

## **Post-Event Report**

December 2-3, 2024 Monte-Carlo, Principality of Monaco

Held under the High Patronage of H.S.H. Prince Albert II of Monaco



## **Letter From The President**

As President of the Monaco Hydrogen I would like to express my heartfelt gratitude to all the participants of third edition of the Monaco Hydrogen Forum, December 2-3, 2024. held on contribution was one of the reasons the event was such a success. We felt the 2024 Forum was our most accomplished yet, with meaningful conversations, great exchanges, deep-dives and demos - and an extremely strong critical mass of public and private sector leaders...



John Rossant President Monaco Hydrogen Alliance

We had more than 250 participants from more than 35 countries and were honoured that H.S.H. Prince Albert II of Monaco and the Principality were such a key part of the event.

We are now already hard at work on our 2025 activities. As you know, we have now launched the *International Task Force on Hydrogen Mobility in Coastal Areas (ITHCA)* and will be publishing our first white paper in time for the 2025 UN Ocean Conference, which will take place in Nice this coming June. We have also officially launched the **Monaco Hydrogen Fund** and will be announcing initial investments in the next couple of months. Beyond that, we are already working on the 4th edition of the Monaco Hydrogen Forum, which will take place on December 1–2, 2025.

We were delighted to see so many of you at the Third Edition of the Monaco Hydrogen Forum!

With my warmest regards,



## The 3rd Edition of the Forum













The Monaco Hydrogen Forum, held under the High Patronage of H.S.H. Prince Albert II of Monaco at the prestigious Hotel Hermitage Monaco, is the leading gathering of key political and industry leaders, together with founders, technologists and investors, all committed to placing clean hydrogen at the heart of energy transition strategies in mobility and transportation. This year's theme was BUILDING THE CASE FOR CLEAN HYDROGEN.

Through two days of keynotes, high-level panel conversations and deep dive workshops, the gathering explored how Mobility Ecosystems & Innovation, Infrastructure and the H2 Value Chain are needed to Strengthen the Value Proposition of H2.

#### Day 1 - December 2<sup>nd</sup> 2024

The First Day of the Monaco Hydrogen Forum focused on financing hydrogen projects while taking into consideration its sustainability, efficiency and possible limitations, the future of H2 aviation, and the importance of infrastructure in the future of H2 mobility.

#### Day 2 - December 3<sup>rd</sup> 2024

The Second Day of the Monaco Hydrogen Forum focused on funding for hydrogen ventures, the critical role of collaborative efforts, as well as insights on the regulatory framework in the hydrogen mobility network. There were sessions on decarbonising the transport sector, with an emphasis on the aviation and the maritime sectors.

monacoh2.org



## The Forum in Numbers:



250+ Participants



63 Speakers



35+ Countries Represented



19
Plenary
Sessions &
Discussion







## **Attendee details**

- Chair, Presidents, GM, CXO, SVP (50.8%)
- VP, Country Manager, Head, Senior Manager (31.7%)
- Commercial, Sales, Marketing (8.5%)
- Academia (5%)
- Others (4%)





## **Session Key Takeaways:**

"Among the solutions, hydrogen undoubtedly plays an essential role. This is why we are gathered here and why the responsibility you bear is so significant. Today is dedicated to solutions, progress and hope."

- H.S.H. Prince Albert II of Monaco

#### → Collective Efforts is key

The successful implementation and widespread adoption of hydrogen technology require collaboration among governments, industries, and research institutions. This collaboration is essential for advancing hydrogen production, storage, transportation, and utilization methods. By working together, we can overcome technical and infrastructure challenges, accelerate the transition to a hydrogen economy, and unlock the numerous environmental and economic benefits it offers.

"Aviation is the most valuable application of hydrogen [...] Hydrogen is three times lighter per unit of energy than jet fuel and 100 times lighter than the batteries we operate today. Because it is three times lighter than jet fuel, we can convert it to propulsion twice as efficiently with hydrogen fuel cells as a small turbine can convert jet fuel into propulsion. This results in a multiplier effect, meaning that the mass of the fuel needed to carry is dramatically lower [...] Since hydrogen is three times lighter and can be converted it into propulsion twice as efficiently, the combined advantage allows you to carry more passengers

and

less

hydrogen."

