Minds & Machines

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current
powered by GE

Introduction

As a signal of its continued and growing commitment to the energy sector, GE has recently announced the launch of Current, powered by GE: a new energy start-up inside the walls of GE, which integrates GE's LED, solar, CHP energy storage, and electric vehicle charging businesses with our industrial strength Predix platform, to deliver the most cost-effective, efficient energy solutions required by commercial, industrial and municipal customers today and in the future.

Through an energy-as-a-service model, Current not only curbs one of business' biggest operational costs – energy - but uses energy infrastructure to drive additional value, even as needs change over timeThis paper explores how Current's holistic business model drives value for customers navigating a new energy reality in Europe and across the globe.

A Market Ripe for Intelligent Energy

Far-reaching EU climate and energy legislation has paved the way for an unprecedented shift of paradigms in the European energy sector. CO_2-intensive fossil fuels are being replaced by renewable and low-carbon energy sources; decentralized, point-of-use power and heat generation technologies are covering an increasing share of demand; technological progress and global economies of scale have moved technologies such as solar PV or battery storage from a niche to a commercial mainstream position; paybacks for district energy system investments are becoming increasingly attractive.

In parallel, a mega trend known as digitization is turning traditional one-way power grids into intelligent systems accommodating reverse power flows, empowering customers to become active, energy-literate participants (or so-called Prosumers) in the energy market, rather than mere end users and consumers. This is a fundamental change in the nature of the energy market that is driving down the cost of asset management and is enabling the optimized integration of technologies and energy sources.

This new reality has far reaching implications. The lines between electricity producers and consumers have been blurred. A home owner can simultaneously produce, sell and buy electricity while at the same time dramatically reducing and optimising their use of electricity (and gas).

For retailers, industries, cities and others there is a similar if not larger opportunity: to dramatically improve the efficiency of any service relying on energy, and at the same time optimizing that service so that it delivers even more value than before, using powerful software platforms and applications that allow once disparate parts of the energy system to 'communicate' with one another, which in turn allows both operators and end users to use their energy resources much more efficiently and productively.

In this new world of energy, what we know as 'the grid' will be potentially transformed from a power network and delivery system that requires regular investments and maintenance, to a marketplace for smart energy services.

A Holistic Approach to Energy

At Current, we work with customers to make the best decisions on energy through a holistic view of energy across four areas: reduce, produce, optimize and shift.

Reduce is about identifying the right measures to increase energy efficiency. From a technology comparison point of view, LED lighting is often the first and financially most attractive efficiency investment made by organisations.[1] LEDs typically use 50 percent less electricity than traditional lighting sources, delivering an energy cost savings of 15 percent or more per building. Considering that lighting is a major component of energy cost in the enterprise, these benefits are of even greater consequence.

Produce as the word suggests, is indeed about producing power, but with the consideration that in the new world of energy, the paradigm of production has shifted dramatically. For traditional energy market players, as well as customers, this presents both opportunities and challenges.

On-site generation options, including solar and CHP, are plentiful and cost effective. When implemented by a company with access to a full menu of on-site generation technologies and finance/purchase options, deep project-management and engineering expertise, a big balance sheet and a century of energy innovation on its side, on-site generation is a strategic and indispensable part of solving the 21st century energy management equation. **Optimize** means converting data into actionable insights through the use of sensors and the Industrial Internet. For Current, this kind of optimization encompasses all of a customer's relevant energy assets and processes while accounting for relevant (external) energy market signals.[2] Developing software that is sophisticated and adaptable enough to accommodate this requires analytics capabilities paired with a profound know-how of energy assets' technical and operational properties, of the European energy market and of industry processes.

It also means using digital capabilities to drive outcomes past energy – sensors and software integrated with energy infrastructure that drive productivity, propel customer insights and/or create new revenue streams.

