conference (IGDC) co-organized by MIIT and the Guangdong Provincial Government; the 2nd Future Energy Forum – a key sub forum of the 14th China International Petrochemical and Chemical Industry Congress (CPCIC 2023), organized by China Petrochemical and Chemical Industry Federation (CPCIF) and China





2023 was an extraordinary time of growth for MI's Beijing Office, and also the methanol industry in China.

Abiding by China's Overseas NGO law and having been accredited by the Chinese Ministry of Industry and Information Technology (MIIT), MI's Beijing Office fulfilled the first full year operations successfully, under the management of China Chief Rep Kai Zhao and office manager Toni Zhou who joined in 2023.

MI's official China WeChat account has launched, marking an important benchmark after the MI BJ Office became officially registered as an NGO in February 2022. Aligning with MI's global communications strategy, MI's Beijing Office utilizes WeChat as a central platform to disseminate the best safety practices for methanol handling and use, and explore the range of market opportunities for methanol as a fuel for cars, trucks, buses, ships, cookstoves, boilers, kilns, heating, and power generation. Leveraging WeChat's presence, MI's Beijing Office seeks to help strengthen collaborations with key stakeholders and policymakers, and enable MI China to provide more cohesive services to members - both online and offline. Going forward, MI China will keep optimizing this platform to keep WeChat's daily consumers informed of the latest methanol industry developments.



Scan for WeChat

#### Market Development

In 2023, methanol demand continued to grow in China, with methanol imports reaching 14 million metric tons, a historical record; and markets for clean fuel accredited in thermal and transportation applications.

Supported by MI and MI member Methanex Corporation, a recent study by the China Association of Alcohol and Ether Fuels and Automobiles (CAAEFA) showed methanol fuel demand reaching to 7.903 MMTs, which was primarily applied as transportation fuel and combustion fuel, with consumption of 6.859 MMTs and 1.044 MMTs, accounting for 86.79% and 13.2%, respectively, methanol fuel consumption in cook stoves was the largest total component of methanol fuel consumption in China, accounting for more than 50%.

To address safety concerns around methanol as cooking fuel, MI's Beijing Office continued to work with stakeholders in China, improving safety best practices, including promotion of more safe steel cylinders in Lu Zhou where four people died due to methanol fuel mis-drinking, and investment supporting the creation of a China national standard of Alcohol Based Fuel GB16663.

**Road Transportation** 

In China, MI also took a leading role in the policy making and promotion of methanol for road transportation with our long-term partners on MIIT's Steering Committee of Methanol Vehicle Promotion. We hosted a joint event, the Beijing Methanol Energy Summit. Guests from academia and industry at home and abroad shared cutting-edge views, leading technologies, and the latest products, and held in-depth discussions on methanol supply construction, prospects for methanol fuel applications, and the necessity of developing a methanol economy. Additionally, in partnership with Jin Zhong Municipal Government, we hosted the Methanol Economy Forum under Tai Yuan Energy Low Carbon Development Forum, which was initialized by Chinese President XI Jinping.

Methanol Industry Forum held by China Nitrogen Fertilizer Industry Association.

Assisted by the continuous effort from MI, three Chinese national standards on fundamental methanol fuel for motor vehicles have been in effect from 2023, and the total number of methanol vehicle filling stations are now over 140. MI Member Geely Automotive, leads the deployment of methanol fueled vehicles, which now number over 31,000; while other OEMs are developing methanol fueled models as well.

A joint research effort with MI members Aramco Asia and Geely also highlighted that methanol could play an even bigger role by benchmarking methanol-based e-fuels options for their environmental benefits, energy efficiencies, and economic competitiveness in passenger vehicles available on roads today. Both parties believe that electrofuels used with internal combustion engines, together with electric powertrain vehicles, could enable a seamless transition to a low-carbon road transport system, and also expect that introducing e-fuels to China's road transport sector could foster innovation and collaboration across the entire value chain, creating new business opportunities, driving continuous economic growth, and accelerating

the net-zero transition.

However, the most exciting methanol story from China in 2023 was definitely the fueling of the Asian Games's torch cauldron by carbon-zero methanol, marking the Games' historic shift toward eco-friendly energy sources.

The methanol used in the cauldron was produced in Henan province in a new emissions-to-liquid plant that opened in February 2023 and was partly funded by Geely. The technology for the facility, which was provided by MI member Carbon Recycling International (CRI) of Iceland, captures industrial emissions and converts them into green fuels and chemicals.