- JoeBen Bevirt, Founder & CEO Joby Aviation

#### → Aviation and Hydrogen

Hydrogen-powered planes hold immense potential, particularly for smaller aircraft connecting regional B and C-type airports. These planes are lighter, more efficient, and combine several advantages that could revolutionize the aviation industry. As hydrogen technology becomes increasingly accessible, it promises to create a transformative shift in the future of air travel.

"We decided to go in a four pillar strategy to work in different areas to secure the future. We are decarbonizing our operations, [...] developing new products, SAF and different types of e-fuels [...] we decided to articulate the industrial land with all the international developers that are in our region, about 60 gW of projects happening as we speak [...] Our fourth pillar, not yet solved, is how are we going to play with them in the hydrogen industry? It is a very interesting game of chess we are playing, who gets there first."

- Gloria Maldonado, Board Chairwoman, Chile's National Petroleum Company ENAP, Chile

#### → A Scaling Platform

Building a scalable platform in a new industry is a complex challenge, requiring extensive integration and system-level thinking. The real difficulty lies in bringing all these elements together seamlessly. We must simultaneously develop production, generate demand, and establish the necessary infrastructure—an intricate balancing act that underscores the complexity of the task.



## **State of Play Presentation:**

We set the scene with a state of play presentation in partnership with Boston Consulting Group (BCG), presented by Peter Jameson and François Bastard. The aim of this opening session was to review with BCG latest perspectives on the low-carbon hydrogen market, with a particular focus on shipping decarbonization.





### **Key messages:**

- The importance of identifying "pockets of value"
- Where businesses and customers are willing to pay for decarbonized transport solutions
- Effective regulation and market-based measures are crucial With a level playing field where financial mechanisms eliminate the "first-mover disadvantage" and drive action at every level
- Infrastructure
  - Even the most committed companies cannot transition to green fuels without efficient fuel bunkering systems and robust supply chains in place
  - Book-and-claim systems can help These mechanisms separate the physical flow of goods from green fuel use, offering a practical and scalable solution for accelerating adoption in the short term



## Innovation at the Center

Partners, members and key contributors to the Monaco Hydrogen Alliance brought their innovative technologies and projects to Monaco.



The Forum's opening was marked by an extraordinary moment as H.S.H. Prince Albert II of Monaco arrived behind the wheel of a prototype hydrogen-powered Extreme H race car, the 'Pioneer 25.' Following training with British race driver Catie Munnings, the Prince navigated Monaco's iconic streets, seamlessly merging innovation with tradition.



Venture Investment Fund: MHA and MobilityVC unveiled a Venture Investment Fund targeting early-stage hydrogen mobility technologies. With initial investors already engaged, the fund aims to make its first strategic investments within months.



Hydrogen Scotland and the Monaco Hydrogen Alliance sign a Memorandum of Understanding strengthening best practices in the safe use and deployment of hydrogen technologies.



## Innovation at the Center







Helion showcased their turnkey hydrogen generator. Helion supplies and markets fuel cells and fully integrated hydrogen systems for Energy and Transport applications..





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**Artemis Technologies** organized tours for our participants on their 100% Electric Foiling Vessel



# Strategy & Sector-Specific Deep-Dives

Parallel, participative workshops and roundtable discussions were held by members of the Alliance as well as leading companies in the renewable energies and hydrogen.

Round Table of the International Task Force on Hydrogen Mobility in Coastal Areas – a collaborative Platform to engage in dynamic discussions with key stakeholders in hydrogen technology and the maritime sector



**Powered by ENOWA** 

ENOWA.

Power-to-liquid to Decarbonize the Transport Sector – What Prospects?



**Powered by Scorpio** 



High-Performance Horizons: Accelerating Zero-Emission Maritime Innovation presented by John Cummings



**Powered by Artemis** 



The role of synthetic fuels in decarbonizing maritime shipping and aviation presented by Dr. Behrang Shirizadeh



**Powered by Deloitte** 

Deloitte.



# Monaco Prize for Innovation in Renewable Hydrogen and Transportation

















The Forum saw the third edition of the *Monaco Prize for Innovation in Renewable Hydrogen and Transportation* in which eight finalist companies pitched their cutting-edge solutions to a distinguished panel of international judges.

