NineSigma

Energy challenges

NineSigma has been involved in running partnership programs with clients through several challenges over the last years in open innovation, with the purpose to solve and achieve sustainability agendas.

What are NineSigma's challenges in the industry?

I. Efficiency: A Carbon Utilization Approach

- “Game-changer” continuous / semi-continuous MgO fusion process technologies
- New Technology for Synthesis of Eco-friendly LP Gas Components (Propane and Butane)
- Carbon Dioxide Capture and Utilization for Power Plant

II. Cutting-Edge Integrated Solutions and Industries

- 'Light Sharing' Agri-Voltaic Systems for Crop Growth and Energy Generation
- “Plug-n-Play” energy efficient solutions for residential buildings

III. Building Resilience in Systems

- Renewable Electricity Generating Technologies for Harsh Environments
- Innovative Energy Storage Solutions for Harsh Environments

IV. Bringing the Best Experts Together

- "Rhenium in the Generation and Uses of Green Hydrogen"
- Air Liquide Scientific Challenge 2018
- Air Liquide Scientific Challenge Edition 3, 2022

NINESIGHTS®
BY NINESIGMA

We help others solve and achieve sustainability agendas & goals through innovation collaborations. :

We work with major global companies in many regions, serving them with publicized & anonymous tech scouting, technology landscaping & Experts Surveys.

About NineSigma

We enables you to **explore** new scientific, **technology** and commercial space, build **new ecosystems** of partners, and **discover** new business **opportunities**.

22 Years of Experience

All industry sectors

Global Presence

- Connected to more than 80,000 partners from start-ups, SMEs, Academia for over 2K clients
- Reached out to more than 4M+ contacts in the global B2B technology and Academia communities.
- Covered more than 10,000+ projects in all industries, such as Chemistry, Digital, Energy, Engineering, Health, Industry 4.0, Physics, Sustainability

I. Efficiency: A Carbon Utilization Approach

At NineSigma, we believe creating efficient energy systems and infrastructures is a primary goal when adopting sustainable approaches.

“Game-changer” continuous / semi-continuous MgO fusion process technologies

RHI MAGNESITA

RHI Magnesita was seeking an innovative method for the production of MgO ingots by melting MgO particles via a continuous or semi-continuous process.
Traditionally, MgO ingots are produced by melting powders in an electric-arc furnace, but this process is highly demanding in terms of energy and time. RHI Magnesita want to revolutionise the standard practices by integrating continuous process technologies.

The desired technology for this project required the following:

- Based on continuous or semi-continuous processes.
- Reduce/eliminate downtime
- Obtain MgO product with crystal size in the millimeter range
- Possibly cover all process steps (generation of the molten, thermal management, cooling down), but also solutions addressing partial process steps are considered

More information on the project: “Game-changer” continuous / semi-continuous MgO fusion process technologies

New Technology for Synthesis of Eco-friendly LP Gas Components (Propane and Butane)

NineSigma, was here representing a major energy company, seeking the development partners for new technology to synthesize environmentally friendly components of liquefied petroleum (LP) gas (propane and butane). Focusing on manufacturing technology using raw materials other than existing petroleum fractions, a variety of proposals for catalyst process, bioprocess, and other synthetic processes are expected.
It was not necessary for all requirements to be met at this point; proposals were welcome if there was a good chance of meeting them through further development for three years.

The conventional LP gas production is based on the removal of LP gas from fossil fuel-derived fractions. In accordance with the current trend to go carbon neutral, environmentally friendly LP gas manufacturing is also required. However, technology to produce LP gas as a target product using raw materials other than fossil fuels has not essentially been established for practical use. The Client, therefore, decided to widely invite technical approaches to producing eco-friendly LP gas and recruit development partners to jointly work toward practical use.

The client will execute necessary agreements with the selected respondents and move to the advanced development phase. Specifics of any collaboration will be determined through consultation with the concerned parties.

More information on the project: New Technology for Synthesis of Eco-friendly LP Gas Components (Propane and Butane)

Carbon Dioxide Capture and Utilization for Power Plant

NineSigma, representing MVM group, a Hungarian innovative energy company, is seeking Carbon dioxide Capture and Utilization Technologies from organizations for implementation in their power plants. Proposals are invited from solution providers who could either provide integrated solution for CO2 capture and CO2 utilization or one part of the solution.

MVM group, a state-owned company and the third largest company group in Hungary, is in the business of serving the Hungarian energy market. MVM owns and operates several thermal power plants in the country. It is also playing a leading role in innovation, energy efficiency and energy related technologies and strives for a leading position in the introduction of renewable energy technologies. As a part of decarbonization measure, MVM is keen on introducing Carbon Capture and Utilization Systems as a mitigation strategy for reduction of Green House Gases in their natural gas fueled power plants.