The facility is the first of its type in the world to produce methanol at a commercial scale from captured-waste carbon dioxide and hydrogen gases and also the first to be used in world scale sports event, as MI's CEO Greg Dolan noted when interviewed by China Daily: "A really big milestone, and it shines a very bright light on methanol for not only the participating 45 countries in the Asian Games, but globally. I think it becomes a really important symbol that methanol is a clean and sustainable fuel for the future." The opening ceremony which included the lighting of the cauldron received more than 500 million viewers.



in focus

#### Marine Fuel

As is the case around the globe, MI's partners in China – the China Classification Society (CCS) and the Waterborne Transport Research Institute both under the Ministry of Transport – are working together accelerating the use of methanol as marine fuel. The MI Beijing office worked with CCS on proposals addressing air circulation and exchange to the International Maritime Organization; for China inland waterway, the Chinese regulation of methanol fueled vessels is in effect from 2023.

MI's Beijing office also participated in a large number of marine events, sharing the latest developments around methanol as a marine fuel and bridging the gap between shippers and methanol producers. Apart from MI's interactive workshop in Hong Kong; MI also joined China's top level marine events like World Sustainable Transportation, Clean Air Aisa Marine report launch, Xinde Marine Methanol Fuel Conference, IPEC 2023 in Zhou Shan, Ningbo Ocean Economy Expo, and Shenzhen Ocean Economy Expo.

MI also witnessed a number of additional achievements in China in 2023: new methanol vessels orders and engine model announcements In Shanghai MarinTech; Methanol fueled MR tankers delivered to Proman Stena from Guangzhou Shipbuilding International, and newly developed methanol engines at different sizes from Chinese engine manufacturers.



### LOOKING FORWARD TO 2024,

Chinese shipowners ordered various methanol fueled vessels including COSCO, China Merchant Shipping, Shandong Shipping, CHN Energy and more orders are planned in 2024

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Ports in China are active in the global Green Corridors, like Shanghai which plans to bunker methanol around Q1 2024

The first Chinese standard for methanol bunkering was completed in 2023, led by MI member COSCO with MI Beijing Office's participation

### METHANOL IS SET TO TAKE OFF AS:

Around half of all globally ordered methanol vessels are being built in China.

For inland waterway, CHN Energy Shipping is to receive methanol fueled dry bulk vessels from 2024. Already the world's largest methanol production center, both conventional and renewable methanol production supply continues to rapidly expand across China.





### MI Organized the COP28 Side Event on Cutting Edge Fuels

At the Conference of Parties (COP) 28 in Dubai, MI co-organized a side event with the CEM Biofuture Campaign and the Renewable Natural Gas Coalition. The event titled "Cutting Edge Fuel" was generously hosted by Denmark State of Green.

Promoting the use of low carbon and net carbon neutral fuels for heavy industry and transport, including aviation and maritime, is fundamental to achieving global sustainability goals. Fortunately, tremendous progress is being made by Danish companies and their global peers to realize the potential for renewable, small-molecule fuels, like methane, methanol, and DME to for heavy industry and transport. The public panel discussion explored progress in Bio-to-X and Power-to-X, and discussed lessons for countries and hard-to-abate sectors eager to produce and use cutting-edge fuels that complement hydrogen production and use.

MI members Topsoe, Mitsui, and OCI Global participated in the event to provide their insights. Topsoe gave an overview of the technologies that are available today to produce fuels for the net-zero circular economy including methanol. OCI Global discussed exploring methanol for shipping and industrial fuel applications. In August 2023, OCI Global successfully bunkered bio-methanol for the maiden voyage of the world's first-ever carbon neutral container vessel, which is owned by MI member Maersk. Mitsui recently invested in the first e-methanol production and sales business in Denmark, and discussed the potential of

methanol for achieving decarbonization goals.

# MI Hosts a Webinar on "Amassing Feedstocks: Exploring Low Carbon Methanol Opportunities".

In a joint effort with the Danish Embassy in India, MI organized a webinar titled "Mapping Low Carbon Methanol Opportunities" to highlight the work and achievements of Danish and Nordic companies on methanol production, and how methanol could play a pivotal role in the country's energy mix. The webinar shared the experiences of companies that are part of the renewable methanol value chain in various regulatory and commercial landscapes. The speakers also discussed what they believe is the future of this sustainable solution as global industries move towards limiting their impact on their operating environments and reducing greenhouse gas emissions. Their experiences and challenges in India as one of the largest emerging energy markets would be key to the industry towards energy transition. The webinar had opening remarks from the Consul General of Denmark, Bengaluru, and featured speakers from MI members Mitsui & Co. Ltd, Topsoe, and Glocal Green, as well as MAN Energy Solutions.

#### MI's Policy Advocacy Efforts with Biofuture Campaign for Methanol inclusion Under G20 Energy Policy Framework

MI participated in the advocacy efforts in India for the inclusion of methanol in the biofuel policy framework

under the G20 alliance. MI partnered with The Biofuture Campaign, a global coalition of government bodies and organizations that have committed to investments in clean energy.

