Capgemini

TECHNOVISION
2022

BEING LIKE WATER

ENERGY & UTILITIES

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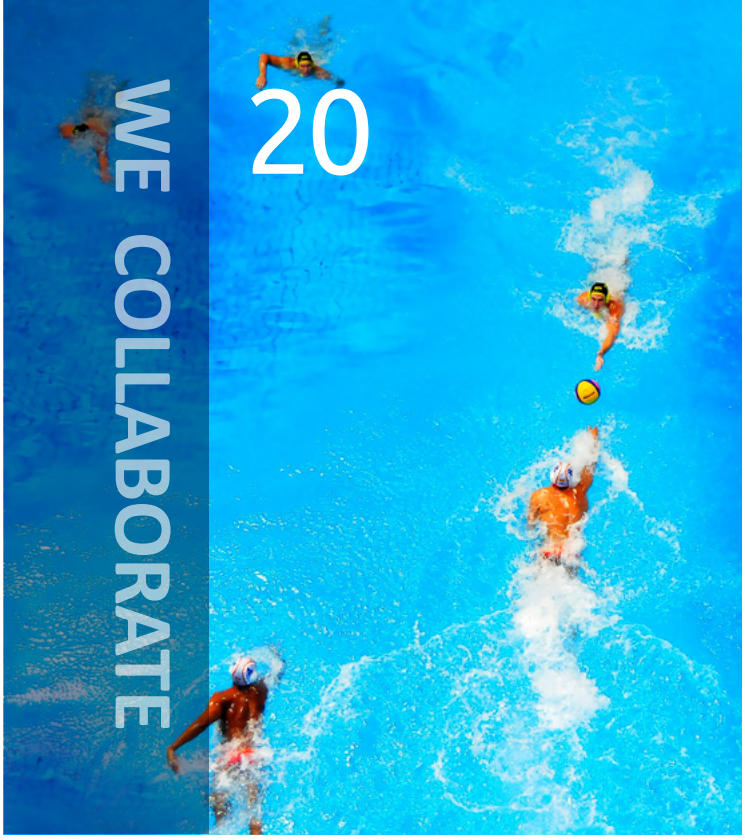
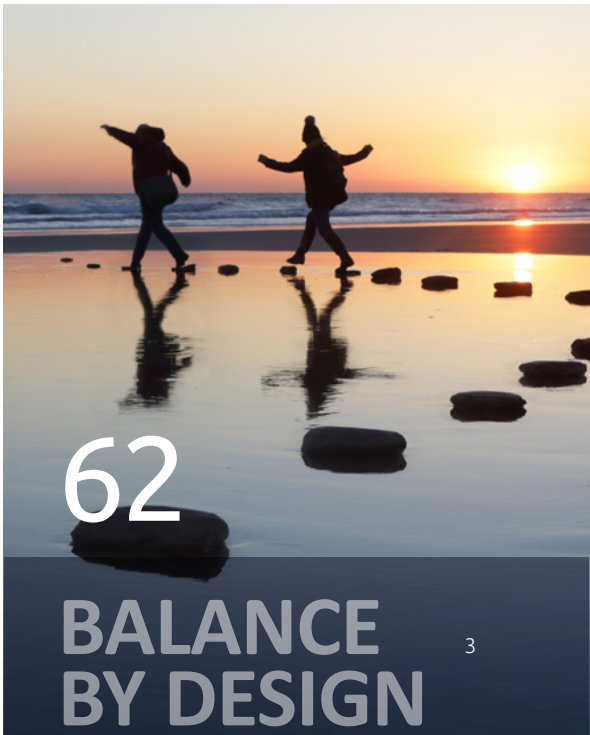




Foreword

Being like water … What better motto than this to illustrate our TechnoVision 2022 Energy & Utilities Playbook!

Born in the French Pyrenees mountains, I've always been surrounded by lakes and … water dams. One of the greenest energies, hydroelectricity is a good example of how the energy sector started the sustainable journey decades ago.

Innovation is a key driver for the energy & utilities sector. Monitoring energy infrastructure is no longer an option but a necessity. Internet of things, remote access through new telecommunication networks, 5G, satellites, LPWAN… All these technology innovations are accelerators to provide new services.

Specifically for the energy sector, a mix of energy sources is a priority and is being boosted by data analytics. By monitoring energy consumption, in particular tracking and predicting usage, providers are able to anticipate the global network consumption and production which will allow them to incentivize green energies.

Looking at distribution, blockchain is already being used to track and secure exchanges for private communities and the grids are onboarding more and more artificial intelligence.

As the final consumer, we've also seen the results of technology innovation with live monitoring and data analytics provided through new web or mobile applications, pushing the user experience to the limit to provide us with the tools and knowledge to optimize and reduce our consumption, each one of us playing our role within the global warming challenge.

Beyond addressing consumer usage, utilities are building intelligent data solutions to improve the customer service experience by alerting customers of incidents before they become a nuisance.

You will find within this TechnoVision Energy & Utilities Playbook not only a vision of the future of the energy & utilities sector but also many tools and examples to implement innovation in a pragmatic way.

I hope you will enjoy reading this report as much as we did building it with our expert and passionate team!

So come on in, the water's fine.

Patrice Duboé
Executive Vice President,
CTIO Southern &
Central Europe

Introduction

As energy & utility leaders, we face two big challenges. Firstly, 73% of the world's carbon emissions originate in our sector, and the energy transition is vital to the world climate change agenda. While progress was made at COP26, there is still much to do to transform the global energy system to meet the required 1.5-degree temperature rise pathway. Secondly, with the current geopolitical situation, the world is facing significant energy supply challenges.

Agility and speed are key drivers for the transformation of the energy & utility industry. Our theme for this year's TechnoVision report is "Being Like Water," which focuses on the fluid strategies and architectures of a modern technology business. To achieve this status, energy & utility companies must use digital systems and services alongside low carbon technologies to transform into nimble, customer focused, platform centric, and energy transition focused organizations.

The TechnoVision 2022 Energy & Utilities Playbook highlights the key elements for such an organization. Through a continuum of building blocks extending from "systems" to "people," it brings to life the underlying fabric that supports the technology-business transformation of an organization. Readers are inspired through real-life case studies mapped to these building blocks as well as implications of larger, more encompassing technology trends.

We hope the insights in this 2022 edition of TechnoVision Energy & Utilities Playbook help you to drive technology business transformation in your own organization.

We look forward to hearing your feedback.

James Forrest
Executive Vice President, Global Industry Leader Energy and Utilities

Philippe Vié
Vice President, Group Leader Energy and Utilities

Peter King
Vice President, Global Energy and Utilities Lead Capgemini Invent

The storm is coming…

The waters are certainly not calm for the energy & utilities sector in 2022 as high energy prices endanger the climate change agenda, and global energy markets face a number of growing challenges on the horizon.

The storm is coming...

A perfect storm is the intersection of multiple weather systems but for energy supply three seem to be on an inevitable collision course:

- Energy affordability
- Energy sustainability
- Continuity of supply in a politically destabilized world

The combination of the concept of "energy poverty" in the developed world, where light and warmth become a privilege of the few, the need to meet neutrality and net zero to have a sustainable future for all, and the sudden removal of supply sources due to political intervention is creating chaos. However, necessity is the mother of invention, and in turbulent times innovation and market disruption are common. Moving from centralized generation to local community-based renewables, decoupling generation from consumption through battery technology and full lifecycle sustainability on all products that we own, may mean that after the storm clears we have a better future for all. However, do what you always did, get what you always got...

Global energy markets face increased competition as outsiders capitalize

Faltering energy companies will be at the mercy of increased M&A activity from larger companies who are taking the long view of energy market profitability, looking beyond today's unfavorable conditions to capitalize on cheap deals. This process of consolidation will enable financially secure players to adapt faster in the energy transition. We can hope that this will lead to greater collaboration between market players.

A step change in adaptation and risk monitoring

Expect to see fixes for challenges at a local level, with firms adapting and improving physical infrastructure. Take, for instance, the recent failure of Texas's wind turbines, which presents a clear need to improve design and interconnection across the board and tailor it to the demands of a given geography. As we increasingly rely on and invest in solar and wind technologies, inherent complexities and risks are becoming clearer. We can expect to see a combination of greater innovation for challenges, such as soil erosion creating dust at solar farms and greater urgency at a basic level. Quick and easy physical adaptations, like concrete bunds at energy facilities to prevent flooding from disrupting supply, should be rolled out in 2022.

Bringing hydrogen and nuclear into the fold

Hydrogen has a key role in the future, and yet we're far away from fulfilling global ambitions if it is to take a key role in the energy transition. The sector can be expected to focus on making green hydrogen cheaper and improving efficiency, which will provide another option for clean dispatchable generation. Clean energy solutions like solar and wind, which are now at the right price point, will be deployed at a greater pace in 2022. Whether green hydrogen will in fact accelerate is harder to say. If funding becomes more concrete and availability of low carbon generation is reliable, the odds look bright.

The case for investment in nuclear will be more convincingly made in 2022. Nuclear offers low carbon energy at a known price, insulated from global energy trends. We can expect governments to start to make direct commitments to nuclear (both large and small plants) as one way of demonstrating the viability of their net zero plans.

The year of truth for COP26 commitments

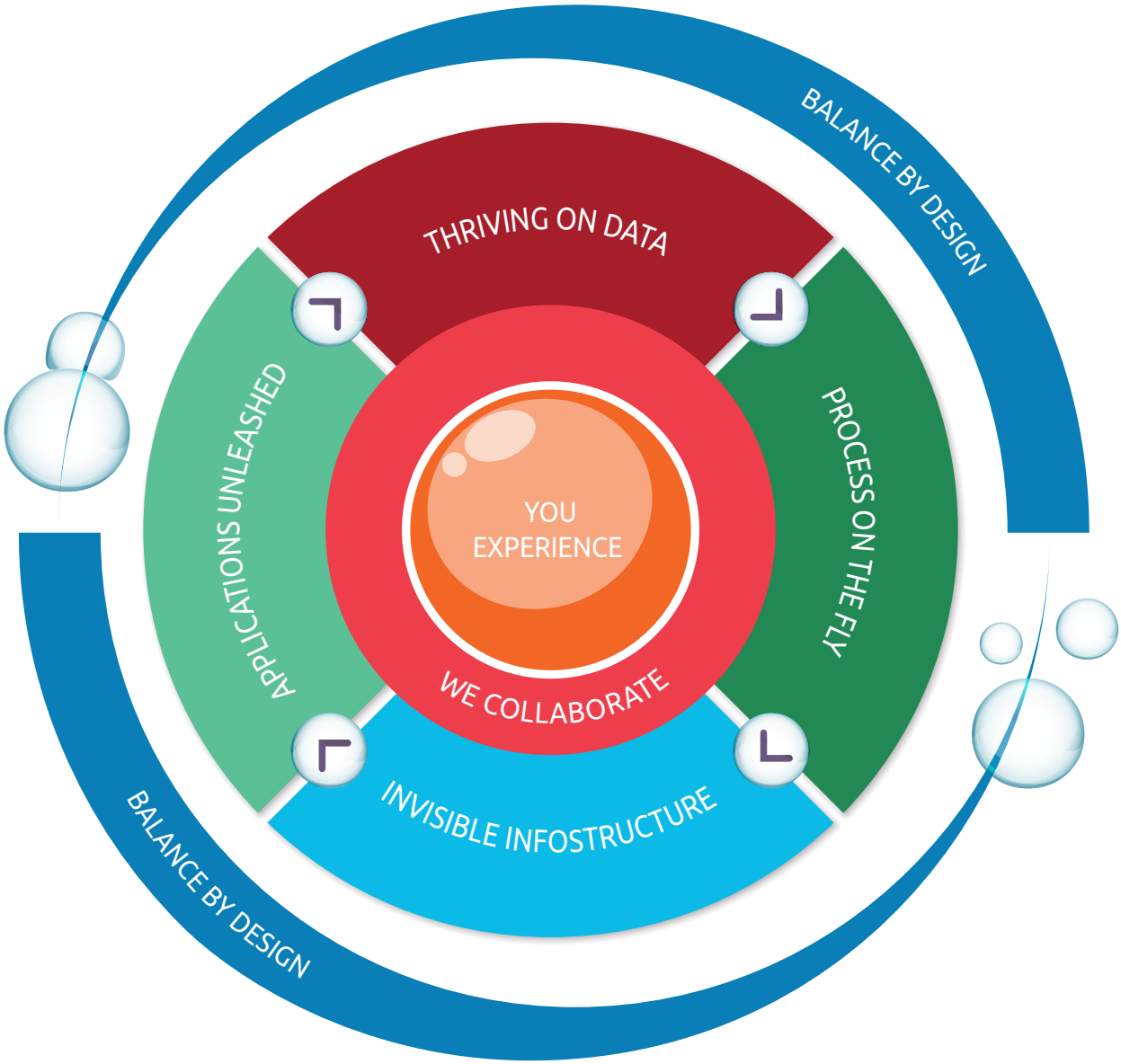
Following COP26, the question is whether nations will make good on their 2030 commitments to make the 1.5-degree target feasible, and we expect many key players, including the EU, to accelerate their transition agenda and legislation. Less predictable is whether the US, India, and China will escalate climate funding and 2030 plans too. The US in particular finds itself at a crossroads, with the far-reaching Build Back Better Act liable to go either way. What we can say is that industry will be watching. We can also expect businesses to ramp up their lobbying efforts to overcome the administrative and regulatory hurdles currently holding them back from an affordable and accessible transition.

In view of COP27, we are going to see more and more political groups drawing the parallel between the levels of crisis financing we've witnessed over the pandemic and the dedication of increased funding to the climate crisis – an existential threat, with far greater financial and health consequences than the pandemic. We can reasonably expect funding to accelerate. Keep your eye on developing nations as capital is unlocked, with the goal of helping them adapt to climate change and stimulating investment in clean energy production. As cliché as it sounds, it really is now or never.

OVERVIEW OF **TECHNOVISION**

TechnoVision categorizes technology trends into six well-defined containers, offering a snapshot of innovation from different perspectives (the "what") – ranging from user experience and collaboration, via data and process automation, all the way to infrastructure and applications. A seventh container offers a series of overarching design principles to successfully apply to the trends and create transformational impact (the "how"). These principles help to build a sharp mindset, ready for any portfolio, program, project, architecture, innovation initiative, or idea.

Those familiar with earlier versions of TechnoVision will notice that we have discontinued the framework picture we have been using for years, which to some – unintendedly – suggested a sequential transformation from the more systems-orientated (infrastructure and applications) to the human-centered side (user experience and collaboration). Others thought they saw an architectural diagram.



To stay true to one of the key themes of this year's edition, we upcycled a somewhat older framework: a holistic, circular version, firmly placing You Experience and We Collaborate at the heart of the technology-driven exchange. This core foundation is surrounded by the more functional containers – Thriving on Data, Process on the Fly, Applications Unleashed and Invisible Infostructure. All wrapped up with Balance by Design as the overarching container to be considered while working with the others

Within each container, trends are presented as one-page summaries, designed to be crisp and to-the-point, yet appetizing enough to warrant further study. Balance by Design follows a similar principle, offering a view of how to shape balance within an organization using easy to digest one-page principles.

The seven TechnoVision containers are summarized below:

YOU EXPERIENCE

IMMERSIVE, LOW-TOUCH, EMPHATIC

You Experience forms the very definition of a highly personalized, seamless user experience. As technology entwines itself in our daily lives, the user experience is no longer a separate discipline. Fully immersive, it is now an integral part of life: at home, at work, or even in leisure time. Organizations can no longer take the well-loved "customer-first" route, but must consider "employee-first," and even "partner-first" routes too, emphatically considering user experiences from a holistic, end-to-end perspective. Loyalty, advocacy, and satisfaction remain as key words, joined by talent retention, engagement, emotional connection, sustainability, and inclusiveness to boot.

WE COLLABORATE

TEAMED, DISTRIBUTED, CREATIVE

Many realities have changed irrevocably since the pandemic – how businesses operate and collaborate being one of them. Many aspects of value delivery are now entirely independent of location and time. People work together in different ways, increasingly at the very edges of what used to be considered the "core organization." Consumers and employees expect creative, integrated experiences. It requires a new level of cross-organization, cross-sector partnering to meet these expectations. Distribution is the leading design principle, together with mesh-style, loosely coupled collaboration. And as the physical and digital fuse, it's no longer clear where technology ends, and business begins.

THRIVING ON DATA

ALGORITHMIC, FEDERATED, SHARED

It's no wonder organizations aspire to thrive on data, to be data-powered enterprises. With every business now being a de facto technology business, data is at its core. Dare we say, every business is now a data business? Data powers superior customer experiences, highly tuned operations, and smart, self-optimizing products and services. Data provides resilience, predictability, and effectiveness, but equally enables organizations to achieve their sustainability ambitions. It's tempting to declare data to be the new corporate asset. But assets tend to be stacked, isolated, and safely put away. It's much better to see data as a first-class product: owned, managed, and activated by business domains, and shared in lively exchanges inside and outside the organization.

PROCESS ON THE FLY

BINDING, PORTABLE, SELF-DRIVING

Strategy tends to be eaten for breakfast, by culture – but also by a lack of operational execution. Organizational aspirations simply "blah blah blah" without any ability to turn insight into action, quickly respond to events, or go with whatever flow the corporate purpose supposes. And all that goodness must be delivered against a scarcity of skilled resources and a need to reduce travel and energy consumption. This is where Process on the Fly shines brighter. Having been less in the spotlight than its complementary container, Thriving on Data (ever heard of "Big Process"?), breakthroughs within intelligent automation and a taste of touchless execution firmly place this container at center stage.

APPLICATIONS UNLEASHED

MESHED, HEADLESS, AUGMENTED

At the heart of any technology business is its applications portfolio. A thriving heartbeat of the organization – part of the business, responsive to every demand. These applications mirror the new business dynamics – built, and continuously changed at high speed, to a high quality, and in whatever incarnation necessary. Yet, many applications no longer look like the ones we used to know as they morph into a connected mesh of microservices. With agility and minimum viable products no longer the "new normal," but the "well and truly established," the quality of application services needs to be at enterprise level, with a continuous, flawless deployment throughout all business operations.

INVISIBLE INFOSTRUCTURE

OMNIPRESENT, AUTONOMOUS, INVISIBLE

The odyssey towards a truly invisible IT infrastructure remains ongoing, but progress is being made. For many organizations, the pandemic accelerated a move towards the cloud: a signpost of increasing "invisibility." To keep up with the pace of a technology business, IT infrastructure needs to be omnipresent, fluently adjusting to the whimsical ways of the time. A software and AI-driven, nearly autonomous supply chain is key, with reliability built in. It also deals with the scarcity of skilled experts and excess energy consumption. But IT infrastructure also expands its reach, integrating operational technology and "things" at the edges of central IT, showing yet again that "Infostructure" is not a spelling mistake.

