

**Building a  
Smart Society:**  
Decentralized Energy  
and the Grid Tech  
to Power it

## Introducing “Building a Smart Society”: Climate tech investment opportunities

I am pleased to announce the launch of Smart Society Ventures’ “Building a Smart Society” research series, examining climate tech and energy transition investment opportunities. Going forward, we will release a series of research papers diving into key climate tech sub-sectors, the technology innovation happening in them and case studies on some of those leading the charge to net zero. We’ll examine current and emerging investment opportunities – and discuss why these sectors offer the potential for some of the largest investor value creation we have ever seen, while we build a greener, cleaner and smarter global society for future generations.

I am pleased to release Decentralized Energy and the Grid Tech to Power It, together with Smart Society Ventures’ Senior Advisor Anton Kotov, SVP Strategy and M&A at ABB, the €97 billion market cap technology Zurich-based leader in electrification and automation. Global energy transition investment hit €1.7 trillion in 2023, up 17% from 2022<sup>1</sup>. As a part of this, the renewable energy and smart grid market is undergoing a fundamental shift from centrally-generated and

distributed fossil-fuel intensive energy, to decentralized clean energy generation and consumption.

These shifts are fueling innovation across generation, integration, transmission, distribution, storage, optimization and trading, often underpinned by cutting-edge data, software and AI. Renewable energy now accounts for 30% of global electricity generation, up from 20% in 2010<sup>2</sup> with predictions that Renewable energy sources, including DERs, are projected to account for 65% to 85% of global electricity generation by 2050<sup>3</sup>. The global smart grid market, which connects and optimizes DERs, is expected to grow to €120+ billion by 2028<sup>4</sup>, while the global energy storage market, essential for supporting electrification and optimizing intermittent renewable power, is expected to reach €300 billion by 2030<sup>5</sup>.

We see significant opportunities for value creation and investor returns in the rapidly-evolving energy and grid tech sector. We expect to see increasing numbers of multi-billion dollar regional and global companies in the sector and growing numbers of compelling investment

opportunities across the value chain. At Smart Society Ventures, we are bullish on the energy and grid tech sector and are actively investing in it as one of our priority climate tech sub-segments. We hope you enjoy this paper exploring some of these trends and opportunities.

### **Brynne Kennedy**

*Managing Partner and Co-Founder, Smart Society Ventures*



## The Corporate Perspective: Energy, electrification and smart grids for the future

I am pleased to co-chair this paper *"Building a Smart Society: Decentralized Energy and the Grid Tech to Power It"*, which explores the rapidly changing energy, electrification and grid tech market. At ABB, we have long been a global technology leader in electrification and automation. Today, we are driving forward sustainability and decarbonization through our continued innovation. A key part of this transformation lies in integrating software, AI and data analytics in energy, building and asset management on the electrification side, as well as in process and discrete automation. This paper explores these trends, as well as the innovations, partnerships and investment needed, providing case studies on this new era.

The energy, electrification and grid tech sector is undergoing a transformative period, unparalleled in both its scale and potential. With renewable, and largely distributed, energy sources now accounting for a growing share of global electricity generation, the world is redefining how energy and electricity are produced, stored, and consumed. This shift represents not only a technical revolution but also a critical step toward achieving a sustainable, low-carbon future.

ABB helps industries run at high performance, while

becoming more efficient, productive and sustainable so they outperform. At ABB, we call this 'Engineered to Outrun'. By combining innovative technologies with our global footprint, we are driving advancements in both cleaner electrical distribution networks and leaner manufacturing. Our approach emphasizes intelligent solutions that enhance system efficiency, improve resilience and ensure sustainability for a rapidly changing energy landscape.

This paper highlights the critical innovations shaping our energy future and the vast opportunities for investors and corporate leaders. As part of the "Building a Smart Society" series from Smart Society Ventures, it explores how emerging technologies such as smart grids and virtual power plants are optimizing energy flows, unlocking new business models and reshaping energy markets globally.

The shift to clean energy and electrification brings unparalleled opportunities but also challenges. Increased pressure on existing infrastructure, coupled with the need to integrate variable renewable energy sources, calls for bold investment in grid modernization and digital technologies. At ABB, we believe that collaboration is essential to overcoming these challenges and achieving our global energy transition goals. Through investments

in startups and scaleups, partnerships with co-investors and collaborations with corporate peers, we are committed to fostering the ecosystem required to power a sustainable energy future.

I am pleased to be a Senior Advisor to Smart Society Ventures, and partner in our collective mission to accelerate impactful investment and innovation. The future of energy and grid tech is clean, smart, and electrified. Together, through strategic collaboration and innovation, and partnerships between global corporations, investors and scale-ups, we can build a resilient, sustainable energy system that meets the demands of tomorrow.

### Anton Kotov

Senior Advisor  
Smart Society  
Ventures and SVP  
Corporate  
Strategy,  
ABB Group



## Outline

### Executive Summary

**I - Introduction:** Technologies and themes of the energy transition

**II - Decentralization:** Renewable energy is distributed energy

**III - Electrification:** The charge forward

**IV - Smart Grids:** The Era of Data, Software and AI

**V - Virtual Power Plants and Energy Trading:** The new energy marketplace

**VI - Building Tomorrow:** Partnerships Between Corporates and Innovators

**Conclusion**

## Executive Summary

The energy transition is a global movement aimed at reducing carbon emissions and fostering a sustainable future. This transition requires a unique interplay between energy generation, infrastructure and innovative software and AI solutions that use increasing amounts of data to power ever more complex energy grids and utility markets. Integrating these elements is crucial for transforming the energy landscape in a scalable, secure, and stable way, and achieving the world's decarbonization goals.