The desired technology for this project required the following:

- Technology Readiness Level (TRL): 5 and above (Technology validated in relevant environment)
- CO2 capture rate: ca. 15 - 30 tons/h; above 90% capture efficiency and high purity
- Provision for bypass function: 0 - 100%
- Reference: Technology successfully demonstrated for gas turbine/CCGT flue gases
- CO2 utilization: To products like fuel, chemicals, materials, industrial etc.

More information on the project: Request for Proposal: Carbon Dioxide Capture and Utilization for Power Plant.

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II. Cutting-Edge Integrated Solutions and Industries

Innovations and ideas have potential to impact the overall success of businesses.

Light Sharing' Agri-Voltaic Systems for Crop Growth and Energy Generation

NineSigma, representing a leading Energy Company, invited proposals for innovative photovoltaic technologies that enable the maximal exploitation of agricultural lands. The technology should show a synergy with agricultural production whilst allowing electricity production on the same plot of land.

A leading Energy Company, wants to contribute to a sustainable future. To positively impact each human being, NineSigma's client wanted to target **two major sectors** which play a key role in everybody's life: the **agricultural industry and the energy sector.**

The desired technology for this project required the following:

- Have minimum negative impact on crops yield & quality, preferably positively impacting the crop(s) of interest
- Generate electricity from solar light
- Be compatible with certain target crop(s) associated operations (e.g. soil management, fertilization, sowing, irrigation, harvesting, dust generation, treatments)
- Be affordable

More information on the project: Light Sharing' Agri-Voltaic Systems for Crop Growth and Energy Generation

“Plug-n-Play” energy efficient solutions for residential buildings

NineSigma, representing a paints and coatings manufacturer was seeking to adopt technologies that can improve the energy management of residences worldwide. In cold climates, this would address heat insulation and in warmer climates, the technologies would address either heat repulsion or energy harvesting for usage elsewhere in the home.

Potential high-tech solutions i.e. “solar panel” paints are of high interest if a commercially viable development is proposed. Alternatively, paint or film/coating technology which allows energy harvesting is also of high value.

The desired technology for this project required the following:

- Improve energy efficiency, by reducing heat gain, and / or heat loss
- Energy absorbing/releasing (phase change/other) for hot climates
- Nonconductive coatings (interior/exterior)
- Solutions focused on emittance.
- Work on various substrates e.g. buildings with wooden, brick or concrete construction
- Can be retrofitted to existing buildings without major building work, or fitted to buildings during upgrade/renovation work
- Use a ‘whole house’ approach and work on surfaces that are coated today (e.g. exterior & interior walls, floors, ceilings) and/or work on surfaces that are not normally coated (e.g. windows, roof, loft spaces).
- Reclaim the energy/Energy Harvesting

More information on the project: “Plug-n-Play” energy efficient solutions for residential buildings.

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III. Building Resilience in Systems

NineSigma is working with innovation experts around the world to uncover progressive and cutting edge solutions to overcome such challenges and to build resilient systems that are scalable and secure.

Renewable Electricity Generating Technologies for Harsh Environments

OMNIPRENEURSHIP AWARDS

Al-Dabbagh Group's strategic businesses are seeking renewable energy technologies which can efficiently and cost-effectively generate electricity in Saudi Arabia's desert climate.

Al-Dabbagh Group and its business units are working to become eco-friendly organizations. In order to do so, they want to tap into more sustainable energy resources to power their business activities. By investing in sustainable energy technologies, ADG and its businesses want to lower their carbon footprint, while paving the way for other organizations in the Middle East region to follow in their footsteps.

The possible approaches that were included but were not limited to:

- Wind turbines that can resist sandstorms
- Bespoke solar panels with high efficiencies in the harsh conditions of KSA, in combination with energy storage devices
- Existing renewable energy technologies with improved properties that withstand KSA environment
- Microturbines
- Any other technology that meets multiple key requirements and which can be applied to at least one of ADG's strategic businesses and their specific use cases

For more information about the project: Renewable Electricity Generating Technologies for Harsh Environments

Innovative Energy Storage Solutions for Harsh Environments

KAHRAMAA in collaboration with QRDI are driving innovation within Qatar to utilize energy more efficiently with the goal of preserving local resources and reducing environmental footprint.

They were inviting proposals from Startups, SMEs, and Corporates for technologies which provide Innovative Energy Storage Solutions for Harsh Environments. They were looking for innovative high-capacity solutions which address advance storage capacities and technologies operating in the climate conditions present within the State of Qatar where humidity and temperatures can be over 90% RH and 50°C respectively.

