



InnoEnergy

TBB.

Energy transition, geopolitical resilience, and economic growth.

Trilemma or opportunity?

16-17 October 2024, Barcelona

Post-event report for The Business Booster 2024

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November 16, 2024

Introduction | Linda Nyberg, Moderator

Conversations at The Business Booster (TBB) 2024 addressed three key topics: economic growth, geopolitical resilience, and the energy transition. Is it a trilemma or an opportunity? Let's see, probably the latter.



Welcome | Diego Pavía, CEO, EIT InnoEnergy

» As we walked through the doors to the conference hall this morning, you already had over 2,900 meetings booked with each other for the coming two days. These meetings connect innovators, customers, investors, policymakers, and corporates. This is a strength of the InnoEnergy ecosystem.

By 2030, 40% of the market is ours to capture

We are at a key moment in time.

Since the European Green Deal was announced, Europe has created a set of regulations generating tremendous demand for green products through the Fit for 55 and RePowerEU packages, which include targets such as the combustion engine ban by 2035.

For the past three decades, the supply side was driven by cost alone, meaning products such as solar PV modules were manufactured



outside the EU. For the first time, Europe has started to address this through its Net-Zero Industry Act (NZIA), to secure its autonomy and resilience as an economy. By 2030, 40% of the demand must be supplied by European-made products. It will create around five million new jobs and €500bn annually. We can capture this market.

Continuity in policymaking

The Green Deal is here to stay, and Europe is pushing ahead with its

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Diego Pavía, CEO, EIT InnoEnergy



decarbonisation agenda for 2050. But alongside decarbonisation must also come competitiveness: ensuring the European economy is resilient and protected.

The Draghi report states, "Either we change and do things right, or we will have to compromise between our environment, freedom, and prosperity." This is tied to the three focus areas of this year's TBB event. Achieving our goals will be a marathon, with casualties along the way.

We are proudly part of the solution

InnoEnergy and our ecosystem are proud to be at the core of what Europe is doing and actively delivering on the EU's climate and energy objectives. The Commission

has mandated InnoEnergy to lead industrial value chains such as battery and PV.

The additional investments from our new shareholders have enabled some of our portfolio assets to expand their capital rounds. The capital markets are very dry. Closing a round in the past used to take 9-10 months. Today, it takes 14-15 months. We have also welcomed new shareholders in our cap table, including oil and gas companies who have the resource and technological know-how to accelerate the energy transition

Let's continue to deliver. Let's leverage this ecosystem we have here today.



Opening address | Elena Bou, Innovation Director, EIT InnoEnergy

The first TBB was held eleven years ago in Barcelona, attended by 150 people and 20 innovators. It was held in a much smaller place. That is not possible anymore, which is a great thing.

» Clean energy transition

Something relevant has happened in Europe in recent years. The climate targets are now embedded in our law, giving stability and a solid business case for investors. The Green Deal has brought dynamism, especially on the demand side. As a whole, we have created market conditions for innovators so that clean tech can happen in Europe.

At the same time, innovation has been present. Since 2010, the number of emerging technology companies globally tackling climate problems has quadrupled, and

40% are in Europe. In 2023, 43% of all the global VC investments in climate tech occurred in Europe. We are leaders in renewables, wind, offshore, marine energy, recycling, and hydrogen.

In terms of the clean energy transition, we are on track. Last year, the amount of energy generated by renewable energy was the same as that of fossil fuels. The deployment of clean technologies has been increasing. Greenhouse emissions are going down. However, Europe accounts for only 10% of greenhouse

emissions globally. While Europe is on track, emissions grew 2.1% globally in 2023. The world has a long way to go, and some countries are freeriding. Others are doing their homework. China accounted for 60% of the new capacity for renewables last year. Much of the technologies we have deployed, such as solar panels, come from China.

Geopolitical resilience

The US applied protectionist measures with the Inflation Reduction Act (IRA). As the US import market closed and with a stagnating domestic economy,



the European market became the solution to China's economic problems. 55% of China's EVs, PVs, and battery exports are to Europe.

What about the European industry? Yes, we were the cleanest, but we had higher energy costs and to complex processes, like permitting, and higher compliance costs. Our companies have not used state aid at scale, but the European market has been open for subsidised competition from third countries. We are proud of our free market and welcome competition from third countries. Nevertheless, we need fair competition.

The European Commission reacted with the Green Deal Industrial Plan, a law with a 40% target of domestic manufacturing capacity. The Made in Europe partnership was developed to create fair conditions for competing in the European market, not only on cost but also in terms of sustainability and circularity.

Europe urgently needs to derisk from China. This will cost us, but inaction will cost us much more. We must look for ecosystems and cooperation and build our capacities. With the US and our transatlantic cooperation, we share values. Instead of waiting to see what happens on the other side of the Atlantic, we should focus our efforts now and decide our own destiny.

Dual-use technology, defence, and climate tech are very relevant. Traditionally, innovations were applied first in defence, then in public organisations, and last in commerce. Now, it is the other way around.

For the first-value approach, we need resilient supply chains. Not only are

cost, delivery, and quality important, but we must also consider geopolitical risks, innovation, and sustainability. Let's also think about new partnerships for clean trade and investment. It is not only about securing raw materials. Why not make our European Green Deal global and bring clean re-industrialisation to third countries?

Economic growth

Even without subsidies, the cost of many products from China will still be lower because of its scale and technological leadership. China has successfully integrated manufacturing with digital tools and AI, leveraging considerable resources. For a battery, the level of scrap in Europe would be 40%, but in China, it would be less than 1%.

The Draghi report clearly states that no company in Europe has had a market capitalisation of over €100 billion in the last 50 years. This is a structural problem. We need a real, true Single Market. We need to make innovation commercially viable, and we have many innovators.

We must take the next step: bridging the startup world with the industry. The industry also needs to modernise. We need to address the growth financing problem in Europe, where private and public entities must collaborate and with a less risk-averse attitude. More warranties are needed, too. We also do not have enough manufacturing skills, we lost them. We need to recover them.

We have created many regulations to foster the green economy, but have we incentivised cleantech champions? There is the concept of first mover advantage, but in Europe, we have the first mover disadvantage in clean tech. Other countries, like the

US, have created those incentives, subsidising pioneers.

We need carrots; incentives—perhaps through ETS credits or by fostering procurement and public administration geared towards green products, like the US chips industry. We must support pioneers; otherwise, our efforts towards clean tech innovation will be a lesson people will not forget.

Call to action

InnoEnergy was founded in 2010 when sustainable energy and the energy transition were unpopular. We took the challenge, and we are delivering with innovators. We will continue delivering in strategic value chains.

We are proud: our portfolio can potentially decrease CO2 emissions in Europe by 20%—but only if they can scale up and grow. Our commitment is to the pioneers of clean tech, and we will do our best to support them. We are addressing the financial challenges, creating mechanisms to support growth financing, and building skills through our Skills Institute. We will complement the teams and evolve their profiles with industrial competencies. Finally, we are supporting growth by creating new opportunities, building a transatlantic bridge and new operations in the US, and fostering synergies among newcomers and the industry.

However, we cannot do it alone. We need the support of the whole ecosystem. This event is taking place in Spain, the country of human towers, the Castellars. The entrepreneurs are at the top because a whole ecosystem supports them. We have the same common purpose, not only for the environment but also for our welfare and freedom.

“ The entrepreneurs are at the top because a whole ecosystem supports them. We have the same common purpose, not only for the environment but also for our welfare and freedom.”

Elena Bou, Innovation Director, EIT InnoEnergy



Keynote address | Joan Groizard, Director General at IDAE

>> Climate crisis

Carbon emissions grew last year despite the international community officially knowing about the challenges of CO2 emissions since at least 1992. While we have been committed to change for 32 years, we still struggle to bend the curve. Adding to this worry, news this week reported that natural CO2 absorption capacity seems to be slowing.

Most Europeans seem to be worried about the climate crisis. European society understands that the energy transition is not just about the climate crisis but also about the security of supply and economic security, reducing our vulnerabilities to somebody using what we import as a war weapon. 75% of Europeans agree that climate action will lead to innovations.

Energy as a tool for geopolitical resilience

Energy is a tool to solve climate emergencies, a geopolitical and strategic security factor, and an economic and industrial development element. It is an opportunity shaping into a necessity by its nature. Enrico Letta, who wrote a report on the European Single Market, recently said, "The energy Single Market in Europe can be Europe's best asset to ensure its success on the international scale." The energy transition with a sustainable energy innovation ecosystem as an instrument for international economic success can be achieved if we get the right tools in place. We have discussed how geopolitics and economic growth have been tied to the energy transition since COVID-19, the war on Ukraine, and more recently, as the European Commission President

clarified in her political guidelines and mission letter. Competitiveness and industrial growth must be a part of the green agenda and vice versa. The Draghi report also explains that if we get the energy transition right, we can use the energy transition as a force for geopolitical resilience.