Global energy transition investment hit €1.7 trillion in 2023, up 17% from 2022, with electrified transport, renewable energy and power grid investment as the sub-sectors attracting the largest amounts of capital<sup>6</sup>. Several high-level themes drive energy transition investment. Innovations in decentralization, smart grid technologies, and renewable energy integration are revolutionizing how energy is produced, distributed, and consumed. These advancements reduce carbon emissions, transitioning the world from its fossil fuel legacy, enhance grid resilience, reduce transmission losses, and improve efficiency through advanced energy management capabilities that ensure a reliable, flexible and sustainable energy supply.

The trend towards electrification is pivotal in this transition, as is the growth of “green energy” provision such as natural gas, wind, solar, hydro, Blue and Green Hydrogen, biofuels, nuclear and batteries, among others. Electrification shifts power provision from fossil fuels to clean energy, and at the same time, significantly increases electricity demand across transportation, industrial processes, buildings (residential and commercial) energy use and more. This surge is driven by supportive policies, advancements in battery storage, and growing consumer awareness of environmental impacts, coupled with often lower costs for consumers of electricity. Electrification is essential for reducing carbon footprints and enhancing energy efficiency.

Inherent in the shift to greater electrification and green energy is both greater decentralization of energy resources, and the need for more complex grid technology that can predict and optimize energy storage and usage. Within this evolving landscape, Virtual Power Plants (VPPs), Battery Energy Storage Systems (BESS) software and energy trading platforms are redefining electricity economics. These innovations offer significant investment opportunities by aligning supply and demand, optimizing power generation and consumption, and promoting market efficiency through direct energy trading and matching.

***Global energy transition investment hit €1.7 trillion in 2023, up 17% from 2022, with electrified transport, renewable energy and power grid investment as the sub-sectors attracting the largest amounts of capital<sup>1</sup>.***

The energy transition is continuously creating new innovations and presenting substantial investment opportunities. Investors who understand the market dynamics and identify key players capable of integrating the disparate parts of the energy transition will be well-positioned to capitalize on this trend. Specifically, the unique integration of energy generation, infrastructure and software and AI required to effectively make the transition presents multiple compelling areas for investment. Taking advantage of these investment opportunities requires energy and grid tech domain expertise applied to both vertically-integrated business models (those that incorporate generation, infrastructure and software to serve a particular need) and specialist business models (those that focus on a particular part of the value chain such as battery infrastructure or AI for grid optimization). As a part of the energy transition, we believe that there will be many compelling investment opportunities in both infrastructure and hardware (energy generation assets such as solar, wind and battery hardware), and in AI and software (technologies that aggregate data from generation, consumption and external factors, such as weather) to optimize energy grids and assets.

From our research, it's clear that Europe will be a leader in the energy transition, and seize many new opportunities for economic growth and investor value creation. The region's strong regulatory framework (also considered an inhibitor to innovation and investment by many), substantial investments in renewable energy, advanced technical research universities and commitment to decarbonization make it a fertile ground for innovation and scale-up company creation in the energy and grid tech sector. Since COVID-19, Europe has incubated the highest rate per capita of new climate and energy technology startups, many of whom are now entering the commercialization and scale-up phases of growth (Series A, B and C). While the US has historically played a significant role in creating and scaling technologies for decarbonization and the energy transition, recent political changes could impact the pace of progress. However, strong foundations laid by prior government incentives, such as the Inflation Reduction Act and CHIPS Act, alongside private sector innovation, may continue to drive advancements despite potential policy shifts.

The energy transition will upend the world as we know it, but with this change comes significant opportunities for growth and investment across the vast majority of our global economy. By leveraging the synergies between energy generation infrastructure, hardware and software/ AI, investors can lead the charge toward a sustainable, low-carbon future while capturing substantial value and returns. The potential for significant impact and return on investment in these sectors is immense, making them critical pillars for capital allocators around the world.

# 1

## Introduction: Technologies and themes of the energy transition

The energy sector is at the forefront of the global decarbonization push, driving significant changes in how energy is generated, distributed and consumed. Increasing amounts of our global energy supply are now provided by cleaner and renewable energy sources, such as solar, wind, hydro, nuclear, biofuels and clean hydrogen. In 2023, renewable energy sources accounted for 30% of global electricity generation—up from 20% in 2010—while the share of coal fell from 40% to 33% over the same period, reflecting the shift towards cleaner energy<sup>7</sup>. Innovations in renewable energy generation, decentralized energy systems and smart grid technologies are reshaping the energy landscape. Decentralized systems are enabling localized renewable energy production and consumption, with projections indicating that Renewable energy sources, including DERs, are projected to account for 65% to 85% of global electricity generation by 2050<sup>8</sup>. In parallel, the global smart grid market, which connects and optimizes DERs, is expected to grow to €120+ billion by 2028<sup>9</sup>, reflecting the critical role these technologies play in supporting modern energy infrastructure.

At the same time, the shift towards electrification is accelerating across various sectors, from transportation to industrial production, driving a substantial increase in electricity demand. Global electricity demand

is projected to grow by nearly 75% by 2050 vs 2021<sup>10</sup>, fueled by the rise of electric vehicles (EVs), the electrification of industrial processes and buildings, and many other areas across the global economy. According to the IEA's Stated Policies Scenario (STEPS), electric vehicles are projected to account for over 20% of global sales by 2030. This growth is expected to drive a significant expansion in the global EV stock, multiplying today's levels by 11 times to reach approximately 200 million vehicles<sup>11</sup>.