Eight finalist companies, coming from six countries pitched their cutting-edge solutions to a distinguished panel of international judges: Dolphyn Energy and Drift Energy from the United Kingdom, Italy's NatPower H, H2Gremm representing France, Ireland's Viritech, Germany's Water Stuff & Sun, and Sea Cheetah as well as CROFT from the United States.

#### The Prize's Jury Members:



**John Rossant** President, Monaco Hydrogen Alliance



Wim Elfrink
President & Founder,WPE
Ventures Digitized
Solutions



Emanuele Lauro CEO, Scorpio Holdings Limited, Monaco



Raphaël Schoentgen CEO, Hydrogen Advisors, France



Virginie Haché-Vincenot Head of Energy, Finance & Innovation, Mission for Energy Transition, Monaco



Robert Evans
CEO, Center of Excellence
for Low Carbon and Fuel
Cell Technologies (CENEX)



### Meet the Winners of the Monaco Prize:

**Drift Energy Ltd.**, a pioneering Somerset UK-based company producing net-positive ships that exploit deep ocean wind to produce green hydrogen at sea, won the **Monaco Prize for Innovation in Renewable Hydrogen and Transportation**.

Three other companies were formally recognised:

- The Best Cross-Sector Applicability Solution was awarded to France's H2GREMM, developer of innovative hydrogen ecosystems combining advanced electrolysis technology and renewable energy to decarbonize mobility;
- 2. Croft, from the United States, was awarded the Most-Disruptive Potential for its creating hydrogen ecosystem, integrating a high-performance, combustion-powered pick-up truck with a Base Station for on-site hydrogen production;
- Germany's Water Stuff & Sun was awarded the Best Emerging Technology Solution for its carbon fiber SFEERs and MEMS chip technology, enabling safe, flexible, and cost-efficient hydrogen storage and distribution.













The Monaco Hydrogen Forum was the occasion to award the third Monaco Prize for Innovation in Renewable Hydrogen and Transportation.



## **Media Coverage**













Mobiwisy Son Altesse Sérénissime le Prince Albert II de Monaco a fait une arrivée remarquée pour l'ouverture du Monaco Hydrogen Forum

**H2 TODAY Drift Energy wins Monaco** Prize for Innovation in Renewable **Hydrogen and Transportation** 

Monaco Tribune Prince Albert II launched the third Monaco **Hydrogen Forum** 

**Hydrogen Fuel News Prince Albert** Il Powers Through Monaco in a **Hydrogen Race Car** 

Hello Monaco Monaco Hydrogen **Forum** 

Yahoo News Prince Albert II Monaco drives Extreme E car ahead of the annual Monaco **Hydrogen Alliance Forum** 

L'Auto Journal Le Prince Albert II de Monaco a ouvert le Monaco **Hydrogen Forum** 

Il Giornale dell'Ambiente Il Principe Albert II di Monaco, inaugura il Forum annuale della Monaco **Hydrogen Alliance** 

h2connect.eco Prinz Albert II gibt Gas und zwar mit Wasserstoff

G-HyTV Forum de Monaco: une plateforme d'échanges sur l'avenir de <u>l'hydrogène</u>

**Bénin Regard Maixent Raoul Ominga** porte la voix du Congo à Hydrogen Forum de Monaco

Radio Monaco S.A.S. Le Prince Albert II <u>pilote pionnier de l'Extrême H</u>

LA STAMPA Alberto II pilota sul bolide a idrogeno tra le strade di Monaco

**H2 View Ahead of the Monaco** Hydrogen Alliance's annual forum, H.S.H. took the Pioneer 25 for a drive

Monaco Life Prince Albert II at the Monaco Hydrogen Forum

Smartenergy Monaco Hydrogen Forum

Point de Vue Albert de Monaco au Monaco Hydrogen Forum



## **Select Social Media Coverage**



Amazing time travel this morning at the Yacht Club de Monaco ■! Ten years ago I started introducing with Torqeedo the Deep Blue electric propulsion system - great to discover the RIBs by my dear friends and electric pioneers from Naviwatt operating quietly in the Monaco sailing school as state of the art system by now!