BALANCE BY DESIGN

OVERARCHING, TRANSFORMATIONAL, PURPOSEFUL

The essence of designing a technology business is to find and preserve several balances in parallel: balance between the interests of stakeholders, between short and long term, centralized and decentralized, friendly and authoritative, purposeful and spontaneous. Besides the "what" of technology trends, TechnoVision offers a view of how to shape these balances within the organization – by purposeful design. The principles within this container aim to provide control questions for executives, a bouquet of perspectives for architects, and a systematic checklist for anybody involved in a technology business portfolio, program, project, or initiative.

As always, the authors have had their way hiding copious references to rock, pop, movies, and other cultural and societal phenomena. The reader is invited to find as many of these "Easter eggs" as possible. It should not be ruled out however, that Generation Z and their "OK, Boomer" colleagues – blessed as they are with quite different frames of reference – may find completely different hidden gems.

If you still possess an appetite for more, the TechnoVision Expert Connect community caters for a variety of detailed posts and articles about your favorite 37 building blocks. And by all means, read our sister report "Applying TechnoVision" to discover various means of using, applying, and playing with TechnoVision in a unique and entertaining way.

YOU EXPERIENCE

The definition of a highly personalized, seamless user experience – literally, a You Experience – has been included in our TechnoVision dictionary for some time. Yet, as technology entwines itself in our daily lives, the user experience is no longer a separate discipline. It is now an integral part of how we experience life: at home, work, when shopping, traveling, or even when enjoying leisure time. Organizations can no longer take the well-loved "customer-first" route, but must consider "employee-first," and even "partner-first" routes too, considering user experiences from a holistic, end-to-end perspective. Loyalty, advocacy, and satisfaction remain as key words, now in the company of talent retention, engagement, and emotional connection to boot. Here, we should take the principles from the School of Positive Computing to heart and apply well-being factors such as self-awareness, mindfulness, empathy, and compassion, too. Call it Us Experience, if you like.

The energy sector has been in a period of dramatic change and will carry on changing for many years to come. The "D-words," decarbonization, decentralization, and digitalization, are ever-evolving, as industry players and their customers seek to adapt. All three areas are embraced, but while it is being done at different speeds, it all starts with establishing customer experience and IT transformation leaders focused on embracing the change. The pandemic only furthered this digital move, placing it right at the forefront of business requirements. But, as humans, we do our best work when driven by excitement, not fear. As the restraints of the pandemic ease, we can find the opportunity to embrace the new doors technology opens for a better you, me, and us.

Key Trends in the Energy & Utilities Sector:

- Creating seamless, personalized interactions is no longer focused solely on customers: employees now demand it, and it doesn't stop there. Citizens expect companies and utilities to partner and collaborate more than ever before, to enhance the service they offer and deliver truly seamless user experiences across the industry. Take streetlight repair and outage restoration as an example.

  Here, seamless means information exchange in real time, creating stand-out moments that intertwine digital and real-life interactions. To achieve them, silos along the value chain need to be broken down. When innovative technology is implemented, it is integrated between the customer's user experience (UX) and the backbone of the organization to achieve a wholesome experience inside and out.

- Safety is always a focus when working in the energy industry: it is not a trend that will go away. However, creating realistically fake virtual spaces is a complete game changer. Safety training and tabletop exercises that enable employees to practice in a hyper-realistic – yet perfectly safe – environment help teams to be ready for any potential emergency incident. Using new virtual worlds (digital twins) that can represent real-life scenarios to practice sound decision making is certainly here to stay.

- What if you could save millions in operating costs while increasing customer experience (CX) and customer satisfaction at the same time? Chatbots and virtual humans in combination with artificial intelligence (AI) can answer customer questions faster, while meeting customer expectations and enhancing the user experience. Evolving from a simplified text-only service, now incorporating voice and soon even cultural meaning and intent, the reliance on a technological solution to a human challenge allows scarce resources to be utilized elsewhere, no customer experience harmed.

- As the pandemic challenged our status quo and re-defined our day-to-day life – the need for empathy increased exponentially. From tackling customer improvement processes that remove pain points, to complex and challenging digital transformations – all these projects are more successful when they include that special – empathetic – ingredient. The superpower that holds everything together like glue is having a diverse organization demonstrating high emotional intelligence (EQ), mindfulness, and compassion.
- The obsession with frictionless experiences is the last – but not least – trend to highlight. The "Internet of Behavior" combined with AI technologies captures data across multiple touch points, converting data into insights, predictions, and recommendations. As utilities embrace energy usage load disaggregation, their energy advice will become proactive, highly relevant, and actionable, creating a truly frictionless experience.

Nicole Cadek, Canada
Expert in Residence

EXPERIENCE²

Creating a user experience as an integrated whole, seamlessly covering the perspectives of customers, employees, and partners, enabled by all available variants of UX technology

The trend of the decade is the need for information. Right here, right now. Available in real time whenever you so demand. But for an E&U business, what does that really mean? It means a need to connect customers with their environment and communities with their inhabitants by providing high-quality, reliable services to satisfy every demand.

As cities start to embrace the need to transform their IT architecture and applications, they too empower enhanced data collection from the various business domains: mobility, building management, street lighting, and environment to name a few. This enhanced use of data results in enhanced knowledge of the region, which ultimately leads to better understanding of customer requirements.

Communities can now edit data using tools tailored for different users – a personalized mobile app for citizens, hypervisor to monitor regions, or dashboards for technical service managers. At every level, data simplifies the process and enables people to make informed decisions.

A Vision Towards Smarter Cities in Dijon, France

The Context & Challenge:

Dijon Metropolis in France is a medium-sized community of 260,000 people. The region wanted to make the management of the city's infrastructure and economy more efficient, as well as to support sustainability for the area and develop the economy to improve services dedicated to its citizens.

The Approach:

By converting six siloed command centers into a unique Connected Command Center, a holistic incident management service was created (for car accidents, streetlight defaults, etc.). The solution included a tool called Hypervisor which provides a 360° real-time view of the territory, including a map with equipment and incidents. The city's data platform functions as the foundation for data aggregation and utilization for front offices.

Benefits & Results:

Not only was the city able to realize significant cost savings, but they were also more effectively managing the territory through real-time administration of operations, deep analysis, steering, and decision support for city staff – all enabling Dijon to offer new and better services to its community.

Taking Care of Customers One Moment at a Time

The Context & Challenge:

Welsh Water wanted to improve the user experience when customers reach out to their contact center. Serving over 3 million people across the country, the company recognizes that water is our most essential need. To provide more efficient and superior customer services, the customer relationship management (CRM) system needed to be updated.

The Approach:

Driven by a desire to better understand their customers, Welsh Water conducted a product selection process and chose a cloud-based SAP C/4HANA solution, with Capgemini as their chosen technology partner. To meet internal requirements, Capgemini – together with Welsh Water – held a workshop with stakeholders to show-and-tell using the waterfall method.

Benefits & Results:

Once implemented, Welsh Water created a better customer experience and received higher satisfaction scores. Customer insight creation was simplified and personalized, and new customers are now onboarded faster.

Alexandre Ryckman, France
Expert in Residence

ME MYSELF AND MY METAVERSE

A new virtual world augments real life, creating a potentially profound impact on the way we live, work, and collaborate

Merging digital and physical worlds through augmented reality (AR) and virtual reality (VR) is at the heart of smartphone applications worldwide. With the birth of AR games such as Pokémon Go back in 2016, we have welcomed AR characters onto our streets and in our parks. AR allows us to enhance reality with interactive digital components. The new buzzword: "metaverse." This new concept is dubbed the next generation of the internet. The only question is: when?

Yet what entertains us can also offer significant benefits on the way we work and collaborate. The energy industry values and seeks – above all – safety for its employees. Mantras like, "everyone goes home safe, everyday" and business targets focused on becoming a world leader in safety are posted on thousands of corporate bulletin boards around the globe, set in stone in safety policies of companies now, tomorrow, and well into the future.

With the drive for safety, and new technology potential, the ambition to push innovation even further is an exciting prospect. Brain–computer interfaces (BCI) can do just that, by using:

- Cognitive neuroscience and neuroimaging techniques (experimental methods and data acquisition)
- Signal processing and machine learning (ML)
- Embedding systems

Here, applications in health care are already being developed and tested. Many use cases come to mind when thinking of the day-to-day work of power technicians: training apprentices how to handle high-voltage lines, maintenance, and repair of large power generation units, or simply fending off wildlife when patrolling and repairing remote line equipment.

Mind & Act Project for an Energy Industry Player

The Context & Challenge:

Despite continuous process improvements, the energy industry still faces ambitious safety challenges to reach the ultimate goals of "zero incident" and above all, "zero accident." More specifically, humans are at the center of complex and potentially dangerous activities. Intake from neurosciences and emerging technologies may support pushing frontiers in human safety challenges.

The Approach:

A rich, qualitative user research program enabled a detailed understanding of human worker activities, behaviors, and their possible associated cognitive states. Taking an experimental approach in laboratories allows the development and testing of specific algorithms with wearables that are neurophysiological and, importantly, non-invasive. The goal is to validate their operational feasibility for real life use.

Benefits & Results:

The benefits include innovative perspectives in human factor understanding, a significant reduction in the number of incidents and accidents, and their associated socio-economic impacts.

Nicole Cadek, Canada
Expert in Residence

MY OWN PRIVATE AVATAR

Hyper-realistic representations of humans bring unprecedented and unexplored ways to communicate within virtual channels and the metaverse

Global consumers now expect exceptional customer experience. As such, brands need to offer high-quality, 24/7 customer service, or risk becoming rapidly obsolete. Tools such as chatbots need to be thoughtfully implemented and accelerated as technology evolves, preventing customer service departments from becoming overwhelmed by customer queries.

It is anticipated that the next five years will see a meteoric rise for chatbots, with retail sales reaching USD 142 billion and services becoming increasingly automated through the smart use of data, AI, and natural language processing (NLP). Consumers' perceptions are starting to shift with developments in chatbot technology leading to:

- 81% of consumers expecting brands to engage with them over private messaging
- 69% of consumers being happy to use a bot if it answered their questions faster
- 46% of consumers being happy with the quality of customer experience interactions and customer support questions

Most chatbot use cases center around simple "frontline" customer enquiries, providing immediate solutions to common queries, or re-routing customers to human agents for anything more complex or emotionally involved. But a shift is occurring as chatbot technology augments from text-only capabilities to text and voice. Here, limitations such as understanding, intent, nuance of dialogue, and cultural meanings must be tackled. At Capgemini, we are actively working with our clients to adopt next generation chatbot functionality, regularly resulting in savings running into the millions, and big leaps in CX scores, customer satisfaction, and brand loyalty.

Most importantly, chatbots should never be viewed as a magic silver bullet. They are simply a highly effective tactic as part of a wider CX strategy that seamlessly combines the best of automated and human interactions to enable high-quality personalized experiences.

As we spend more time in virtual environments, the way we present our virtual selves (or avatars) will become more and more important. Avatars are already taking many different shapes and sizes, matching to the virtual context and personality of the individual from an "idealized self" through to totally new characters bearing no likeness to the real person.

Using Chatbots and IoT to Streamline a Global Manufacturer's Plants

The Context & Challenge:

Working with Capgemini, a global manufacturing plant wanted to create a conversational UI interface to enable supervisors to obtain information quickly about the state of a milling machine's condition, manage product quality by analyzing a large amount of data produced, and presenting it all in a manner that was easily digestible and actionable.

The Approach:

A voice- and text-enabled conversational UI (CUI) allows the plant manufacturer to query the health of multiple machines quickly and efficiently:

- *A CUI is a digital interface that enables users to interact with software following the principles of human-to-human conversation.*
- *OPC UA (open platform communication unified architecture) is the interoperability standard for secure and reliable exchange of data that is platform independent and ensures seamless flow of information among devices from multiple vendors.*

Many machines on the plant floor use OPC UA protocol that chatbots understand and navigate based on the user search criteria. The result is then analyzed and presented in an easily digestible format for supervisor staff, while allowing interactions with the machine and systems to fetch data in real time.

Benefits & Results:

The availability of real-time information using new-age digital solutions helps to empower employees and realize the true business value of these innovations, empowering organizations to join the AI transformation wave.

Rob Bartlett, UK
Expert in Residence

I FEEL FOR YOU

Boosting both the individual and corporate EQ by creating a more effective, meaningful, and satisfying symbiosis between people and their technology enablers

The one thing that is for certain, is that nothing is certain. In today's VUCA (volatile, uncertain, complex, and ambiguous) world, organizations, leaders, and individuals alike are facing unprecedented challenges, change, and the "era of uncertainty2." This, coupled with increased competition and ever-higher demands, certainly places an overwhelming sense of stress and anxiety for many.

The Future of Jobs 2020 reports that "the past decade of technological advancement has also brought about the looming possibility of mass job displacement, untenable skills shortages, and a competing claim to the unique nature of human intelligence now challenged by artificial intelligence (AI). The coming decade will require purposeful leadership to arrive at a future of work that fulfills human potential and creates broadly shared prosperity."

We often turn increasingly towards technology – such as AI – to provide the answer to a challenge, displacing the importance of the human touch. But, by intentionally building emotional intelligence (EQ) into technology, we can increase the impact resulting in a higher ROI, better collaboration, and increased value outcomes.

Neuroscience and behavioral research studies valorize how EQ encompasses skills needed to improve resilience, collaboration, individual and team performance, sustainable wellbeing, and effective leadership, to name a few.

The Capgemini Research Institute conducted a global survey on emotional intelligence in the age of digitization. On surveying more than 2,000 executives and non-supervisory employees across many regions and industries, 74% believe that EQ will become a "must-have" skill.

Human-centered skills – such as EQ, mindfulness, empathy, and compassion – are no longer optional, but vital to meeting the challenges of uncertainty2 today and well into the future. The outcomes of individuals, teams, and organizations with higher emotional intelligence will result in more successful organizations in regards to leadership, performance, creativity, decision-making, and wellbeing.

Digital & Emotional Innovation Day

The Context & Challenge:

One of Capgemini's top utility clients worked closely with the Accelerated Solutions Environment (ASE) to help identify pivotal and defining moments throughout the company's transformation. The Capgemini ASE team facilitated an Innovation Day, exploring inventive ideas focusing on the future of work, NextGen AMI, digital customer experience, and emotional intelligence and mental wellbeing.

The Approach:

The ASE Experiential Event supported the client on "big idea thinking" and "dreaming the art of the possible" for what digital and emotional innovation could mean for their everyday working life. As a key outcome, the client identified the need to "build muscles around empathy, courage, trust, diversity, and collaboration." The ASE Academy built a 12-month program integrated into the client's innovation efforts to meet this new muscle-building objective. The program included a combination of monthly and self-paced learning, with mentoring on topics related to all ASE Academy pillars: emotional intelligence, storytelling, facilitation, creating a collaborative culture and design thinking, micro-practices, muscle-building practices, and deep listening.

Benefits & Results:

These human superpowers of empathy, courage, trust, and diversity translate into tangible benefits, including a more collaborative work culture driving higher productivity, creative and innovative new ways of solving business problems, and using diversity of thought to make decisions that stick to be implemented by the team and organization.

Krystianne Avedian, USA
Expert in Residence

NO FRICTION

The Experience Economy becomes real, enabling businesses to provide truly frictionless experiences

Global consumers' expectations and enthusiasm for quick, convenient, and contactless experiences has skyrocketed – driven by an unprecedented shift to digital channels during the pandemic, and technological advancements in adjacent industries such as retail. The bar is constantly being raised by companies that are redefining the standards for what an experience should be (for example Spotify, Apple, or Amazon). For energy & utility companies who are operating in a monopoly, it is important to keep pace with global CX trends.

The winners will be the brands who are able to fuse online and physical experiences. Providing customers simultaneously the best of both worlds — emotional connectivity within a physical environment, coupled with online convenience.

Today, nine out of 10 consumers want an omni-channel experience with seamless service. For brands, omni-channel customers have a 30% higher lifetime value (LTV) than those that only use one channel, and 86% of customers are willing to pay more for a seamless customer experience. Brands should place high importance on the design and orchestration of the omni-channel customer experience, considering every touchpoint to ensure it meets or exceeds expectations. When implementing solutions, it is crucial to architect and build platforms and services that enable a free flow of information and data to provide crucial automation, insights, and recommendations to create truly connected and memorable experiences.

Mixed Reality Helps Energy Leader Develop New Ways of Working During Crisis

The Context & Challenge:

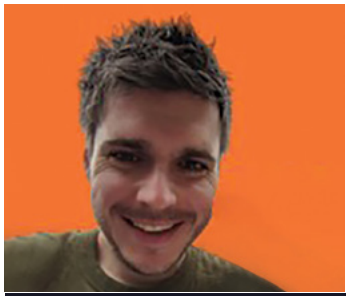
Genesis Energy operates 1,800 megawatts (MW) of hydro, thermal, and wind-based power stations across New Zealand's North and South Islands, providing electricity to around 500-thousand customers. Maintaining these complex, geographically diverse infrastructure assets typically requires specialized engineers to fly between sites to physically inspect, test, and maintain these assets in person.

The Approach:

Microsoft HoloLens was deployed at Genesis Energy's Huntly Power Station – the country's largest power station. Changes to the vacuum plant at the station were required to be certified. The virtual certification exercise went ahead successfully during the pandemic, using Microsoft Teams and HoloLens to enable remote inspection and visual certification.

Benefits & Results:

The successful pilot paved the way for future uses of extended reality (XR) technology to enable the future of work at Genesis Energy. Additional use cases on training and assisted maintenance are now being explored.



Graham Taylor, UK
Expert in Residence

WE COLLABORATE

Back to life, back to reality. The world may return to some semblance of what it looked like before the pandemic, but many realities have changed irrevocably – how businesses operate being one of them. Many aspects of value delivery are now entirely independent from location and time. People work together in different ways, in different setups, increasingly at the very edges of what used to be considered the "core organization." Consumers and employees expect integrated experiences, with their latest online endeavors fresh in mind. It requires a new level of cross-organization, cross-sector partnering to meet these expectations. Distribution is the leading design principle, together with mesh-style, loosely coupled collaboration. And with physical and digital worlds fusing, it's no longer clear where the technology network ends, and the business network begins. Oh, it's back to life. But not as we know it.

Energy companies across the world are reviewing how organizations can collaborate by using new technologies and a collaborative mesh-style approach, which can enhance the integrated experiences of consumers and employees alike. The energy sector is undergoing immense transformative change, where the "art of the possible" boundaries are being stretched like never before. But it also means that energy & utilities companies must ensure they have the right talent, skills, capabilities, and supporting ecosystem to make this new vision a reality.

Many realities have changed since the pandemic, including how core businesses operate, and how people collaborate across sectors, industries, and geographies to create value and deliver outcomes without compromising on productivity.

Rapid shifts in the global business environment, led by the forces of decarbonization, decentralization, and digitization, have created a strong impetus for change in the energy & utilities sector. Organizations are working towards a common goal of net zero, which requires cross-sector collaboration and the development of a strong framework and ecosystem including start-ups, partners, and cooperative partnerships with competitors, as well as developing new energy business models.

With the uptake for new solutions in IoT, AI, edge computing, and 5G connectivity, consumers and employees expect creative and integrated experiences. The increased need for seamless experiences for customers and employees has given rise to cross-industry business models and new productivity tools and techniques, which break the boundaries of working in a mesh environment to achieve the joint targets for sustainability.