Sometimes, it is difficult to say we are leading the way in Europe, but we do a lot of things right in, for example, clean tech, the rule of law, life expectancy, low infant mortality, inequality, sustainability, environmental standards, etc. This is difficult to achieve and maintain, but we should be proud of what we do. Yes, we have much work to do, but let's not forget our strengths.

The middle-tech trap

Europe is growing slower than our competitors, such as the US and China. It is mainly due to productivity: European R&D investment is not that different from the US from the quantitative perspective, but the difference is where we focus our innovation and investments. The largest challenge lies in the middle

tech trap—a vicious circle where we focus on and keep investing in areas where we are already good. These are already mature technologies, and while we can get marginally better in them, there is no potential for disruption and the growth needed. The middle-tech is interesting, but we are beaten by technology that comes up at a much faster pace. The European policymakers understand that we need disruptive innovation and investment in R&D, and political conversations are targeted at this. I expect we will have these sorts of conversations at TBB.

In addition to a lack of disruptive innovation, energy prices slow economic growth. As expected, the more energy-intensive an industry is, the more it suffers during spikes in energy prices. Europe will not have a competitive edge if we base our advantage on fossil fuels because we do not have natural gas reserves. We must invest in disruptive tech that makes Europe competitive. We should focus on home-grown renewable resources and efficiency that reduces energy intensity.



The low-hanging fruit of replacing coal and gas is already happening step-by-step. The other part of the energy transition is on the demand side. It is about how the industry, public administration, businesses, and households decide their energy use. Policymakers must help these decision-makers replace fossil fuels with renewables until the right market conditions exist.

To further the energy transition, in addition to incremental increases, we need disruptive innovation. For example, we need more power grids and integrate more renewable energy into the system and extract more electricity from the grid. This takes time, material investments, iron, steel, copper, permitting, transformers, logistics, time, etc. This helps with the incremental improvements, but what if we could duplicate the power grid? The grid's utilisation is below 50% today, but if we use power grids like the telecom infrastructure, we could duplicate it with little time and investments. It requires changing the mindset and moving from how to add another power line to how we think about the power system differently. This requires innovation in the market and public sector. Fortunately, we are moving from prototypes towards mature technologies quickly, reducing material needs and making things better, less costly and more productive.

How do we change? We must turn the Draghi report's finding of this lack of dynamism self-fulfilling into dynamism that is self-fulfilling. This can be done by setting clear and ambitious goals that focus our innovation efforts, put our public and private investment capacity into these innovations, and create real-world results. Then, we evaluate



and re-assess our expectations. Likely, we will be better off than anticipated as many of the changes happening are non-linear, something the human mind is not very good at anticipating. With this, we can continue to increase our ambitions.

The case of Spain

For example, Spain's physical reality did not change from 2012 to 2013, the technology was not radically different, and the wind and solar regimes were similar. Still, different regulations and perceptions created different expectations in the market and, therefore, different decision-making.

In 2018/2019, there was a new government with a new energy plan but no significant technological disruption. Yet, the physical world changed because of perception. Renewable energy in Spain accounted for more than 50% of electricity generation in 2023. The sector has created jobs, exported wind technologies, and become very attractive for investments in the clean technologies sector.

Believable targets are very important. Translating international climate commitment into specific

collective targets for renewables at the last COP and having specific targets at the European level is important. If we as policymakers do not set credible targets or start to rethink ambitious targets, we will shatter business cases, and investors may not be inclined to bet on the technologies if targets are still up for conversation. Businesses need predictability and certainty.

With credible, ambitious targets, we know where we want to go. We will not change policy to fit a specific technology, but we need to find the barriers to fine-tune them and allow innovations to make sense. We invite innovators, investors, and the ecosystem to take a seat at the table of the public conversation to help shape the market and not expect it to be created for you.

Global public and corporate spending on R&D and venture capital investments in clean energy startups are increasing.

If we do all this properly, we can end up better than we started. Let's make it happen. The public sector will be there. We need the innovation community there.

Keynote speaker | Lewis Pugh, Endurance swimmer and UN Environment Programme Patron of the Oceans

» The North Pole should not be swimmable, yet I swam it 17 years ago to prove to world leaders that we need change. At -1.7 degrees water temperature, I had to find a strategy to finish the one-kilometre swim. Whether I would achieve the goal or not became a matter of mindset.

According to the indigenous people in the high Arctic, there is a big battle within every person. The battle is between two wolves, a good wolf and a bad one. The wolf that wins is the one you feed.

In 2007, so many leaders denied what was happening in the Arctic. What we witnessed would

eventually impact everyone: every single future generation and the whole animal kingdom.

In finding the strategy for my symbolic swim, I divided the one-kilometre swim into milestones of a hundred meters each. At every one-hundred-meter mark, a flag reminded me of the people in that country who inspired and encouraged me to do this swim.

The most difficult part of the swim was the lead-up to the 900-metre mark. When we give up at this point, several consequences flow from this simple decision, which has long-lasting implications. Not only do you want to kick yourself for giving up

on your dream, but the more serious consequence ... is that quitting can easily become a habit in a team.

The world is divided between pioneers and followers. You are either a pioneer or a follower; you cannot be both. If you are a pioneer, you do not know what will happen until you dive into the water because nobody else has ever been there. So, all the risk, all the worry is on you.

To persuade the British government to protect the water surrounding the UK properly, I swam the length of the English canal in 49 days. Due to climate change, plastic pollution, and overfishing, our oceans are struggling, and unless we protect





at least 30% of the world's oceans by 2030, they will not be able to recover. My swim convinced the UK government and brought about the 30 by 30 target, which over 130 countries have agreed to follow.

The glaciers in the Himalayas providing water to India, Bangladesh, Pakistan, and China, are melting away. The third swim was in a lake

that recently appeared on Mount Everest because of the climate crisis. My regular swimming style is aggressive since I often swim in cold water and need to maintain my body temperature. However, this approach does not work in the Himalayas due to the low oxygen levels. I had to stop and restart the swim after clearing my mind. Nature gave me a simple message: change or drown.

In terms of the climate emergency: for real, effective change to occur, you must be prepared to change your mindset completely. It is much easier to go second, but now is the time to lead the energy transition change, roll up our sleeves, and keep going. Our world is changing, and we need to take serious action. We will be with you every single stroke.



Roundtable | How effective are domestic green industrial policies in supporting the manufacturing of climate technologies at scale?

>> With traditional global supply chains in flux, safeguarding energy security and protecting domestic interests have become as crucial as our decarbonisation efforts. Within this context, the domestic manufacturing of climate tech is of growing strategic importance as a high-growth market.

A green industrial race between China, the US, and the EU has unfolded, with new players like India entering. Each region aims to strengthen domestic value chains for climate technologies through aggressive green industrial policies. The EU has built a robust regulatory framework, the US has built a strong financial support scheme, and India is promoting domestic manufacturing through a \$130 billion investment to become the domestic manufacturing hub for solar panels.

However, how effective are these green industrial trade policies, and are the right regulatory, trade and financial measures in place to support manufacturing at scale? How do European, US and Chinese industrial policies compare? Is further collaboration on sustainability criteria needed to boost collective trade and investment opportunities for climate tech?

This panel featured perspectives from national and EU levels, as well as insights from the US and China, on their assessments of what constitutes a successful green industrial policy for scaling climate technology.

Speakers

Kerstin Jorna, Director-General, European Commission, DG GROW
Franck Neel, Board Member, OMV

Petrom
José Noldin, CEO, GravitHy
Mikołaj Budzanowski, Vice President for Development of Boryszew S.A. Capital Group
Dr. Philipp Matthes, Senior Investment Manager, Siemens Financial Services
Moderator: Linda Nyberg

Net-Zero Industry Act (NZIA)

Kersin Jorna

With the Green Deal Industrial Plan, we have a vision that gives investors predictability. Now, we must make it happen and focus on the business case of the transformation. Our focus has been on regulation, grants, etc., for a long time, but now we have further developed our vision to understand the business case. It is always the same: business, energy, the market. On clean tech, the



business pace was too slow. The NZIA, as well as the Critical Raw Materials Act (CRMA), targets the pace for cleantech in solar panels, cables for the grid, wind turbines, etc., around four points:

1. **Access to land and operating permits:** it took 5 to 10 years in the past. Permitting must be the same everywhere.
2. **Access to finances:** it gives companies a strategic project label that leads to different financial possibilities. For CRMA, they were expecting 30 calls for strategic projects but received 170. CRMA has created a vision to invest.
3. **Access to skills:** there has been a big shift in the skills required. Rather than harmonised qualifications, we created a skills academy: the EIT InnoEnergy battery academy and solar, too, where you can upskill. We need to know where the skills we need in the future will be.
4. **Access to market:** companies will have to invest. There will be a cost for existing installations. And they have a product that is more expensive than the regular project. We must derisk the market. We must look at regulation and public procurement to create a market for uptake.

How do we transition without damaging a whole value chain?

José Noldin

We understood that we must do something different to decarbonise steel production. We exist because there is a Green Deal, a Fit for 55. There are future challenges. Let's not forget why we are doing this: we saw floods in the Sahara Desert and a devastating hurricane in the US.