Moreover, the global battery storage market, essential for supporting electrification and for optimizing renewable generation and consumption, which can be intermittent depending on weather conditions and demand periods, is expected to reach €300 billion by 2030<sup>12</sup> under current policy, and could reach €470 billion under a Net Zero Emissions (NZE) Scenario<sup>13</sup>. The growth of DERs, electrification and battery storage (including large-scale Battery Energy Storage Systems or "BESS") will continue to place pressure on aging, legacy grids, accelerating the opportunity for AI and software-enabled smart grid technologies that can help to integrate and optimize these energy sources.

## ***‘The Global Smart Grid Market is expected to grow to €120 billion by 2028’***

Virtual Power Plants (VPPs), BESS software and energy trading platforms are redefining electricity economics, while offering new avenues for software and AI investment and innovation. VPPs are projected to represent a €16+ billion market by 2030, while optimizing energy generation and consumption. Energy trading platforms are projected to represent a €9.3 billion market by 2032, and BESS software is projected to represent a €25 billion market by 2029<sup>14</sup>, while optimizing energy generation and consumption. Meanwhile, peer-to-peer energy trading platforms are gaining traction, and are expected to be a major tailwind to the growth of VPPs and renewable energy generation infrastructure. VPPs and energy trading platforms, enabled by software, AI and Machine Learning (ML) are crucial for enabling more flexible, reliable and decentralized energy systems. In certain circumstances, they can also turn energy consumers into energy sellers, offering new revenue streams for individuals, businesses and municipalities, and in some cases, even creating a negative energy cost for them.

Europe remains a leader in the energy transition, supported by robust regulatory frameworks and substantial investments in renewable energy. The European Union’s Green Deal, aiming for climate neutrality by 2050, has catalyzed significant investment in clean energy, with €1 trillion earmarked for sustainable projects over the next decade<sup>15</sup>. In 2021 alone, European countries invested €185 billion, with EU member states accounting for

€143 billion of that, underscoring the region’s commitment to leading the global energy transition<sup>16</sup>.

The energy sector is the powerhouse behind our low-carbon future, fueled by cutting-edge new generation technology, rapid electrification, new energy technology platforms and supportive policies. As this transition accelerates, the sector’s impact will be profound—shaping economies, transforming markets, and unlocking significant

“The path to net zero runs through energy and utility markets. So much of our zero emissions future depends on scaling up renewable energy generation and optimizing it with storage, smart grids and VPPs.”



**Rt Hon Chris Skidmore,**  
Former UK Energy  
Minister, MP and  
Smart Society Ventures  
Senior Advisor

SmartSociety  
VENTURES

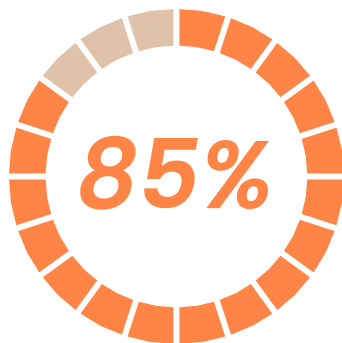
## 2

# Decentralization: Renewable energy is distributed energy

### Current Trends

Over the past decade, the global energy landscape has undergone a significant transformation, with renewables rapidly scaling up their contribution to electricity generation, while coal and other fossil fuels have seen a steady decline in their share, reflecting the shift towards cleaner energy<sup>17</sup>. The growth of renewable energy is closely linked to the growth of decentralized energy resources (DERs), with our global power infrastructure shifting from large, centrally generated and distributed energy powered by fossil fuels (eg. large coal-fired power plants), to decentralized renewable energy generation (eg. many solar panels spread throughout the world).

This decentralized renewable energy world drives both increasingly local and distributed consumption detached from the grid, and increasingly complex integration and multi-party distribution within the grid, which is driving the growth of the grid tech sector. At the same time, the growth of renewable energy, which is dependent on varying weather and consumption patterns, is fueling rapid growth of energy storage technologies, such as batteries. Renewable energy sources, including DERs, are projected to account for 65% to 85% of global electricity generation by 2050<sup>18</sup> and that the global energy storage market will reach €300 billion by 2030<sup>19</sup>.



***Renewable energy sources, including DERs, are projected to account for 65% to 85% of global electricity generation by 2050***

## Opportunities and Challenges

The global decarbonization push and energy transition requires increasing amounts of renewable energy generation and infrastructure, coupled with greater storage capabilities to mitigate fluctuations in weather and consumption. These generation assets offer the opportunity for both local, off-grid consumption (eg. a solar panel powering a house) and for integration with the main grid for distribution across consumption points and balancing supply and demand across a multitude of consumers. This is making grid management and optimization increasingly complex, requiring grid and utility operators to make significant investments in smart grid technologies that both help to manage and maintain distributed energy assets and infrastructure, and facilitate renewable energy integration, optimization and distribution dynamically through software and AI. This is also creating an opportunity for much more sophisticated matching of energy supply and demand, and opportunities for individuals, households, factories, municipalities and more to become energy sellers, generating revenue and/or effective negative energy prices.