Kahramaa are interested in all technologies that address the following key technical criteria

- Storage systems ideally above 10MW with potential for development up to 250MW
- Energy storage for minimum 2 hours up to 12 hours with rapid access (<100ms) as required
- Compatible with local or central control systems
- Operate in variable external air temperatures over 50°C for 4-5months per year
- Operate in Relative Humidity over 90%
- Long life span minimum of 5000 cycles
- Capable of retrofitting to existing solar panel farms / grid networks in addition to new smart solar farms.
- Environmentally friendly solutions
- Cost efficient energy storage
- TRL 3 – 8 with potential for pilot development within Qatar

More information on the project: "Innovative Energy Storage Solutions for Harsh Environments"

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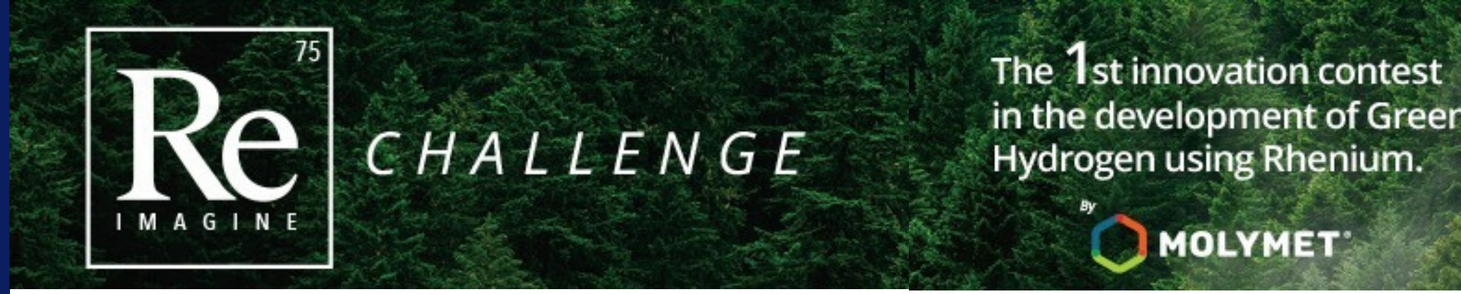
IV. Bringing the Best Experts Together

Businesses with a strong goal of contributing to the Climate recovery have a chance to share their vision with the world, while inviting experts to collaborate with them on it.

Rhenium in the Generation and Uses of Green Hydrogen



The goal for this challenge was to incorporate rhenium in novel catalyst formulations that allow efficient and economic production of hydrogen from renewable sources and/or the use of hydrogen in fuel cells or chemicals synthesis, in order to make green hydrogen a viable carbon-free chemical and energy vector.
In the spirit of open-source science and our commitment to the well-being of humanity through products developed by people who care about the planet, Molymet believes that the excellent catalytic properties of rhenium can help improve the hydrogen value chain, thus contributing to its decarbonization.

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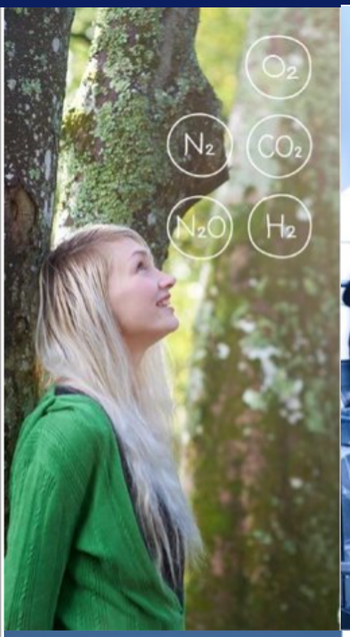
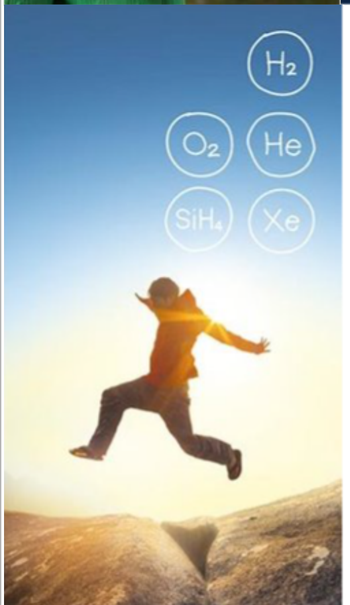
The solution needed for this challenge was:
This might include, but is not limited to:

- Catalytic materials for water splitting
- Catalytic materials for oxygen reduction
- Catalytic materials for e-fuel production
- Other rhenium-based materials for “green hydrogen” production or utilization

More information on the project: Grand Challenge: Rhenium in the Generation and Uses of Green Hydrogen

• Essential small molecules for Life, Matter and Energy





Air Liquide

The Challenge embarks the scientific community to innovate through the Essential Small Molecules and develop new applications on three topics related to improving air quality for the people and preventing climate change for the planet.