As the first digital industrial company globally, GE is in a unique position to act as trusted partner in this area. This does not imply, however, that we are tapping only our own internal expertise and talent to build solutions. We are building out a robust ecosystem of partners to accelerate innovation and outcomes.

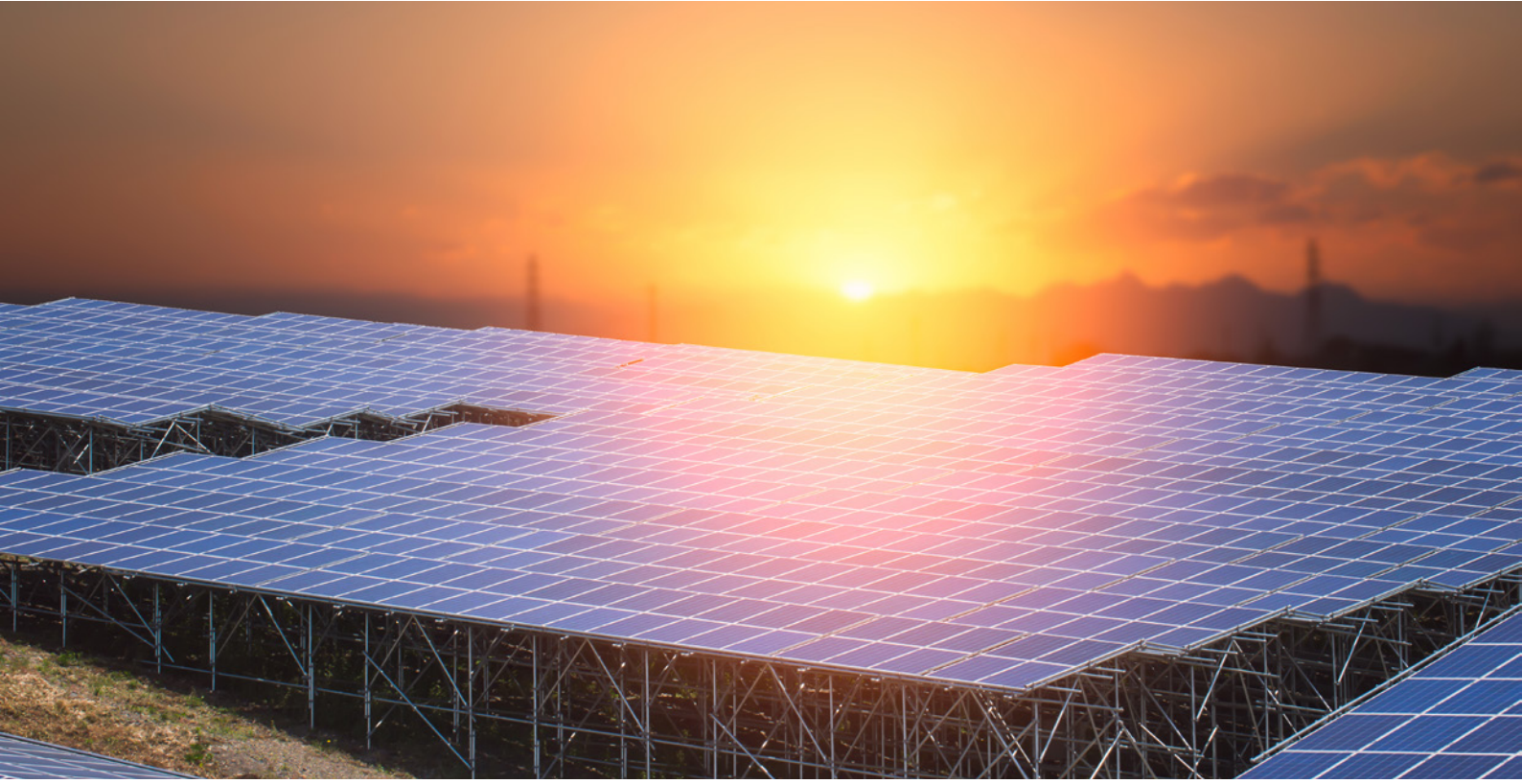
Shift refers to deferring power consumption or power in-feed into the grid in accordance with the actual supply situation (predominantly from renewable energy sources) and the capacity utilization of the power grid at any given point in time. Shifting power consumption, commonly referred to as demand response or load management, follows a logic which is new to the energy sector, namely demand following supply rather than vice versa.