## Investment Landscape

The shift to renewable, decentralized energy is creating a significant investment opportunity. The renewable energy sector attracted €600 billion of investment in 2023, up 8% from 2022, including investment for renewable energy infrastructure<sup>20</sup>. Significant infrastructure and energy generation investment and innovation is happening across solar, wind, geothermal, biofuel, hydro, Blue and Green Hydrogen, nuclear and other renewable energy sources. These energy sources create new opportunities for energy consumption to happen at distributed local points, detached from the grid, and for grid tech to support integration and optimization with the main grid. This shift also creates the opportunity for innovative businesses to partner with customers to facilitate renewable power purchase agreements (PPAs) tied to renewable energy infrastructure projects, to meet their power needs.

## Case Studies

### Enpal – A vertically-integrated solar energy and grid tech unicorn in Germany



**Enpal** .

In Germany, Enpal is reinventing renewable energy with home solar installations and integrated AI-enabled software to allow homeowners to trade the energy that they do not need to other consumers and the grid, at points achieving a negative energy cost for Enpal customers. Enpal, now worth more than €2.27 billion in their last funding round, is Germany's first greentech unicorn. With expansion ahead into new markets, Enpal has significant growth ahead as they write the future of energy markets.

**Dr. Wolfgang Gründinger, Chief Evangelist, Enpal** – *"The integration of software and hardware allows Germany's grid to tap into renewable energy's full potential, often generating enough power to supply the entire country and even creating negative energy prices. In these moments of surplus, consumers can earn money by using electricity."*



### Caban Energy<sup>21</sup> – A rapidly-growing Series B funded solar battery innovator from the US



**caban**

In the US and Latin America, Caban Energy is decarbonizing telecom and fiber network infrastructure, replacing diesel generators and on-grid power with solar-powered batteries and integrated software. Caban's solutions can provide fully off-grid power for infrastructure in remote locations, backup power and storage for intermittent grid power and demand fluctuations, or full power where needed. With the vast majority of the world's networks still powered by diesel and a big Series B round led by German energy behemoth RWE and Smart Society Ventures, Caban has large growth ahead as they drive smart network infrastructure.

### Voltiris – An innovative Swiss solar energy startup for global agriculture



**VOLTIRIS**

In Switzerland, Voltiris is reinventing the global agriculture market with a unique multi-patented solar energy technology for the €45 billion global greenhouse market. Voltiris' solutions give greenhouse growers local energy generation, detaching from the increasingly crowded main grid and decarbonization without affecting crop yields due to their spectral filtering innovations. With the global greenhouse market set to double by 2030 driven by climate change and food security concerns, and a seed round behind them, Voltiris is reinventing solar and agricultural energy technology.

# 3

## Electrification: The charge forward

### Current Trends

Electrification is rapidly reshaping the energy landscape, driving a sharp increase in electricity demand across the transportation, industrial and residential sectors, among others. The electric vehicle (EV) market is expected to grow significantly, reaching a total stock of 500M+ by 2035, representing more than 1-in-4 vehicles on the road<sup>22</sup>. Increasing adoption is driven by ongoing advancements in battery technology and increasingly stringent government regulations on emissions and gasoline-powered cars, coupled with ongoing innovation from the major automotive companies. Concurrently, the industrial sector is electrifying processes to reduce emissions, while households are adopting electric heating, cooling, and cooking technologies, driven by both economics and regulation. This shift will increase the share of electricity in overall energy demand, from 20% today to over 50% in the Net Zero by 2050 Scenario<sup>23</sup>. However, this evolution also brings challenges in grid capacity and the need for significant infrastructure upgrades.

### Opportunities and Challenges

The electrification wave offers significant growth opportunities, especially in the EV sector, where the stock of EVs is expected to grow at 23% annually through 2035<sup>24</sup>. Industrial and residential electrification also hold promising potential, with opportunities segmented across various applications. Collectively, this shift will exert substantial pressure on existing legacy grid infrastructure, requiring extensive upgrades. Coordinating the shift to a clean, decentralized grid in tandem with rapidly rising electrification demand will be crucial. This shift will require significant upgrades in grid technology and equipment. It will also require legacy grid operators to work collaboratively and quickly with new technology companies to upgrade their infrastructure. Regulatory efforts to advance electrification must align timelines to ensure that increased demand is matched by a corresponding rise in generation capacity, and that grid operators and suppliers can make the necessary investments to modernize.

## Investment Landscape

The surge in electrification is drawing significant capital. In 2023, electrified transport was the largest investment sub-sector of overall energy transition investment, attracting €600 billion of investment, 36% growth from the prior year<sup>25</sup>, and including electric cars, buses and commercial vehicles and more, plus their associated infrastructure. Investors across venture capital, growth equity and private equity, are increasingly targeting the electrification space, drawn by the strong growth potential and the opportunity to enter already-defined markets with emissionless alternatives. We see particular opportunities

in electrified transport, across private and commercial use and including in the logistics sector. These opportunities span EVs themselves, batteries that power them, vertically-integrated EV infrastructure and software, and software to optimize charging and EV operations. We see additional strong investment opportunities in industrial electrification, where many processes are both electrifying and decarbonizing industry, as well as in the residential sector where there is a significant push to replace fossil fuel powered heating and cooling with electrified heat pumps and more.

## Case Studies

### Octopus Energy – A UK unicorn electrifying the homes of the future



UK-headquartered, Octopus Energy is driving the electrification of home heating and transport across more than 7.7 million homes in countries throughout the world. Now valued at more than €8.5 billion, making it one of Europe's biggest climate tech companies, Octopus installs, manages and optimizes heat pumps, EV chargers and smart energy hardware with vertically-integrated software to power the electrified homes of the future.