Key Trends in the Energy & Utilities Sector:

- People, and a fluid workforce: A hybrid workforce is the future of all work. According to a study by the Capgemini Research Institute, 75% of organizations expect at least 30% of their employees to work remotely, while over 30% are expecting 70% of their workforce to become fully remote. This requires organizational agility, a trusted work culture, innovation, and creativity.
- Open and secure collaborative platforms: Emerging technologies and new ways of working and redefining business interactions with customers and employees are helping organizations to transition to net zero by 2050. The convergence of physical and virtual environments becomes the new normal, and a natural place for creating next-level business results.
- Ever-evolving technologies – such as IoT, 5G, AI, blockchain, and edge computing – are not only enabling transformation, but breaking the boundaries across geographies, businesses, and sectors. Energy companies need to rethink their business and operating models to unleash the power of these technologies.

- We know that non-fungible tokens (NFTs) open access to decentralized finance (DeFi), which is an upcoming trend in parallel with central bank digital currency (CDBC). Tokenization – along with collaboration – is expected to transform industries worldwide, making transactions efficient, secure, reliable, and scalable.

Overcoming the challenges of ecosystem collaboration will enable organizations to manage and prepare for energy transition. The new, always connected style of working has given rise to mesh collaboration to drive agility and control, greater visibility, and knowledge sharing to continuously improve products, services, and customer experience. Several energy & utilities companies are partnering with start-ups and R&D labs to enable the agility to transition to "water-like" technology.

This exciting future still requires the engagement of the team. Whilst a distributed team is not a new challenge, the ability to leverage tools to engage the team and partners remains a critical factor as we navigate our new normal.

Stephan Taitz, Australia
Expert in Residence

THE TEAM IS THE CANVAS

Collaborating in teams-oriented workspaces becomes the new natural place for creating next-level business results

How do we ensure we can still have fun at work and enjoy our workplace despite seldom being able to meet in person and build that all-important sense of team? Keep everyone's enthusiasm up across extended delivery cycles? Avoid becoming too transactional in our day-by-day dealings with others?

A strong sense of team is the answer. Of course, these challenges are nothing new for dispersed project teams – and we now have many tools to support a distributed workforce – but software alone won't build a high performing team. So how do we ensure we can look past the plethora of products and services available to develop our team into the best it can be?

Most of us are social by nature and enjoy interacting, learning about each other, and sharing common experiences. Some of us even have a competitive streak, whether we like it or not! If we think first and foremost about what makes us "us," we can easily apply the right approach to build the high-performing team we need.

Strategic Initiative for South Australia Power Networks (SAPN)

The Context & Challenge:

SAPN embarked on a major strategic initiative to renew its market-systems landscape and introduce customer relationship management capability.

The Approach:

Capgemini implemented SAP S/4 HANA IS-U on Azure, SAP C4C using SAP's advanced deployment methodology based on Activate, Discover, Explore, Realize, Deploy, and Run. We used an accelerated implementation approach for this greenfield transformation, which was supported by the adoption of best practice processes. We built strong social cohesiveness by using a gamification approach and collaborative and fun games (Menti, Kahoot). We delivered major enhancements to current SAP ERP, SAP PO, and SAP BW systems to integrate with the new S4/ HANA IS-U solution. We delivered these in an extremely creative, collaborative, and interactive manner, taking people out of their day-by-day environment.

Benefits & Results:

SAPN now has a single source of truth for data and market transactions, automated workflows, and simplified processes. The project won the award for "SA Project of the Year" from the Australian Institute of Project Management.

Augmented Reality Platform Deployed for Siemens Energy

The Context & Challenge:

To stay ahead of the market and continue to provide outstanding service to their customers, Siemens Energy required a solution to deliver access to remote experts, content, and procedures across every environment.

The Approach:

Librestream's augmented reality platform Onsight was deployed to thousands of field service workers and external contractors. The solution delivered:

- *Remote expert collaboration optimized for challenging field environments*
- *AI, such as computer vision object recognition with integrated IoT data*
- *Digital workflow procedures and document management*
- *Specialty field hardware including the Onsight Hub adapter and Onsight Cube, an Ex-certified thermal imaging wearable*
- *Integration with collaboration tools such as Microsoft Teams to streamline communications*

Benefits & Results:

Teams can now remotely inspect, diagnose, and maintain plant instruments and controls. Benefits include faster resolution time, increased productivity and worker safety, and higher uptime for customers.

David Crook, Australia
Expert in Residence

FLUID WORKFORCE

An agile, adaptive workforce model that boosts organizational resilience and productivity, saves costs, and addresses the shortages of skilled resources

In the exciting but complex landscape of the energy & utilities (E&U) sector, there is a deficit of sufficiently skilled talent and the means to recruit them. Adopting a fluid workforce helps an organization to utilize flexible work structures to fulfill demand and quickly respond to changing situations. In the context of energy & utilities, it also forms a key role in enabling a shift towards clean energy by allowing for a talent pool with a breadth and depth of knowledge and experience that would not otherwise be feasible.

The transition to net zero will rely heavily on the incorporation of advanced technology, implemented, operated, and maintained by a workforce with specific skills including data scientists, engineers, and communications professionals, to name a few. Delivering net zero targets globally will require a large-scale transformation in the energy workforce. The International Energy Agency's (IEA) net zero pathway estimates a 14 million net job increase by 2030 worldwide. The UK will need to fill 400 thousand new roles, and the EU projects a net gain of 5 million jobs.

While upskilling the existing workforce will help to mitigate this, the volume of talent required may prove challenging. In addition to this pressure there is the complication of an aging workforce in energy & utilities, compounded by the E&U sector's lack of appeal to Gen Z. A recent report highlighted that only 14% of people surveyed said that the E&U sector appeals to them, making it less popular than either the financial or defense sectors. A fluid workforce provides an excellent opportunity to offer both increased flexibility and more purposeful work, and with the increased emphasis from employees in areas of sustainability and wellbeing, meaningful work is almost as important as the remuneration package itself.

The nature of this workforce model undoubtably creates a risk of paying a premium if resourcing of in-demand skillsets is not timed with industry requirements. With the right strategic workforce planning, a fluid workforce provides the flexibility to attract the right candidates at the right time, to truly leverage the raft of technological advancements in energy & utilities right now.

With this in mind, what insights can a fluid-workforce mindset provide for the E&U sector?

Building the Net Zero Energy Workforce for National Grid

The Challenge:

The way the world views climate change has shifted significantly, and people want to see action. The UK is leading the way as the first major economy to pass a net zero emissions law but can't delay action as the next ten years are critical.

The Report Context:

National Grid is at the heart of Britain's energy system and sought to understand the employment opportunities and skills required to build a net zero energy workforce for the UK.

The Insights:

The UK's energy sector needs hundreds of thousands of people to fill 400-thousand roles in the net zero energy workforce. Of this, 260 thousand will be in new roles, while 140 thousand will be replacing those who have left the workforce.

To succeed, National Grid believe the UK should retain and retrain existing employees, reframe a job to promote joining the net zero energy workforce, and inspire the next generation to choose STEM qualifications.

Alexandra Luxton, Australia
Expert in Residence

YOUR BUSINESS IS A MESH

Enabled by "water-like" technology, it's easier than ever for organizations to join forces, even if it's just for one day, for one occasion, or for one customer

Enhanced focus on energy transition, sustainability, and digitization is increasing the need for the use of "water-like" technologies – such as cloud-native infrastructure, microservices-based APIs, secure data sharing platforms, intelligent automation, IoT, and 5G connectivity. With these technology enablers, organizations can collaborate with other ecosystem players to drive innovative products, services, and customer experiences. The future of collaboration is creating an integrated virtual mixed reality, breaking the barriers of sectors, industries, and geographies alike.

In the energy & utilities sector, mesh collaboration is already visible in the areas of energy storage and usage, network asset tracking and maintenance, energy efficiency, smart electric grids, smart transportation, and mobility. Sharing expertise, best practices, platforms, knowledge, and lessons learnt can facilitate innovation and unlock more opportunities. Going forward, mesh collaboration is key to overcome the increasingly complex social, environmental, and supply chain challenges

Creation of a Competitive and Sustainable Battery Industry in Europe by 2025

The Context & Challenge:

EIT InnoEnergy is forging the way to a decarbonized Europe by 2050 by leading three industrial alliances: European Battery Alliance (EBA) for battery storage, European Green Hydrogen Acceleration Center (EGHAC) for green hydrogen, and European Solar Initiative (ESI) for solar photovoltaics. Capgemini helped InnoEnergy carry out this commitment by structuring the program, developing the mesh network for collaboration, supporting the translation of decisions into strategic projects, and managing and implementing the plans.

The Approach:

Detailed market analysis and open channel communication with major industrial players identified new project opportunities, with in-depth analysis of the market potential and risks to launch and run selected projects with key partners.

Benefit & Results:

The project identified references to over 100 battery projects in the EU and contacts with over 100 companies in the battery value chain to fact sheets and a directory for future use. A business case was created along with the framework design and structure for the execution of 10 projects. Capgemini also helped in creating a consortium with key partners to launch these new projects.

Global Start-Up Accelerator Program for Creating Disruptive Solutions Through Mesh Collaboration

The Context & Challenge:

Techstars Energy is a global accelerator for start-ups in the energy sector, focusing on new business models, digitization, and renewable energy. In collaboration with Equinor, Kongsberg, and Capgemini, Techstars has established the accelerator program "Techstars Energy" in Oslo, Norway.

This partnership provides an opportunity for companies, especially start-ups, and invests up to 120-thousand USD in the ten selected start-ups that aspire to disrupt and shape energy platforms.

The Approach:

Capgemini provided expertise and consulting services to participating start-ups through an on-site management consulting team and mentorship programs, in the areas of growth strategy and planning, financial modeling, market and competitor analysis, business model strategy, and benefit realization.

Benefit & Results:

Techstars continues to disrupt the energy industry, supported by partnerships and a mesh collaboration network with key industry players. Capgemini continues to advice these start-ups on combining their technologies and solutions with our sector expertise and business acumen to provide insights and offerings to our clients.

Abhishek Gokhale, Australia
Expert in Residence

IT'S ALL CONNECTED

In combination with IoT, AI, and edge computing, 5G connectivity is the catalyst for technology-driven, networked business innovation

The energy transition is under way and involves numerous challenges: increase in renewables, bi-directional energy flows, distributed resources, intermittent flows, storage requirements, and increase in energy consumption control, to name only a few. This energy transition is supported by a massive digital transformation, harnessing the power of data and digital to enable smarter management of assets, operations, and services.

To become more "intelligent," organizations need advanced solutions to collect, share, and process exponential volumes of data in real time, with the right scale, velocity, and security. In this context, advanced connectivity solutions such as 5G, edge computing for more distributed computing and data storage capabilities, IoT devices, and AI are all key enablers to the transformation of the energy & utilities sector for the following activities:

- Smart asset management (digital twin, predictive maintenance), security monitoring, worker safety for production (nuclear, hydroelectric plants)
- For real time asset monitoring and control of renewable assets
- Smart grid management, such as maintenance, field ops connected worker, high/medium voltage protection systems, and real-time dynamic routing
- Downstream: edge-of-grid monitoring and control, smart city / building energy optimization, and real time optimization of electric vehicle charging

Wind Turbines Service Monitoring With SAP

The Context & Challenge:

Wind turbines are high value assets operating in complex environments, requiring real-time monitoring and control to optimize their performance and maintenance operations. SAP teamed up with Capgemini 5G Lab team to pilot the integration of edge and 5G solutions for wind turbine service monitoring.

The Approach:

As a first step, Capgemini managed the integration of SAP, 5G, and edge solutions at the windfarm O&M location to perform on-premises predictive analytics.

As a second step, Capgemini plans to industrialize 5G and edge computing for wind turbine connectivity for monitoring and control, using IEC standards.

Benefit & Results:

The combined real-time analysis of sensor data with external information (for example, the weather) allows triggering service alerts and work orders in real-time to optimize farm operations and perform predictive and service monitoring capabilities by seamlessly integrating SAP with 5G and edge solutions.

Smart5Grid Research Program

The Context & Challenge:

Smart5Grid is a European research program (between 2021–2023, with EUR 8 million funding) bringing together mobile network operators, power grid operators, large industries, research centers, and universities to explore the potential of 5G to address the connectivity challenges of monitoring and operating high-performance smart grids.

The Approach:

The program is comprised of technical work packages – including 5G architecture and interfaces – and demonstration packages, with the setup of an open 5G experimentation facility.

Benefit & Results:

Several use cases are being tested around Europe:

- *Automatic fault detection in a medium voltage in Italy*
- *Real-time safety monitoring for operators in high-voltage substations in Spain*
- *Remote distributed energy resources (DER) monitoring in Bulgaria*
- *Wide area monitoring in a cross-border scenario between Greece and Bulgaria*

Pierre Fortier, France
Expert in Residence

TAKEN BY TOKENS

The emergence of a "token economy" through the convergence of "real" and digital assets within real and digital business models – converging on themselves

Broadly speaking, the "token economy" is about combining programmable tokens (smart contracts) within an ecosystem to promote desired behaviors. This includes utilizing tokens to reward participants when they complete certain activities or use specific platforms.

With the pressure to embrace renewable resources and cut costs, consumers are looking for competitive pricing or turning to microgeneration. In Australia, one in four homes have solar panels on their roofs (CSIRO). The token economy is enabling a free peer-to-peer (P2P) energy market and a distributed, omnidirectional model, where consumers can play an active role in how they acquire and trade energy.

NFTs are another token standard being utilized. These can be "owned" and exchanged on a shared database or blockchain; and have embedded metadata like an artwork, a song, etc. NFTs open-up access to decentralized finance (DeFi), helping collateralize real-world assets in the token economy. Converging physical and digital assets turns illiquid assets into liquid, floating assets that can be easily traded and exchanged. Supply chain products like MarketsN are also combining traceability, provenance, and digital twins (via NFTs) to reimagine supply chain participation.

Peer-to-Peer (P2P) Energy Trading with the RENeW Nexus Project

The Context & Challenge:

Current home microgeneration of electricity via solar panels is usually either sold directly to the grid for nominal prices or wasted. With the rise of solar panels and renewable energy sources, the microgeneration economy needs new infrastructure to empower individuals.

The Approach:

Blockchain and tokens enable large volumes of transactions between prosumers (producers/consumers) and consumers with low-cost authentication, validation, and settlement while ensuring data privacy. P2P energy trading allows these prosumers to directly sell any excess electricity.

Benefit & Results:

The project resulted in a completed trial enabling a dynamic pricing model for residents to sell excess energy they produce via a competitive P2P marketplace to other consumers. Consumers are protected when there is no P2P trade activity as residents can acquire electricity at the nominated local government rates.

P2P energy trading powered by blockchain and tokens enable large volumes of transactions between prosumers and consumers with low-cost authentication, validation, and settlement with data privacy; allowing prosumers with rooftop solar PV systems to sell excess electricity across the electricity network.

Supply Chain Traceability and Collateralization (MarketsN)

The Context & Challenge:

Supply chains are notoriously complex networks spanning across geographies. Complete end-to-end B2B workflows can take weeks or months to adhere to, involving multiple documents, stakeholders, and increasing levels of risk. Modern digital tools are still insufficient to achieve real-time visibility and integration of supply chain processes to keep up with today's hyperconnected business demands.

The Approach:

MarketsN provides a shared, immutable event log to validate events by all participants in the supply chain. By combining NFTs, we create a shared, single source of truth, validated by all parties, to record key data, approvals, certifications, and changes. The underlying asset can also be collateralized and traded, both within and outside the supply chain, using DeFi rails.

Benefit & Results:

Koinearth's solutions allows us to connect data against individual entities and objects, enables visibility and control over suppliers, and provides immutably at both an organization and supply chain group level. Data can be enriched through IoT devices and enable companies to showcase their environmental, social, and governance (ESG) objectives and KPIs.

Duncan Cameron, Australia
Expert in Residence

THRIVING ON DATA

It's no wonder organizations aspire to thrive on data, to be data-powered enterprises. With every business now being a de facto technology business, data obviously is at its core. Dare we say, every business is a data business? Look at the facts: data powers superior customer experiences, highly tuned operations, and smart, self-optimizing products and services. Data provides resilience, predictability, and effectiveness, but equally enables organizations to achieve their sustainability ambitions. It also helps their potentially scarce human resources to achieve the best, most satisfying results. With that, it's tempting to declare data to be "just" the new corporate asset. But assets tend to be stacked, isolated, and safely put away. It's much better to see data as a first-class product; owned, managed, and activated by business domains, and shared in lively exchanges inside and outside the organization.

Key Trends in the Energy & Utilities Sector:

Water, water all around and not a drop to drink. Not so for data – it's all around us, but without careful consideration we could easily drown in it. However, there is no aspect of any energy or utilities business that doesn't gain a material benefit from the intelligent exploitation of this wealth of data.

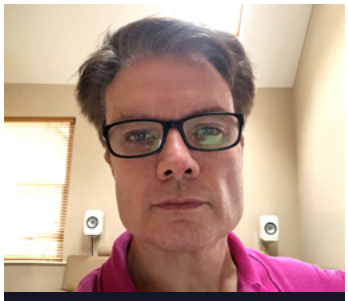
The asset intensive nature of energy & utilities provides rich streams of telemetry data from next-generation supervisory control and data acquisition (SCADA) and industrial IoT. Using this to make informed – and predictive – choices for maintenance, repair, and overhaul drives an order-of-magnitude reduction in cost of ownership, with a corresponding increase in asset health and a reduction in outages and the associated customer impact and reputational damage.

Being able to assemble data from disparate areas of the business – in what were once isolated islands of information – and deliver proactive responses can radically reduce customer service interruptions and improve the quality of information being given to those customers.

For many state-regulated industries, the quality of asset information, its associated health, and the investment plans underpinning it are fundamental to the financial settlements awarded. Being able to quickly assimilate that data and have a high degree of confidence in its quality and accuracy directly impacts the bottom line.

Digital twins will change the ways of working for future generations, which will be remote by default. Soon, we will be able to manage complex systems just from our smartphones.

As we move towards a carbon neutral future with a core ethos of long-term sustainability, the concepts of machine learning and artificial intelligence will be instrumental in delivering that future profitably.



Ian Oliver,
UK
Expert in Residence

DATA SHARING IS CARING

Participating, collaborating, or even leading in data ecosystems gets more value out of data – creating new connected products, services, and experiences, boosting enterprise performance, and contributing to a better society

Data will naturally be born to one mother, but when it mixes with its siblings, true business insight and value will be unleashed. Moving data from individual islands and siloed systems into an easily accessible platform will deliver additional value across the enterprise. With Anglian Water, we have an example of data, both structured and unstructured, from multiple sources, being leveraged for a new business view and value.

Enterprise Analytics for Anglian Water

The Context & Challenge:

The business needed to collate and analyze data from smart meters in hourly intervals in both domestic and non-domestic installations. Merging this data with customer data from SAP, a new configurable platform was needed to rapidly consume and analyze vast amounts of data to meet aggressive business timelines, all the while meeting strict GDPR requirements without extensive manual effort and cost.