This mechanism allows the best-possible exploitation of renewable energy sources, whereby storage becomes a commercially interesting addition to a customer's energy portfolio. Storing energy from fluctuating renewable sources when it is abundantly available and prices are low for later use makes batteries a key component of Current's solution portfolio[3].

[1] The savings potentials of digital lighting are tremendous, and the advent of software defined lighting – whereby lighting systems are networked and enabled with sensors, cameras and other complementary technologies – has completely revolutionized the role of lighting in our world. Imagine if every lamp, every street light, every spot light had 'eyes and a brain', and could 'communicate' critical data back to the cloud. The possibilities are endless

[2] Optimization is an inherently dynamic and often site-specific process that aims to achieve the most efficient operation of energy assets at any given point in time, based on real-time data and customers' preferences.

[3] Batteries are only one of the means by which energy can be stored; sinks for heat and cooling for instance present additional means by which customers can store energy. In addition, storing energy in times of high production and feeding power back to the grid could, with according regulation in place, open up additional revenue streams; the market for ancillary services at the distribution grid level is an ongoing discussion in the European Member States with increasing support for a higher level of interaction between distribution system operators and end customers.



The Bigger Picture – Energy and Current in the European Union (EU)

Current's vision and value proposition are well aligned with the broader trends and market dynamics around energy in the European Union (EU), which has a well-known headline target of reducing CO_2 emissions by 20% while increasing renewable energy output by the same percentage by 2020 (compared with 1990 levels). The EU is also a global leader in the promotion of low carbon energy and has signed up to major international treaties and obligations on climate change to achieve CO_2 reduction targets by 2020, 2030 and 2050.