But in the sunrise the latest innovation was awaiting me with the electric and hydrogen powered eFoiler boat by Artemis Technologies Ltd! What a moment hitting the take off button in a 12Pax boat and flying 3m above the water without feeling the waves at 25knots cruising speed! John Cumming (thank you an the team!) showed an impressive graph at the #MonacoHydrogenForum demonstrating continuous operation by @hydrogen refueling between #Nice and #MonteCarlo! Later in the morning I had the privilege to test the GEKO (thank you for the hospitality!) hydrogen runabout boat - the waves which seemed before not existing now made as jump with 300kW continuous power and 50knots top speed. The range is 70% compared to fossil fuel boat while

the #fuelcells by INOCEL while having this impressive ride! A great demonstration of the clean power of hydrogen! Great to experience this jointly with Aik Hoe Lim and Manuel Chaufrein!

the electric would make only 25% in planing mode However - instead of



Marina Villalante Sustacha · 1st Renewable hydrogen strategy, regulation and markets 3d • Edited • ⑤

smoke only clean water vapour is coming out of

> Last week, I had the honor to participate as a speaker in the Monaco Hydrogen Forum, representing Fotowatio Renewable Ventures (FRV) and Abdul Latif Jameel. There, we discussed the future of ...more



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Reflecting on the Monaco Hydrogen Forum 2024

Last week marked the third edition of the #MonacoHydrogenForum, an increasingly important event advocating for hydrogen use in mobility – on land, in the air, and at sea - held under the Patronage of HSH the Prince Albert II.

Given Monaco's unique ties to the Mediterranean and commitment to a sustainable future, it's the perfect venue to showcase innovations in sustainability and the hydrogen economy's role in global decarbonization.

As a proud partner of the Monaco Hydrogen Alliance, SBM Offshore is honored to contribute to this significant event, in full coherence with our tagline, BLUE. TRUE. TRANSITION., that encapsulates our mission: True: Pragmatic, safety-focused, and cost-effective.

Blue: Reflecting our expertise in the deep blue oceans Transition: Building towards tangible goals in the energy transition.

Imodco Product Manager, Philippe Lavagna, participated in the final panel, "Navigating Green Shipping Corridors", brilliantly moderated by Pierre Sames from DNV. We look forward to contributing to next year's edition of the Monaco Hydrogen Forum.

#Ammonia #CleanEnergy #Jettyless #decarbonization #EnergyTransition



Gloria Maldonado F. · Following
Chairwoman Enap | Past President CorreosChile | Board member Hubtec...
1w · ⑤

What a great experience!

Shared an amazing panel on how Countries are developing its green hydrogen networks, where I presented #Chile's H2V Roadmap and ENAP shared infrastructure strategy!

Presided by the fantastic John Penney, Ad van Wijk, Maixent Raoul Ominga and myself were able to present new perspectives from different

An honor to meet and hear it's royal highness Prince Albert of #Monaco!!!





Artemis Technologies Ltd.. a 20 minute, silent, comfortable commute to #Monaco harbour from #Nice for the Monaco Hydrogen Alliance.

Cost in #electricity €17.52

#zeroemissions





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days of networking have left us with pockets full of exciting discussions to 





Jorgo Chatzimarkakis · 2nd CEO @ Hydrogen Europe | Hydrogen Philosophy | E... Visit my website

#Monaco becomes the hot spot discussing #Hydrogen in #mobility % diagram #

🙏 Thanks for the invitation !: The Monaco Hydrogen Alliance hosted the 3rd Monaco Hydrogen Forum bringing together key public and private hydrogen operators, transportation & mobility leaders and policymakers to help accelerate the use of #green hydrogen in mobility.

👑 Under the auspices of his Serene Highness Prince Albert of Monaco 🗂 the theme of the Third Edition was "Building the Case for Green

st platform exclusively dedicated to mobility and #renewable hydrogen Through two days of keynotes, high-level panel conversations and deepdive workshops, the gathering will closely examine the latest innovations, technologies, and financing mechanisms driving clean hydrogen's use across transportation.