The Approach:

Capgemini built a framework to consume, manage, and orchestrate information on the Microsoft Azure platform using a metadata-driven approach that automated the loading and cleansing of data into the data lake. From this data, any continuous leak alarms automatically called REST APIs to raise service work orders so that the leaks could be fixed, or a device replaced. A self-service analytical reporting model was developed so that the business could produce regulatory reports to OfWat. And for the consumer, applications were built to allow users to view their own usage and compare it to similar homes in the area.

Benefit & Results:

The business was able to deliver enterprise analytics not only for Smart Metering, but for other projects across the platform. Analytics provided useful insights to drive change across the business by automating the creation of work orders and reducing the requirements on already scarce manual resources. Architecture enabled the accelerated onboarding of new datasets with reduced overheads and costs, allowing the business to rapidly turn insights into action. The consistent approach to delivery – across projects using agile techniques – reduced the risk of regulatory non-compliance from a GDPR perspective. Most importantly, the customer could reduce any excessive water usage through the information on their app.

Wesley Boyd, UK
Expert in Residence

ESO Dynamic Containment for National Grid (ESO Settlements)

The Context & Challenge:

The company needed to adopt an approach of "bring your own analytics and machine learning" to better keep up with business demand. The current manual monthly process – processing over six billion rows per month – always presented challenges regarding ad-hoc processing, data quality, and error correction. By moving to a weekly process – where data could be collated and computed without any manual process – the business would be able to better keep up with demand. But with an outdated mainframe infrastructure, the business lacked the desire to change because it lacked the skills to approach the task at hand.

The Approach:

Capgemini proposed a metadata-driven approach to locate the required data and process the correct analytical and ML scripts based on further metadata within the discovered data files. The solution used Microsoft Azure utilizing Cloud Adoption Framework with Azure Databricks in a high-availability cluster orchestrated by Azure Data Factory.

Benefits & Results:

The business decreased its monthly data processing to daily, reducing its data age from up to one month in arrears to as of 11pm the previous day by default, far exceeding their original ambition of weekly processing. For the first time, the business was also given the ability to re-process their data at any point – going as granular as hourly increments – reducing the overall cost of recomputing problems in the outputs. Using Databricks, pre-existing analytical and ML scripts could be installed with minimal effort, allowing a rapid deployment of code that the business was already familiar with.

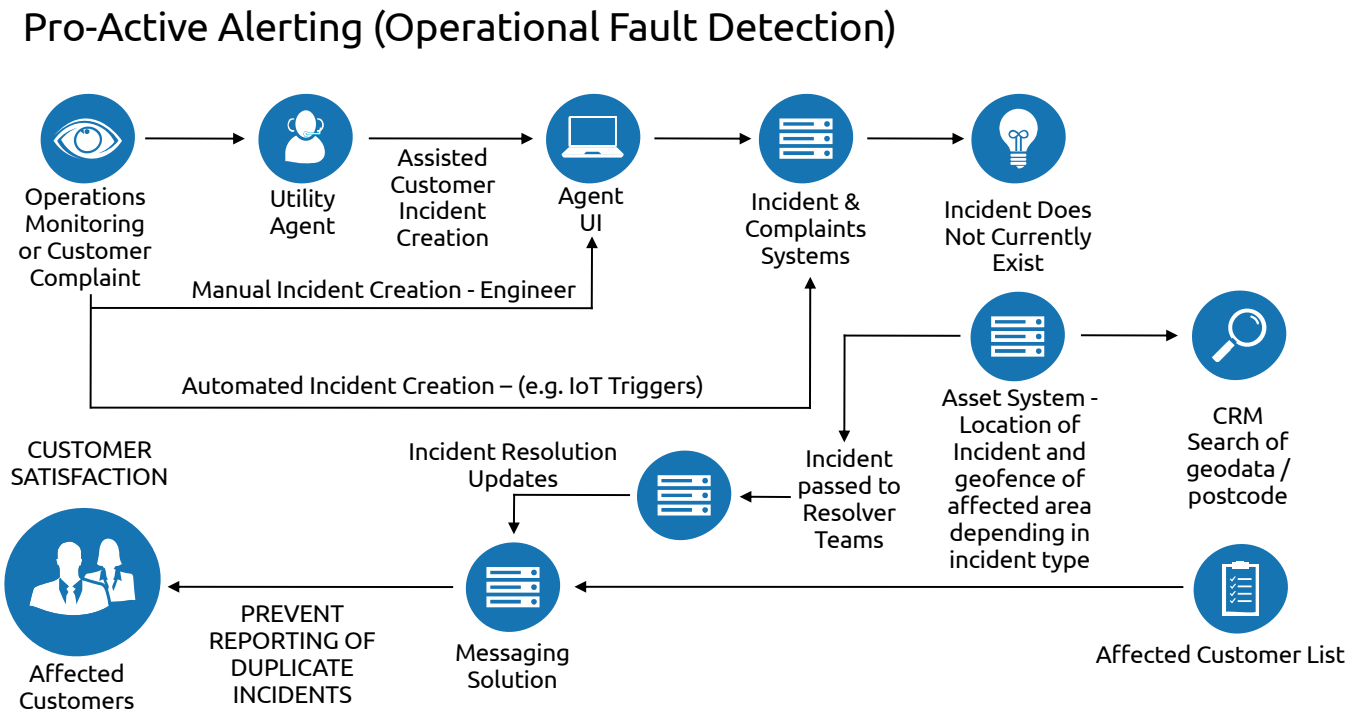
Aaron Bergin,
UK
Expert in Residence

POWER TO THE PEOPLE

A growing scarcity of specialized skills, the need to activate data as close to the business as possible – plus powerful AI and automation tools – are all driving the unstoppable self- service data revolution

How a customer interacts with utilities is an exercise in trust and satisfaction: trust of the utility to deliver their best service, and satisfaction that customer concerns are heard and addressed. This satisfaction metric is not only beneficial for the company, but also to inform future investments from governments and stakeholders. A connected data approach – at the heart of the business – is core to success.

Secondly, following the European Union's goal of net zero emissions by 2050, the energy sector is faced with an unprecedented challenge – being one of the industries with the highest CO2 emissions. Furthermore, other EU regulations, such as changes to taxonomy and the Corporate Sustainability Reporting Directive (CSRD), will increasingly challenge how a business activates and stores data. However, all is not lost, as all these challenges can be met head on using high automation and data-driven workflows.



Improving Customer Satisfaction Scores for a Large Water Utility

The Context & Challenge:

A large water utility in the UK wanted to improve its customer satisfaction scores to reduce customer complaints and release more investment from UK regulators. The company needed to ensure that once a problem was registered, all affected customers were kept informed and updated while teams worked to resolve the issue. Customer satisfaction surveys were needed once each issue was resolved, hopefully showing increased satisfaction metrics, resulting in increased funding awards at the end of each five-year performance cycle.

The Approach:

Capgemini proposed connecting asset data (equipment monitoring, IoT, engineering reports) to geospatial data (mapping, asset area modelling) to provide a "geofence" of reported incidents. Customers could then be alerted in a timely manner through a simple postcode search of a CRM database followed by a mass-messaging solution.

Benefit & Results:

By combining live incident data with an address or geographic location, customers are automatically alerted to any incident that will affect their area. Without the need to report the fault themselves, inbound call volume is reduced, while customers are aware the outage is being addressed. Updates on progress and scheduled works are sent in a timely manner, with customer satisfaction surveys when work is complete.

Overall, there is a significant reduction in service calls and improvement in overall customer satisfaction.

Tim Stevenson, UK
Expert in Residence

Measuring Carbon Emissions for a Large Energy Supplier

The Context & Challenge:

Anticipating the net zero carbon emission ambitions of the European Union (EU), a large energy supplier in Germany declared their objective to become net zero by 2045. In doing so, this initiated a process to measure emissions in detail across all business activities. Data needed to be collated and analyzed to understand carbon emissions of all business activities – and beyond!

Yet, there are two main challenges in carbon accounting: measuring carbon emissions from many sources and obtaining relevant data on a broad spectrum of activities (including sales, procurement, buildings, fleets, travel, and more). For the latter, the client – together with Capgemini – saw great potential in intelligent automation to reduce the time and effort required to compile data for regular reporting.

The Approach:

Capgemini identified relevant data sources within existing systems to source information on carbon emissions and gather data allowing for a high level of automation. The structure of the data layer was also adapted to fit other reporting requirements and to allow for expansion and the use of the inhouse dashboarding solution.

Benefits & Results:

The solution we worked out with our client identified relevant data sources within existing systems, where relevant information for carbon emissions could be gathered and which would allow high automation. In addition, the structure of the data layer was adapted to fit other reporting requirements and allow for expansion as well as the use of the in-house dashboarding solution.

By compiling dashboards with all relevant information, the annual process of accounting for carbon emissions was transformed from taking months initially to an almost fully automated process.

Robert Rehner, Germany
Expert in Residence

CREATIVE MACHINE

Unleashing the generative capabilities of AI to enable individuals and organizations to express themselves better in different creative ways, even if they lacked the capabilities or manpower for it in the past

Data science, combined with AI, ML, and optimization can truly transform the way the manufacturing industry operates, unlocking new levels of efficiency improvements and increased innovations to deliver long-lasting benefits.

And as part of the enterprise-wide digital initiative, a key focus is to optimize and automate complex production processes using AI and analytics, maximizing on the health and resilience of operations along with a cloud-based enterprise digital platform to enable data science and apps including AR/VR and IoT.

AI-Based Solutions for a Major Petrochemical Production Company

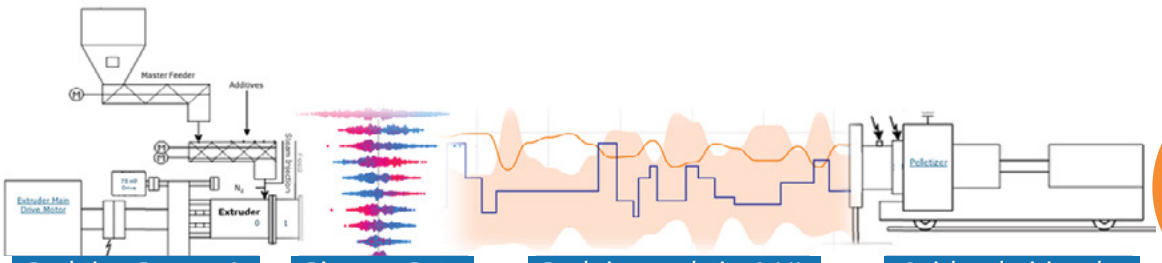
The Context & Challenge:

In the USA, a major petrochemical production company – operating over 30 manufacturing and research centers across eight countries – sought to infuse machine learning, AI, and advanced analytics into their core chemical and polymer production processes. Capgemini was employed to develop AI-based solutions to enhance production process efficiencies by minimizing off-spec product volume.

The Approach:

Capgemini took a holistic, but pragmatic, approach to exploit existing legacy systems for data extraction, building a bespoke data architecture and governance which focused on a future-proof ecosystem.

The Capgemini team designed a state-of-the-art tech architecture, data processes, and interactive dashboard, being fed by various custom machine learning models, to validate and predict real-time product composition properties, enabling speedy identification of products that meet regulatory specifications. Capgemini's digital process optimization (DPO) solution could identify opportunities and implement emerging digital technologies to enhance safety, maximize profitability, improve process efficiencies, and optimize product quality.



96% PROCESS IMPROVEMENT

Harnessing the power of advanced analytics, the team were able to gather actionable insights and develop sophisticated machine learning algorithms – all operationalized using the principles of MLOps for improved scalability, accuracy, and reliability.

Benefit & Results:

A digital twin – in this case of a digital rheometer – was developed and deployed to replace physical equipment and automate the manufacturing process. It used real-time production data (including temperature, pressure, and feed rate) from more than 35 sensors, in 19 extrusion process units across four plants, and machine learning models to accurately and reliably predict quality specifications for over 20 products, allowing faster and more informed decision-making. Capgemini's solution enabled the customer to reach a new level of functional excellence, with up to 96% process improvement and over USD 50 million in cost savings and revenue opportunity.

George Jacob,
USA
Expert in Residence

DATA APART TOGETHER

A federated, actively collaborating "mesh" of data producers and data consumers – owned and governed by the business domains themselves – brings data as close as possible to where it is picked up and used, a hallmark of a true technology business

Master data management (MDM) drives consistency across the enterprise. Data is created, read, and updated in many different business areas and within many different information systems. Effectively managing that consistently is key to overall information integrity and associated trust.

Transforming the Perception of MDM for National Grid

The Context & Challenge:

The National Grid Gas (NG Gas) business is being separated from the parent company to run as a standalone legal entity. As part of this undertaking, the new company – with new ownership – wants to evolve the current network to include hydrogen as part of the shift towards a low-carbon future. The current analytics platform is closely coupled to the parent company in terms of integration, processes, design, architecture, and data. NG Gas needed a strategic partner to help create a ground-up enterprise platform for analytics, reporting, and data science on a dedicated, discrete Azure tenant. As part of this work, legacy data challenges also needed to be addressed. Consistency in data usage and meaning, standardized reference data, and best-practice modeling are all areas of particular focus.

The Approach:

Capgemini proposed close alignment to our reference architecture for insights and data, which includes a clear definition of data trust. Data trust is the suite of capabilities to ensure data is quality assured, governed, standardized, documented, and understood. MDM is the central pillar of data trust: a service that enables the clear definition of core structural data and its associated business, technical, quality, and social metadata. By ensuring MDM is considered from the outset, and aligning to our reference model, Capgemini can ensure that the data trust capabilities will be fully integrated into the operational data processes from the outset.

Benefit & Results:

Capgemini was able to work with the business users, data owners, and senior stakeholders to elicit, document, and prioritize their data trust requirements. By treating MDM, and data trust in general, as an equal part of the architecture and design, Capgemini was able to ensure the functional and non-functional considerations of master data management are "baked in" from the outset. This forward-thinking approach ensures MDM is not treated as a retrospective activity – with the associated cost – rather, that MDM becomes integral to NG Gas's new capabilities and that the enabling aspects of MDM (people and process) become part of the overall business change agenda.

Neil Parker,
UK
Expert in Residence

ERA OF ALGORITHMS

Challenge everything you've tried so far: the next-generation AI algorithms bring brand-new, awesome ways to solve problems, innovate, and bring out the very best in humans

High quality Geographic Information System (GIS) data is critical to supporting network investments as part of the energy transition, as well as other strategic objectives. However, these representations involve large volumes of data, often derived from paper records, and errors are both widespread – especially in the low voltage (LV) network – and usually hard to spot and fix.

In the example below, Capgemini delivered an innovative proof-of-concept model using graph neural networks (GNNs) – a generalization of traditional deep learning methods to irregular structures – that was able to identify errors and propose corrections using the GIS data alone, without making assumptions about electrical connectivity, which is normally a limiting factor.

Using AI and Machine Learning to Fill in the Blanks for Western Power Distribution (WPD)

The Context & Challenge:

WPD wanted to explore novel applications of AI and machine learning to identify and fix errors in GIS network data and connectivity. These data are critical to support network investment as part of the energy transition. Furthermore, inaccuracies in the GIS data could limit ambitions set out in digitalization strategy, constrain the future build of network topologies that support smart networks and the transition to a DSO, and reduce the value and wider use of their data by third parties.

The Approach:

The SEAM project, funded through the Network Innovation Allowance (NIA), delivered a successful proof-of-concept tool demonstrating that ML could be used to automatically clean and fill-in missing and incorrect values from the GIS. It uses a novel GNN-based model to predict the correct properties of network assets using the properties of their geographical neighbors. By viewing the assets as a geospatial network rather than an electrical one, it avoids the normal reliance on network connectivity information, which is often unreliable and incomplete, and can autonomously identify errors and propose corrections to attributes such as voltage, conductor size, and material.

Benefit & Results:

These techniques have the potential to further improve performance as bigger and richer datasets become available. They also support all kinds of assets, attributes, and relationships so they have the flexibility and potential to address a broader range of issues in the future. This includes generalizing to similar problems in other utilities networks and asset management scenarios, while minimizing the functional assumptions that need to be made.

James Myatt,
UK
Expert in Residence

PROCESS ON THE FLY

Strategy tends to be eaten for breakfast, by culture – but also by a lack of operational execution. Organizational aspirations simply "blah blah blah" without any ability to turn insight into action, quickly respond to events, overcome business silos, or go with whatever flow the corporate purpose supposes. And all that goodness must be delivered against a scarcity of skilled human resources and a need to reduce travel and energy consumption. This is where Process on the Fly comes to the fore and shines ever brighter. Having been consistently less in the spotlight than its complementary container, Thriving on Data (ever heard of "Big Process"?), breakthroughs within intelligent automation and a taste of touchless execution have firmly placed this container at center stage. Quit talking and start doing.

Our world and our organizations are full of processes. From procurement to logistics, accounting, and beyond. Some are simple sets of activities, while others are holistic and highly complex. Designing and managing complex processes has traditionally suffered from the often-fractured observations and assumptions made by the process designers and managers.

But data-driven process assessment and design is a growing trend that takes a more objective approach to understand how activities are performed in the organization. Centered around the data collected in a process assessment, the approach collates knowledge and insights to help identify simplification and automation opportunities. Ultimately, this data-driven process assessment method can itself be automated while identifying improvement opportunities and implementing the requisite changes in close to real time.

Key Trends in the Energy & Utilities Sector

The energy & utilities sector uses technology to improve operations and provide safer, cleaner, and cheaper sources of energy. Here, AI is leveraged to mimic the problem-solving and decision-making attributes of humans in predictive maintenance, load forecasting, and energy theft prevention to streamline backend functions.

With an aspiration to remove humans from the picture, digital twins – the digital representations of real-world entities and systems – are used to simulate scenarios to determine the health of assets and identify preventative actions in real-time. Not yet fully autonomous however, these twins still need controlling virtually from a remote operation center.

To make the monotony of manual processes a little easier, robotic process automation (RPA) is embedded in core processes such as month end closing, systems monitoring, and work order management. This augmented workforce of new (virtual) colleagues reduces the need for repetitive effort, allowing employees to focus on more productive activities.

Artificial Intelligence for IT Operations (AIOps) takes monitoring and automation to the next level by helping organizations to significantly reduce the time needed to execute new requests and ensure high availability, high performance, and reduced cost of operating the application environment. These solutions are self-optimizing, adapting to their environments without human intervention and integrating and unifying advanced AI technologies that have self-learning and proactive decision-making capabilities.

Process simplification and standardization is another core driver for the sector and imperative when adding a technology layer to facilitate process automation. Process mining is a data-driven approach that can contribute to:

- eliminating all unnecessary and sub-optimal transactions and interactions,
- standardizing transactions and interactions to create so-called golden paths,
- optimizing the solutions using existing investments to drive quick wins,
- automating intelligently to create AI solutions,
- robotizing processes where appropriate.