An industry needs to be protected, and polluting must become costly. But how do we transition without damaging the whole value chain?

Mikołaj Budzanowski

We share the same and common vision. There are only positive words about the Commission's work in the last two to three years. However, often, we do not share the same interests. There is a problem at the bottom level. If we want to make certified steel or chemical factories in Europe independent and base our production on green energy, we want to do this from CAPEX. However, it is impossible because of distribution regulations. When we express that we want to be independent, the operators will say that they will lose profitability because we want to be independent. But the industry needs to be independent. It is a very important issue.

Another issue is energy storage, which we need. However, the distribution of energy between the UEs is a problem. Where is the market? Execution is a problem today. There are 27 countries and 27 ideas. This is the real challenge. If we solve this with the European Commission, the business will improve.

Franck Neel

You mentioned three important things: regulation, permitting, and grants. Regulations like Fit-for-55 have worked well for SAF and renewable power by boosting the final investment decision. Grants help renewable power. They reduce the risk of capex and the power price risk.

Permitting is challenging due to cumbersome regulations and a lack of people. The local administration does not have the skills and digitalisation to handle this. Romania has a bottleneck in distribution. There is

money for digitalisation from the European Union. We must look at what we want to achieve with the upskilling to improve the processes.

Dr. Philipp Matthes

The new changes in the European Commission certainly help. There is money that needs to be deployed, and regulation can help companies achieve profitable business cases. We need the correct regulation since long-term planning security is needed for business cases. I miss that when I look at hydrogen and eSAF. A quota for eSAF is good, but what if there is insufficient eSAF?

Franck Neel

We need to check the time needed. You use two years to prepare a project and three years of execution. It is a big commitment. We must ensure feedstock qualifies. Getting technology and the labour force could be a challenge. I am looking for what we can achieve by 2040. I am here; to look for the technology to help us get there in time.

Mikołaj Budzanowski

The Commission's targets and regulations are important, but there are also business-to-business relationships. When we deliver to BMW, we must be 100% green in 2026. The same is true in China. Each customer has different criteria. The business-to-business level is even more important today.

New measures

Kersin Jorna

Put as a metaphor, everyone has started walking, but your shoes are hurting. There are still several problems ahead:

- **Energy prices:** our ambition for AAA energy is affordable, abundant, and at the factory gate. How do we make sure that we get

the power? And the amount of power? There is renewable energy we throw away because we cannot put it into a grid. We must synchronise and get better at this to not block investment decisions; operational and offtake.

- **Derisking:** there is money, but not the right money at the right moment. It is missing in the scale-up, compared to a dramatically new, innovative technology. Draghi argues that we need to mobilise at least 4.5% of GDP to finance the transformation, but we should mobilise our 1% better to leverage private and public money. Leverage is more. We need to give it a new shape, the idea behind the competitiveness fund.
- **Execution:** we are presenting a single market strategy in June to, among other things, speed up implementation. InnoEnergy and we are experimenting with digital containers to put into national administrations to facilitate handling permitting processes. Another tool is a single digital gateway, a hardware connecting member state authorities, which is used to retrieve evidence but could grow for use in permitting. The Parliament is also asking to develop AI to retrieve data. Some member states are creating data spaces where

you would not have to report. Member states must embrace the implementation of a single-market digital system.

I hope everyone feels their shoes will be feeling better in two years. It is not magic; it will require new collaboration formats. There will be new regulations, such as the Clean Industrial Deal, public procurement, and the Accelerator Act. The Commission will stay close to businesses and provide support.

José Noldin

I want to build my plant in 2026, and I hope the conditions will be in place by then. China is beating us; there is urgency.

There are many challenges with the CBAM, but it is actually a very good starting point. We need clear standards on what a green product is, we must invest a lot in clean energy, and it must cost to pollute. To deal with pollution costs, CBAM is a good answer.

Mikołaj Budzanowski

The biggest beneficiary of achieving net zero, according to the European Commission's priorities, is China. 75% of investments are being executed by Asian imports, mostly China. We are missing our domestic industries.

If that is not properly addressed, for example, from a cybersecurity perspective, we will develop a heavy dependence on external suppliers, with overcapacity and overflowing of products. We need to tackle this and give the European industry a chance to succeed. That is very important.

Dr. Philipp Matthes

There is money out there, but it needs to be unleashed on the right projects. We need help from politics to create a good pragmatic regulatory framework that enables us to execute quickly. Politicians can also help with the infrastructure, e.g., a hydrogen backbone. If the target is to sell hydrogen by 2030, it is not enough to make a financial decision. How can you sell if you do not know what customer you are selling to?

We should not add additional costs to the system and be pragmatic. In the US and China, they are more pragmatic, with easy, understandable financial incentives to invest in green tech. We must have clarity on what a green investment is, and that it will stay for the next 5 to 10 years. It needs to be reliable for investors.

Kersin Jorna

The Commission is already playing its role in setting targets, establishing climate law and communications for 2040, and framing the different aspects of the business case. The Commission must continue understanding where your shoe hurts and bring pragmatic solutions.

The energy piece is big. In the case of hydrogen, half of it is feedstock. We need get it into fertilisers and steel. We are looking at standards for green steel, bringing the costs



down, speeding up production, and scaling up. Not everybody agrees on the standards to achieve scale. Please continue to tell us where your shoes hurt as you walk.

Dr. Philipp Matthes

Project certifications take too long and are tough to get only a little bit of money.

Franck Neel

We will face large challenges by 2026 to allocate the money and finish the projects. We ask for an extension since some projects might be penalised. We ask for space.

Kersin Jorna

The glass is more than half full. Support the Commission and help

us get this business case-thinking and new type of industrial policy collaboration going. Regulators and businesses should not be separated. It is a collaboration for an unprecedented challenge, a transformation and decarbonisation of the economy. It is a good moment now. What I see is a push to take this forward and that is the most important.

“ Our first call for strategic projects under the Critical Raw Material Act (CRM Act), we expected 30 ... and then we had 170, which clearly shows the CRM Act has created an ambition to invest in an area where, to be frank, there wasn't much investments.”



Kerstin Jorna, Director-General, European Commission, DG GROW

Roundtable | Reshoring the PV industry: by or despite economic growth, geopolitical resilience, and the clean energy transition?

>> The energy transition positions photovoltaic (PV) technology as one of its fundamental pillars. This represents a significant opportunity to rejuvenate industrial manufacturing capacity. Both the EU and its member states are exploring this potential, with ambitions to rebuild up to 30 GW of industrial capacity. However, the challenge is considerable, given China's dominance in this sector. The roundtable discussed what is necessary to succeed in this endeavour from various perspectives.



Speakers

Moderator: Javier Sanz, Thematic Leader - Renewable Energies at EIT InnoEnergy

Jan Jacob Boom-Wichers, CEO, Holosolis

Olivier Sala, Group Vice President Research & Innovation at ENGIE

Dr. Yun Luo, Co-founder, and CEO of ROSI

Lucas Aranguena, Global Head of Green Finance, Santander Corporate & Investment Banking, Group Santander

Miguel Rodrigo, Director of Knowledge, Development of New Business Models and Competitiveness at IDAE

Penelope Nabet, EU Public Affairs Manager at EIT InnoEnergy

How difficult is it to go for solar PV made in Europe?

Javier Sanz

This is about having an honest discussion about the difficulties in bringing back the PV industry to Europe. Starting on the demand side, how difficult is it for an off-

taker to go for European-made products?

Olivier Sala

Engie's ambition for renewables is bold, adding 4-5 GW per year, with the majority from PV. We have experienced problems in the supply chain in recent years. Prices increased by about 50% between 2020 and 2022. We are open to Chinese PV, while new entry barriers exist in major markets like the US and India. Demand is growing at a fast pace of around 30% per year.

The current procurement strategy aims to mitigate risks and problems in the future due to regulatory, raw material, and geopolitical reasons. We diversify our suppliers while building strong partnerships and ensuring compliance with regulations and sustainability. Our goal is to accelerate the energy transition by providing affordable green energy. To mitigate risk, we need to localise more PV in Europe.

Javier Sanz

With Olivier's points, let's look at the supply side. How difficult is it to close fundraising to develop your products in Europe further?

Jan Jacob Boom-Wichers

Fundraising is complicated, considering the economic situation in Europe. The recent French elections created instability in the process. However, the process is starting to generate solid non-binding offers from investors because the NZIA was passed. Member states, including Italy, Austria, and France, are implementing rules that favour models Made-in-Europe. Some provide incentives, other tax breaks, and other tariffs. This generates financial visibility for IPPs, resulting in orders and confidence from investors. The loop starts with regulation, which drives the orders and funding. It is a clear pattern.

Dr. Yun Luo

A sustainable business is not working towards fundraising, but fundraising is a tool to achieve

our dream and ambition of a sustainable business.

ROSI is engaged in the development, industrialisation, and operation of recycling end-of-life PV models, and we can recycle all valuable materials except polymer. Our products have reached the highest purity and quality in the market.