Main message: The current transition problems of transition in the whole mobility sector underpin the special need of hydrogen as an important enabler also in mixed versions of energy supply and techapplication but in any case accelerating the reduction of #CO2 across the whole mobility sector.

Important precondition: absolute technology diversity allowing a faster pace of transition.

Thanks John Rossant for organising this wonderful event bringing together distinguished personalities building up the Hydrogen Economy.





Great closing of the Monaco Hydrogen Forum 2024 with a Gala Dinner hosted by Monaco Chamber of Shipping and an Artemis Technologies Ltd CLEAN MARITIME TRANSPORT experience.

Thank you for the great event!

Monaco Hydrogen Alliance Tomasz A. S. Philippe Lavagna Christian Pho Duc Marina Villalante Sustacha et al.





Peter Jonathan Jameson • 1st

Managing Director and Partner at Boston Consulting Group (BCG)

1w • Edited • 🕟

What does a Serene Highness and a green hydrogen molecule have in common?

Sounds like the start of a bad joke, but it was actually how my Monday began at the Green Hydrogen Forum in #monaco, inaugurated by HSH Prince Albert II of Monaco.

I had the privilege of speaking about maritime decarbonization, alongside my colleague Francois Bastard and in the company of many passionate, determined organizations and individuals who all share the belief that the speed of our energy transition isn't fast enough.

Why Monaco and hydrogen?

It's a question many ask, and the answer is clear: Monaco has long been a pioneer in sustainability and ocean conservation. \*\* From innovative technology to bold commitments, Monaco has consistently shown how industries can already begin decarbonizing today.

In my keynote speech, I struck a balance between optimism and realism—balancing a "glass half full" with a "glass half empty" perspective on maritime decarbonization:



Olivier Dhez • Following

Directeur Général Délégué chez Hydrogen Refueling Solutions 6d • 🔊

2 jours riches en échanges et en perspectives sur l'avenir de l'hydrogène à Monaco.

Cette semaine, j'ai eu le plaisir de participer à l'événement inspirant : Monaco Hydrogen Alliance.

Deux jours de discussions passionnantes qui ont permis de mettre en lumière les innovations dans la #MobilitéHydrogène et leur synergie avec les plans d'action européens et mondiaux pour la décarbonation des transports.

C'était un honneur de participer à la table ronde "Multi-Purpose Hydrogen Mobility Hubs" aux côtés de Stephan Herbst (Toyota Motor Europe), Faouzi ANNAJAH (NamX), Marina Villalante Sustacha (FRV-X) et Hechem Nadjar. Nos échanges ont porté sur la mise à l'échelle des stations hydrogène, l'essor du transport hydrogène ainsi que sur le rôle clé des collaborations et des innovations pour accélérer la croissance de cette filière.

Cette rencontre a confirmé l'importance du soutien stratégique des initiatives mondiales pour faire de l'#hydrogène une solution incontournable dans la transition énergétique.

Un grand merci à la #MonacoHydrogenAlliance pour son engagement en faveur de la mobilité durable et de l'innovation.



Echoing my thanks to the Monaco Hydrogen Alliance for inviting me to join the 3rd Monaco Hydrogen Forum. It was great to meet and hear from the innovators, thought leaders, impact investors, companies, experts and policymakers building up the hydrogen economy. Pleased to share a panel with Jorgo Chatzimarkakis Rebecca Maserumule, Ph.D. Manuel Villavicencio Valérie RUIZ DOMINGO to discuss what role for policy, not least trade policy, to drive the expansion and take-up of clean hydrogen





Alicia Eastman • 1st

As a Trustee of Monaco Hydrogen Alliance (#MHA), it was a delight to see so many dedicated agents of change at the #MHAForum last week, under the patronage of His Serene Highness Prince Albert II of Monaco. H.S.H. has ...more









Dolphyn Hydrogen

3,369 followers

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② We had a fantastic few days in sunny Monaco at the invitation of the Monaco Hydrogen Alliance. 

Many new connections made, impactful discussions and days of networking have left us with pockets full of exciting discussions to continue. 

✓

#DolphynHydrogen #Hydrogeninnovation #MonacoHydrogenAlliance2024







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Thank you to everyone who joined us at the Monaco Hydrogen Alliance Forum.