Danish Nadeem, Norway
Expert in Residence

Morten Taksrud, Norway
Expert in Residence

PROCESS IS MINE MINE MINE

Using Digital Twins to inject continuous process innovation, making it the envy of the entire flock

Today, every company is taking advantage of digital technology to reinvent their core business process and differentiate products and services. Technology allows companies to innovate the way business and IT work together by creating a continuum between the digital and physical realms. The underlying technologies behind virtual engineering include mixed-reality, spatial computing and digital twins that animate dynamic replicas of physical assets, systems of systems, and business processes. We believe that digital twins will drive efficiency by design and effectiveness in operations/service. The convergence of IT and Operational Technology (OT) ensures digital continuity and fuels extended collaborations. A digital twin is a virtual replica to model, simulate, and constantly optimize the physical world that helps to inject continuous process innovation, making it the envy of the entire flock!

Digital Twin for a Utilities Client

The Context & Challenge:

A large utilities client faced a significant challenge to replace their legacy ERPs while standardizing and digitizing business processes to leverage best practices and create a lean and efficient business unity. A new program was initiated to transform the client's largest business unit, to ensure it remained highly competitive while ensuring lower costs, improved efficiencies, and process digitalization.

The Approach:

An operating model for S/4HANA was designed and built by leveraging the Capgemini Digital Global Enterprise Model (DGEM) assets, pre-configured with over 400 live processes, controls, and automation zones. A cloud-based process library was established to develop a digital twin of the client's business operations, and scenario modelling was conducted to evaluate transformation initiatives to drive standardization and efficiency.

The operating model was designed and built for 17 thousand employees, and client adoption and change management efforts were performed across all finance, procurement, and HR processes.

Benefit & Results:

The program reduced time-to-close, increased productivity, and realized significant cost benefits within HR and procurement. Timewise, the time-to-close was reduced by 50% and productivity was increased by 45% through AR/AP enhancements and centralization of services in UK SSC, while at the same time reducing the processing cost.

For HR the agency fees were reduced and the administration and payroll costs were decreased by 30-40%. Re-negotiated supplier rates, reduced tail-spend, and utilization of dynamic discounting, together with the use of an e-sourcing platform, decreased the procurement driven cost by 40%.

Established End-to-End Purchase to Pay Process Using Process Mining

The Context & Challenge:

There was a challenge in reviewing the end-to-end purchase to pay process, starting with the procurement team and ending in accounts payable (AP) using Celonis process mining, producing poor visibility for insights and metrics into commonly known business pain points. The challenge was to identify process bottlenecks and conformance points to ideate improvement opportunities, leading to the touchless invoice vision (known as straight-through processing).

The Approach:

Celonis process mining, procure-to-pay (P2P) and AP connectors for SAP ECC and S/4HANA were implemented whereby process data was analyzed to validate business hypotheses and obtain overall process insights. Collaboration with the customer to validate insights found and shape improvement opportunities with high impact meant that potential improvement opportunities were identified to the overall process, to align the customer's operations to best practices, shift to touchless processing, and improve compliance. Potential savings were calculated from the identified opportunities to support the customer, prioritizing mobilization and next steps.

Benefit & Results:

Thanks to the program, Celonis was successfully set up for 3 months in line with the planned solution and a strong collaboration with the customer team ensured that Capgemini could focus the analysis specifically to the processes. For example, separating utilities suppliers from the main data and identifying legacy transactions from an old tool that initially meant a significant number of invoices were being paid late. In total, 36 ESOAR opportunities were identified in the end-to-end process, from purchase order to payment, focusing on moving transactions to touch free processing, improving compliance, and enhancing customer experience. The opportunities identified enable PO/ invoice lines to be processed two days faster on average.*

Sanket Solanki, Norway
Expert in Residence

*The ESOAR (Eliminate, Standardize, Optimize, Automate, Robotize) transformation methodology helps reimagine your processes in the light of intelligent automation, enabling you to implement straight-through processing and automated solutions while delivering the best impact and outcomes to your business users.

ROCK ROBOT ROCK

Robots become a dependable, digital companion, giving us the time and freedom to think, plan, and focus

The global energy & utilities sector is changing, driven by decarbonization, deregulation, and decentralization. Consumers expect the industry to become more effective, sophisticated, and service-based. Rule-based technologies such as robotic process automation (RPA) are vital to deliver on these expectations.

Research from Capgemini shows that three out of every four organizations in the energy & utilities sector are adopting RPA technology. However, scaled adoption is still rare. Of the organizations that have deployed RPA, only 17% have deployed it at scale.

Consequently, organizations are missing out on critical use cases that can deliver outsized benefits. The key is to unlock the road to scaling automation. As with all scaling, this is about giving it the organizational attention and investment that it deserves – both top-down and bottom-up!

Month-End Closing Automation for a Global Client

The Context & Challenge:

When closing every month end, a global energy & utilities customer performed a reconciliation of the transaction data that was uploaded from the SAP ECC system to a consolidation tool SBC. The process comprised the reconciliation of 150 company code data sets between four systems for each company code. This process caused many overtime hours, reduced on-time payments, and resulted in many late payment fees.

The Approach:

Capgemini's approach to developing an automation solution is called ESOAR (Eliminate, Standardize, Optimize, Automate, Robotize). This transformation methodology addresses the underlying causes of inefficiency in business operations, before working on the actual symptoms. Using this framework and by leveraging an automation platform based on Blue Prism robotic process automation (RPA) technology, a centralized team automated the process end-to-end.

Benefit & Results:

By automating the month-end closing process through RPA, the customer was able to complete the process within 45 minutes each day, saving 400 hours per month. Reducing the process time also made the closing report available for accountants earlier, reducing the lead time by several days for further work that was dependent on this report.

Robotic Process Automation (RPA) Center of Excellence for a Global Client

The Context & Challenge:

A client's employees – in both core and support functions – were performing many time-consuming manual tasks working with siloed systems limiting their time for more value-added and strategic work.

The Approach:

The client identified RPA as a quick win that would reduce manual work and wanted us to establish an RPA program to increase productivity. Our approach was first to establish a program strategy, and then design and operationalize a corresponding program target operating model. The short-term strategy was to have an evangelist development approach - bring quick results to ensure traction and visibility- by developing minimum viable products and moving pilots into production environment for benefit realization. After an experimental phase successfully deploying different pilots in the organization, the RPA program became enabler to help the client's improvement agenda.

Benefit & Results:

The automation center of excellence has accelerated big ticket digitalization items and supported general business improvements. Through automating time-consuming manual tasks, the center has also provided value at scale through cost savings and increased employee engagement and satisfaction by freeing up employees' time for more value-adding and strategic tasks.

Kevin Rydland, Norway
Expert in Residence

SILO BUSTERS

Busting corporate silos by adding flexible process layers on top of them, rather than breaking or rebuilding already established structures

Organizations are rushing to innovate and up their game in order to satisfy the ever-increasing demands of process optimizations and breaking silos. Yet, process-specific applications are creating seemingly impenetrable walls between processes.

Data within these systems is stranded on their own splendid islands, unable to see each other, much less interact. Workarounds and exception processes only serve to push them further apart. Thankfully, new technologies avoid the need to replace process specific applications that we've grown dependent on. Bridging the divide through data aggregation and cross-silo process flows not only break the walls towards enterprise-level unification, but also towards the outside world. Technologies accelerates bridging the gap between corporate or intercorporate, processes and systems, without intruding upon them and ultimately busting the silos!

Centralized and Automated Processing for a European Energy Sector Client

The Context & Challenge:

The client had fragmented operations in three scattered finance hubs resulting in large processing costs for the finance and procurement operations. Furthermore, manually intensive processes increased the personnel's dependency on the finance and procurement operations and led to the need for costly temporary staff to manage seasonal volume spikes. There was a lack of harmonization in the processes, with no standardized workflow for receipt and journal transaction processing in the general accounting stream.

The Approach:

The initial process centralized all finance and procurement processes into Capgemini offshore and nearshore delivery centers, to cater – securely and efficiently – for security and compliance obligations. Using ESOAR methodology to harmonize non-standard procedures, together with proven "off-the-shelf" technology tools such as BPO pen and Cadency journal entry modules, the client was able to transform traditional workflows and transaction processing. Finally, UiPath-based robotics were used for invoicing, billing, and journal processing.

Benefit & Results:

Centralizing the financial and procurement processes and automating the processing of over 200,000 manual transaction by use of robots and an analytical business insights dashboard for more informed executive decision-making had significant impact. It improved the on-time payment ratio from 74% to 84% in six months, saved EUR 2.5 million through accelerated discount capture, reduced days payable outstanding by 12% from 42 to 37 days, and improved on-time billing for receivables that improved cash flow.

Internal Audit Process Optimization for an Oil & Gas Company

The Context & Challenge:

A client's internal audit function identified 30 use cases pertaining to uncovering suspicious activity. A lean and adaptable solution was needed for application deployment to different regional locations that integrated delicate topics such as embargo lists and legal entity forms to uncover sales to private parties.

The Approach:

Several highly configurable, adaptable dashboards that changed focus based on user preferences were developed, together with language-independent backend analysis for suspicious activity. The back-end analysis engine utilized an interface to facilitate the interaction with external files and their integration to existing data structures to look for keywords of suspicious activity.

Benefit & Results:

The dashboards and the analysis engine developed to improve the internal audit process enabled several additional capabilities for internal audit such as detection and uncovering of suspicious master data, payment data, process flows, users, and more.

Chinmay Baral, India
Expert in Residence

CAN'T TOUCH THIS

A process seamlessly adapting to its environment, optimizing itself without human intervention or support – is that even a process anymore?

Whether you are looking to manage a complex infrastructure, maintain security and compliance, or gain operational efficiency and agility, automation is an essential factor to provide the flexibility you need, helping you to create the business you want.

Industrializing automation is becoming a priority for all organizations to digitally transform end-to-end operations and scale excellence. Many automation implementations fail due to the lack of consideration over important factors before starting the project. Organizations must address challenges ahead of time and properly prepare for them to gain the highest return on investment.

Environment Viewpoint Monitoring Tool (EVMT) for a Global Client

The Context & Challenge:

Being frugal is the new smart! Proactively monitoring the health and performance of the applications in the client's IT landscape and being able to detect potential issues before they affect the end users had become increasingly challenging with the rise of hybrid and more complex applications. Achieving goals in the IT strategy required awareness of how the IT landscape was performing to avoid spending time and money on labor-intensive manual support activities.

The prevailing legacy monitoring tools, which in addition had a high licensing cost, lacked the needed security features and required a lot of manual effort by people with a specialized skillset. Enhancements and integration with other tools was also challenging due to the lack of customization options. In short, proactive monitoring of application health and performance was difficult due to the limitations in the legacy tooling.

The Approach:

Capgemini gathered and collated all the infrastructure, application, security, and compliance requirements for monitoring the various applications in the customer's IT landscape and developed a custom monitoring application named EVMT (Environment Viewpoint Monitoring Tool).

The development process was agile and iterative, where Capgemini initiated several pilot applications to validate the different aspects considered for monitoring, such as infrastructure, database, ports, CPU, memory, web applications, user access, and auditing.

Potential improvement opportunities are now identified by use of dashboards that give a concise view of the application metrics in real-time in combination with historical data. EVMT also has auto-healing capabilities, where rules and machine learning techniques are used to understand application issues and apply the appropriate fix – rather than just alerting the operations team.

Benefit & Results:

EVMT has improved application maintenance and operations by providing the client with a complete status overview of the IT landscape. It has enabled the monitoring team to become proactive and focus on the core tasks and allowed the client to decommission the legacy monitoring tool, saving approximately EUR 50,000 on the IT budget annually. The overview that EVMT provides has also helped to create more appropriate operational strategies, set realistic goals, and ensure that continuous improvements could be delivered.

Chandreshwar Prasad, Norway
Expert in Residence

AUGMENTED ME

Adding AI to business operations to accelerate decision-making, create a symbiotic relationship, and bring harmony to both human and machine

Assemble the minions! "Taking the robot out of the human" is an established first step towards any automation of work processes. But what about bringing AI into the equation? Mimicry is one element of mechanistic automation, but perhaps – more importantly – is the ability to augment human intelligence. Apparent from AI's mastery of natural language, and its understanding of audio, video, and images, it has an uncanny ability to observe processes in their broader context, detecting complex patterns that humans cannot even see or absorb. The resulting symbiotic relationship between humans and AI is changing the way we work, the way we organize ourselves, and ultimately, the way we do business and live our lives.

Augmenting Drilling Data with Vision for a Global Drilling Client

The Context & Challenge:

A global drilling client asked, "when drilling cuttings are taken out of the drill string to be stored for later analysis and references purposes, how can we augment and extend the capabilities of geologists for improved exploration success?"

The Approach:

The approach was to automate the digitalization of drill cuttings using multi-spectral, high-resolution imaging by training, automatically aligning, and comparing the visual inspection with XRF (spectral) analysis of the samples to create reports and a reporting interface.

Benefit & Results:

The manual and visual inspection of digital cuttings is extremely labor-intensive, expensive, and lacks consistency across experts over time. Digitizing cuttings decreases the costs of analysis and boosts the reuse of samples and knowledge. Digitalization is also the enabler for increased use of intelligent technology and AI.

Technical Integrity Management Portal

The Context & Challenge:

Platforms are evaluated on a regular basis for Health and Safety Executive (HSE) based on certain performance standards, with these findings presented to management and the authorities. A foresight into how the performance standards might impact the platforms was missing, and hence no preventive action could be taken in the case of unforeseen risks.

The Approach:

The project looked to simplify scoring by using available historic data to accurately predict scores. Machine learning intelligence was used to predict evaluation scores with highest confidence levels and concepts from machine learning and natural language processing could be applied to perform classifications (B-F).

Benefit & Results:

More accurate predictions of the evaluation scores were achieved by applying machine learning algorithms to the data to create predictive models. The user experience was simplified and improved by, for example, embedding search functionality to pull results instead of users having to navigate multiple screens to see the desired result. An overall platform view of all the locations along with the current assessments with the platform could also be provided.

Robert Engels, Norway
Expert in Residence

APPLICATIONS UNLEASHED

At the heart of any technology business is its applications portfolio. A thriving heartbeat of the organization – part of the business, responsive to every demand. These applications mirror the new business dynamics, built and continuously changed at high speed, to a high quality, and in whatever incarnation necessary. Yet, changes are afoot, dear Watson. Many applications no longer look like the ones we used to know, as they morph into a connected mesh of microservices. And where is that old-fashioned user interface again? With agility and minimum viable products no longer the "new normal," but the "well and truly established," the quality of application services needs to be at enterprise level – with the trust balance of the organization secured by design and a continuous, flawless deployment throughout all business operations.

Today – more than ever – the energy & utilities sector is in a complete transformation from a business perspective to a technological centricity. The energy transition – and the current pandemic – are a pathway towards transformation, putting the applications right at the heart of the interactions. Apps are the key to a global experience between all the stakeholders – citizens, companies, and services alike – giving them the opportunity to transform the mass data into added value and monetized services.

Agility, time-to-value, modernization, and cost optimization are key drivers in this experience race. And emerging solutions are on the starting grid to compete with the traditional approach; tools such as economic Application Portfolio Management (eAPM) to analyze and rationalize your own application landscape, micro and mesh services, API, and AI are the future levers of the necessary sector acceleration.

Key Trends in the Energy & Utilities Sector:

The trends around high energy prices, decarbonization, and competitions impose new models around:

- Simplification and rationalization with a strong application portfolio rotation strategy to decommission old and costly applications to the benefit of new and cloud-native capabilities
- Building of new applications – agile and DevSecOps-style. As soon as one ebbs, another is formed. Rapid iterations are developed jointly by business and IT teams, using micro and mesh services, APIs, software containers, serverless computing, and radically automated, highly productive tools.
- Digital acceleration with augmented interactions leveraged by smart analytics, services, and user-friendly interfaces in a consistent and 360° experience view

It is the unleashed application that operates in the most fluid and seamless manner, leveraging and seemingly anticipating the intentions of its users/clients almost before they are expressed. Whatever the forecast, the application landscape must help us weather the storm, adapt quickly, and respond to change so that we can move into calm waters.

Nicolas Carayon, France
Expert in Residence

KONDO MY PORTFOLIO

Tidying up the applications portfolio in a systematic, decisive way to make room for innovation, agility, and the next generation of powerful application services

Much has been written over the years about the need to "rationalize" applications and the business or cost benefits they can bring about. Yet, the pace at which it has actually happened has always been dictated by either technical obsolescence or business demands. Today, however, as enterprises look to simplify processes and reimagine their business models for a new normal, we are seeing a big push for simplification and modernization of the IT estate. The imperative for cloud adoption is also a big catalyst fueling this transformation. We are also beginning to see sustainable (green) IT initiatives picking up steam as part of the overall corporate sustainability goals and commitments. This is especially true of the energy, utility, and chemical sectors. We believe this will lend further impetus to optimize the size and complexity of IT systems and modernize legacy systems through an "eco design" of applications to reduce the IT carbon footprint.

Capgemini's eAPM is a comprehensive approach powered by a powerful SaaS platform for IT ecosystem analysis and decision making. It can be a powerful accelerator when decision-makers need fact-based answers to fast forward their portfolio transformation journey.

Cloud Transformation for a German Chemical Company

The Context & Challenge:

The client launched a cloud transformation program to enable their IT to proactively drive new business innovation and development supported by a flexible infrastructure platform for agile delivery. There was a massive push for applications modernization as part of this exercise.

The Approach:

Using eAPM, the team assessed the suitability of 584 applications and the associated infrastructure for migration and modernization. The evaluation was based on a decision algorithm built in agreement with the client. Deliverables included the treatment for each app, the migration plan, and migration costs.

Benefit & Results:

Four hundred and two apps were found eligible for immediate migration, which is currently ongoing. In terms of portfolio optimization and modernization, it was determined to retire 9%, replace 2%, rehost 4%, redeploy 50%, replatform 26%, and refactor 9%. It is estimated that CO2 emissions will be reduced by 58% post migration.

Digital Strategy for an Australian Energy Company

The Context & Challenge:

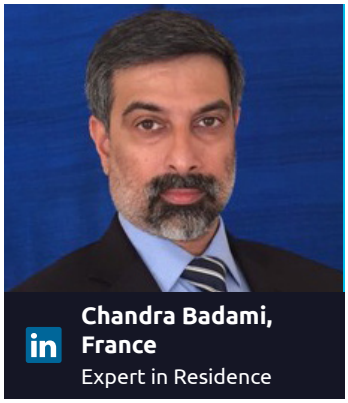
The client wanted to develop a five-year roadmap aligned to the company's digital strategy and the regulatory constraints. It included developing the architecture principles for the future, assessing risks, as well as modernization and rationalization of the estate in addition to an evaluation of cloud options.

The Approach:

Using eAPM, Capgemini analyzed the technology platforms and 186 underlying applications to baseline the portfolio, map the risks, identify functional overlaps, and determine the application total cost of ownership (TCO). Decisions on cloud and the adoption of new digital solutions as part of the roadmap were also detailed through client workshops.

Benefit & Results:

As part of the roadmap, 92 apps and associated platforms are to be modernized, taking into account alignment with vendor roadmaps, licensing cost considerations, and recommendations based on key industry future trends. It is estimated that the TCO reductions will be around 35-40% post transformation.