Topic 1: **Lower-CO2 H2 - Objective: How to produce cost-competitive hydrogen while reducing greenhouse gas emissions?**

Topic 2: **H2 is coming! - Objective: How to use H2 to avoid greenhouse gas emissions in fossil fuel based industrial processes?**

Topic 3: **Sustainable Farm to Fork - Objective: Can the dietary needs of 7.6 billion people in 2018 be met in an affordable, healthy, and sustainable manner?**

The scientific prize per laureate was €50,000 and €1,500,000 that was shared among the collaborations.

June 25
Challenge opening

September 20
Deadline submission

Oct 2018 - January 2019
Proposals Review

March 2019
Laureates Announcement

if you'd like more information about the challenges contacts us and we'll get back to you.

Based on the Essential Small Molecules

Scientific CHALLENGE

Use Essential Small Molecules, Data and related Technologies to decarbonize industrial ecosystems

• Air Liquide Scientific Challenge Edition 3, 2022

Air Liquide

The Challenge embarks the scientific community to innovate through the Essential Small Molecules and develop new applications on three topics related to improving air quality for the people and preventing climate change for the planet.

Topic 1: Data sharing for decarbonization: How to leverage confidential data from different stakeholders to meet shared sustainability targets?

Topic 2: Energy storage using Essential Small Molecules: How to store and reuse energy using small molecules or processes to achieve net-zero?

Topic 3: Electric Heating for hydrogen production: How to decarbonize the catalytic Steam Methane Reforming reaction by electric-based heating?

The Air Liquide Scientific Challenge aims to identify up to **3 laureates**. A scientific prize of **€50,000** will be awarded to each of the laureate teams at the end of 2023

If you would like to get more information about the project please, for more information access the challenge page.

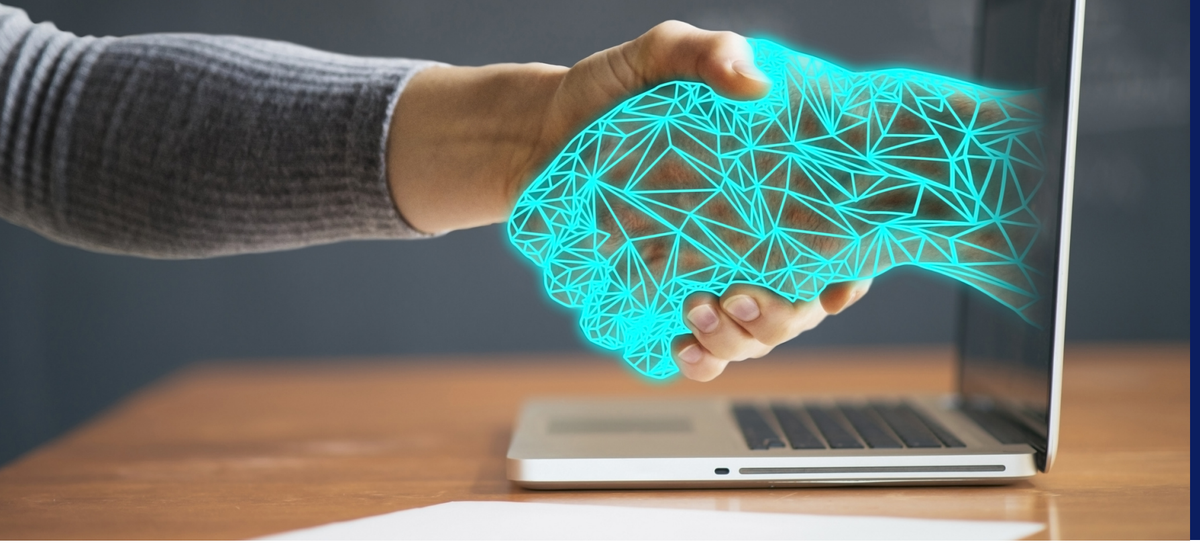
Click Here

Nov. 3, 2022
Challenge opening

March 10, 2023
Deadline submission

May 2023
Final Jury

September 2023
Laureates Announcement



Connect with us now

We accelerate innovation and a sustainable future by:

- Helping you understand the external environment and make strategic decisions
- Connecting you to new partners, start-ups, suppliers, manufacturer, Universities, Research Centers.
- Discovering and testing new business ideas in B2B markets

Our love of **science and technology**, worldwide presence and **2 unique science and technology networks** can transform your business.

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