### Electra – A French vertically-integrated EV charging infrastructure and software scale-up



Paris-based Electra is one of Europe's leading EV charging scale-ups with ambitions to deploy 2,200 EV charging stations and 15,000 charging points across Europe by 2030, operations currently in 8 European countries and more than €480 million of funding to date. Electra's proprietary and vertically-integrated hardware and software offer fast-charging points for a variety of EVs.

**ELECTRA**

### Monta – A Danish EV charging software platform expanding globally

Alongside the electric vehicles and infrastructure of the electrified transport shift, Danish scale-up Monta is a leading AI-enabled software platform that helps EV charging operators to manage and optimize their networks, while supporting consumers with finding EV charging points. With a €80M Series B round and a recently-announced US expansion, Monta is enabling the EV market of the future.

*"This is critical infrastructure; it needs to be regulated. It needs to get the same kind of attention as putting up windmills, solar panels, power plants, and other essential infrastructure."* – **Casper Rasmussen, Co-founder and CEO of Monta**



**MONTA**



# 4

## Smart Grids: Connecting and optimizing DERs

### Current Trends

The significant societal shifts to renewable decentralized energy and electrification are driving significant growth in smart grids and corresponding energy storage technologies to integrate with them and optimize renewable energy generation, distribution and consumption. Smart grids are underpinned by software, AI and automation, and therefore able to support the complex integration of DERs, manage decentralized assets and systems and handle the variability of renewable energy like wind and solar. This growing need for resilient and flexible grids is fueling substantial investment in grid technology, generally underpinned by complex data models, software and AI / ML models.

### Opportunities and Challenges

The global smart grid market, which connects and optimizes DERs, is expected to grow to €120+ billion by 2028<sup>26</sup>, while the global energy storage market, essential for supporting electrification and optimizing intermittent renewable power, is expected to reach €300 billion by 2030<sup>27</sup>. We see particular opportunities for software to enhance asset management for DERs, allowing for complex and dynamic integration and management of distributed energy assets, as well as in predictive maintenance for distributed energy systems and in AI to optimize energy supply and demand. However, these opportunities come with challenges, such as the high upfront cost of grid upgrades, particularly in capital-constrained regions and with often slow-moving incumbent utility providers. Integrating intermittent renewables complicates grid stability, and responsibility for power delivery in a decentralized system remains a key issue. Clear regulatory frameworks and advanced technologies enabled by cutting-edge software, AI and ML, are essential to maintain grid stability in this complex landscape. Similarly, it is critical that legacy utility, power and electricity companies work closely with technology startups and scale-ups who have the capabilities to develop and operate these technologies.

## Investment Landscape

Grid investment reached €300 billion in 2023<sup>28</sup>, with significant growth projected in years to come as operators work to integrate, manage and optimize growing amounts of renewable energy generation, DERs and energy storage. While certain vertically-integrated renewable energy and energy storage companies are also building software platforms to enable management and optimization of their assets, the vast majority of the grid tech investment landscape itself is

in software and AI technologies that integrate with these generation assets to power energy management, transmission, distribution, and optimization. We expect to see numerous large software and AI companies created in the coming years, and given the incumbency effects of the global utility, infrastructure and energy market, increasing collaboration between infrastructure, software and corporate investors.

## Case Studies

### Terralayr – A rapidly-growing Swiss Series C energy and grid flexibility platform



Swiss Terralayr is building the “Amazon Web Services” of energy storage, enabling flexible distribution and consumption of energy storage, and in turn, building an alternate, battery powered grid of the future. Powered by intelligent software and integrated battery storage capacity, Terralayr lets customers get the energy storage they need. With a fresh €77M in Series C funding and innovative flexible business model, Terralayr is writing the energy and grid markets of the future.

**terralayr**

### Enode – A Series A-funded energy management platform from Norway



In Norway, Enode is helping energy companies connect the data from their customers’ energy devices to enable dynamic data reviews, energy management and monitoring. With out-of-the-box APIs and €14M in Series A funding, Enode is helping to write the future of connected, dynamic and digital distributed energy systems and grids.

**Enode**

## Pratexo – An innovative asset management and condition monitoring start-up in the US



Pratexo<sup>29</sup> is partnering with incumbent grid, and energy and electrification equipment companies to provide cutting-edge asset management and condition monitoring software for complex distributed energy infrastructure. With investment from ABB and Smart Society Ventures, and customers across Switzerland, Norway and the US, Pratexo is helping customers connect and manage the distributed grids of the future.

*"Increasingly distributed and complex energy and electrification infrastructure needs intelligent software and AI to ensure its reliability, efficiency, and flexibility. The grid tech maturity curve starts with integrating distributed assets and using the data to manage, maintain and optimize performance."*

– **Blaine Mathieu, CEO Pratexo**



# 5

## Virtual Power Plants and Energy Management: The new energy marketplace

### Current Trends

Virtual Power Plants (VPPs) and energy trading platforms are fundamentally reshaping the economics of electricity, creating new markets and optimizing power generation and consumption. VPPs integrate distributed energy resources (DERs) allowing for coordinated management that enhances grid stability, and eliminates the need for large, centralized generation points. Energy trading platforms, particularly those utilizing peer-to-peer models, are enabling more dynamic and decentralized energy markets where excess supply and demand can be directly traded between energy consumers. These advancements are supported by cutting-edge digital technologies in software, AI, ML and IoT that enable real-time monitoring and automated transactions. With renewable energy adoption expected to account for nearly 90% of the global increase in power capacity by 2025,<sup>30</sup> these platforms are becoming essential for managing and optimizing the complexities of decentralized renewable energy systems.