The way ROSI contributes to the reshoring of PV manufacturing could be a model for others:

- **Confidence in innovative technologies:** we have lost the PV manufacturing race regarding operational excellence, cost reduction, and vertical integration. Today, it is clear that the European legacy is innovative technology. We should develop our own technology as an anchor point for reshoring European PV manufacturing.
- **Co-construction:** all actors must work together. It is not easy, but we must ask for commitment and contributions to make reshoring PV happen. Anchor points are in co-construction and confidence in innovative technology.

Javier Sanz

Why do we feel like money is not accessible? Are the conditions the problem?

Lucas Aranguena

Much capital has been deployed to finance solar plants. Now, we need to decide how to finance the entire PV value chain in Europe. What we are trying to solve is a billion-euro challenge. We will need equity, grants, and different forms of debt.

Our role as a bank is to prepare companies to raise equity and debt. We help them face the private equity capital market and give them access to strategic or financial investors. A lot of debt will need to be deployed to build the value chain and come in the form of non-recourse financing, structural debt, and project financing. What is needed for this is unfortunately a long checklist in two main areas:

- **Ensuring that the plant will work:** we must ensure that the supply chain provides the feedstock needed. We often need an EPC contract to ensure that the engineers building the plant provide some performance and financial guarantees that the plant will work. We also need to mitigate technology, ramp-up, and scale-up risks.
- **Offtake:** is there a demand for the product? Banks want to see contractual agreements that make off-take binding. The further down the value chain, the less likely we will have long-term off-take agreements. Large buyers of solar panels do not buy more than five years out. This will be a bit of a challenge even if we see more buyers go into binding agreements.

The role of the public sector

Javier Sanz

How will regulation be implemented, and what is the rationale behind it?

Penelope Nabet

The ambition to re-shore has been clearly stated multiple times, especially by the European Commission, and we also see more member states vocal about it, so the objective is strongly aligned. The EU is ready to take action to support that ambition, as seen with the Green Deal Industrial Plan. Other levers that can be mobilised are public finance, trade policy, and skills. Now, we must implement them correctly and fast. Non-price criteria involving public money will be developed by March 2025 and could be implemented as early as 2026.

Miguel Rodrigo

The EU has provided national energy and climate plans to ensure the union achieves renewable targets and energy efficiency and gives a clear signal to all stakeholders. In Spain, we have increased our ambitions in all branches of the energy transition. The target is to have 48% of energy from renewables by 2030, which includes 81% of renewable electricity generation. We have doubled our ambition for wind power and increased our targets for



battery and EV. For PV, we aim to have 76 GW of PV installed in Spain by 2030.

There is a huge market for solar PV in Spain, and we want solar production made in Europe. All actors across the value chain must talk to each other. The Ministry of Industry has also pushed for industry and autonomous strategy to create the regulatory and planning framework that, combined with the appropriate financial incentives, creates an environment that makes investments in the value chain happen.

Penelope Nabet

There is a fine balance between restoring the industry and keeping up the pace of PV deployment to reach our climate targets. This is a tough political debate that needs to happen and is currently crystallising. We can be optimistic about balancing supply and demand, particularly thanks to the NZIA.

Implementing regulation

Jan Jacob Boom-Wichers

We are building a 5 GW solar module and cell factory in eastern France. This factory will be able to supply one-eighth of Europe's demand. What we need are regulations. It is already clear that energy sovereignty is necessary. PV and wind are the current renewable energy sources that can deliver on the demand at a low cost and scale.

Spain and France are developing regulations that will create incentives for off-takers to work with products made in Europe. Manufacturing in

Europe will be more expensive than in China due to their cheap labour, but we need to compete. Currently, the weighted average cost of the solar panel system over a 30-year period is very low compared to the past, regardless of whether it was made in Europe or China.

So, what is important for Europe? Do we want energy sovereignty? Customers hit hard by the increase in energy prices due to the war in Ukraine are not worried about the cost of the solar panel system. However, they are worried about the availability of solar panels if there is a war between China and

“European rights is a way to create differentiation.”

Jan Jacob Boom-Wichers, CEO, Holosolis

Taiwan. Regulation can create an environment for off-takers to find economic logic for investing in European innovations. Non-price criteria such as value chain and carbon footprint. The mechanisms exist in Europe; we just need to implement them.

Dr. Yun Luo

At the end of the day, it is about money; for a business to be sustainable, it must be cost-effective. How do we get there? We are more expensive than the Chinese, but there are solutions, like large-scale automation and producing our own sustainable, renewable energy.

When we talk about production lines, uptime is key. The point is to maintain operational excellence with both existing and new technologies. Industrial actors with know-how and legacy can draw a roadmap together for the financial decision-makers to show how we go toward sustainability. Cost-effectiveness is important. The policy is a friend. We need rationale and objective thinking to build this roadmap together based on technology and collaboration.

Olivier Sala

Implementing NZIA will be a challenge. We can all agree that it is in our common interest to create the conditions for a PV industry in Europe. It all boils down to the end customer who does not want to pay double or triple the cost compared to Chinese-made products. We really need to work on how to implement the non-price criteria, the sustainability, resilience, and sovereignty factors. We will see whether we succeed in the next six months or if we, again, had great dreams and principles but were unable to implement them.

Penelope Nabet

Implementing NZIA is about resilience, with the most effective criteria being diversification and made-in-Europe. The second is sustainability, focusing on the highest added value of the European industry today, such as carbon footprint, recycling, and traceability. Traceability is the next big thing on the regulation agenda as it will enable fair competition. The third aspect is socio-economic requirements. Nothing new, but we must get them right.

Miguel Rodrigo

To get the implementation right, we need simple, objective, and



easy-to-verify factors to check, but this is not always evident. I expect clear legal boundaries for member states from the Implementing Act. We are dealing with the World Trade Organization, and it would be very helpful to clarify what member states can and cannot do. This would have an impact on the resilience and environmental factors if we decide to focus on the environmental footprint already in use by some member states.

We have many requirements in Europe and do not want forced labour. But how can we check that a supplier is reliable? The regulatory framework helps to assess the risks of raw materials. Sometimes, suppliers will be reliable, and others will not. In the end, off-takers need to be able to deliver.

Javier Sanz

In terms of implementing ESG criteria, particularly for labour conditions, how do you visualise that in your off-take? And how do you plan to protect the way of things we have in Europe?

Olivier Sala

We inject more requirements into our procurement strategy, including sustainability and labour conditions. Leveraging a regulatory framework is instrumental in checking whether what a supplier says is true. We also need a bill of materials. We have hidden risk exposures as we ask for the information but do not always get the full picture explained. We keep raising the bar in procurement. European localisation means visibility and another level of confidence that does not have anything to do with a document from China.

Jan Jacob Boom-Wichers

If you want to get a bill of materials, you can get it. The problem with it is its traceability because you will not be able to go for inspection of, for example, forced labour in certain parts of China. The only way to provide a clean bill of materials is to use, for example, silicon that comes from somewhere else, such as Germany. This is how the US is systematically

approaching the bill of materials. However, the bill of materials adds up and can be 60,000 lines long, which is impossible to analyse.

We need simple methods that the European Union can use to check whether something was done properly. If we look at sustainability, for example, the big topic that we are not addressing is social sustainability. It is not only about forced labour, but there are a lot of aspects about the way the societies of other countries are based and whether they respect the same rules that we have in terms of human rights. Questioning whether the product respects the principles of the fundamental declaration of European rights is a way to create differentiation. If you make the differentiation in equipment, China will always find a way to bridge the gap. You must create barriers that are difficult to cross.

Parallel session | Emerging Battery Applications: catalysts for economic growth and value chain expansion?

» While the adoption of electric vehicles (EVs) has been the primary catalyst for the growth of a domestic European battery value chain, there are emerging indications that other applications and sectors will become significant drivers in the future, particularly as EV sales numbers begin to stagnate. The market for stationary storage systems (ESS), essential for the clean energy transition, is experiencing exponential growth, with China and the US leading the way, surpassing the growth of EVs. Will Europe witness a similar trend?

The potential growth of new sectors should not be underestimated. However, this raises questions about the future demand for battery materials and Europe's geopolitical resilience in developing new growth opportunities amid a slowdown in EV demand.

This parallel session delved into how novel applications, innovations, and business models, supported by regulations emphasising sustainability and circularity, can propel the growth of a European battery value chain.

Speakers

Matthieu Desbois-Renaudin, Co-Founder and President at WattAlps

Mikołaj Budzanowski, Vice President for Development of Boryszew S.A. Capital Group

Ewelina Daniel, Policy Officer, DG CLIMA European Commission

Olivier Brosse, Platform Global Leader, AmpR Medium at Ampere

Adrian Polec, Chairman and Founder of PRIME

Thore Sekkenes, European Battery Alliance Program Director, Industry at EIT InnoEnergy

How customers demand batteries Thore Sekkenes

Last year, 80% of batteries went to EVs. The outlook for 2035 is that 60-70% of batteries will be produced for something other than EVs. This is why we must start talking about these other applications now. For example, BESS stationary storage enables renewable energy sources to operate more efficiently. There are also industrial applications, from drills to lawnmowers and the transportation sector.