The Government of India hosted the 3rd meeting of the G20 Energy Transition Working Group (ETWG-3) in Mumbai on 15 - 17 May 2023, which served as a preparatory meeting for the G20 Summit energy transition dialogue in September. The Ministry of Petroleum and Natural Gas (MoPNG) organized a Biofuels Seminar supported by Biofuture Platform and invited MI India Chief Representative Prakriti Sethi to participate as a keynote speaker on the importance of Future Fuels and Chemicals in India. The purpose of the seminar was to ensure Indian contributions to the Biofuture Platform Policy Recommendations to be delivered to Energy Ministers for the G20 Summit. MI provided policy recommendations to the Biofuture Campaign which promotes the utilization of biomethanol as a fuel that will decarbonize end-use applications in India.

#### **Industry Events**

MI actively participated in a host of events in India and was invited as a guest speaker on eminent panels to highlight the role of the methanol industry in the country's energy landscape. MI's Prakriti Sethi, was invited to speak at the Deep Electrification in Pune hosted by the Vasudha Foundation. The forum focused on the transport sector and looked into the potential of deep electrification pathways to abate emissions in shipping, aviation, and road transport. MI presented the case for methanol as an immediate opportunity for a low-carbon future for the transport sector. MI was also part of the panel discussion "Setting Sail for a Carbon-Free Future: Strategies for Decarbonizing Shipping," noting methanol taking the lead in shipping



as an alternative fuel.

MI participated at the ShipTek Marine Offshore Oil & Gas Conference 2023 in Kochi which brought together the most prominent names and key players in the maritime industry from across the globe to discuss key market trends, maritime opportunities, challenges, and the way forward. MI discussed the pivotal role of methanol in supporting the maritime industry to achieve decarbonization goals. MI Chief India Representative Prakriti Sethi, was conferred with the "Young Woman Achiever of the Year" award at the 18th Shiptek International Maritime Awards 2023.

MI was also invited be to part of the World Future Fuel Summit organized by the Energy and Environment Foundation to discuss the role of methanol as a viable alternative fuel. The event was supported by the Ministry of Petroleum and Natural Gas (MoPNG) and NITI Aayog.

#### India Launches Country's First MD100 Truck and MD15 Buses in Bengaluru

The country's first 100 percent methanol-powered prototype truck was unveiled by Minister for Road Transport & Highways Shri Nitin Gadkari in Bengaluru on March 12. MI's long-standing strategic partner NITI Aayog along with a host of stakeholders including Ashok Leyland, Bangalore Metropolitan Transport Corporation (BMTC), Indian Oil Corporation Ltd. (IOCL), and Indian Institute of Science (IISc) carried out the project. Additionally, MD15 buses were also introduced for pilot trials. BMTC will reportedly induct a total of 80 methanol-run buses and IOCL is responsible for providing diesel and methanol for the pilot project.





#### Digging Deeper; Brussels Post Fit for 55

2023 saw the conclusion of the legislative cycle of most climate and transport related initiatives announced in 2021 by the European Commission under the Fit for 55 package. Putting strong advocacy efforts already conducted to its advantage, MI EU staff worked closely on contributing to the implementation of key Fit for 55 legislation, delivering its messages via expert fora, public consultation responses, and direct advocacy campaigns.

With implementation across the bloc ahead and generic policy terms being adapted in actual industrial settings, the team has analyzed the details of relevant files and translated that into business impact for its members. Further, MI has provided intricate implementation recommendations to officials on key files, such as the Alternative Fuel Infrastructure Regulation. Policy positions and proactive advocacy campaigns regarding more recent initiatives were also developed, for initiatives such as the Net Zero Industry Act and the CO2 Emission Standards for Heavy Duty Vehicles, upholding the principles of technology neutrality and alignment between the Union's regulatory environment and its climate objectives. Working in in concert with Members of the European Parliament and the various Directorate Generals of the European Commission, the Brussels office has obtained unique visibility on policy developments and forged links with EU Member States ministries.



See full paper online

#### Sharing the Voice of the Methanol Industry Among Stakeholders

Contributing to or hosting no less than 60 events across Europe in 2023, the MI EU team voiced the collective perspectives of the methanol sector to audiences from multiple government agencies and industries. Whether during industry panel debates on the future of maritime transport, presentations at CEN standardization committee meetings, Port seminars on alternative fuel integration, or expert for operated by the European Commission, our EU staff has worked to position methanol in the context of the energy transition and safeguard the principles of its members. MI also launched its own series of breakfast events chaired by Ministers of European Parliament (MEPs) or governmental officials with a focus on policy initiatives undergoing discussion at EU institutions. The Methanol Talks series have featured direct contributions from MI members, providing unique opportunities to share their messages and engage policymakers.