### Opportunities and Challenges

The rise of VPPs and energy trading platforms opens up significant avenues for innovation and revenue generation. These technologies are enabling new business models, such as peer-to-peer energy trading and participation in demand response programs, with the global trade in electricity markets expected to evolve and mature. However, several challenges accompany these opportunities. Regulatory barriers, which can restrict the free movement of power across markets (particularly cross-border and cross-continental markets) pose a significant obstacle to widespread adoption. Additionally, integrating these advanced platforms with existing grid infrastructure requires substantial technological and financial investment. Ensuring the security and reliability of these platforms is also paramount, as they face increasing cyber threats targeting entry at points amid their decentralized design. Robust cybersecurity strategies are essential to protect these systems and maintain trust in these rapidly evolving markets.

## Investment Landscape

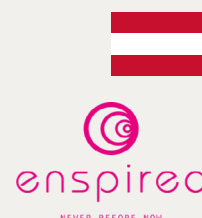
Although still nascent compared to some of the other sectors of energy and grid tech, investment in VPPs and energy trading platforms is gaining significant traction, drawing substantial interest from venture capitalists as one of the key sectors of future energy markets. The demand for flexible, efficient energy management and trading solutions is driving interest and capital inflows

into these technologies. While many of these platforms are software and AI alone, certain companies have taken a vertical integration approach for segments of their business, building VPP and energy trading software that works with third-party energy assets, and building their own renewable energy generation and storage capacity through investments and acquisitions.

## Case Studies

### Enspired – A Series B energy trading scaleup from Austria

Enspired is a software platform that optimizes the flexibility of renewable energy assets and powers energy trading to create new revenue streams for asset owners, such as utility companies, renewable energy asset developers, VPP operators and energy-intensive industries. With €25.5M in Series B funding and scaling ahead, Enspired is driving forward flexible renewable energy trading markets.



### Flower – A rapidly-growing Swedish energy management marketplace scale-up

Sweden-based Flower, is an energy management system that combines cutting-edge AI and software with renewable energy assets across batteries, solar energy, wind power, industrial facilities and homes, enabling energy forecasting, optimization and trading to power the grids of tomorrow. Flower works across third-party assets, and is also building their own battery storage capacity through acquisitions. With more than €100M in funding and recently-announced expansion throughout Europe, Flower is an emerging leader in grid tech and energy management.



FLOWER

### Fever – An innovative VPP start-up from Sweden



Fever is an energy management software startup based in Sweden that integrates renewable energy assets into virtual power plants to optimize supply and demand forecasting, flexibility and reporting. As a pure horizontal software player, Fever is advancing energy markets through data science and AI of tomorrow.

FEVER



*“VPPs and energy trading are a huge emerging category in energy and climate markets. At Caban Energy, we are building the renewable energy generation, storage and software to decarbonize network infrastructure – and see energy optimization through stacked ancillary services as the next frontier.”*

Alexandra Rasch,  
Founder and CEO, Caban Energy



# 6

## Building Tomorrow: Partnerships between Corporates and Scale-Ups

### Current Trends

One of the hallmarks of the energy and grid tech sector is close partnerships between innovative new technology companies and incumbent energy, industrial, electrification and grid corporations, often early in the life cycle of scale-up technology companies. As such, many corporations in these sectors have grown significant corporate venture capital investment arms, investing both directly in these companies and partnering with venture capital and growth equity funds investing in the sector. By partnering with these companies and funds, incumbent corporations can accelerate the energy transition, their own net zero journeys and deliver new solutions to their customers to drive the energy markets, power grids, electrification, vehicles, factories and homes of the future.

In traditional startup technology markets, new innovators have historically been known to disrupt the businesses of legacy incumbents, often presenting challenges to the incumbents future market position. However, in the energy transition, we see unique partnership dynamics driven by the scale of many energy, utility and electrification equipment companies, the inherent integration between generation infrastructure and software, and the regulatory landscape. For example, oil and gas companies are some of the largest investors

in new energy generation technologies, while industrial and electrification equipment companies (OEMs) are partnering with grid technology companies, whose AI and software can integrate with their infrastructure and equipment.

We are seeing continued integration in the market of software and AI grid tech solutions with existing hardware provided by incumbents. For example, Danish EV software scale-up Monta's platform works across EV charging infrastructure, owned by both incumbents and infrastructure startups. Similarly the business models of Sweden's Flower and Fever, and Austria's Enspired are designed to work across energy generation infrastructure owned and operated by third parties, who can be incumbents. As we will discuss in the following case study, US grid tech startup Pratexo is working with both ABB and grid operators to provide intelligent asset management and condition monitoring across their existing power and electrification assets.

At the same time, certain of the vertically-integrated energy and grid tech companies may provide direct competition to incumbents and be more positioned to disrupt them. Companies such as Enpal in Germany and Octopus Energy in the UK are taking a vertically integrated approach, aiming to own and operate both the energy generation infrastructure and the data and software that integrates with it and provides vertically-

integrated asset management, condition monitoring, energy management and energy trading.

As we look ahead to the future of the energy transition, we expect to see significant growth in both the pure software and vertically-integrated generation and software segments of the market, with significant potential for unicorn formation in both.

## Case Studies

### Case Study – How ABB works with energy and grid tech innovators

Zurich-based electrification and automation company ABB is a €97B market cap leader in sustainability, decarbonization and the energy transition. As a part of the company's strategy, ABB looks to partner with innovative electrification, grid tech and industrial decarbonization technology companies that can help to accelerate the energy, electrification and power grid markets of the future, and offer new solutions to customers. Considering ABB's legacy in power and industrial equipment, ABB is keen to collaborate with software and AI-led businesses that can work with existing equipment deployed throughout the world.