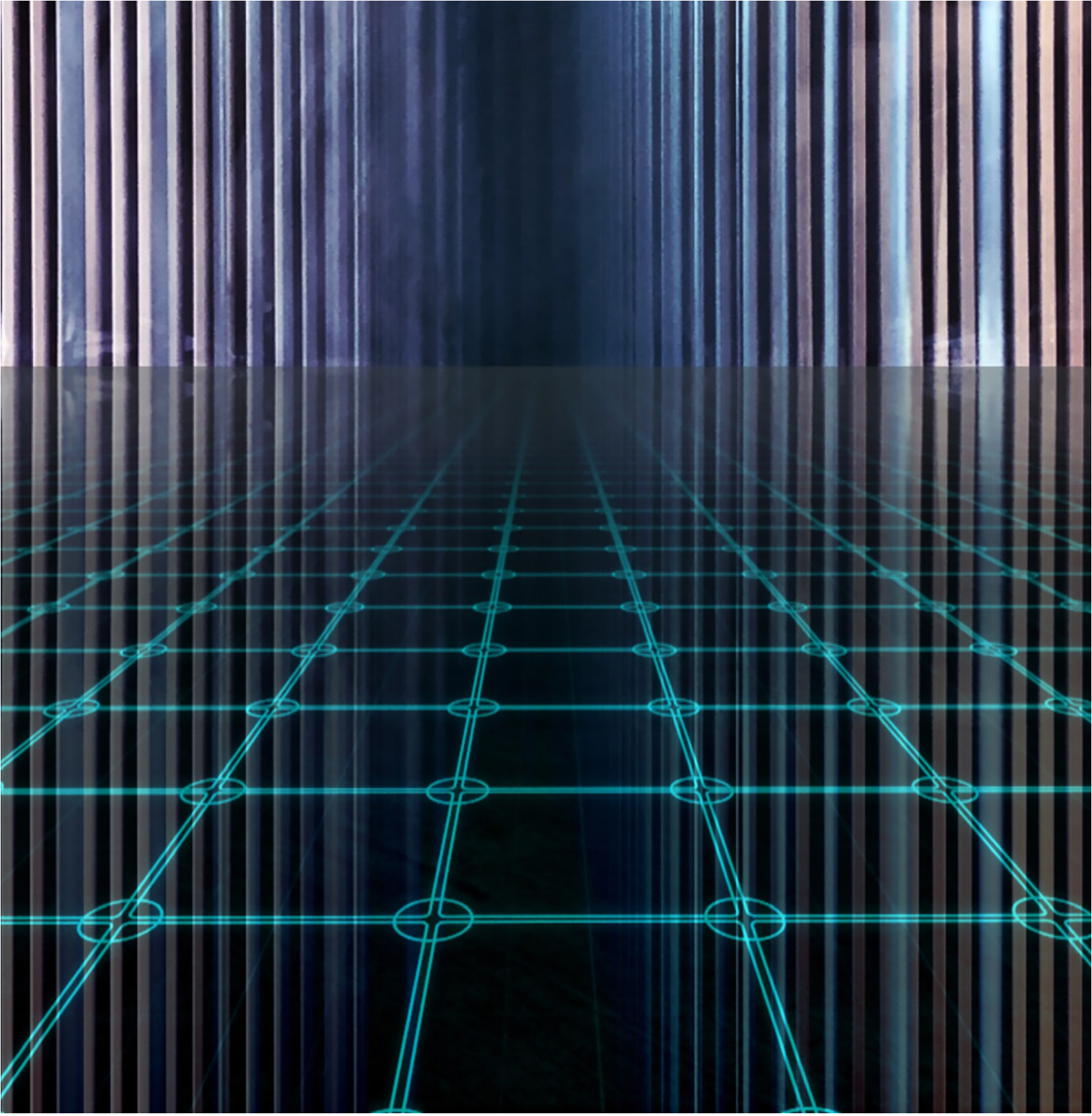
These targets are part of a legislative drive on energy that will extend well beyond 2020, and are backed by a range of specific laws, norms and rules that shape the energy sector across 28 Member States. Overall the EU has increased gross consumption of renewables by 67% between 2005 and 2013. For solar PV, the market has grown from a fringe market in 2005 to a roughly $40bn annual turnover market today, with nearly 100GW of Solar PV capacity installed, up from around 10GW in 2008 – that represents a 10 fold increase within 10 years.[4] The EU also invests around $1.4Bn of public funds annually on renewables focussed R&D, with nearly $3Bn of additional R&D investment coming from the private sector.[5]

Energy security concerns also impact and drive demand for the kind of solutions being offering in the Current and wider GE energy portfolio. After all, EU countries import more than half (around 53%) of their energy sources from outside of the EU at an annual cost of €400 billion.

Combined, the EU offers an attractive legislative and market framework for reducing, producing, shifting and optimizing energy use. A move to the kind of renewable, off-grid and intelligent energy solutions being developed by Current would bring multiple benefits for a range of actors across the EU, from energy system operators to end users and consumers.

[4] European Environment Agency, 2016. file:///C:/Users/212349352/Downloads/Renewable%20energy%20in%20Europe%202016%20-%20Recent%20growth%20and%20knock-on%20effects.pdf

[5] UNEP Global Trends in Energy Efficiency Investments, 2015.



Join us on the Current Journey

We know that a new data driven marketplace for smart energy is not created 'off the shelf' or overnight. It is the product of much effort and investment, combined with the confidence that what is being built will deliver significant returns over the medium and long term, using metrics to track progress and success. The time to lay the foundation for your energy future is today. There are many options. Let us help you choose wisely. Follow us at www.CurrentByGE.com.

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