#### Stronger Together

Following the formation of the Methanol Institute's Policy Committee in December 2022, a standard member forum within the Methanol Institute enabling collective action to attain policy objectives, MI EU sought to further strengthen its core base by creating working groups under the Committee. The EU Working Group, Americas Working Group, and International Maritime Organization (IMO) Working Group now serve more than one hundred member representatives, obtaining high-quality intelligence on policy developments, effectively deliver their priorities to relevant decision-making bodies and mobilize resources to facilitate joint advocacy efforts. MI EU has fostered strong alliances through strategic partnerships with stakeholders across the methanol value chain and other industries, participating in multiple joint initiatives.

#### Going Global

In light of the momentous opportunities associated with methanol's integration into maritime transport and the significance allotted to global regulations in that context, the MI EU team has sought to build a presence at the IMO. Expanding knowledge and awareness of methanol and the regulatory levers necessary to facilitate its use in shipping, the MI EU team has attended key committee and expert meetings in London. Through the collaboration with its members via the IMO Working Group and MI's membership in the International Bunker Industry Association (IBIA), MI has contributed expert opinions on the specific components of a life-cycle approach to measuring GHG intensity of marine fuels under the organization's proposed GHG reduction strategy. MI EU team has shared the methanol industry's perspectives with delegations on key policies under discussion, such as a carbon pricing mechanism and a global fuel standard. MI's efforts have also served to significantly improve member visibility on developments at the IMO, with the team having established links with multiple IMO observer organizations and flag states.



The first Methanol Talks session held at the European Parliament, featuring an opening statement from MEP Vera Tax (S&D,NL)



in focus

### PRICING & AVAILABILITY

According to S&P Global Commodity Insights figures, methanol traded at lower prices, on a dollar per ton basis, than MGO, HFO and LNG at the Rotterdam bunkering hub from November 2021 to March 2024 (Figure 1).

Natural gas prices spiked towards the end of 2021, amid supply tightness ahead of winter, and more spikes emerged after the Russian invasion in Ukraine in February 2022. The surging natural gas price impacted the LNG price, but also had a placed upward pressure on methanol prices, as most methanol is made from natural gas.

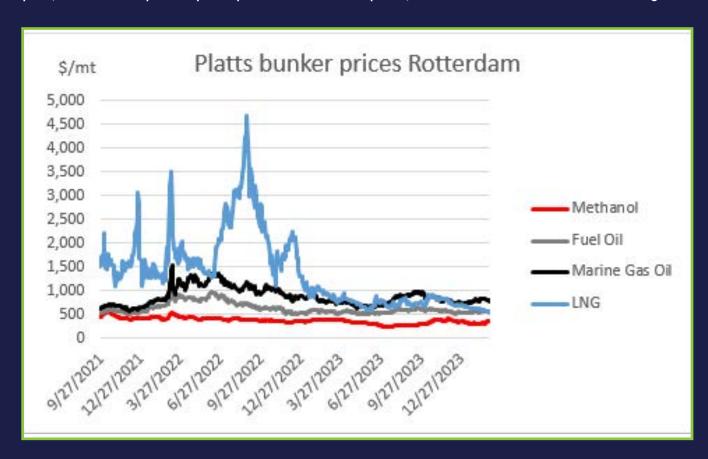
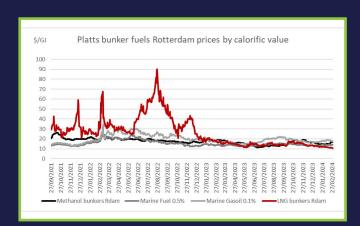


Figure 1: Bunker Prices of Methanol, HFO, LNG, and MGO at the Rotterdam Hub (\$/mt)

Methanol appears very attractively priced, especially under the high energy price environment seen since the second half of 2021, and the trend continued towards the end of 2023.

However, when incorporating the relevant energy density factor to compare the different fuels on a like-for-like basis, HSFO typically becomes the cheapest, although methanol often traded at lower prices than LNG and MGO in the Rotterdam bunkering hub (Figure 2).