What changes do you expect in a battery when moving from EV to stationary or yellow machine application?

Olivier Brosse

An EV has deeper energy gravimetric and volumetric density constraints than an energy storage, heavy-duty truck, or commercial vehicle. Cyclability is less of a problem as long as the vehicle reaches its full life. The common goal is to develop cheaper battery solutions. A vehicle could also be seen as a battery on wheels and use the battery for a vehicle to read applications, which is when cyclability becomes a common issue. We must follow up closely on the developments in energy storage and commercial vehicle applications. We should build an efficient supply chain together in Europe with enough scale.

Thore Sekkenes

You have developed batteries for transportation, although not for EVs, and stationary storage. What are your thoughts on the shift from an EV battery focus to storage and other applications?

Adrian Polec

It is not easy to switch. When we started, we developed C11. Then we changed to LFP. After that we changed back to NMC because of LFP's technical characteristics. At one point, we saw that people cared about what was inside the battery and its type of chemistry. However, now, people treat it as a black box and mainly care about the overall cost per storage over the lifetime of the battery.

Industrial applications definitely need energy density, which NMC provides. The automotive industry also needs energy density.

Thore Sekkenes

Do your customers care about NMC or LFP? And what about a solution for cooling batteries?

Matthieu Desbois-Renaudin

They are more educated now. In the past, their concern was only euro per kilowatt-hour. For tough applications, people were disappointed when testing lower-cost batteries that could not meet their needs due to overheating or shorter lifespans. Customers are now looking deeper into the applications, which helps us explain the advantages of our technology. Some customers have reasons to stick to LFP or NMC. The most advanced thinkers seek the best technology for its application to fulfil the job to be done.

We immerse the cell into a fluid to control battery temperature to control the life and performance of each cell. It took eleven years of R&D to find this solution and get the product working. Customers really



like the product. Now, our focus is on cost reductions for parts and supply. We are scaling up and hoping to find more applications for our product.

Public support for batteries
Thore Sekkenes

On 6 December 2023, Maroš Šefčovič announced that the Commission would set up a dedicated instrument for the battery value chain under the Innovation Fund, mounting up to €3 billion, for three years. When will we see it happening?

Ewelina Daniel

The Commission has committed three billion euros to batteries under the Innovation Fund. We have been discussing with the industry and the Commission how to best implement this. We aim to open the call in December 2024. There will be a selection procedure, several lucky winners, and an investment decision. We know we must act fast, that time is of the essence now. If it is not in the next month, some players might leave. But yes, it is going forward.

While this lies under the Innovation Fund, the projects need not be new or breakthrough innovations. They can be scaling up innovative technologies. We are looking for cell producers/manufacturers

and applications in EVs. The sustainability and resilience of the projects are key, not just the price.

We do not plan to apply the model of the hydrogen project, where competition was purely on price, although it brought wonderful results. It was truly an eye-opener for many that hydrogen can be produced that cheaply in Europe. They have learned lessons from the Hydrogen Bank.

Batteries Made in Europe
Thore Sekkenes

What are the most important parts of the Draghi report?

Mikołaj Budzanowski

After Covid-19, our OEMs were not receiving shipments from Taiwan for several months. This created a huge delay for consumers to receive their cars. Audi had around eight months of wait time. We were too dependent on external suppliers.

Today, we have shifted our focus. We look at price, of course, and are agnostic about the technology. What is important for us is where the battery is produced; whether the components are produced within Europe.

The Draghi recommendations are very intelligent, and I hope the European

Commission will adopt some of them. Where products are produced is important. It is not about obtaining a green certification because that is very easy to obtain from the factories in China, and we do not know for certain whether they are green. We have learned from experience that all components should be produced within our borders.

Regarding dual-use batteries, we have supported the Ukrainian troops with batteries for their soldiers at the front line. They need a source of energy to charge their laptops and mobile phones. It is for their safety and the independence of Europe.

Competing with China and the US
Thore Sekkenes

To further build on your point, could making batteries for energy systems be seen as a strategic product, justifying our need for control over their production?

Ewelina Daniel

Yes, you can make this case. To think that the electric mobility transition would happen without batteries made in Europe is a disaster. If this is not building the case strongly enough, the next argument is energy storage. If not produced in Europe, they could be controlled remotely and more vulnerable to cyber



security issues. The case should be made just by these two alone, but dual defence is also super important. I would not let it get to that but argue for European-made batteries simply because of the mobility transition and cyber security.

Adrian Polec

Batteries are critical. You cannot have renewables without batteries. One main reason for moving from automotive to energy storage was that electrochemical storage is currently the most efficient way to store electrical energy. I often give an example from our customer who had 40% of total product cost was energy. They invested in photovoltaic and batteries, feeding the electricity of their factory that is running 24/7. Instead of an energy bill, they have a 5.5 year-bank loan, which reduced their cost by 80%. The solar panels have a warranty of 25 years, giving them almost two decades of free energy. Besides reducing CO₂, this is why we are pushing for competitive advantage and change to renewable energy. 200 years ago, countries with abundant coal had an industrial revolution. 100 years ago, there was oil. Now renewable energy is taking this spot. Fusion may take the majority share in another 100 years.

But for now, we need batteries to support renewables. For the economy to be competitive, it needs renewable energy as its main source.

We are currently building a 260-megawatt battery, competing with a producer from China. We must go into technical details to understand how this works. The Chinese producer is building a globalised product, a containerised system that can work in countries with temperatures ranging from -20 to + 60 degrees. Temperature is very important for batteries, so it is almost impossible to make an efficient system with such a wide range of temperatures. Therefore, their efficiency is around 85%. Our batteries are built for being placed inside buildings with very little energy loss, enabling a 90-94% efficiency. Because of this 7-9% efficiency difference, even if the Chinese producer gave our customers their batteries for free, it would be more expensive for them over the lifetime of the battery to operate the Chinese batteries.

Matthieu Desbois-Renaudin

We must source cylindrical cells from Asia because we cannot find them in Europe. Companies are

announcing they will start producing cylindrical cells but have had to postpone because of their difficulties in developing them. We hope to see newcomers and big players capable of manufacturing in Europe so we can solve the supply chain issue, which is clearly a big topic to solve.

Innovation brings more and local supply, which brings value. We still need a balance as we cannot compensate for too high of a cost for innovation and local services.

Adrian Polec

Everybody talks about automotive. The next big thing is robots that will work in factories. We have already started to ship 1.5-kilowatt batteries for robots. Nobody talks about them yet but they are coming.

Ewelina Daniel

The Innovation Fund is targeting to open with €1 billion this year. We want the focus to be cell producers, with cell manufacturing and application in electric and heavy-duty vehicles. Also, vertically integrated and recycling projects are value-added. In the EU, we cannot do it IRA-style. We will launch a call for proposals with five award criteria that look at cost-efficiency, the

“ We need batteries to support renewables. For the economy to be competitive, it needs renewable energy as its main source.”

Adrian Polec, Chairman and Founder, PRIME

degree of innovation, the abatement, the replicability, and project maturity. Normally, evaluation takes a couple of months, but you can expect some results in the autumn of next year.

Minimum recyclability requirements will become part of the battery passport to further a common approach to battery recycling. The Innovation Fund also has a couple of promising recycling projects.

Adrian Polec

At the moment, it is not profitable to recycle, but it will become. The

reason is that there are not enough batteries to recycle.

Matthieu Desbois-Renaudin

We design our batteries for use as second-life batteries and recycling.

Olivier Brosse

At Renault Group, we work under the motto “The future is neutral.” This motto concerns the supply chain and circular economy. We see many applications moving to LFP from an OEM perspective, creating an irreversible trend. We are producing €30,000 EVs, and if we

must switch to LFP tomorrow, there is no supply chain for the cathode in Europe. So, how much will China control us once we start building LFP giga-factories in Europe?

With the shift to LFP and major volume coming from OEM, will it also cover energy storage and potential commercial applications? Regarding recycling, LFP has less raw material value at the end of battery life, pushing recycling out longer to reach profitability.

November 17, 2024

Keynote speaker | Maroš Šefčovič, Executive Vice-President, European Commission

» It is essential to boost European business and help them decarbonize. After the Russian invasion of Ukraine, there was an energy crisis and the Commission launched the REPowerEU plan to boost renewables, diversify supply, and increase energy efficiency. We have reduced dependency on Russian gas to only 15%.

Our goal is that by 2050, the EU will be the first climate-neutral region. The cleantech market in the EU is worth €700 billion. It is crucial that Europe stays at the forefront of the

clean transition to remain competitive on a global scale. The framework to achieve this is the GDIP, which has three pillars: NZIA, CRMA, and a reform of electricity market design. It will help us bring resilience and market competitiveness.

Von der Leyen has made it explicit that the Commission is looking at how to combine competitiveness and decarbonisation. There are challenges ahead; energy is expensive, and we have some critical dependencies. Private funding needs to go where it is needed. In conclusion,

competitiveness will be a key factor in the coming years.