Chandra Badami, France
Expert in Residence

MESH UP YOUR APPS

A "mesh" of highly accessible, secure, and agile application services that are ultra-easy to connect with and combine, both inside and outside the organization

"Mesh architecture" is a reset process for organizations to communicate inside and outside the organization with customers in a natural and easy-to-use way by embedding accessible, secure, and agile applications services.

Many energy & utilities companies are contemplating how they can become more "open" to the word and how they can leverage their own data to create new services, to communicate with their partners, or to reduce their costs.

The level of interaction and the mass of data are necessitating new priorities to the way the energy sector is dealing with its external and internal ecosystems. Innovative energy & utilities companies are moving from big legacy monoliths towards microservices and mesh in a more event-driven paradigm and in a reliable way to answer business objectives.

"Data mesh" and "services mesh" are complementary to the modern microservices architectures by giving opportunities to:

- configure, maintain, and secure communications between all the microservices; and
- configure and execute network functions (reliability, load balancing, and failure management);

all the while, focusing on business value.

Data Visualization for Customers of Finland's Nationwide Electricity Grid (FinGrid)

The Context & Challenge:

Faced with a rapidly changing regulatory environment and electricity market, FinGrid has chosen customer-centricity as the core of its strategies. The first step in offering the best service to its customers, Finnish power plants, industrial plants, and regional electricity distribution networks, was to replace the numerous extranets with one user-friendly, scalable customer portal.

The Approach:

FinGrid chose a solution based on a mesh-oriented architecture to accelerate the capability to quickly migrate old portals. This mesh capability gave the opportunity to prototype the portal, complete any iterations, and launch it for selected customers. Using a DevOps strategy, FinGrid ensured continuous development based on data and user feedback.

Benefit & Results:

The old extranets are now replaced one by one in an accelerated mode because of the capabilities provided by these mesh architecture patterns and continuous interactions.

Grid-Edge and Smart Meter, a Global Utilities Challenge

The Context & Challenge:

As grid-edge and behind-the-meter innovation increases and more smart meter data becomes available, the flow of data to be shared and processed will change from a mere trickle to a flood. The main challenge around this is to manage multiple and distributed data sources, ensure their data integrity and quality, and analyze and valorize them in real-time to benefit both operations and clients.

The Approach:

A data mesh uses a modern distributed architecture approach. Unlike a monolithic data lake, a data mesh breaks the mass of data into streams which are "owned" by different teams, operating as distributed data lakes. Teams can then analyze data and generate insights almost in real time.

Benefit & Results:

The significant advantage of data mesh and services mesh lies in the capability to exploit a huge mass of data in real time, allowing utilities to process data and giving them the agility and opportunity to create innovation with new partners for new services.

Tathagat Banerjee, India
Expert in Residence

WHEN CODE GOES LOW

Low-code and no-code platforms make building next-generation application services a high-productivity matter, for both IT and business specialists

Leaders within the energy & utilities landscape are all facing similar challenges: the world is changing at a rapid pace, and digital is transforming the way companies create value, serve their customers, manage costs, and optimize processes. The energy sector in particular is facing unprecedented challenges, and energy companies need to make significant changes. The COVID-19 pandemic highly impacted the market by reducing demand but also by transforming the supply chain with a more dedicated and personalized user experience.

Low code is an extended cloud-based platform-as-a-service environment. Applications in this space are designed to interface and solve business problems faster – and with higher customer satisfaction – than traditional software development, which typically takes a long time to develop and deploy.

With capabilities to efficiently replace legacy systems, integrate process innovations, or introduce new applications without adding operational risks, low-code / no-code platforms become strategic platforms in future-oriented enterprise architecture in the energy & utilities sector.

Minimizing Operational Costs at TransAlta

The Context & Challenge:

As a result of low energy prices in the province of Alberta, Canada, TransAlta's wind management team decided to change the way they resourced their operations. The direction was to reduce the amount of overtime required to maintain TransAlta's Wind fleet.

The Approach:

To support this new resourcing model, TransAlta was looking for an effective way to accurately dispatch employees to repair power equipment and related assets. The purpose of the tool is to avoid unnecessarily dispatching jobs that do not possess an economic benefit, provided the outage does not jeopardize commercial availability. Leveraging Power Apps, TransAlta built a decision-making tool called Economic Callouts to calculate the economic viability of sending an immediate response to service calls outside of their core operating hours.

Benefit & Results:

By taking immediate action instead of analyzing the cost benefits of deploying a service resource, TransAlta can be more efficient with their time, capital, and labor, providing an instant return on investment, an adoptable and intuitive platform, and innovation across other business groups

Process Standardization in a French Multinational Company

The Context & Challenge:

The client relies on nomination and balancing programs to help manage gas flow, minimize operational imbalances, and avoid costs associated with penalties. The client wanted a solution that would standardize the nomination process while accounting for regional differences, thereby minimizing penalties and legal concern for the technical requirements.

The Approach:

The team built a solution to deliver a uniform and optimized toolset for scheduling, capacity auctioning, and commodity bidding, covering different power markets around the globe. The solution enabled power operators to focus on their core business by reducing manual data entry and duplication while shielding them from data transformation tasks and technical communication details.

Benefit & Results:

This approach gave the team significative gains in terms of cost reduction and business focus:

- *80% penalty reduction and 90% productivity gains*
- *Allowed the intraday desk to fully focus on the core business and conduct trades without worrying about penalties*
- *Training time reduced from two months to two weeks, and need for full-time employees was reduced by 25%*

Tathagat Banerjee, India
Expert in Residence

HONEY, I SHRUNK THE APPLICATIONS

Next-generation agile and response "light" application services are built on the concepts of M microservices, API-first, cloud-native, and headless

With the influx of renewable energies, brings volatility in electricity production.

The transformation from a centralized model to a diffuses model brings changes in the management of the consumer/producer balance. New uses (electric mobility) are giving rise to massive numbers of new consumers but also storage potential.

Energy companies and new players alike are forming new businesses to capture, optimize and forecast. Connected objects, algorithms, forecast models, and APIs are among the tools building these new and virtual power plants.

This market requires adaptation, agility, and capacity to scale up. The method – and agility – and the use of adaptive architecture – and upscaling – are necessary to achieve these objectives.

IOT to Forecast Wind Farm Production for Agregio (EDF Subsidiary)

The Context & Challenge:

EDF is a major player in the energy market in France. In March 2018, its subsidiary Agregio was initiated to build a virtual wind power plant. The aggregation of a large volume of power plants combined with demand/response capacities of large consumers proved a major issue to conquering the market.

The Approach:

EDF employed Capgemini to play the role of CTO for Agregio. This support provided the product architecture definition, the solution choices, and the definition of the development structure of the subsidiary. The deployment in the AWS Cloud and the use of services such as IoT and algorithm training have made it possible to better predict production and to exchange data or instructions with the wind power plant through APIs.

Benefits & Results:

Rapid implementation – in less than four months – has made it possible. The virtual power plant now manages the capacity of more than three nuclear power plants distributed across several hundred assets.

API to Interact With the Ecosystem for LEM (EDF Business Line)

The Context & Challenge:

LEM – Local Energy Management, an EDF business line – wants to build value-added offers between microgrids and batteries with market optimization strategies (asset pooling). The customer's different businesses have the algorithms, but not the deployment strategy or interactions between their systems.

The Approach:

Capgemini, with its cloud and DevOps expertise, has defined a deployment architecture allowing on-board optimization and regulation containers developed by data scientists. The definition of APIs and data model abstraction allow interactions with other components such as IoT and permit frequency regulation in near real time. Millions of timeseries points were processed each day.

Benefits & Results:

A deployment strategy has made it possible to optimize the value of two EDF subsidiaries to create a new product on the electricity market by participating in both energy storage and grid frequency regulation – a first in France.

Tanguy Charrier, France
Expert in Residence

APPS ♥ AI

Systematically infusing new and existing applications with AI capabilities, making them smarter, autonomous, and valuable, with a positive impact on society and the environment

AI becomes key in the future of energy & utilities when it comes to challenges such as:

- Improving grid design and avoiding waste
- Managing and improving performance in grid operations
- Moving to a hyper-personalization of the offers for customers
- Allowing regulatory compliance

Bringing AI into the ecosystems provides more accurate insights on how the grid is used by the consumers. It helps to regulate production and have a more efficient consumption for the end users by pushing savings notifications on both web and mobile apps. AI is also used more and more for detecting any loss in the network and anticipating service disruption for maintenance.

The next generation of AI apps will combine with RPA to bring intelligent automation into the grids and a graph neural network for optimizing investments. Increased market competition will also force companies to renew their service offers, which will reinforce the use of AI to have better knowledge of customer expectations.

Energy Network Asset Data for Western Power Distribution

The Context & Challenge:

Distribution network operators need to invest huge amounts in their network's decarbonization strategies and changes in patterns of electricity consumption and generation. Western Power Distribution compiled their network assets data over many years, but digitization of the information to build the geographical information system led to missing data and incorrect values.

The Approach:

The team used an innovative spatial network graph representing network assets and applied a graph neural network to analyze existing data and make predictions on missing asset attributes using the properties of geographically-close assets.

Benefit & Results:

The model was able to autonomously predict and propose corrections to attributes such as voltage, conductor size, and material, greatly improving data quality and reducing costs associated with the manual and lengthy processes of correction and validation of the grid asset attributes.

Saving Water the Smart Way with Siemens

The Context & Challenge:

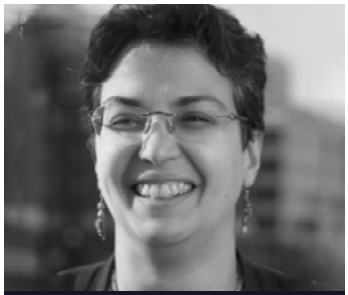
Water company VA SYD estimates non-revenue-generating water accounts for 10% of all water supplied to customers because of leaks in the pipeline network. Given this information, the company wanted to detect and reduce small and slow leaks over their five thousand kilometers of pipelines to improve their service to customers.

The Approach:

VA SYD installed Siemens SIWA LeakPlus to measure and detect leaks. They refined the hydraulic models for the pipelines and linked the data from the metering systems and pump stations with SIWA LeakPlus. They simulated different leaks and were able to detect leaks as small as 0.5 liters per second.

Benefit & Results:

The immediate result for VA SYD was the reduction of the number of installed flowmeters required in the pipeline network as they improved the leakage detection. They now aim to improve the model to more precisely locate leakages and limit unplanned service disruptions.



Isabelle Tachet, France
Expert in Residence

INVISIBLE INFOSTRUCTURE

O' Infrastructure, Where Art Thou? The odyssey towards a truly invisible IT infrastructure may still be ongoing, but progress is made. For many organizations, the pandemic era accelerated a move towards the public cloud: a signpost of increasing "invisibility." It is now the default choice amid a diverse range of cloud deployment options. To keep up with the pace of a technology business – or rather, being its pacemaker – IT infrastructure needs to fluently adjust to changing needs and the whimsical ways of the time. A software- and AI-driven, nearly autonomous supply chain – with reliability engineered within – is key to that. It also deals with the scarcity of skilled experts and excess energy consumption. But IT infrastructure also expands its reach, integrating operational technology and "things" at the edges of central IT, showing yet again that "Infostructure" is not a spelling mistake.

The energy sector has been shaken by large transformational changes that impact infrastructure: new self-consumption behaviors, electric vehicles, local communities, and new intermittent sources to manage like solar, wind farms, and intermediate storage. New competitors enter the market and bring aggressive offerings, new services, and quickly transform the deregulated energy market. The sector must react to enable the energy transition and bring sustainable solutions to help people, communities, cities, and regions to transform. This transformation requires both efficiency and velocity to both historical players and newcomers.

The cloud-first strategy is used to accelerate and bring cost savings. Due to regulation and security concerns on data, sovereign cloud solutions are required to fully enable transformation in the sector. AI completes the vision to optimize network and infrastructure availability and remediation at scale.

Key Trends in the Energy & Utilities Sector:

- Smart networks and edge computing: to integrate and control the new renewable sources and enable the new end-user usages, intelligence should be brought at the edge of the network. Substation architecture needs to manage both data and energy and enable monitoring, control, and prediction at the edge of the network.
- Cloudification: a hybrid cloud strategy is at the heart of IT principles to foster new agile approaches in all energy products but also to enable a quick international deployment.
  - Cost reduction and velocity is targeted by historical players to regain leeway on their investments. SAP cloud transformation is an opportunity to alleviate their costs and bring better scalability. Pure players favor simplicity and speed of deployment.
  - Security and sovereignty are key constraints that slow their momentum. Sovereign cloud solutions like Bleu in France should enable this full transformation.
  - Meanwhile, containerization can be seen as an intermediate step to bring agility on-premises and prepare cloud transformation.
  - On demand infrastructure and software defined infrastructure provide efficient infrastructure solutions to agile projects. DevOps, GitOps, and FinOps practices are quickly adopted and require production-ready landing zones and security by design services.
  - Managed services enable new customer services and data services without the burden of managing infrastructure. Micro-service adoption is simplified and enables scalability and full automatization.
  - In Europe, initiatives like Gaia-X and the energy data space will bring new opportunities to share data and services across the sector and should be integrated within the infrastructure playbook. Services like maps, network assets, environmental data, and collaboration on operations could be integrated.

- Software defined infrastructure:
  - The move from legacy infrastructure and virtualization is engaged. Containerization is an efficient path to private cloud for sensitive apps. It simplifies the deployment of managed services and prepares the move to cloud. It also enables unified multi-cloud approaches with hybrid control plane solutions. Kubernetes is ruling this trend as a de facto standard.
  - Full managed services is the path for new applications based on a strong DevSecOps approach and FinOps practice to optimize costs.
- International deployment: The energy transition is a huge market to address internationally. Energy actors are looking for the quickest way to capture those opportunities. Cloud solutions offer scalability, local presence, and turnkey solutions to win the race.

Guillaume Leroy, France
Expert in Residence

SILENCE OF THE SERVERS

Building a highly automated, self-optimizing IT infrastructure that is so entwined with business operations that it is no longer distinctly noticeable

With a constant pressure on costs, quality of service, and innovation, a continuum from business teams, to developers, to infrastructure experts is now required.

The infrastructure building blocks should provide better time to market with embedded security, automation, and sustainability. IT infrastructure should become truly invisible and provide fast, secure, agile, and cost-effective access to any data or application services. Infrastructure should be fluid and flexible and must be delivered anywhere.

To unleash that power, a set of API-based solutions and a rich ecosystem should provide a consistent experience across on-premises and public cloud. Workloads should seamlessly be able to move and ensure their protection, reducing the cost of service delivery while preserving agility.

Virtualization of computing and storage with software-defined networks is the rule. Declarative and programmable infrastructure with Terraform or Ansible associated to orchestration, automation, and GitOps pave the way to this era.

A Natural Gas Producer Competes at the Forefront of Energy Transition

The Context & Challenge:

A natural gas producer must answer new challenges generated by market dynamics on energy transition. To confirm its position as a frontrunner in green utility, an element of agility and flexibility was required as well as continuous focus on reducing its cost to serve.

The Approach:

Capgemini provided a fully automated framework to build landing zones quickly (Infra-as-a-Code). Acting over the three axes (people, process, and technology), the team updated IT standards through reference architecture to deliver a natural and comprehensive approach. Working together, Capgemini guided the client along the path of moving their application portfolio to the cloud.

Benefit & Results:

The delivery and management of a highly automated, hybrid multi-cloud landing zone – in just 4 months – that enabled automated deployments in a few hours.

An Electric Utility Company Wants to Rationalize and Scale Its IT

The Context & Challenge:

The client had four disparate applications for each state service territory to manage a common business function using outdated and antiquated technologies. The client sought to consolidate on a single platform with varying customizations for their different state-based regulatory needs.

The Approach:

Capgemini embedded automation and security by design within cloud-native applications based on the Azure platform and Platform As A Service (PaaS) components.

Benefit & Results:

Gathering all requirements in one common cloud platform enabled a more effective, scalable, and robust solution for the company. It also leveraged a set of common services and provided technical enhancements, including performance and reliability, throughout the application scope.

Skander Guetari, France
Expert in Residence

CROUCHING TIGER, HIDDEN CONTAINER

All the complex infrastructure an application needs, nothing to see but next-generation, energy-saving containers that will run anywhere, delivering multiple critical consumer-facing business services

Containers provide the intermediate steps between virtualization and full managed services. Their lightweight nature enables infrastructure abstraction and optimization, agile deployment, greater reliability, and scalability. Docker and Kubernetes are the de facto standard on the market.

The energy sector has started to move from virtualization to containerization. Central use cases are related to the new agile practices of the product teams with DevSecOps practices, and quick deployment requirements. The use of micro-service architectures is also growing.

Smart networks also require new technologies to distribute computing over the network, needing lightweight infrastructure and global orchestration. Containerization is one possible answer to this challenge.

Self-Service Platform for Oil & Gas Industry Company

The Context & Challenge:

The company had a complex operational management approach with various product teams using various delivery models, affecting application development and deployment. To deliver on its dual challenge of meeting increasing demand for more energy while producing fewer emissions, the company wanted to explore a robust, modern technology infrastructure that could operate worldwide and be accessed by thousands of business users and millions of end customers.

The Approach:

The company wanted to build a self-service platform and a DevOps culture. To simplify processes and enhance productivity, the company used the Red Hat OpenShift Container Platform running on Amazon Web Services (AWS). This platform provides process automation that empowers product delivery teams with self-service capabilities, a DevOps approach, and a continuous integration/continuous delivery (CI/CD) pipeline.

Benefits & Results:

The result was increased agility, security, and speed to market – at scale. With the new platform, the company can now provision a new environment in just seven minutes, allowing developers to innovate quickly and better support business goals. The new platform runs security scans automatically and ensures best security protection while empowering DevOps teams to embrace self-service capabilities.

E.ON Optimum Offering based on Google Cloud Platform

The Context & Challenge:

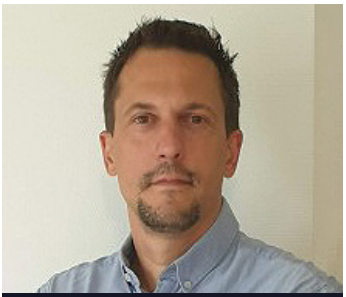
E.ON wanted to propose a real-time energy consumption service to their customers to help them optimize their consumption, manage costs, and better evaluate their CO2 footprint. Enabling this internal offer to their customers proved to be a true challenge.

The Approach:

E.ON replaced their existing SQL infrastructure and deployed a cloud infrastructure using Kubernetes and Google Cloud Platform to provide the service to their customers.

Benefits & Results:

This cloudification through Google provided a more scalable and available product for the customers. It has also freed the technical team from the burden of infrastructure management, helping them to concentrate on more features and benefits for customers.



Jonathan Le Lous, France
Expert in Residence

SIMPLY THE EDGE

Intelligent devices, at the “edge” of central IT and close to operations, add a powerful dimension to the existing IT infrastructure

Edge computing is a key enabler of smart networks, bringing computation closer to the energy producers and consumers, enabling better control, smarter management, and new services. New software solutions can be deployed to enable:

- voltage, demand and generation monitoring;
- transformer regulation and control;
- fault detection and remediation;
- energy management;
- analytics and prediction; and
- predictive maintenance and more, together with an enhanced cybersecurity.