Towards the end of 2023 and the beginning of 2024, HSFO prices declined while methanol prices rose In Singapore, LNG bunker prices fell to around \$10-11/GJ in March, while methanol bunkers were the costliest at \$18-19/GJ (Figure 3)





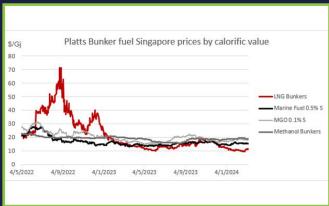


Figure 3: Fuel Prices Considering Calorific Value – Singapore Bunker Fuel Prices (\$/GJ)

#### **Fuel Cost Projections**

According to the Methanol Institute, conventional methanol is available in more than 120 ports across the globe, while worldwide production capacity in 2023 was around 135 million tons, according to data from S&P Global. There has also been a surge in orders of methanol dual-fuel vessels. According to Platts Analytics, at least 228 such vessels were in order books as of H1 2024 for delivery by 2028, added to the 29 already on the water. Thanks to a partnership with MI, S&P's Methanol Bunker Market Insights are available on MI's website HERE.

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### in focus

# in focus



2023 STATS BY PLATFORM:

+2,528,571	IMPRESSIONS
+69,693	ENGAGEMENTS
+2.8%	ENGAGEMENT RATE
+5,687	NET AUDIENCE GROWTH
+474	VIDEO VIEWS

### **Website Analytics**

USERS: 103,320

2	023	STAT	ΓS
3 <b>Y</b>	PLA	TFO	RM:

+865		MI FACEBOOK - PUBLISHED POSTS
+210		MI FACEBOOK - NET FOLLOWER GROWTH
+1.7%		MI FACEBOOK - ENGAGEMENT RATE
+1,333,259		MI FACEBOOK - IMPRESSIONS
+1,532		MI FACEBOOK - NET FOLLOWER GROWTH
+68		MI TWITTER - PUBLISHED POSTS
+143	9.6% INCREASE	MI TWITTER - NET FOLLOWER GROWTH
+5.3%	15.2% INCREASE	MI TWITTER - ENGAGEMENT RATE
+868		MI LINKEDIN - PUBLISHED POSTS
+5,334	32.5% INCREASE	MI LINKEDIN - NET FOLLOWER GROWTH
+4%		MI LINKEDIN - ENGAGEMENT RATE
+1,184,402	52.6% INCREASE	MI LINKEDIN - IMPRESSIONS







SESSIONS: 160,207

### 2024 METHANOL INDUSTRY

### in focus



#### Tier 1 · Major Methanol Producers

Major Producers of Methanol (>1.5m mtpa)
Two Board Seats with Voting Rights
Board Chairman, Vice Chairman and Treasurer
Standing Committee Chairmanship Potential

#### Tier 3 · Associate Members

Minimum Tier Level for Producers

Board of Directors Meeting Participation (Non-Voting)

Standing Committee Chairmanship Potential

#### Tier 2 · Methanol Producers

One Board Seat with Voting Rights

Board Secretary

Standing Committee Chairmanship Potential

### Tier 4 • Affiliate Members (Non-Producers)

Board of Directors Meeting Participation (Non-Voting)
Participation in Standing Committees



#### MARINE FUELS

Methanol Vessels on the Water Supply and Infrastructure Safety and Crew Training

Green Corridors Working Group Bunkering Working Group

#### MARKET DEVELOPMENT

Emerging Technologies Deployment Cookstoves, Boilers, Kilns, Home Heating Gensets and Turbines Methanol as Hydrogen Carrier

Committee Structure

Cars, Truck and Bus Commercialization
Sustainable Aviation Fuel (SAF)
——

Aviation Working Group

Methanol Fuel Standards

#### POLICY

**ROAD & AVIATION** 

Legislative & Regulatory Monitoring Policy Positions & Advocacy Campaigns Lobbying & Stakeholder Engagement

European Policy Working Group Americas Policy Working Group IMO Working Group

#### **PRODUCT STEWARDSHIP**

Methanol Safe Handling Best Practices Bootleg Alcohol Poisoning Prevention Low Carbon, Renewable, Small-Scale Production

Sustainable Methanol Value Chain (SMVC) Working Group

### in focus





**Aircela:** Aircela captures carbon in a prototype refrigerator-sized unit that turns CO2 from the air around us into carbon neutral e-fuels, powered by renewable energy. Aircela's mission is to make this technology available to everybody, now, at an affordable price, and turn the world's CO2 into a replacement for fossil fuels.



**Berge Bulk:** Berge Bulk is one of the world's leading independent dry bulk owners and has an outstanding record for its reliable, safe and efficient delivery of commodities around the world. Starting out with 12 vessels in 2007, the company has more than quadrupled the size of its original fleet. Today, Berge Bulk owns, operates and manages a fleet of over 80 safe and fuel-efficient vessels, equating to over 15 million DWT.

Berge Bulk's vision is to lead the world to a zero-carbon future through safe, efficient and sustainable shipping. Acknowledging the crucial role of emerging marine technologies in this transformation, Berge Bulk takes an active stance by retrofitting its existing vessels with revolutionary decarbonization equipment as part of pilot trials, expediting the progress towards greener maritime practices.