Prof. Dr.-Ing. Josef Kallo shared insights on why liquid hydrogen is the ...more



We're excited to share that Prof. Dr.-Ing. Josef Kallo, co-founder & CTO at H2FLY, will be speaking tomorrow at the Monaco Hydrogen Alliance For ...more





John Penney • 1st Chief Growth Officer | Strategy | Business Model & Product Innovation .. 3d • 🔇

"What will it take to scale hydrogen into a cornerstone of the global net-zero economy? Attending the highlighted the momentum behind hydrogen innovation. By accelerating technological advancements, infrastructure, and collaboration, we can unlock hydrogen's full potential to help decarbonize hard-to-abate sectors in our quest to build a sustainable energy future."

A shout-out to the big thinkers on my panel-- Gloria Maldonado F., Maixent Raoul Ominga, and Ad van Wijk-- for their powerful insights on how to increase the velocity of hydrogen innovation.

A very special thank you to the Monaco Hydrogen Alliance, John Rossant, Timothy Gribaudi, and their team for creating this invaluable and collaborative innovation platform.

#MonacoHydrogenForum, #HydrogenEconomy, #GreenHydrogen , #EnergyTransition, #CleanEnergy, #SustainableMobility, #Innovation





Show translation





Kostis Geropoulos • 1st

Co-founder / Director of Energy & Climate Policy and Security at NE Gl... 1w - \$

Great to see again Monaco Hydrogen Alliance President John
Rossant and Hydrogen Europe Secretary General Jorgo Chatzimarkakis at
the reception following the conclusion of the first day of this year's
Monaco #Hydrogen Forum in Monte Carlo and catch up on the latest
developments in greening #transport.





1w . (5)

Artemis Technologies Ltd 18,984 followers

In the occasion of its presence in the Principality of Monaco during the 3rd edition of the Monaco Hydrogen Alliance forum, our 100% electric foiling vessel competed alongside Cala del Forte Monaco One, not as rivals, but as ...more



Monaco Hydrogen Alliance © Building the Case for Clean Hydrogen

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## **Special Thanks to our 2024 Partners**

Our Members & Partners are fundamental to our work and success. They support us in promoting innovation, guide our strategy and development and inspire our mission to decarbonize the transportation sectors and transition towards a greener economy.

#### **Founding Members**





#### **Leadership Member**



#### **Network Members**







#### **Hydrogen Pioneers**





















#### **Advocate Partner**





## Special Thanks to our Media Partners

#### **Media Partners**















## And a special thanks to our Gala Dinner co-hosts

A special mention and an expression of gratitude to the Monaco Chamber of Shipping for having co-hosted and sponsored the Gala Dinner of the Monaco Hydrogen Forum for its attending VIPs, Speakers and Participants – for the second year running.

A big thank you to Mr. Sébastien Knecht de Massy, President of the Monaco Chamber of Shipping, for his continuous support.





monacoh2.org



## About the Monaco Hydrogen Alliance

## The world's only platform exclusively dedicated to renewable hydrogen and mobility

The Monaco Hydrogen Alliance is a not-for-profit Association under Monegasque law to promote the use of renewable hydrogen in land, air, and maritime transportation. Alliance members include key public and private hydrogen operators, as well as transportation & mobility industrial leaders and policy makers coming from all over the world.

## **Building on Monaco's leadership in Energy Transition**

The Principality of Monaco's leadership in Energy Transition and in the fight against climate change - as well as its preeminent global position in the world of motor sports, global shipping and energy trading - make it an ideal host for a new and important global conversation on Hydrogen and Mobility.

## **Engage With Us On Social Media**

Communicate and engage with us on your social media accounts:



Monaco Hydrogen Alliance



<u>@MonacoHydrogen</u>

#MonacoHydrogenForum #hydrogenmobility

Subscribe to our Newsletter:



Monaco Hydrogen Alliance



We look forward to meeting you again in 2025!

## Any questions?

Contact us on <u>info@monacoh2.org</u> to receive more information on our membership options, upcoming events and engagements.

For any additional information, visit the Monaco Hydrogen Alliance Website: <a href="https://monacoh2.org">https://monacoh2.org</a>

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