Edge computing also fuels new opportunities and capabilities: Smart networks provide better resilience with edge decision capabilities, beyond the meter services (DERs management). Smart substations offer new services to manage equilibrium, control security, and safety. Smart meters offer new opportunities for sales and services.

Edge for Smart Secondary Substations (E4S) Alliance

The Context & Challenge:

With renewable integration at scale in the distribution grid, climate change creating more disruption and cybersecurity threats, DSOs need to modernize and digitalize their operations.

The Approach:

Edge for Smart (E4S) was created to develop a standard, flexible, manageable, and interoperable platform for the next generation of smart grids.

This will be based on application virtualization in combination with edge computing, including all (cyber)security components. Capgemini has joined the E4S alliance to contribute to the definition of the solution.

Benefit & Results:

This new solution leads to lower total cost of ownership, faster time to market for new applications, and more efficient management and delivery of electricity by helping to digitalize the grid and make it data driven.

IoT Platform Implementation for a Major European DSO

The Context & Challenge:

Digitalization of the electric distribution network – an essential contribution to the implementation of the concept of intelligent networks – will support information transactions between application entities and the most diverse devices and assets via an IoT environment, which, when properly secured, will leverage new operating and generation models.

The Approach:

An IoT solution based on ThingsBoard that brings the most feasible ROI and ensures roadmap independence from black box solutions. For the last one and half years, Capgemini challenged several Proof of Concepts from competitors and consistently demonstrated the benefits of the proposed solution.

Benefit & Results:

The solution allows the independent evolution of functional blocks, promoting innovation, efficiency, and lack of lock-in to products and suppliers.

Thierry Batut, France
Expert in Residence

OPS, AI DID IT AGAIN

AI renders IT operations fluid, proactive, and resilient, improving efficiency and reliability while it learns on its way to full, handsfree autonomy

Applying artificial intelligence to data center operations is a growing trend to optimize operations in IT. New AIOps strategies and platforms combine automation and AI analysis to increase the accuracy of identifying identify problems, reducing false alerts, and increasing the ability to resolve issues for customers before they happen. This capability comes from the ability to crunch large datasets but, more importantly today, to leverage real-time information.

For energy & utilities, the current focus points are availability and performance improvement, customer enablement, billing efficiency, cost reduction on legacy systems that work with a large, aging asset infrastructure, and applications. And AIOps could help to solve such challenges.

AIOps Improves Customer Service for Major Energy and Services Company

The Context & Challenge:

A fundamental activity as a retailer of energy services is high-quality customer contact management via the company's call center. If a customer faces errors that are critical to their business operations, they may well choose another supplier. The challenge for the company was to correlate technical performance data held within APM and customer contact data via the call centers.

The Approach:

The solution was featured around ServiceNow capabilities into AIOps firing some automation procedures to remediate issues. The creation of a customer journey dashboard, which can be used as a template, helped business owners know the real state of their business processes. Associated with this journey, digital operations dashboards, linked with IT, helped to deliver high-value services with fewer errors.

Benefit & Results:

AIOps reduced outages during calls or user interaction with applications by nearly 30% in its first year, and the system continues to learn.

Transforming Operations Documentation for an Electricity Producer and Operator

The Context & Challenge:

The digitalization of services has changed habits irrevocably: customers can contact and manage services at any time, in any place. B2C service portals must always be available. But offering automatic recovery to have a 24/7 service certainly presents a challenge.

The Approach:

The main innovation idea was to transform operations documentation into automated procedures by the help of AI technologies around natural language processing to avoid coding procedure. Using this no-code method, operations run by a machine are the same as a human expert intervention for a given issue. The innovation gave birth to a Capgemini asset called Smart Operations: a Level 1 digitalization assistant that helps support operations to recover issues in minutes.

Benefit & Results:

Started only this year, the benefits are already promising as infrastructure and middleware components are well repaired, with no code.

Jean-Louis Baudoin, France
Expert in Residence

LORD OF THE CLOUDS

Cloud adoption moves far beyond the middle-earth realm of cloud migration, now also driven by sustainability, distribution, sovereignty, “FinOps” and multi-cloud forces – all for that precious, better business flow

Energy & utilities companies are adopting sovereign and public cloud solutions en masse, becoming more agile in managing business acquisitions and sales. They also aim to be more competitive and continually propose new customer and partner services, such as consumption prediction, optimization, and much more.

Cloud adoption mainly relies on a full automation stack which is now a prerequisite not only for the infrastructure layer, but also on all available cloud services, applications, and data layers. Additionally, cloud-native services for redundant storage, auto-scaling, and auto-recovery have driven the definition of site reliability engineering (SRE) practices within development teams in order to ensure high reliability for application services.

Automation and reliability approaches now lead to almost completely hiding the infrastructure layer and touching the ”no-ops” operating model. These transformations, implemented under a rigorous FinOps approach to control cost-consumptions, have direct benefits on sustainability, at both solution and operation levels. Also, IT architectures are increasingly scattered and interconnected by using external and efficient SaaS services.

That confirms the wish to avoid infrastructure and technical service management, which must be fully performant but also invisible for companies, all the while delivering sustainable solutions.

New Auto-Consumption Service for Electricity Producer and Operator

The Context & Challenge:

An electricity producer wanted to create a new service for the auto-consumption of energy produced by local communities before reselling it back to the grid. This would be a new offer that required a new cost-effective contract management application – dependent on the number of clients – all fully aligned with business growth.

The Approach:

The producer employed a new serverless application, deployable on the fly, and able to auto-scale autonomously without business downtime.

Benefit & Results:

With the application, no operational activity is required for the technical maintenance. The main monitoring utilizes FinOps to continuously control the evolution of the consumption.

Tailored Reputation Monitoring for a Major International Electricity and Gas Operator

The Context & Challenge:

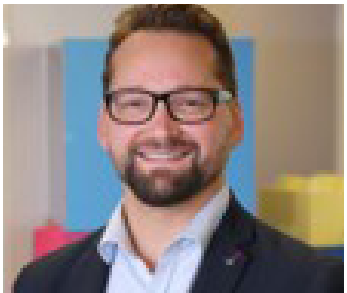
The company board needed a tailored index to measure the company’s reputation on key social media platforms around the world – regardless of time zone – and the number of messages with potential good or bad buzz.

The Approach:

The project provided analytical and technological solutions to implement a business intelligence monitoring tool according to a taxonomic model and KPIs tailored to the company’s needs. The tool – based on data analysis automation – is fully reliable across peaks of activity due to the AWS Cloud-native services, Kubernetes, and a micro-service architecture.

Benefit & Results:

The advantage is strategic, real-time monitoring of the company’s reputation that allows the board to adapt and guide its decisions. Automation has provided savings relative to the previous cost of the manual effort required to analyze online conversations.



Laurent Lefrançois, France
Expert in Residence

BALANCE BY DESIGN

The essence of designing a technology business is to find and preserve several balances in parallel: balance between the interests of stakeholders, between short and long term, centralized and decentralized, friendly and authoritative, and purposeful and spontaneous. Besides the WHAT of technology trends, TechnoVision offers a view of HOW to shape these balances within the organization – by purposeful design. The principles within this container aim to provide control questions for executives, a bouquet of perspectives for architects, and a systematic checklist for anybody involved in a technology business portfolio, program, project, or initiative.

Every so often there is a seismic shift – and we are experiencing this in the energy sector right now. The global net zero imperative and supply chain instabilities are creating a tsunami of change, bringing a new emphasis on substantive action. The transformation has started – from commodity product and disengaged consumers to a "new normal," a 2050 new energy mindset characterized by "nature positive," backed by global business leaders and engaged consumers, who demand a low-carbon, low-pollution, sustainable, and affordable relationship with energy. Technology will continue to play an ever more important role and will be increasingly design-led and fully integrated in every aspect of business.

As "old world" energy wakes up to the full impact of flexibility; the entire energy system is embracing the criticality of design thinking, systems thinking, and customer-centricity to re-imagine, re-design, and create a new energy environment and a new energy market that is flexible in every sense.

Key Trends in the Energy & Utilities Sector:

- Sustainability and purpose are now central tenets across the whole energy value chain. Businesses are reimagining and recreating themselves, and sustainability and purpose are now a core part of their design process – their physical and digital products and services, customer and employee experiences, and the digitalization of everything they do.
- Increasingly, energy companies recognize they are technology businesses and are understanding what that means in practice. Across the value chain, they are transforming how they work. They are creating operating models that transcend the legacy business–IT divide: digitally enabled, integrated, and product-centric models that deliver better all-round results, anchored in a new sense of purpose.
- The product-centric approach is transforming what is being achieved and is becoming increasingly common in energy & utilities, resulting in far greater business agility. This is also being extended beyond customer-facing digital platforms and into the core operational systems, delivering similar benefits.
- Flexibility is the energy system's new catch phrase. It brings a huge increase in the volumes of market participants, who all need to interact and transact digitally, often in real time – assets, energy management systems, contracts, and people. This is forcing the rapid expansion and adoption of open standards – well-defined, proven, evolvable, and easier to adopt approaches to integrate with the energy market in order to trade and deliver energy and energy services. The API pioneers in energy & utilities have proven this works; the rest of the market is starting to catch up.

- Energy & utility companies, regulators, and policymakers alike have woken up to the importance of data. Even more significantly, there is a shift to open data, which recognizes that sharing data (with controls and permissions) is fundamental to delivering the flexible energy system. Organizations are not only getting the fundamentals right – data management, governance, etc. – but also deploying, at scale, data- and insight-based solutions that transform business outcomes – through automation solutions as well as creating better insight – often derived through AI and advanced analytics. Increasingly, this is designed into the solution from the start.
- Process automation continues to gain traction, with large scale use across the industry. Increasingly, as the need for flexibility expands and the volume of assets participating in the market grows significantly, businesses are being forced to explore and adopt operational automation solutions.
- Trust remains a key issue. Increasingly, we see companies taking a more holistic approach, from customer experience through to cyber, and across the whole design and delivery lifecycle.

Dr Julian Keates, UK
Expert in Residence

ADAPT FIRST

Move adaptability from afterthought to prime time

The pace of change shows no signs of easing – if anything, it continues to accelerate. First movers have demonstrated the benefits to be gained by adopting operating models that are designed to be adaptable and which enable agility in every business process.

While this started in technology businesses before being adopted increasingly by IT organizations, our clients have recognized the benefits of realigning their whole organizations to reap the benefits that have been proven by adaptable, agile, and flexible organizations.

Energy & utilities businesses are no exception to this trend. Like in other industries, the early adopters here have shown the way and, probably without exception, the industry is learning and adopting working practices that drive better value and a better experience – for customers and for employees, enabling a better physical and digital experience.

Creating Agile Digital Organizations for a Utility Company

The Context & Challenge:

Like many businesses, our client was frustrated by an inability to deliver change at pace and struggling to adapt and achieve the benefits from the widespread digitalization capabilities that have become increasingly available in the market and workplace. This organization was determined to change the status quo.

The Approach:

Capgemini supported the client in the definition and implementation of a new target agile organization, the supporting operating model, and agile delivery methods. This was combined with a product-centric approach and revamp of the funding approach as well as far closer integration with every part of the organization. Integration with an "x-ops" approach enabled far greater responsiveness and accountability for every team.

Benefit & Results:

Enabled by a clear vision of "what agile means to us," and driving engagement across all part of the organization, the introduction of agile delivery radically enhanced their ability to deliver change quickly, prioritizing needs that enhanced their regulatory outcomes while also delivering better for consumers and employees alike.

Agile Mobile Application Factory Enabling Rapid Business Adaption for a Water Utility Company

The Context & Challenge:

Faced with multiple operational inefficiencies across different parts of the organization, this major water company was struggling to develop solutions quickly enough to meet business demands. It required a delivery methodology and operational model which could rapidly pivot to meet new requirements.

The Approach:

The establishment of a "Mobile Application Factory" model, in which a fixed capacity team quickly spun up proofs of concept, before building these out into enduring solutions. The factory was fed with new ideas from a central innovation hub, which prioritized demands from across the organization.

Benefit & Results:

The Mobile Applications Factory rapidly developed solutions to address business needs, including cutting down the timescales for an inspection process from five days to just four hours, and providing operatives with the ability to raise issues with broken assets directly from the field. The flexible approach of the model helped to embed a more agile approach to digital projects across the wider organization.

Luke Matcham, UK
Expert in Residence

WITH OPEN ARMS

Upgrade your technology platform to a technology business platform: a superior, open set of attractive services, acting as a magnet for active collaboration

Open data, standards, and APIs are drivers for stimulating innovation and collaboration, encouraging new operating models and service offerings that benefit customers and support the drive to net zero. Data is a tremendous resource that is, as yet, largely untapped. Many organizations collect a broad range of siloed data but do not extract the true value from it.

The innovation needed to develop new offerings, achieve efficiency gains, and generate crucial social and environmental value cannot be tackled with traditional operating models or the limited insights available from data held by individual organizations.

Utilities are at the beginning of their journey to open data, encouraged by national regulators to unleash the value of the data they hold. Often, they are still grappling with more fundamental data quality, consistency, and governance challenges. Capgemini is a leader in open data, supporting clients to develop new models and capabilities to realize the value of the data they have.

Smarter Energy, Accessible for Everyone through Open APIs for Industry Smart Meter Enablement

The Context & Challenge:

Smart metering is a key enabler for the energy transition, enabling consumers to be closely connected to their consumption and opening up the ability to send pricing signals to consumers, on a more granular basis, that enable behaviors to change and reduce systemic costs. Some consumers were being left behind as they lived in hard to serve buildings.

The Approach:

Capgemini pioneered the development of an industry-wide platform, accessible via standards-based APIs, to create a centralized platform for energy suppliers to coordinate and manage the installation and operation of smart meters and required repeater infrastructure into apartments across the UK.

Benefit & Results:

This first-of-its-kind platform enables a coordinated and optimized approach to enable energy suppliers to manage smart energy infrastructure across a diverse range of multi-dwelling buildings. The APIs enable a digital-first approach at lowest-overall cost to industry and to consumers.

Data and Digital by Default, Across the Whole Asset and Operations Lifecycle Information Management for Major Energy Capital Initiatives

The Context & Challenge:

Major energy capital programs have long treated data and digital as after thoughts. This has led to problems across the build-operate-retire lifecycle – poor access to data, lack of digital asset views, multiple silos, and increased cost and risk at every step of what is often a 20-40 plus year lifespan.

The Approach:

We pioneered and drove the adoption of a standard set of approaches for the collection of material and equipment attribute data, and its verification and management across the full digital lifecycle. It included enterprise asset management, plant lifecycle management, materials management, logistics, commissioning, and operations, and provided comprehensive 1D, 2D, and 3D views.

Benefit & Results:

The inititative led to end-to-end availability, quality, and transparency of comprehensive plant and asset information across the whole lifecycle, enabling confidence in the "as-designed," "as-built," "as-configured" states. This resulted in significant efficiencies during transition activities and a reduced risk profile. It is also a key step in enabling digital-twin capabilities and the benefits that enables.

Simon Rixon, UK
Expert in Residence

TECHNOLOGY ∈∋ BUSINESS

Move from alignment to unity of business and IT, creating a seamless technology business

Every utilities organization needs to shift from simply aligning business with IT to becoming a true – fully integrated – technology business. Utility players need to be more adaptable and responsive than ever. This is a huge challenge for an industry with a tradition of long-term planning cycles and project driven approaches. In a technology business, IT and business teams work jointly on products and services rather than on projects. This requires new operating models and new skillsets. Many energy suppliers are therefore shifting towards fully agile organizations beyond the IT department. This new approach is well adopted by digital front-runners thriving on customer driven cloud-based platforms that enable acting in a fast and flexible way.

For the system operators the technology business becomes a reality when combining static and dynamic real-time performance data from assets and IoT devices to steer the operations and increase real-life perspectives with, for example, AR and VR. Open digital twins enriched with ecosystem data will eventually become the heart of any digital system operator.

Next-Generation Built-for-Energy Digital Retail Energy Platforms

The Context & Challenge:

The retail energy market has suffered from a lack of differentiation, poor digital customer experience, high cost to serve, and a lack of agility in delivering change, often due to legacy business practices and technology estate.

The Approach:

A new wave of built-for-energy, digital-first, event-driven software-as-a-service energy platforms are being adopted across the retail energy market, e.g. Ensek Ignition, Octopus Kraken, and Powercloud. This is combined with the widespread adoption of product-centric operating models and agile delivery methods, resulting in faster time-to-change, enhanced digital-first consumer experience, and lower cost to serve.

Benefits & Results:

By leveraging modern platforms and working practices, retail energy companies are getting "match fit" for the energy transition and net zero. Their new platforms enable "energy-as-a-service" propositions and are ready for a real-time event-driven energy world.

Digitized Technical Procedure for Effective Fisheries Control via a Shared Smart Water Platform

The Context & Challenge:

The challenge here was lack of synergies between mass smart meter deployment programs for water and energy, different head-end systems (HES), and a lack of integration of meter data with operational network data (pressure, leakage, etc.).

The Approach:

A co-innovation project between three largest Flemish water companies (Farys, Pidpa, De Watergroep), Capgemini, and SAP set up a shared smart water platform to fully roll out multi utilities (water, gas, and electricity). The platform is meter independent with capabilities for integrating different HES, Data As A Service (DaaS) providers, and other sources of data. Extension towards more IoT and asset-related data, enabling processes such as non-index-data, alarm and event management, extensive analytics, and specific use cases such as leak detection in the distribution network, water balance, and water quality.

Benefits & Results:

Synergies provided savings in platform development and program roll out, seamless integration between all components, one source of truth for their entire data, and extensive analytical capabilities.

Pieter Schoevaerts, Belgium
Expert in Residence

IQ, CQ, EQ UP

Ensure a properly measured and monitored balance between three – sometimes conflicting – assets: the corporate intelligence quotient, creativity quotient, and emotional quotient

As the volume, complexity, and velocity of data continue to increase, AI's capacity to build an organization's IQ and EQ through enhanced data capture, as well as its ability to mimic human action and decision-making, will become increasingly valued in solving global challenges.

According to some sources, poor data quality issues mean nearly half of businesses fail to achieve their business targets. The importance of utilizing high-quality data for data analysis is obvious, and many organizations spend resources and time on data cleaning and preparation. This means that they spend more time on pre-analysis processes, rather than focusing on extracting meaningful insights. This is where AI comes in.

Allowing AI to handle the bulk of the arduous tasks grants the workforce greater bandwidth to focus both on the details that require human touch, as well as the creative brainstorming of new solutions (its creativity quotient), hence: IQ CQ EQ up.

Novel Applications of AI & Machine Learning to Identify and Fix Errors in GIS Network Data and Connectivity

The Context & Challenge:

GIS representations involve large volumes of data. The LV network is particularly extensive, and errors can go undetected. Accurate LV representation is critical to support network investment as part of the energy transition.