Keynote address | Gwenaëlle Avice Huet, Executive Vice President, Europe Operations, Schneider Electric

» We must continue targeting European decarbonisation despite crises and questions concerning the geopolitical situation, competitiveness, sustainability, and energy transition. We want to focus our discussions here on further progressing the energy transition. As the Draghi report suggests, we must accelerate in skills, innovation and energy. It is a wake-up call. If we fail, we will lose ground to competition worldwide. We must bridge the skills gap and how to accelerate skills deployment across Europe. We must also talk about innovation, investment, startups,

and collaboration. The third aspect we must find solutions to is turning our ambitions into concrete actions. We have high and ambitious targets, which is great; now, we need concrete actions and investments.

Skills

We do not have a crystal ball for solving the energy transition regarding new business models or technologies, but we know we must prepare our workforce for the future. We need a million solar workers in Europe by 2030. We will need to reskill 18 million people for the energy transition to work on

batteries, heat pumps, electrification, and hydrogen. It is the responsibility of policymakers and large companies to invest in the transition to re-skill people. We must re-skill many workers in very few years to make the transition happen.

Innovation

Our R&D intensity in Europe is 2.2% of GDP, which sounds good, but is it enough when comparing Europe to South Korea, Japan, the US, and China? No, we are far behind. This should be a wake-up call for investing a lot more in innovation. We need policies that

foster innovation spend. We need InnoEnergy to help. Startups must be able to believe Europe is the place to be because investments will be fulfilled. Large companies must accompany this. For this reason, we have set up Schneider Electric Ventures. We will discuss with the startups at TBB to learn their options for the energy transition. Our venture is rich in expertise to help startups with their go-to-market strategy and technology scaling. We have dedicated €1BN to this fund in which we invest in over 40 companies. We must think about innovation in terms of scaling and collaborating.

Action

Europe has lots of passion, ambition, and energy. However, we must look at the numbers. We want to reduce greenhouse gas emissions by 55% and increase renewable energy by 42.5% by 2030. This is great; these are large numbers. 2023 was a record year in Europe for developing and installing renewable energy. The energy transition is happening in Europe. But it is not enough. The wind industry is developing 17 gigawatts annually, but we need 30 gigawatts annually to reach our 2030 objectives.

In terms of hydrogen, electrolyzers have increased across Europe; more than 200 megawatts were installed last year. However, if we keep the same rhythm, hydrogen will produce 1 gigawatt in 2030. Looking at the EU plan for REPowerEU, we need 40 gigawatts. We are doing well, but

it is not enough. How do we accelerate and turn these commitments into reality? The Draghi report explains the importance of concrete actions, reduced administrative processes, faster permitting, re-directing investments in the right technologies, and fostering European industry champions. This is the future, and we cannot jeopardise that. We need collaboration, investors, startups, and big companies. We must keep this know-how in Europe; it is our

“ We need heat pumps, microgrids, wind, renewables, and nuclear; we need all the technologies together, not just one.”

Gwenaëlle Avice Huet, Executive Vice President, Europe Operations, Schneider Electric

future. We must turn ambition into action as a collective effort.

Where to invest, then? We must electrify the world, and especially Europe. We need heat pumps, microgrids, wind, renewables, and nuclear; we need all the technologies together, not just one. Only 25% of the industry is electrified today. We could electrify 50%. Some things, like steel and cement, cannot be electrified. For these, we need hydrogen to decarbonise. We must, therefore, think of complementary alternatives and invest in those different technologies in addition to electrification technologies.



To realise our commitment, we must approach the energy transition in three pillars: electrification, hydrogen, and control demand. We need to work on energy efficiency via digital or software integration. Most importantly, we need collaboration. Schneider alone cannot make it happen. InnoEnergy’s startups, large companies, politicians, and the entire ecosystem must work together

in this direction. At Schneider, we have launched the Energize program, decarbonising pharmaceutical industry suppliers. 300 suppliers, including Pfizer, Sanofi, and GSK, have committed to this program. We are doing something similar for the electronics industry.

Let’s believe in Europe’s power to decarbonise the world and the leadership that we have. We must focus on what will make us different: re-skilling our people, investing largely in innovation and scaling it across the board, turning ambitions into actions. To achieve this, we must collaborate.

Roundtable | Industrial Champions, a “Made-In-Europe” Strategy Description

» Through an enhanced regulatory framework, new public and private finance toolbox and more ambitious entrepreneurial spirit, Europe is nurturing a fertile ground for industrial unicorns—start-ups valued at over \$1 billion—to thrive and lead globally. This “Made-in-Europe” strategy underscores a commitment to net zero, illustrating how innovation can harmonise economic growth with decarbonisation on a transformative scale. During this session, the panel shared their perspectives on the different ingredients that have impacted the creation of Industrial Champions in the EU.

Speakers

Benoit Lemaignan, Co-founder & CEO at Verkor

Gwenaëlle Avice Huet, Executive Vice President, Europe Operations, Schneider Electric

Alessandro Izzo, Director of the Equity, Growth Capital, and Project Finance of the EIB

Lucas Arangüena, Global Head of Green Finance, Santander Corporate & Investment Banking, Group Santander

Moderator: Linda Nyberg

Challenges of champions

Linda Nyberg

Verkor was created in 2020 and has already achieved Unicorn status. What is your plan going forward?

Benoit Lemaignan

We are at an interesting but complex moment in time. Facing headwinds and a global ESG mood hesitation. We must stay on course and face challenges extending to moving from ideas to execution.

At Verkor, we discuss how an industrial organisation goes from a start phase when everything is easy to the build phase, when you need to pour concrete and have machines, and then to the run phase. You do not need the same management for these phases, but you must use them in the right order, or you are dead.

We are in between the build and the run phase, and this deserves a different organisation and different people. Somehow, it means we are becoming a normal company. It is less fancy and more about processes and execution. Like at Schneider, many processes might be painful for some people, but they bring efficiency, execution repeatability, and a collective capacity to execute. Companies must deliver on small, simple objectives that we then bring to the bigger community to trust.

On top of that, Europe is in a difficult moment because of our lack of resources and challenges from the US regarding energy costs and China regarding a different playing field or lack of competitiveness because we do not play by the same rules. We must realise this and stop being naïve. I am asked to sell batteries in Europe at the same cost as Chinese batteries. This would be easy if someone else paid for my CAPEX, labour, and energy. Our customers are looking at the bill and their options. We must be mindful of this. The challenge we have internally is to organise a company to be extremely efficient in delivering the project on time. The rest is marginal.

Gwenaëlle Avice Huet

When large and small companies collaborate, many processes are difficult to navigate. At Schneider, we set up SE Ventures to protect small companies from being lost in these processes.

As the Draghi report showed, we have a big problem with 3-5 times higher energy costs than the US, penalising our industry. We also have fewer resources than other countries, like China and the US. Are these reasons for giving up? We have strengths that we must base our strategy on. We are doing well in several technologies, including nuclear. We have started our work on hydrogen and are progressing. We are doing well in renewable energy.

Now, we must protect this know-how and those champions. There is a sense of belonging in Europe and strong support from policies and investors to ensure these champions stay here. We must be scared of what is happening with Northvolt now. We are not protecting this technology know-how. We have to make decisions, and my conviction is that if we want to make the energy transition happen. Technology is one strength, but we have not yet found a way to protect it. We must ensure these technologies become our champions and can be exported globally.

Another element is everything we have done regarding electrification that is happening faster in Europe. Let's make it concrete and realise it. We must continue to bet on some technologies. Hydrogen is an example. We have talked about it for ten years. Now, the mood is down.



Sometimes it is up, and sometimes it is down. We are waiting, but we should always remain focused. The story of hydrogen is the same as we had in wind and solar ten years ago. We need to believe in it and remain focused. Hydrogen is indeed more costly but with digital twins and software embedded from development to operations and maintenance, we can drastically reduce CAPEX and OPEX.

We must remain focused on what makes us different.

Staying committed, focused, and resilient

Linda Nyberg

How is what is happening to Northvolt affecting investment, support, and the rest of the industry?

Gwenaëlle Avicé Huet

It is affecting the mood. Beyond Northvolt, there is a question about the balance of competitiveness and sustainability. At Schneider, we will not change our strategy on sustainability—we have focused on it for the past 18 years, and it remains our commitment. We need players who commit regardless of

what happens. There are always challenges—COVID-19, geopolitics, and now the question of investments and the Chinese battery companies.

Lucas Arangüena

At Santander, the climate challenge has been at our core for 20 years. We went from basic renewable technologies and expanded into hydrogen, batteries, carbon capture, food tech, EV charging, and clean mobility. We hired experts in all those technologies. We started with the engineering capabilities, financial resources, and regulatory framework, and these are still at work today to make the energy transition happen.

Geopolitics is a major topic. The situation in Ukraine was a wake-up call for Europe that we are energy dependent. It was not on the agenda five years ago but is not at the top. The reindustrialisation and prosperity of Europe are also near and dear to our hearts. When we put everything in the mix, the business case for pushing the agenda forward is more compelling than ever. We must remain focused and resilient. It will not be a straight line, but that is why we call it a transition—there is no

linear transition. Our agreement and commitment to the energy transition agenda have never been stronger.