As a part of this strategy, ABB's venture capital unit, ABB Ventures partners with early-stage companies alongside ABB Divisions, making investments when a clear business need is identified. Examples of this are ABB's investments in Irish AI energy management company GridBeyond, Canadian AI building optimization technology Brainbox AI, and American grid tech software Pratexo (along with Smart Society Ventures). ABB is also an active acquirer of companies that can provide new technologies to its business, with recent acquisitions of measurement and analytics companies Födisch Group and Real Tech, Sevenses, which provides AI-enabled software for robotics, and EVE Systems, a smart home technology company.

ABB and Smart Society Ventures invested in grid tech asset management and condition monitoring company Pratexo. Pratexo's software integrates with a variety of energy and electrification infrastructure, helping infrastructure and equipment owners dynamically manage their distributed assets, and monitor and optimize their performance. As part of the partnership, Pratexo integrates with ABB's traditional equipment and helps ABB offer further value to its customers.

*"ABB is actively investing in sustainability, net zero and the future of electrification by partnering with innovative energy and grid technology companies that help us strengthen our business and offer further value to customers through AI, data, software and more."* – **Anton Kotov, SVP Corporate Strategy and M&A, ABB Group**



## Conclusion

The energy and grid tech market is a huge investment category that will define the future of renewable energy markets, power grids and decarbonization. Global energy transition investment hit €1.7 trillion in 2023, 17% growth from 2022<sup>31</sup>. But this remains just a fraction of what is needed to achieve continued growth in renewable energy, reinvent power grids and achieve net zero emissions. Renewable energy now accounts for 30% of global electricity generation, up from 20% in 2010<sup>32</sup>, but there is a significant way to go increasing renewable energy generation capacity and infrastructure.

Coinciding with the growth of renewable energy is the growth of distributed energy, punctuated by wind and solar generation. Renewable energy sources, including DERs, are projected to account for 65% to 85% of global electricity generation by 2050<sup>33</sup> a seismic shift from the centrally produced and distributed fossil fuel power plants of yesteryear. The increasing decentralization of energy generation is creating new complexities for energy asset and infrastructure management and power grid operations, while introducing massive new opportunities in smart grid technologies leveraging complex AI and software, such as asset management, condition monitoring, energy management, procurement and purchasing, VPPs, energy trading and more. The global smart grid market is expected to grow to €120+ billion by 2028<sup>34</sup>.

At the same time, the growth of renewable energy generation has created the need for a massive energy storage market, owing to both the growth of electrification and the intermittent nature of renewable energy generation that, in the case of wind and solar, can fluctuate tied to weather patterns. The global energy storage market is expected to reach €300 billion by 2030, while the share of electricity in overall energy demand is expected to grow from 20% today to over 50% in the Net Zero by 2050 Scenario<sup>35</sup>.

These seismic market changes present the opportunity for significant investment opportunities for venture capital, growth equity, private equity and infrastructure investors in coming years, enabled by strong sectoral tailwinds. We expect significant company and investor value creation to occur in both vertically-integrated generation and software businesses, as well as in stand-alone generation, storage and infrastructure, and AI and software platforms. At the scale-up stage where Smart Society Ventures focuses, we expect to see significant investment opportunity and unicorn value creation, as these businesses scale to greater adoption throughout regional and global markets, and the energy and grid tech sector continues to mature.

## Authors



**Brynne Kennedy,**

Managing Partner and Co-Founder, Smart Society Ventures

Kennedy is the Managing Partner and Co-Founder of Smart Society Ventures, as well as the Co-Host of The Smart Society Show, a bi-weekly climate tech podcast. Kennedy previously served as Founder and CEO of UK-based software scale-up Topia, ran for US Congress on a decarbonization policy platform and worked in investment banking and private equity at Lehman Brothers and Standard Chartered.



**Anton Kotov,**

SVP Corporate Strategy and M&A, ABB Group

Kotov leads the ABB Group's global corporate strategy, M&A and venture capital investments. Kotov previously served as Chief Strategy Officer and Chief Digital Officer for ABB's Electrification Division, driving strategy and growth for the € 12B division with 15,000+ people. Before joining ABB, Kotov served as VP Strategy at Schneider Electric.



**Conner Irvine,**

Irvine joined Smart Society Ventures in 2024 as a Summer Associate. Irvine is currently completing his MBA at London Business School. He previously worked at Bain & Company, DoorDash and Deloitte, based in Toronto, Canada.