**Cargill:** Cargill Ocean Transportation is a leading freight-trading organization that charters around 650 vessels worldwide at any one time. Founded in 1956 in Geneva, Cargill Ocean Transportation benefits from the rich heritage and expert capabilities of Cargill's global operations in food, agriculture and commodities trading.

Every day and in everything they do, Cargill Ocean Transportation works to make shipping safer, greener and more responsible - both across its operations and the wider maritime industry. Cargill Ocean Transportation is one of the maritime industry's leading proponents of, and investors in, efforts to achieve ambitious decarbonization goals. Cargill Ocean Transportation believes shipping will need to move to zero-carbon fuels to meet its decarbonization goals and methanol offers one such pathway. It is one of the most technologically ready of the zero-carbon options and Cargill Ocean Transportation are moving forward with investments to propel the industry forward.







**Cosco Shipping:** By the end of January 2023, COSCO SHIPPING Lines owned and operated 373 container vessels with a total capacity of approximately 2.1 million TEUs (the Company and Oriental Overseas International, a subsidiary of COSCO SHIPPING Holdings, owned and operated 479 container vessels with a total capacity of 2.9 million TEUs, leading the industry in terms of shipping capacity).

The Company operates 403 international and domestic shipping routes, including 263 international routes (including international feeder services), 56 domestic routes, and 84 feeder routes along the Pearl River Delta and the Yangtze River. The Company's fleet has called 579 ports located in 140 countries and regions worldwide.



**Farizon Auto:** Farizon Auto is the leading new energy commercial vehicle brand under Geely Farizon New Energy Commercial Vehicle Group. We are proud to be China's first commercial vehicle brand to have achieved a complete all-new-energy product lineup.

Farizon's product lines encompass a wide range of new energy commercial vehicles, including heavy trucks, light trucks, small trucks, LCVs, and buses. To power these vehicles, Farizon has developed diversified new energy powertrain solutions including green methanol, pure electric, battery swapping, and range extender. Farizon's diverse portfolio caters to various commercial vehicle application scenarios, ensuring that we meet the needs of our customers across different industries.



**Green Marine:** GREEN MARINE, headquartered in Copenhagen, with a secondary headquarters in Singapore and subsidiaries in Geneva, Gothenburg and Manila, is the global leading authority in marine applications of methanol-as-marine-fuel with over a decade of experience including the design, construction and operations of the world's first ever methanol dual fuel tankers.

GREEN MARINE covers the full value chain within methanol as a marine fuel, including: commercial advisory, design & engineering, procurement and sales of methanol, bunkering, investments in methanol powered ships, ship management and methanol specific crew training. Singapore is GREEN MARINE's global head quarter for methanol crew training, methanol marine fuel procurement and sales, as well as bunkering.



**Linde:** Linde is a leading global industrial gases and engineering company with 2022 sales of \$33 billion. The company serves a variety of end markets such as chemicals & energy, food & beverage, electronics, healthcare, manufacturing, metals and mining.

Linde's primary business is the manufacturing and distribution of atmospheric gases, specialty gases (such as those used for electronics manufacturing) and process gases such as carbon dioxide and hydrogen for clean fuels such as renewable methanol. Today, Linde has the largest liquid hydrogen capacity and distribution system in the world. Our expertise covers the entire hydrogen value chain from generation to liquefaction and transport, as well as application in industrial processes and mobility.



### in focus



M2X Energy: M2X Energy Inc. is focused on stranded gas conversion into low-carbon chemicals. Founded in 2020, its mission is to address flaring and venting by creating valuable products from otherwise wasted gas, reducing methane emissions, and producing low-carbon chemicals such as methanol and hydrogen.



Madoqua: Madoqua is currently developing a world-scale e-methanol project, located in Maceira, Portugal. The project Madoqua Synfuels aims to decarbonize the end-use and maritime industry by supplying more than 260,000 tons of e-Methanol per year to ports across Portugal.



MSEA: MSEA GROUP was founded in 2012 as an international shipping investment group and shipping asset manager with particular expertise in the tanker and commodity shipping segments. Over the years, MSEA has built up a sizable fleet, primarily within the tanker sector, servicing international leading commodity traders, energy companies and ship operators.

In 2021, MSEA took a front seat in shipping decarbonization with a major investment in the transition to alternative clean fuels, through the acquisition of Marinvest Group of Sweden and the incorporation of Clean Sea Transport in partnership with Arkview Capital. The Clean Sea fleet includes 5 Methanol Duel fuel chemical and product tankers and 4 Ice Class Long Range product tankers. MSEA's first Methanol Powered vessels were delivered in 2016, with the second and third generations delivered in 2019 and 2021. MSEA is involved in the facilitation and commercialization of methanol as a marine fuel, in developing and improving methanol powered newbuilding designs and various other initiatives in the methanol space.