Four years ago, when we were raising equity capital many investors trusted their gut feeling. Now, raising equity is super difficult with very thorough due diligence. In the past, many investments were not sound, the technology and product did not work, and the lifecycle analysis did not exist. We are experiencing a painful process, but we will come out much stronger. There are a lot of greatness and excellence in this room, for example. We are part of this ecosystem because we really believe in it. It is remarkable what you have achieved. Europe was made up of large, spin-out, and growing businesses, but there were no unicorns. We did not have entrepreneurs building unicorns and billion-dollar companies. Now, there are a few of them. Unfortunately, there is not enough as we need 5000, not 5. We need to scale up, and that is why it is great to see people meet here to do deals and one-on-ones. We need more of this.

Alessandro Izzo

At EIB, we see it from the perspective of being a technical

“ Microgrids is definitely something we see in the US. We can learn from them even if the US’s electricity and power system is different.

Lucas Arangüena, Global Head of Green Finance, Santander Corporate & Investment Banking, Group Santander



bank. Benoit knows how painful our teams can be in drilling down the technology and industrial aspects. However, that is what scaling up is about: having the toolkit of products that follows through on the capital injection. For a company to remain a unicorn and become a decacorn, you must win the industrial challenge, and this is what makes some ventures stable and successful while others weather storms differently. This is where we put our attention to the investment thesis. It is great to have growth ambitions, but the focus should be on getting the technical and industrial sides of the operations right.

We are in it for the long run. We are a technical infrastructure bank; we do not write hypes of quick, high valuations to cash out on multiples in two or three years. We see our investments as journeys of long paths matching the paths of industrialisation and regaining European competitiveness. Our commitment to innovation, climate tech, and climate transition remains the same, if not even heightened by the current situation and challenges in the market. We are a patient, long-term supporter of the industrial champions of Europe.

Benoit Lemaignan

The hype of investing in AI companies without a business plan, product, or customers is over.

The EIB is not an investor, banker, or lender. It is a partner, and I encourage all entrepreneurs to see it early in the process. It has many solutions that are not easy to understand, but it is in it for the long run and helps improve the business case by pointing out the good areas and challenges.

Execution is core. We have two separate teams for exploration and execution. In the early phases, it is challenging to move from an opportunistic to an execution approach because you must realise how you, as a leader, impact the internal organisation. What may be clear for you may be unclear for others.

I do not like the concept of a unicorn. When you raise money with preferred shares, the company's valuation is not a multiple of the last round's shares times the number of shares. When you do the math, many unicorns are not actually unicorns. We are not raising money to be a unicorn; we do it to create a factory, serve customers with green batteries, and accelerate the energy transition.

Let innovation lead Linda Nyberg

I like the word unicorn because it summarises your success. I also like the theme of this panel, industrial champions, because that is what you do and talk about. Is Schneider interested in other sectors in the green transition to find more industrial champions?

Gwenaëlle Avice Huet

We have not yet talked enough about microgrids, a combination of batteries, solar, and software that optimises production and consumption in real-time at a given place. In the US, they are deploying microgrids relatively quickly. We increasingly see that our customers want to own and produce their energy. It is a big trend in the US to produce where you consume. There are policy incentives to encourage this. We talk less about it in Europe even though we see more requests. It will take off in Europe, too, because energy consumption will continue

to increase, especially due to larger data centre consumption. We must add new generation capacity, but we also need to look at the demand. We need more systems embedded directly on the site where you optimise consumption and production. When you have a production surplus, you reinsert it into the grid. The challenge is that regulation is not yet enabling these microgrids to take off.

When you develop a microgrid, your business plan resides not only in your own consumption and production capabilities but also in the ability to sell back to the grid. It is a big trend; consumers also want to produce their own energy.

Lucas Arangüena

Microgrids are definitely something we see in the US. We can learn from them even if the US's electricity and power system is different. We have decided on the technologies in the six verticals we focus on. We stay away from "either/or" but believe in all energy and call it "all of energies".

Europe should be less prescriptive about what the right technology is and let the market decide. Innovation should lead the way.

Alessandro Izzo

EIB also looks at how we can support ourselves with financial innovation to support novel technologies. In many asset-heavy verticals, there is a need to help optimise working capital to quickly scale up, such as heat pumps and batteries. One example that we are launching together with financial institutions, is guarantees to de-risk the working capital facility build-up of companies. The idea comes from startups in the electricity transition supply chain.



Fish-bowl session | WATT is the problem of AI

» Data centres are significant energy consumers, with a hyper-scale data centre consuming as much power as 80,000 households. Over the past decade, data centres operated by companies like Alphabet, Amazon, and Microsoft for cloud-computing services have accounted for only 1-2% of global energy demand. However, the introduction of Bitcoin and the explosive growth of AI are transforming the landscape. As digital and AI technologies penetrate all industries, their growth is exponential. In a high-growth scenario, data centres and digital infrastructure could consume 10% of all electricity generated. Does this mean your Electric Vehicle may need to compete with your Chat GPT prompt for power? In this session, the speakers discussed current trends and advancements of innovative solutions, such as data centres on the moon.

Speakers

Herve Hellez, Power Europe & France Strategy Leader at Schneider Electric

Julia Padberg, Partner, SET Ventures

Simone Accornero, Co-founder & Chief Product Officer at Flexidao

Mihir Sarkar, Head of AI, ENGIE Research & Innovation for AI

Jef Caers, Founder of Stanford MineralX and Professor of Earth and Planetary Sciences at Stanford University

Prof.Dr.ir. Frank Gielen, EIT InnoEnergy Education Director

AI as an opportunity for the green transition

Frank Gielen

In this session, we want to discuss two topics: 1. What is the impact of the growth of AI on sustainable energy transition and climate change? What does it mean, and

what can we do? and 2. Where will AI make a significant difference in the energy transition and speed it up?

From ENGIE's point of view, what are your approach and solutions to AI's impact on climate change?

Mihir Sarkar

We often discuss the challenges and positive impacts of AI on climate change. One lens that we look through is the lifecycle of energy projects: from construction and design to land use, engaging with stakeholders, running the power plants, understanding production and consumption patterns, the health and safety of running and maintaining the operations, CSR, and ESG. We consider how different AI algorithms and models can help in these areas.

Classic Machine Learning uses numerical data and is prevalent for the time series data that our equipment generates. We also have knowledge coming out of documentation, for which we have Generative AI models. An area we could use AI for is image recognition to identify and inspect defects and design power plants and their setups.

For each use case, we look at AI's positive and negative impacts, the challenges they bring, and each model's return on carbon investment. We try to keep a positive impact on all AI activities we have. We also look at the convergence of these new technologies. For example, Open AI's roadmap for large-scale development started with ChatGPT chatbots and moved on to reasoning systems. Now, they work on intelligence agents that can act based on the recommendation of an AI model.

In addition, we look at the impact this has on the organisation and society. Generative AI impacts individual productivity and performance, but we do not see large-scale organisation and process change in an AI transformation as we saw with IT, data, and digital transformation in the past. One of the next steps will be finding how to embed AI into our daily activities, specifically for energy transition activities and functional activities like HR, finance, and procurement. Both areas will have models that converge, but there is no silver bullet, so we must use the most optimum model and the one that consumes the least amount of energy in training the models and using them.

Herve Hellez

Efficiency has been a key driver for the data centre industry. At Schneider Electric, we work across industries and see it being more concerned and advanced about sustainability and efficiency. There has been a significant increase in efficiency over the past couple of decades. Regarding the infrastructure perspective, many players, whether data centre operators or internet giants, look at improving power usage effectiveness from electrical management and building perspectives. In the past, the average power usage effectiveness had a factor of 2. Today, this has improved in large data centres to around 1.1, meaning about 90% of energy goes to IT instead of other things.

Today, there is a hunger to compute, changing the paradigm. We already had a hunger for storage, servers, and clouds,

“ There is much value to gain in finding a better collaboration between the data centre and utility and energy industries.

Herve Hellez, Power Europe & France Strategy Leader, Schneider Electric

creating a major driver for the growth of data centres. The data centre industry would grow double digits only based on cloud usage alone. AI has pushed the boundaries and inflexion point in terms of the level of computing we demand. The key question is what we use the compute for. If we



look at the inflexion point and the additional requirement, efficiency is not enough anymore. We cannot sustain the growth of the data centre industry just by efficiency.

There are different solutions. Modernising existing data centre parks can free up much capacity. Entrepreneurs are finding ways to bring sev generation to data centres, which customers are really excited about and even talk to TSO's about having their own transmission lines. Schneider believes there is much value to gain in finding a better collaboration between the data centre and

the utility and energy industries. There are many solutions, and the answer is not which solution to choose but to put them all into the equation.

Frank Gielen

Where are the current startup opportunities?

Julia Padberg

Cloud computing and AI use 1.5% of global electricity consumption, which is predicted to more than double in two years. Currently, about 40% of this consumption is powered by renewable energy. The good news is that this number will increase as many large data centre companies have publicly communicated their renewable energy targets. More than \$50B will be invested in the US alone to power data centres. This volume increase in renewable energy will decrease the cost per megawatt hour.