## Sources

- 
- <sup>1</sup> BloombergNEF. (2024). Global Clean Energy Investment Jumps 17%, Hits \$1.8 Trillion in 2023. Retrieved from <https://about.bnef.com/blog/global-clean-energy-investment-jumps-17-hits-1-8-trillion-in-2023-according-to-bloombergnef-report/>
- <sup>2</sup> International Energy Agency (IEA). (2022). World Energy Outlook 2022.
- <sup>3</sup> McKinsey & Company. (2023). Global Energy Perspective 2023: Power Outlook. Retrieved from <https://www.mckinsey.com/industries/oil-and-gas/our-insights/global-energy-perspective-2023-power-outlook>
- <sup>4</sup> KBV Research. (2022). Smart Grid Market Size, Share & Forecast Report to 2022-2028.
- <sup>5</sup> Research and Markets. Energy Storage Market – Growth, Trends, COVID-19 Impact, and Forecasts (2023-2030). Retrieved from <https://www.researchandmarkets.com/report/energy-storage>
- <sup>6</sup> BloombergNEF. (2024). Global Clean Energy Investment Jumps 17%, Hits \$1.8 Trillion in 2023. Retrieved from <https://about.bnef.com/blog/global-clean-energy-investment-jumps-17-hits-1-8-trillion-in-2023-according-to-bloombergnef-report/>
- <sup>7</sup> International Energy Agency (IEA). (2022). World Energy Outlook 2022.
- <sup>8</sup> McKinsey & Company. (2023). Global Energy Perspective 2023: Power Outlook. Retrieved from <https://www.mckinsey.com/industries/oil-and-gas/our-insights/global-energy-perspective-2023-power-outlook>
- <sup>9</sup> KBV Research. (2022). Smart Grid Market Size, Share & Forecast Report to 2022-2028.
- <sup>10</sup> International Energy Agency (IEA). (2022). World Energy Outlook 2022.
- <sup>11</sup> International Energy Agency (IEA). (2022). Global EV Outlook 2022.
- <sup>12</sup> Research and Markets. Energy Storage Market – Growth, Trends, COVID-19 Impact, and Forecasts (2023-2030). Retrieved from <https://www.researchandmarkets.com/report/energy-storage>
- <sup>13</sup> International Energy Agency (IEA). (2022). Batteries and Secure Energy Transitions.
- <sup>14</sup> Grand View Research. (2023). Virtual Power Plant Market.
- Business Research Insights. (n.d.). Energy Trading Platform Market Report. Retrieved from <https://www.businessresearchinsights.com/market-reports/energy-trading-platform-market-113505>
- MarketsandMarkets. (n.d.). Battery Energy Storage System Market. Retrieved from <https://www.marketsandmarkets.com/Market-Reports/battery-energy-storage-system-market-112809494.html>
- <sup>15</sup> European Commission. (2020). The European Green Deal: €1 Trillion Earmarked for Sustainable Investment.
- <sup>16</sup> BloombergNEF. (2022). Energy Transition Investment Trends: Executive Summary 2022.
- <sup>17</sup> International Energy Agency (IEA). (2022). World Energy Outlook 2022.

## Sources

---

<sup>18</sup> McKinsey & Company. (2023). *Global Energy Perspective 2023: Power Outlook*. Retrieved from <https://www.mckinsey.com/industries/oil-and-gas/our-insights/global-energy-perspective-2023-power-outlook>

<sup>19</sup> Research and Markets. *Energy Storage Market - Growth, Trends, COVID-19 Impact, and Forecasts (2023-2030)*.

<sup>20</sup> BloombergNEF. (2024). *Global Clean Energy Investment Jumps 17%, Hits \$1.8 Trillion in 2023*. Retrieved from <https://about.bnef.com/blog/global-clean-energy-investment-jumps-17-hits-1-8-trillion-in-2023-according-to-bloombergnef-report/>

<sup>21</sup> Smart Society Ventures is an investor in Caban Energy and a Board Director of the company.

<sup>22</sup> International Energy Agency (IEA). (2024). *Global EV Outlook 2024*.

<sup>23</sup> International Energy Agency (IEA). (2023). *World Energy Outlook 2023: Pathways for the Energy Mix*.

<sup>24</sup> International Energy Agency (IEA). (2024). *Global EV Outlook 2024*.

<sup>25</sup> BloombergNEF. (2023). *Global Clean Energy Investment Jumps 17%, Hits \$1.8 Trillion in 2023*. Retrieved from <https://about.bnef.com/blog/global-clean-energy-investment-jumps-17-hits-1-8-trillion-in-2023-according-to-bloombergnef-report>

<sup>26</sup> KBV Research. (2022). *Smart Grid Market Size, Share & Forecast Report to 2022-2028*.

<sup>27</sup> Research and Markets. *Energy Storage Market - Growth, Trends, COVID-19 Impact, and Forecasts (2023-2030)*. Retrieved from <https://www.researchandmarkets.com/report/energy-storage>

<sup>28</sup> REN21. (2024). *Renewables 2024 Global Status Report: Global Overview Module*. Retrieved from [https://www.ren21.net/gsr-2024/modules/global\\_overview/](https://www.ren21.net/gsr-2024/modules/global_overview/)

<sup>29</sup> Smart Society Ventures is an investor in Pratexo and a Board Director of the company.

<sup>30</sup> International Energy Agency. (2023). *Electricity Market Report 2023*.

<sup>31</sup> BloombergNEF. (2024). *Global Clean Energy Investment Jumps 17%, Hits \$1.8 Trillion in 2023*. Retrieved from <https://about.bnef.com/blog/global-clean-energy-investment-jumps-17-hits-1-8-trillion-in-2023-according-to-bloombergnef-report/>

<sup>32</sup> International Energy Agency (IEA). (2022). *World Energy Outlook 2022*.

<sup>33</sup> McKinsey & Company. (2023). *Global Energy Perspective 2023: Power Outlook*. Retrieved from <https://www.mckinsey.com/industries/oil-and-gas/our-insights/global-energy-perspective-2023-power-outlook>

<sup>34</sup> KBV Research. (2022). *Smart Grid Market Size, Share & Forecast Report to 2022-2028*.

<sup>35</sup> International Energy Agency (IEA). *Electricity*. Retrieved from <https://www.iea.org/energy-system/electricity>