

Plexigrid Superpowers make it Possible

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ELECTRICITY GRIDS NEED A TECHNOLOGICAL MIRACLE

We got used to living without stopping to understand how some of our most fundamental technologies work. Electricity is probably the most obvious of all of them. For a century, it became totally normal to have access to artificial light on a click.

But even electric grids become obsolete. Ours, already in the third decade of the 21st century, are now more than ever in need of transformation. In how they work, and how we use them.

Talking about how we produce electricity, and the amount of CO₂ we humans emit into the atmosphere, Bill Gates once wrote that “we need energy miracles.”

And so, perhaps in search of an energy miracle, Plexigrid was born.

Electricity grids are becoming the largest bottleneck of the energy transition because nowadays they are tasked with much heavier duties than they did a century ago; technological evolution has taken us from using them to produce artificial light in our homes to using them to power everything in our lives, from air conditioners, heat pumps, electric cars and bicycles, hundreds of electronic gadgets, and thousands of industrial processes, and expecting them to also integrate local solar production and electricity storage. With an electricity grid whose design, in essence, has not

been modified for 100 years, looking for energy miracles is not a luxury but an obligation.

Plexigrid is a deep-tech company in the electricity grid space with headquarters in Sweden and Spain. We develop the necessary technology to make power grids more flexible, intelligent and efficient, and fit for the energy transition.

We have created deep technology than can transform current power grids into flexible ones that understand where, when and why the grid is overloaded or under-utilised.

In essence, the power grid system has remained unchanged for more than 100 years. Even with today's innovation,

operators have limited visibility into what is happening in the grid below 20,000 volts. The grid capacity cannot cope with today's needs (full of electric cars and solar panels), and vast amounts of efforts and money are invested every year trying to accommodate a decades-old infrastructure in a society that is supposed to be future-proofed.

Our technology aims to develop ways to optimize electricity grids. But beyond artificial intelligence, applied data science, and power system analysis, the technology we've developed at Plexigrid has three unique capabilities in the industry.

We've called them SUPERPOWERS because they are.



1. End to End Grid Visibility



Distribution grid operators have critical information spread across multiple siloed systems. The GIS (Geographic Information System) contains the location and physical characteristics of each of the tens of thousands of kilometres of cables wired across a city. The ERP system contains additional asset and economic information. The grid SCADA system traditionally provides real time visibility down to 20,000 Volts but not below, where the

Plexigrid's technology lets grid operators know what's happening at every point in the grid In real-time.

feeders that power the different streets and individual households are located. Data from individual homes have not been accessible in an easy way for grid operators. But all over the world smart metering systems and low latency communication is being rolled out to collect the electricity consumption and generation of every customer across the grid.

But despite all available data,



500-800 billion USD annually will be needed from 2030 onwards to make the grid fit for the energy transition. With Plexigrid technology, 35% of these investments could be saved.

distribution grid operators have been blind on low voltage levels. Our technology brings all this information to their fingertips, in real time, creating the most comprehensive visualization of an electricity distribution grid to date. We

make information flow freely, breaking organizational silos, providing new insights and decision support to operate the grid more efficient, with lower losses and increased availability.