**Nacero:** Nacero is a renewable fuels project development company focused on decarbonizing hard-to-abate sectors such as shipping, aviation, and transportation. The Company uses renewable and traditional natural gas as feedstock combined with renewable power while deploying a catalytic process to covert methane to fuel at scale.

Nacero's first project will be located adjacent to the Gulf Coast and produce ~5,500 metric tons per day of marine grade green methanol, with the ability to also produce gray methanol. Nacero's feedstock and technology makes its green and gray methanol cost competitive will all methanol production methodologies. Nacero's green methanol will be compliant with ISCC Red II standards and Train 1 is expected to COD in 2028.







**Oberon Fuels:** Oberon Fuels is an innovative renewable fuels leader committed to decarbonizing the global propane and maritime industries while unleashing the potential of hydrogen. Emissions associated with the propane industry and international shipping industry are each on par with the global aviation industry emissions at 1B tons of GHGs annually. To meet surging demand for more sustainable fuels, Oberon has developed a proprietary process turning organic waste into low-carbon or carbon-negative renewable methanol and DME, significantly reducing the carbon intensity of fuels. Oberon is also advancing infrastructure that can transport hydrogen at far lower cost using existing infrastructure. The company serves more than 450 customers through notable partners such as Suburban Propane.



PMW Technology: PMW Technology are the inventers and owners of a patented cryogenic carbon capture technology called A3C. The technology is able to capture up to 99% of CO2 from exhaust gases producing high-purity liquid CO2 directly from the process without a need for further treatment. This means that the captured CO2 is directly available for use in other industrial processes such as the production of e-methanol.



PTTEP: PTT Exploration and Production Public Company Limited (PTTEP) is Thailand's national E&P company operating in over 50 petroleum exploration, development and production projects in more than 10 countries around the globe. The company's focus is on Southeast Asia and the Middle East. It is also expanding business into new forms of energy such as the green hydrogen project in Oman and the offshore wind power plant in Scotland, while developing advanced technology in order to thrive in a low-carbon future sustainably.



**PuriFire Labs:** PuriFire is pioneering carbon-neutral methanol production to decarbonise the global shipping, power generation and chemical industries. PuriFire has developed a patented thermochemical conversion process to produce hydrogen and carbon dioxide in the same reactor. This is then upgraded to carbon-neutral methanol.

The process uses widely available and cheap wastewater feedstock and has eliminated electrolysers, compressors, and carbon capture systems in the green methanol process. This results in significant savings in capital and operational expenditure and, ultimately, a lower levelised cost of methanol. PuriFire is currently setting up a 1 ton/day pilot facility in Gloucestershire, UK, which is anticipated to be operational by Q4 2024.



### in focus



2024 METHANOL INDUSTRY



**Pyletech Energy:** Pyletech Energy, the newest energy investment vehicle of the Pyletech Group, will, through the establishment of local subsidiaries, produce and commercialize green methanol in the US, Europe, Canada, South America and Southeast Asia. The first plant with a minimum of 500 thousand tons of production per annum is expected to be operational in the Southeastern US in 2028.

Pyletech Energy is currently working with globally reputable technology providers, engineering and construction firms to develop and refine the design of its green methanol production plants. Pyletech Energy's objective is to become a low-cost global producer of green methanol.



Rolls Royce Power Systems: The Rolls-Royce business unit Power Systems is headquartered in Friedrichshafen in southern Germany and employs more than 10,500 people. The product portfolio includes mtu-brand high-speed engines and propulsion systems for ships, power generation, heavy land and rail vehicles and for the oil and gas industry as well as diesel and gas systems and battery solutions for mission-critical, standby and continuous power, combined generation of heat and power, and microgrids and is intensively engaged in the development of climate-neutral solutions. The company is working on hydrogen engines for stationary energy supply and on methanol engines for marine.



**Royal Caribbean Group:** Royal Caribbean Group is one of the leading cruise companies in the world with a global fleet of 65 ships traveling to approximately 1,000 destinations around the world. Royal Caribbean Group is the owner and operator of three award winning cruise brands: Royal Caribbean International, Celebrity Cruises, and Silversea Cruises and it is also a 50% owner of a joint venture that operates TUI Cruises and Hapag-Lloyd Cruises.



**Uniper:** Düsseldorf-based Uniper is an international energy company with activities in more than 40 countries. The company and its roughly 7,000 employees make an important contribution to supply security in Europe, particularly in its core markets of Germany, the United Kingdom, Sweden, and the Netherlands.