In the short term, the investment opportunities are in AI infrastructure, which is not for venture funds like us. In the longer term, the real value will be in the applications on top of AI, similar to how Facebook is now more valuable than Cisco, which provided the structure.

There is a huge opportunity to accelerate the energy transition by applying AI in the energy sector. While AI consumes a lot of energy in data centres, it reduces it in other sectors.

Frank Gielen

What should we expect from hyperscalers in the short-term?

Simone Accornero

We must consider what it means to consume renewable energy. We cannot track electrons, that is why we rely on guarantees of origin and book of claim systems. As we electrify across industries, and bring additional loads like in the case of AI, what does it mean to be a green AI, a renewable-powered AI? This is top of mind for the industry right now. Google, for example, is a proponent of the 24/7 strategy of matching renewable energy production to loads on an hourly and local basis. Amazon takes a different approach and believes that

CO2 is global and follow an offset-based system. Since all companies have 2030 targets, what does it really mean to use renewable energy and be able to say the AI a company sells is renewable-powered?

We are at a pivotal moment in time. Scope 2 is under review, the rules are being re-written and a new definition will be in place by 2027. This has a significant impact on how hyperscalers will buy renewable energy, how suppliers will define their tariffs, the guarantees of origin systems in Europe, and CBAM.

The energy transition means electrifying, and it must be followed by renewable energy. Questions such as, if I consume energy in Spain, what renewable energy am I allowed to procure? Can I sign a contract with a Norwegian power plant? Hyperscalers are pouring a lot of money into this regulatory discussion, and this will be a top discussion for the entire energy sector in the next couple of years.

The future of AI Frank Gielen

We need all the little things to further the energy transition, but where will AI significantly contribute?

Jef Caers

“Gen-AI is about as smart as a cat.” I want to bet that in five years, nobody talks about Gen-AI. The reason is that you cannot make a business model out of it. Instead, the AI that is really needed is where software meets hardware. We must optimise hardware because it is expensive and takes time to build. AI has a significant opportunity in the upstream raw material supply chain. For every hundred battery expert or academic, there is only one geologist that looks at the raw materials. If you do exploration inefficiently, you are spending a lot of money you do not need to spend. So, future AI will be those that recommend actions instead of the AI that makes predictions. For every hundred application of machine learning, there is only one application of this intelligent agent, also called a partially observable Markov of decision process (POMDP). This is the type of techniques that are coming.

A mine or a processing plant still does the same thing as 50 years ago. There is no innovation. This is where AI will have the biggest impact: modernising this industry to fully embrace digitalisation and the use of computing to optimise operations.



Parallel Session | Economic growth, geopolitical resilience, clean energy transition - trilemma or opportunity for the Green Hydrogen Value Chain

» Pursuing economic growth, geopolitical resilience, and a clean energy transition is often a challenging trilemma. However, developing a Green Hydrogen Value Chain offers a unique opportunity to reset this dynamic. By investing in and developing a green hydrogen infrastructure, nations can stimulate economic activity through new industries and job creation while ensuring energy security and future competitiveness in clean markets. Could the trilemma become an opportunity by capitalising on the Green Hydrogen Value Chain?



Speakers

Carina Krastel, Managing Director, European Green Hydrogen Acceleration Center

José Antonio de las Heras, CEO of Fertighy

Cyril Garcia, Capgemini Group Executive Board Member | Global Sustainability and Corporate Responsibility Head

Alberto Carpita, Head of Strategy & Business Development Climate Change at Siemens

Olivier Musset, Global Head of Energy + Group, Société Générale

Today's challenges and opportunities

Carina Krastel

The paradigm has shifted over the last few years with increased geopolitical tension, more dependencies due to international trade, and a declining workforce. The Draghi report explains that Europe must drastically change how we compete to generate growth for the continent. Competitiveness also links

to decarbonisation. To do this, we need access to raw materials, secure access to energy, industrialise, decarbonise our industries, push cleantech, prioritise innovation, and gain access to finance.

Hydrogen is a great way to generate growth, keep competitiveness, and decarbonise. Hydrogen helps to decarbonise industrial processes, it is a cleantech innovation, and it generates energy security. How do you see the hydrogen market today: what are financing trends and are we on track to meet competitiveness and growth?

Olivier Musset

The hydrogen sector is still a grey area, not yet green. It has been a slow start for hydrogen, which we are all disappointed with. Only 5% of all hydrogen projects targeted for 2030 have achieved a final investment decision (FID), which means we will not be able to deliver what we announced a couple of years ago.

We have only seen two large projects involving hydrogen production at scale: one in NEOM, Saudi Arabia, and one linked to H2Green Steel (now Stegra). Reasons that have prevented more hydrogen production projects at scale today include COVID-19, a peak in inflation, and supply chain destruction. There are also structuring reasons, such as it is highly complex to develop a new business model or a new way to produce hydrogen. Producing hydrogen is not comparable to renewables.

Despite many challenges, hydrogen is here to stay so we must make it work. The question is whether Europe can be competitive in terms of CAPEX, providing green electrons, and build partnerships to provide proximity between producers and consumers?

Cyril Garcia

Hydrogen is a nascent industry. In 1976, the White House installed solar panels that Ronald Regan removed 4 years later. The lesson

is that we must be patient, it is a long journey. Hydrogen has cost, transportation, technical challenges, and a lack of demand today. Still, oftakers make commitments. The effort governments put in is also noteworthy. The global project pipeline has grown by a factor of 7 since 2021 to around 1500 projects worldwide across the value chain.

The key word now is to focus. Hydrogen will bring a lot of value to heavy industries and mobility. We must prioritise technology that will support production and plant performance.

José Antonio de las Heras

The first challenge that may seem simple but depends on your strategy is choosing the country to do the hydrogen project. One factor in deciding is the amount and type of energy that can be used and the carbon footprint. France turned out to be most beneficial for our project at FertigHy, especially due to the carbon footprint and regulation restraints. The second challenge was the lead time. Development and construction take about 3 years each. This time is difficult to change as engineering steps and permitting takes time. A concern for investors and oftakers is that the regulation is not yet clear.

Developing a hydrogen production facility is very different from a renewable energy plant. Hydrogen is about chemistry, and this type of production facility can cost around €30M. This is pure risk so governments do not want to finance it by lending the money so this must come from private investments. Subsidies may come, but for CAPEX. So, financing a hydrogen project from feasibility to ready-to-build is very difficult.

The importance of the ecosystem Alberto Carpita

Thanks to InnoEnergy creating this ecosystem, the entire value chain was gathered to set up the initiative, which will disrupt green fertilizer production and accelerate the energy transition. Fertilizers are very CO2 intensive and an area that must change.

We used to call these companies startups, but the new definition is growth companies. A deep tech startup can take a long time to generate impact, but a growth company relies on high TRL technologies is targeted at medium-term impact on the economy in terms of growth and decarbonisation. This is possible due to InnoEnergy's work in gathering all these players and generating endorsements from key

players such as Heineken, and the necessary industrial expertise.

The investment case of hydrogen Olivier Musset

Three years ago, the focus would have been on the technology, construction risks, and value integration and licensing. Today, we know these work separately, and we do not have to focus on their details. The key is whether the business model is sustainable long term, in twenty years. It will drill down to the offtake. What the hydrogen project can produce must match what buyers can purchase for a long time. We also need subsidies to cover the green premium.

For an oftaker to invest in equity, the company must size the project meaningfully to the number of shareholders.

José Antonio de las Heras

Two of our shareholders decided to invest in the project from its start to develop a way to decarbonise their scope 3 emissions. In our conversations with the EU, their worry is that they will subsidize a project in which the oftaker will walk away last minute because it was not a real commitment from the start. In our case, shareholders have invested in equity and now work together to make the project happen.



“ Hydrogen is a great way to generate growth, keep competitiveness, and decarbonise.”

Carina Krastel, Managing Director of the European Green Hydrogen Acceleration Center, operated by EIT InnoEnergy

Closing | Jordi Hereu Boher, Minister of Industry and Tourism of Spain

>> TBB is an important event that help us create a better Europe. Spain is fully aligned with the NZIA, and promoted and contributed to its adoption during our presidency. We are committed to supporting it, not just with compliance but also by supporting the missions this green transition needs. It is a strategic imperative for our country's long-term competitiveness.

Spain is attractive because of its highly skilled workforce and mature supply chain. We have created funds

to support innovators and a new investment package worth €78 million.

We have the PERTEs funding scheme to harness and facilitate this transformation. We have strategic programs and a framework to keep Spain competitive. The final phase of this framework is a new industry law with clear incentives for innovation.

We support strategic value chains and work with partners like InnoEnergy to accelerate a net-zero future.

Pitching contest winners

1st place: Rivus Batteries

2nd place: Pionierkraft

3rd place: Hysun





See you next year at TBB.2025



Join us at TBB2025 in Lisbon!

22-23 October

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