2. Real-Time Grid Analytics



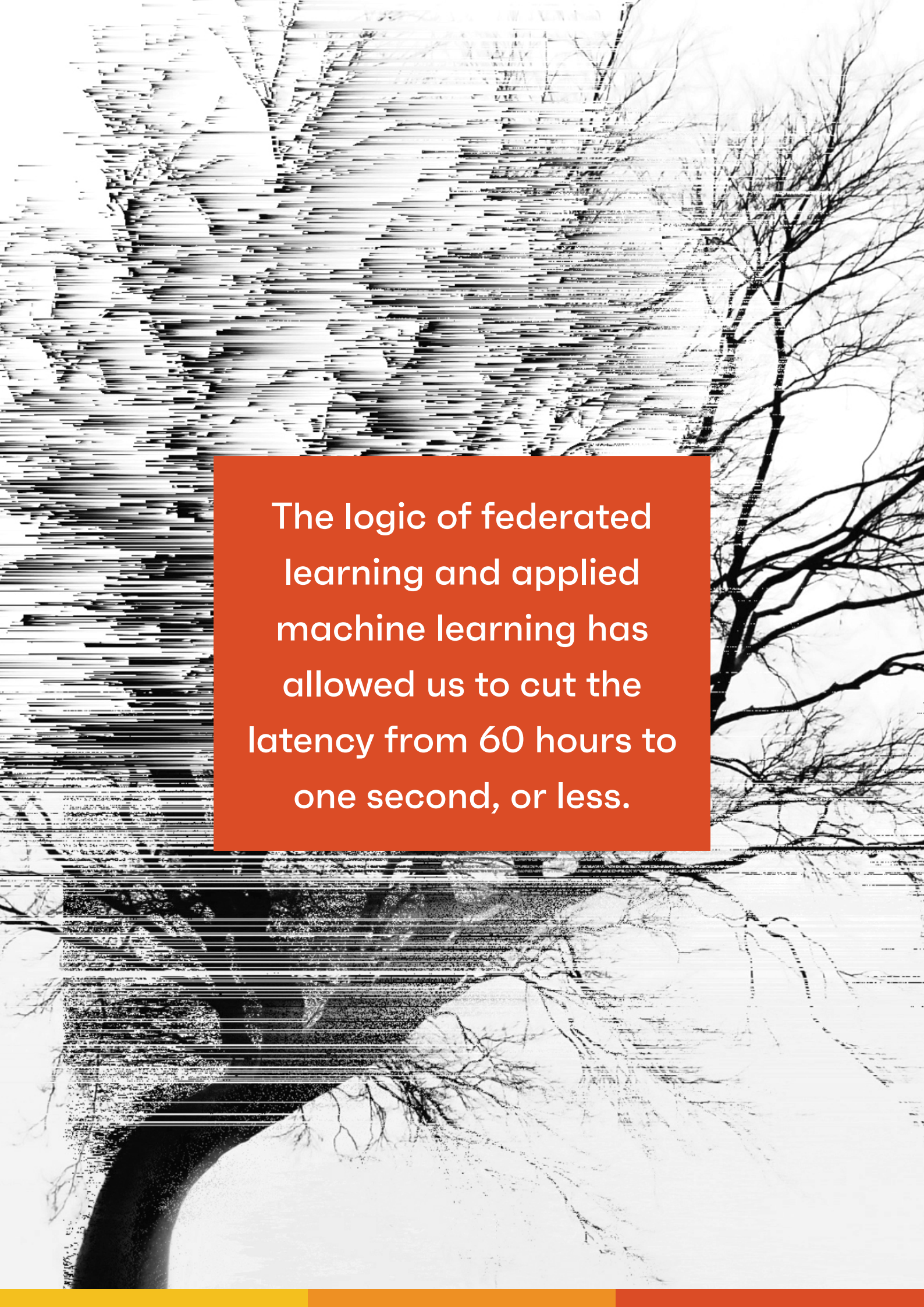
Electricity grids cannot be overloaded without significant risks of causing major damage to equipment, or even national blackouts. Since grid operators don't have access to real time information of the load in their low voltage grids, they install millions of devices to protect the system from an overload like fuses, switches and protection relays. These help disconnect the grid in case of a local overload or failure, protecting the larger grid but at the same time creating a local power outage.

To avoid an overload situation occurring in the first place, grid operators also massively over-dimension their grids adding grid capacity buffers of 100% or more. While this over-dimensioning is effective in reducing the amount of

Plexigrid's technology provides grid operators with an unprecedented Analytical capacity.

local outages, it is very inefficient from a cost perspective. In the end consumers are the ones paying for all this overcapacity via the electricity grid fee.