Uniper's operations encompass power generation in Europe, global energy trading, and a broad gas portfolio. Uniper procures gas—including liquefied natural gas (LNG)—and other energy sources on global markets. The company owns and operates gas storage facilities with a total capacity of more than 7 billion cubic meters.

Uniper intends to be completely carbon-neutral by 2040. Uniper aims for its installed power generating capacity to be more than 80% zero-carbon by 2030. To achieve this, the company is transforming its power plants and facilities and investing in flexible, dispatchable power generating units. Uniper is already one of Europe's largest operators of hydropower plants and is helping further expand solar and wind power, which are essential for a more sustainable and secure future. The company is progressively expanding its gas portfolio to include green gases like hydrogen and biomethane and aims to convert to these gases over the long term.



**VeryOne:** VeryOne is a leader in Fuel Additives and offers the greatest capacity, reliability and expertise. VeryOne is a EURENCO company, is focused on the Development, Production and Sales of fuel additives all around the world.

In an industrial world where securing the supply of key ingredients at an affordable price has become a real challenge, and reliability a key factor of choice, clients rightfully come to expect more. With the highest production capacity and more storage than anyone else, VeryOne can meet your company's needs all over the world and commit to high volumes 2-EHN.

# Join Our Organization













Click Here to Get Started









Gregory A. Dolan CEO · WASHINGTON, DC

Joined MI in 1996 and held a variety of senior management positions within MI before being named CEO in 2013. 10 years as a press officer for the State of New York & 2 years as legislative assistant in the US Senate.

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Lawrence Navin **VICE PRESIDENT OF EXTERNAL AFFAIRS** · WASHINGTON, DC

Extensive multi-lateral experience to include US-India Business Council, US Dept of Commerce Int'l Trade Administration. Prior to joining MI, Mr Navin also held roles with the Overseas Private Investment Corporation (OPIC) and the US Senate.

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London Douglas SOCIAL MEDIA & WEB MANAGER · WASHINGTON, DC

Joined MI in 2021 with a background in branding, social media and marketing.

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Founded in 1989, MI now serves its members in every corner of the globe from our offices in Singapore, Washington, D.C., Brussels, Beijing, and Delhi.

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• DELHI

Joined MI in 2020 with experience of having supported UNESCO Secretariat and assisted in preparing Plan during 2016-2021.

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Kai Zhao
CHIEF REPRESENTATIVE CHINA
• BEIJING

Joined MI in 2015 and serves concurrently as Director and project researcher at the Academic Board Office of the Centre for Global New Energy Strategy Studies (CGNESS) at Peking University, a position he has held for the last 8 years.

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Toni Zhou
OFFICE MANAGER
• BEIJING

Expertise in client services, corporate communications, business administration, and operations; effective interpersonal and crosscultural communications.

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Matthías Ólafsson CHIEF REPRESENTATIVE • EUROPE

Former sales and marketing specialist at Carbon Recycling International, involved in sales, marketing, stakeholder relations and regulatory affairs in the Europoean market for renewable methanol. Background includes business development roles across different sectors as well as academic roles within the field of Political Science.

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Rafik Ammar
DIRECTOR OF GOVERNMENT &
PUBLIC AFFAIRS • EUROPE & IMO

Applies his expertise in the European legislative process to support the association's government relations strategy in Europe. Before joining MI, Mr. Ammar held several positions in EU institutions. He supported political work with a focus on transport in the European Parliament and as a coordinator for interinstitutional relations at the Secretariat General of the European Commission.

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Christopher Chatterton coo · SINGAPORE

Joined MI in 2015 with more than 20 years executive level experience in energy, oil & gas and petrochemicals. Led several successful energy and agriculture initial public offerings (IPOs) and cross-border private placements.

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Belinda Pun EXECUTIVE MANAGER • SINGAPORE

Joined MI in 2018 after 17 years of experience as Executive Assistant and Administration Manager. Previously worked as office manager for Siemens Postal, Parcel & Airport Logistics.

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Joined in 2023



Desmond Loo
BUSINESS DEVELOPMENT, MANAGER
• SINGAPORE

Engineer by training with sailing experience as part of his time with the Republic of Singapore Navy. After completing his studies, he expanded his profile into Account Management with Mercury Marine and Hyundai Global Services, applying his experience to the promotion of methanol as a clean marine fuel from both a technical and business standpoint.

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Kjeld Aabo
SENIOR ADVISOR FOR MARITIME TRANSPORT
• EUROPE

Kjeld works as a Senior Advisor to the Methanol Institute.
Following a distinguished 40-year career with MAN Energy
Solutions, as a retained consultant, Kjeld works with MI in
several critical areas to advance methanol as a clean fuel for
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## METHANOL INSTITUTE