The Approach:

Advanced analytics and machine learning can be used to identify and fix errors in GIS data. Focus on harder-to-fix errors that draw on multiple datasets, machine learning, and advanced approaches to identify errors and propose corrections.

Benefit & Results:

The project delivered two novel graph modelling approaches to address different GIS data issues: a connectivity model which tests for capacity to carry the expected loads, and the other a spatial ML approach to confirm and propose key asset attributes. A user interface tool was also included to run ML models and adjust key parameters.

Smart Network Design Methodologies: How Can Models Be Updated to Cope With Smart Meter Roll Out?

The Context & Challenge:

Data privacy rules from the UK regulator mean smart customer consumption data must be aggregated. Gaps in customer data led to network imbalances, so the company wanted to utilize smart data to find out which phases householders were connected to.

The Approach:

Capgemini developed modeling techniques to aggregate smart data with other network data while maintaining accuracy over a given geographical area, and developed an analytics approach to determining peak demand. Consumption was analyzed and modeled using statistical distributions so infrequent peak values could be better understood.

Benefit & Results:

A statistical approach was created to generate a probability distribution of load at a given time for customers based on a suitable range of demand characteristics. Peak demand on the network is now better understood.

Melissa Hatton, United States
Expert in Residence

TRUST THRUST

Power up the entire trust ecosystem – from the organization's core to its edges – securing your existing business and pushing forward to its next permutation

In IT security, trust is rapidly being replaced with zero trust. Zero trust is often seen as the next logical step in dealing with the security challenges presented by the current threat landscape and the enterprise environment of 2022 with its sharp increase in remote work.

In operational technology (OT), we find different issues that we need to solve first. Capgemini takes clients on a journey that starts with discovering what assets are on a production network and how vulnerable these are. A roadmap is then created to fix the issues found and implement tooling to monitor the manufacturing landscape. Capgemini also works to increase security awareness of employees as well as defining ways to segment and update the networks to reach a level where zero trust is considered as the next step to improve the security of production networks.

Trust also plays a role in dealing with the suppliers and partners that help manage production facilities. Often these relationships do not take security into account. Addressing this is the next step in a secure manufacturing landscape where any remote access is secure and controlled.

A Cybersecurity Experience Center to Train Against Cyberattacks – a Capgemini Solution, Involving Europol Partnership

The Context & Challenge:

Digital transformation exposes organizations to digital risks, testing its resilience capabilities. It requires the right technologies and capabilities to detect significant cybersecurity incidents and respond to them.

The Approach:

Capgemini's Cybersecurity Experience Center offers on-site and remote cybersecurity incident simulations in various settings. With the establishment of a "Cyber Range," the center provides a multi-range and multi-user simulated physical infrastructure in a virtual environment, providing a SOC, an OT/Scada control room, and a boardroom for the executive level.

Benefit & Results:

The tailormade training scenarios prepare C-level executives and security professionals to tackle cyberattacks before they have a real impact on the organization's core business; thus, incoming threats can be mitigated.

Protecting the City That Never Sleeps From Cyber Threats with RWE Energy

The Context & Challenge:

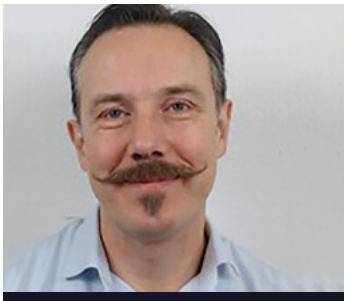
RWE Energy is a fast-changing energy company facing challenges to comply with the European NIS directive and secure its OT environment using the NIST framework and to enable the transition to renewables.

The Approach:

To cope with these challenges, Capgemini's Cybersecurity Unit (CSU) supplied a team to review their OT environment architecture, help them adjust to the changing landscape, and become a more resilient organization.

Benefit & Results:

RWE can face the future with a robust core architecture and more capabilities to adapt to an ever-changing landscape. The implementation of OT security tooling helps RWE to secure its part in the critical national infrastructure, supplying renewable energy.



Jeroen Wijnands, Netherlands
Expert in Residence

NO HANDS ON DECK

Assume full, hands-free automation as the default for all new technology business processes

The key here is self-adaptation: from automation to autonomy in control.

Utility grid operators will further improve network resilience by enriching supervision with real-time awareness and automated control scenarios coupled with contingency scenarios and self-learning algorithms. The human aspect is shifting from monitoring to supervising and decision making. Networks will gradually become more remotely handled and more self-optimizing, leveraging real-time asset data and external data sets (water level, weather, traffic, etc.). This converges the IT and OT world and requires a revisited enterprise architecture and new way of working. Grid automation will also enable the improvement of productivity and overall safety in operations and maintenance and enable remote support for field personnel.

Intelligent automation will be deployed at scale in customer service and back-office functions to automatically monitor processes, fix incidents, fulfill service requests, and provide support. This is achieved by a combination of analytics, RPA, process monitoring, NLP, ML, and AI methodologies and technologies. The self-driven processes enable the reduction of cost to serve and the differentiation of customer experience.

Beyond Digital Twins – Empowering Utility Operations with Artificial Intelligence

The Context & Challenge:

Every utility's network and asset base is becoming more complex, digitalized, and smart, with regulators and consumers demanding ever-greater resilience. The demands of the control room are starting to exceed people's ability to manage rapidly changing operations.

The Approach:

Capgemini is delivering next generation monitoring, control, analytics, visualization, and optimization across the whole front office operational scope through the combination of DevOps, DataOps, AIOps, digital twins and real-time IoT, agile research development, and a business adoption approach.

Benefit & Results:

Our integrated and agile approach is enabling our clients to realize the benefit of more autonomous operations, enhanced situational awareness, and predictive intelligence to deliver better consumer outcomes, particularly in extreme operational scenarios.

Transforming Back-Office Operational Efficiency With Digital Automation Robotic Process Automation for Leading Energy & Utilities Organizations

The Context & Challenge:

There is a constant drive from both regulators and investors to achieve better performance for customers and return on investment for stakeholders in the face of escalating costs across all aspects of business operations.

The Approach:

Capgemini's industrialized and scalable approach is to deploy robotic process automation across a wide range of back-office business processes – including finance and accounting, supply chain, and people and work culture – to rapidly drive adoption and implement sustainable change for many energy & utilities companies.

Benefit & Results:

Our clients benefit in many ways through our rapid deployment and adoption – through reduced operating costs by process streamlining, enhanced compliance and auditability, increasing resource flexibility, and enabling people to focus on higher quality job content.

Benjamin Dawes, Belgium
Expert in Residence

DO WELL, DO GOOD

Boost the organization's societal purposes by saying "Yes" to technology that boosts sustainability and "No" to what is energy-wasting or non-essential

Our industry has rediscovered its purpose and has turbo-charged it with sustainability as a key imperative. Probably without exception, businesses are leveraging digitalization and combining this with the innovative use of energy & utilities technologies in order to reinvent themselves and their markets.

In hydrocarbon-based sectors, there is a sea-change to clean gas technologies – through carbon capture/use/storage and a move towards green hydrogen. In electricity – switching to low-carbon sources combined with storage. In all cases, this is enabled by digitalization, combined with a sense of urgency and purpose. Every digital technology is equally tested for its green credentials.

Energy markets are not immune from this – increasingly, they recognize they were built for a different age and can no longer sustain "bolt-on" rules to retro-fit low carbon needs. A new sense of purpose is observable here, redesigning markets from the ground up to cater for energy markets that must be transparent and efficient – implementing pricing that reflects fully loaded costs and simplicity that enables real competition, while protecting the vulnerable and caring for society as a whole.

Sustainability Enabled by Technology Innovation at GASAG

The Context & Challenge:

The European Union declared the goal of Net Zero emissions in Europe by 2050 and the German government raised its ambition to become carbon neutral by 2045. Berlin's largest gas supplier, GASAG, with a large carbon footprint, has a central role in decarbonizing the economy. They needed ways to decarbonize their business and to set intelligent milestones to achieve this.

The Approach:

The energy sector emits the most CO2 compared to other sectors on a global scale. GASAG sells natural gas, so decarbonization means finding new ways of providing heat to households and power to industries where no scalable alternative exists today.

Benefit & Results:

Working with GASAG and multiple stakeholders, we identified more than 50 measures, including new technologies, business models, products, and governance, to reach the long-term goal of Net Zero emissions, together with a range of initiatives that would enable GASAG to reduce 2.5-million tons of CO2 per year by 2045, constituting a large share of their CO2 emissions.

Simplifying Energy Industry Complexity to drive System-Wide Value for Energy Market Agency

The Context & Challenge:

Since deregulation, the energy market's license-to-operate conditions, codes of conduct, and regulations have become increasingly complex, hard to navigate, and have resulted in barriers to innovation and to new entrants, hindering competition and the energy transition. Legacy systems have become increasingly hard to manage as they were designed for the past.

The Approach:

Capgemini has introduced a digital twin approach to the UK retail energy market, digitalizing not just the industry processes but also the requirements, data, roles, and legal text via an easy-to-use, common platform, accessible to anyone and with appropriate controls.

Benefit & Results:

The approach reduces barriers to entry, providing a simplified view for every participant. It accelerates the assessment of potential change and has enabled a far more future-oriented and roadmap-based approach to transforming the industry to support net zero objectives.

Dr Julian Keates, UK
Expert in Residence

A Few More Things

What if Marty McFly traveled back from the future, in an electric car, with a TechnoVision Energy & Utilities Playbook in his back pocket rather than a sporting almanac – what would it say? Although it's impossible to envisage the future accurately, here are some final trends we believe will further shape our technological horizon.

Marty, have you seen my charger ?

It's hard to believe just how recently electric vehicles hit our streets. Just a couple of years ago, serious engineers still locked horns in debates over batteries, costs, and public demand. Since then, the number of EVs sold has skyrocketed – doubling from 3 million in 2020 to over 6 million in 2021. And as the technology evolves and costs come down, we can expect the early adopter phase to soon give way to mass appeal. Soon, tens of millions of electric vehicles will be on our roads. So… where is all the EV-charging infrastructure? Where are the services?

The EV charging infrastructure that will be needed presents a vast array of opportunities. We're not looking at simply replacing gas stations with charging stations. Rather, we expect multiple different charging needs, each of which presents an opportunity. In the near future we will all be the customers of EV charging services. How we use them, and what we value most will be as diverse as the cars we drive.

But there is one thing that all customers will have in common. They will expect EV charging services to be efficient, powered by data, and seamlessly coordinated end to end.

The climate change challenge for business

Whilst climate change is not a trend, nor new. The choice of tools and strategies required to tackle the challenge, and their implementation, will define our future.

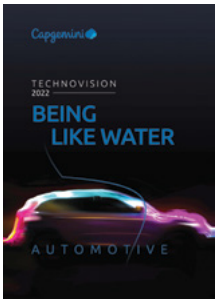
So what can – and should – business do? Our own Group CEO Aiman Ezzat was a keynote speaker at the 2021 UN Climate Change Conference in Glasgow (COP26). After the summit, he called for "nothing short of a revolution" adding, "the private sector must spearhead the carbon revolution! Solutions to decarbonate will mostly come from businesses."

So, putting politics aside, let's first consider why currently businesses are struggling to address the core causes of climate change, such as the operations and supply chains that are the highest emitters of greenhouse gases (GHG) and waste across industries today. Or IT landscapes, where user devices, data centers, and the networks that power business are big CO2 emitters. Or products and services that are still not designed with a circular mindset or from a planet-centric perspective.

These are clearly barriers to an accelerated response to climate change – but barriers can be torn down. At present, many businesses are struggling because they lack innovative tools and strategies to tackle the challenges, yet we believe these tools are available and must be brought into play, or we risk failing both our planet and humankind. For example, in its report FIT FOR NET ZERO: 55 Tech Quests to accelerate Europe's recovery and pave the way to climate neutrality, Capgemini Invent offered in-depth analysis of some extraordinary tools (existing and future technologies) that have the potential to transform the global response to climate change. The report focuses on five core economic domains: buildings, energy, food and land use, industry, and transport. And it offers hope on several levels, not least the potential to reduce CO2 by 871 megatons by 2050.

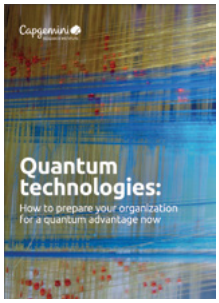
Further research

TechnoVision 2022: Being Like Water



TechnoVision 2022: Automotive

Circular Economy for a Sustainable Future

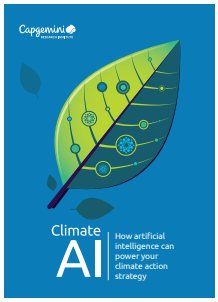


Quantum Report

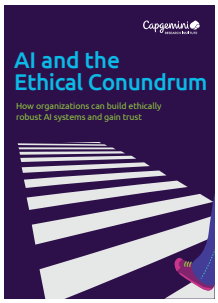
Data Mastery

The Data-powered Enterprise

Sustainable IT

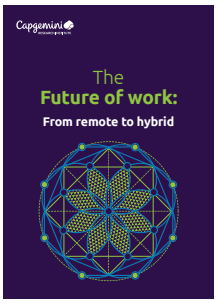


Climate AI

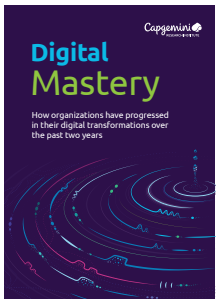


AI and the Ethical Conundrum

Sustainable Operations



The Future of Work



Digital Mastery

The TechnoVision Energy & Utilities 2022 Team

Authors:
James Forrest and Patrice Duboé, with Philippe Vié and Peter King

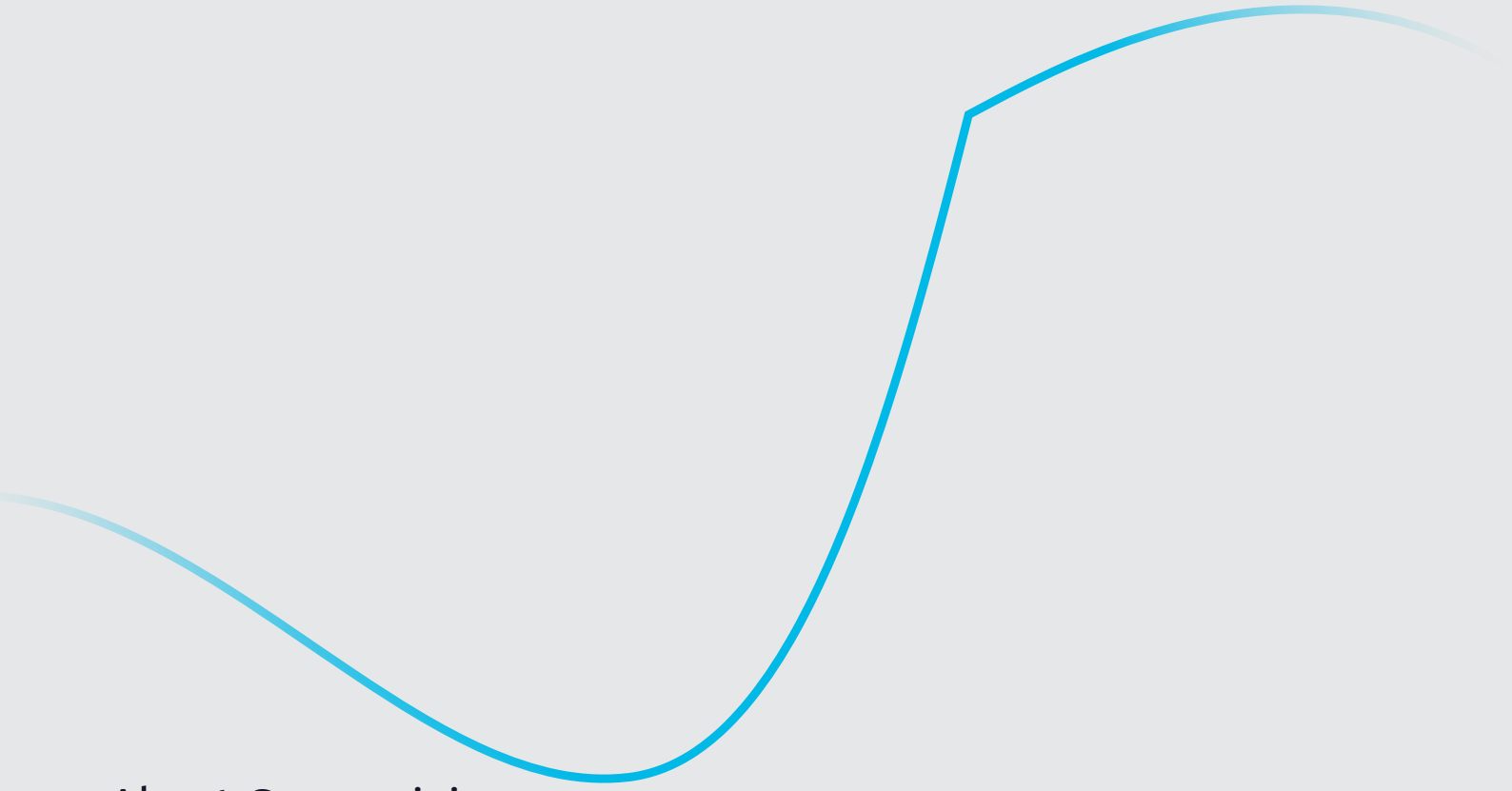
Project Manager:
Caroline Ball

Marketing Manager:
Vito Labate, Pratibha Sharma

Design & Graphics:
Surojit Dhar

Experts in Residence:

Aaron Bergin
Abhishek Gokhale
Alexandra Luxton
Alexandre Ryckman
Benjamin Dawes
Chandrashekar Badami
Chandreshwar Prasad
Chinmay Baral
Danish Nadeem
David Butcher
David Crook
Duncan Cameron
George Jacob
Graham Taylor
Guillaume Leroy
Ian Oliver
Isabelle Tachet
James Myatt
Jean-Louis Baudoin
Jeroen Wijnands
Jonathan Le Lous
Julian Keates
Kevin Rydland
Krystianne Avedian
Laurent Lefrançois
Luke Matcham
Melissa Hatton
Morten Taksrud
Neil Parker
Nicolas Carayon
Nicole Cadek
Pieter Schoevaerts
Pierre Fortier
Rob Bartlett
Robert Engels
Robert Rehner
Sanket Solanki
Simon Rixon
Skander Guetari
Stephan Taitz
Tanguy Charrier
Tathagat Banerjee
Thierry Batut
Tim Stevenson
Wesley Boyd



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Capgemini is a global leader in partnering with companies to transform and manage their business by harnessing the power of technology. The Group is guided everyday by its purpose of unleashing human energy through technology for an inclusive and sustainable future. It is a responsible and diverse organization of 325,000 team members in more than 50 countries. With its strong 55-year heritage and deep industry expertise, Capgemini is trusted by its clients to address the entire breadth of their business needs, from strategy and design to operations, fuelled by the fast evolving and innovative world of cloud, data, AI, connectivity, software, digital engineering and platforms. The Group reported in 2021 global revenues of €18 billion.

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