Plexigrid's provides grid operators with real-time analytics capabilities of millions of kilometres of low voltage networks. This has profound implications in how electricity distribution grids can be operated. Plexigrid computes constraint violations like overloads, bottlenecks, unbalances and other critical analytics, across every inch of the grid, in real-time. Our technology has reduced the time required to run these analytics from days or hours, to less than one second. We make it possible to move analytics into real-time grid operations. By taking away

A black and white photograph of a snowy path lined with bare trees. The path is covered in snow and leads into the distance. The trees are without leaves, their branches silhouetted against the sky. A red rectangular text box is overlaid in the center of the image, containing white text. The bottom of the image has a yellow and orange gradient bar.

The logic of federated learning and applied machine learning has allowed us to cut the latency from 60 hours to one second, or less.

the uncertainty of the actual loading of the grid, the grid operators can run the system closer to its limits and the need to deploy overcapacity is significantly reduced. Investment

decisions can be optimized to target the actual bottlenecks based on facts rather than speculation. Truly game changing!



3. Flexibility Management



Plexigrid's revolutionary technology allows distribution grid operators to connect more renewable energy from solar and wind to the grid and enables faster deployment of charging stations for electric vehicles. We solve the grid bottlenecks and congestions that these assets are causing by mobilizing the flexibility of individual customers, instead of by building more grids with overcapacity. When a section of the grid starts to approach its maximum limits, Plexigrid provides information in real time about the available local flexible loads that can be rescheduled. This could be charging of electric cars, heat pumps, air conditioners or batteries. The right combination of flexible loads is selected to resolve the bottleneck or congestion in the fastest way and at the lowest possible cost.

While renewable energy costs have been reduced over the last decade between 70% to 95% (making renewables cost competitive with fossil fuels), grid costs

Dynamic allocation of grid capacity to meet the growing demand.

have gone in the opposite direction. Grid costs per MWh have gone up between 40% to 90% throughout Europe, America and Asia over the last decade.

And this is just the tip of the iceberg. According to the International Energy Agency study "Net Zero 2050", 500-800 billion USD annually will be needed from 2030 onwards to make the grid fit for the energy transition. As these costs get passed on to consumers, grid costs will become the single largest component of the electricity bill. But this trend can be reversed.

By combining the Plexigrid superpowers, 35%-40% of these investments in grid capacity could be saved. These savings could be shared with electricity consumers in exchange for their flexibility, making the energy transition faster, more affordable and more sustainable for billions of people. A win-win for everybody.

We are Not Magicians We are Innovators in the Electrical Sector.

A team that brings together academics, mathematicians, computer scientists and electrical engineers has spent years designing the algorithms and computing setups that can bring computation times from days to milliseconds.

Great artists bring inspiration from masters in other fields and from outside sources and blend them in their creative process. We have done the same.

During the last decade, three major innovations that have revolutionized other sectors have enabled us to materialize our vision of transforming electricity grids into plexigrids: autonomous driving software, federated learning and edge computing. Plexigrids technology orchestrates through the day millions of solar panels, grid batteries, heat pumps, AC units, charging

of electric vehicles... with unique system performance enabled by combining these technologies.

Finally, Plexigrids game changing dynamic capacity allocation philosophy is inspired by the algorithms that run telecom networks. In these networks, capacity (or bandwidth) is allocated in real-time among millions of users. The result of this is an optimal utilization of network capacity that creates a great customer experience at an unbeatable cost. Plexigrid is aiming to do the same in electricity networks, enabling the largest change in electricity grids technology in a hundred years.

Our technology converts insight into impact, and brings everyone to a world where electricity production, distribution and consumption is rational and optimal.



These are our superpowers.

This is Plexigrid.



Ari

LV monitoring and analytics.



Tatari

Grid planning and system operations.



Tia

Flexibility management.