

**100**  
innovations



**TROPHÉES  
INNOVATION  
TROPHIES 2018**







innovations



Silver Economy

PAGE 6



Cities

PAGE 7



Community

PAGE 8



Smart Buildings

PAGE 10



Clients & Partners

PAGE 11



Circular Economy

PAGE 14



Green Energy

PAGE 15



Hydrogen, Biogas & Green Mobility

PAGE 18



Grid

PAGE 20



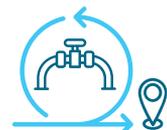
Greener Smarter Industry

PAGE 22



Data science

PAGE 24



Logistics & Procurement

PAGE 27



Health & Safety

PAGE 28



Serious Game

PAGE 30



New Ways of Work

PAGE 31



Fab & Labs

PAGE 32

With more than 150 years' industrial experience and as a global energy and services group, ENGIE has set itself the aim of leading the energy transition in Europe, particularly through innovation. This dynamic drives the whole Group to convert good ideas into operational solutions for its clients.



# Innovation at ENGIE

ENGIE favors entrepreneurial creativity and close connections to innovative ecosystems that contribute to the Group's long-term development. To achieve this aim, ENGIE uses its "ENGIE New Ventures" Corporate Venture Capital fund, which has already made 17 investments in startups, totaling €65m. Also, the Group regularly issues Calls for Projects from startups.



# Innovation TROPHIES

# 2018

## 530

APPLICATIONS  
FROM 36 COUNTRIES.

## 186

APPLICATIONS SELECTED  
BY THE GROUP'S BUS.

## 51

SHORT-LISTED PROPOSALS.

**For more than 30 years, the Innovation Trophies have recognized our employees' innovations.**

The projects are selected over several months before the competition winners are chosen. One highlight is when nominees present their project to a Grand Jury, who selects winners. The interest in this event, which has been part of the Group's history for more than three decades, underlines employees' enthusiasm for inventing solutions that help to transform the energy and services industries.



We are  
imaginative  
builders



22<sup>nd</sup> MAY - 1<sup>st</sup> JUNE 2018

**ENGIE  
INNOVATION WEEK**

**From 22<sup>nd</sup> May to 1<sup>st</sup> June 2018, ENGIE and its partners are mobilizing for the 4<sup>th</sup> edition of ENGIE Innovation Week.** A major event for the Group, ENGIE Innovation Week will feature more than 130 events organized in 25 countries by ENGIE employees, who will celebrate the inventions that are transforming ENGIE business. A highlight of Innovation Week will be the traditional Innovation Trophies Ceremony.

More than **130** events  
in **25** countries.

**10,000** attendees.

**3** themes in the spotlight:  
energy efficiency,  
renewable energies,  
smart cities and mobility.



USING OUR INNOVATIONS  
FOR AN HARMONIOUS  
PROGRESS

# Editorial



With the Innovation Trophies, we celebrate ENGIE employees' taste for entrepreneurship and creativity. They are our Imaginative Builders! The growing success of ENGIE Innovation Trophies demonstrates our Group's pioneering spirit and our will to keep inventing competitive solutions that reconcile individual interests with common goals.

The energy industry is experiencing a radical transformation. The change of mindsets in the fight against global warming and an unprecedented increase in investments in the energy sector are two powerful trends that open the door to a wave of innovations, creating new usages and new ways to consume.

You will find in this brochure several examples of these innovations, which, everywhere in the world, pave the way for an harmonious progress.

Enjoy your reading!

**Isabelle Kocher**

CEO



# Silver Economy

Ageing well means staying active and independent at home. ENGIE's new connected services contribute to supporting seniors in their communities.



## ÔGÉNIE

The first customer centric & digital solution by ENGIE for senior.

Ôgénie by ENGIE, a Group startup, offers a customizable digital platform for cities, public housing, senior-living residence and nursing homes to simply federate services to seniors.

182 - New Corp



## TOUCHPOINT

TouchPoint provides an effective tool for clinical and care staff to manage long term chronic conditions as well as the risks associated with keeping an aging population safe.

TouchPoint increases the efficiency of bed management within the United Kingdom health sector.

TouchPoint uses simple sensors coupled with advanced machine learning to monitor people's activity in their own home. The data from TouchPoint is presented through a dashboard or mobile application to carers to enable them to make better decisions about the care needs of their patients. It enables people to be discharged from hospital earlier, the safety net provided by TouchPoint ensures that should intervention or assistance be required it is provided in a timely and appropriate way.

189 - United Kingdom



## ENGIE "CANVAS LIFESTYLE" RETIREMENT LIVING

Reducing the dependency on health care services from the home.



An inspirational housing and care choice for older people – empowering people through intelligently designed homes, assistive digital technology, along with energy and lifestyle services, to live in their own homes, for longer in their chosen community.

ENGIE Retirement Living provides a direct B2C route to the energy and services market.

239 - United Kingdom



# Cities



Designing the needs of the cities of tomorrow involves unprecedented proposals: co-construction, partnerships, mobile apps, futuristic urban furniture ...



## DELIVERING THE CAMPUS OF TOMORROW: THE OHIO STATE UNIVERSITY P3 ENERGY MANAGEMENT PROJECT

The Ohio State University (OSU) Public Private Partnership (P3) Energy Management project is a first of its kind, replicable commercial structure by a Public University in the United States.

The Project provided a substantial upfront payment to OSU (\$1.165bn) to allow them to focus on their academic mission. For ENGIE, with exclusive rights to manage the current Utility system, the project delivers stable returns with endless potential to deploy emerging and sustainable technologies over a 50-year term.

**053 - North America - USA**

## L'ÎLOT FRAIS (THE COOL ISLAND)

The project aims to use innovative street furniture to provide cities' outdoor spaces with temporary cooling during heatwaves.

**118 - France Networks - Climespace - France**

## 360° CITY SCAN

Improving complex cities infrastructures and frameworks requires a customized approach. The 360° city scan is a holistic methodology to engage with a city and guide ENGIE's business with them on the basis of their needs and priorities. Since May 2017, more than 30 cities have been mapped by ENGIE worldwide.

**139 - Tractebel GE - Belgium**



## SIMPLY CITY

**Secure a loyal base of Territories-Clients!**

Simply City is a collaborative app that offers a selection of activities and events within the public service, trade, tourism and transportation sector.. Simply City reinforces ENGIE'S local presence in the Territory. By creating a lasting link, Simply City is a fabulous opportunity to secure a loyal base of Territories-Clients or conquer new ones.

**131 - France Networks - EPI - New Caledonia**



# Community

Self-production of green energy awakens the creativity for the development of offers and services adapted to new expectations from our customers.



## WEECHAIN

**Disrupting Green Electricity traceability with blockchain.**

Weechain is an innovative and strategic solution to accelerate our renewable energy business expansion worldwide, a first brick on which other BUs will leverage.

With Weechain, our businesses customers, committed to consuming 100% renewable energy, can track the production of renewable assets they have selected and access daily certificates matching their consumption and these assets' production on the blockchain.

**083 - GEM**



## ENERGY COMMUNITY

**Energy Communities in the Netherlands.**

Consumers are attracted to local initiatives where they know the energy is produced in a sustainable, transparent way. ENGIE offers a platform where local sustainable production (solar/wind) and storage are managed and supplemented by ENGIE's renewable power delivered to consumers under a dual branded Energy Community (powered by ENGIE). So people can join an Energy Community, co-branded by ENGIE. ENGIE remains the retailer.

**102 - Benelux - The Netherlands**





## SUSTAINABILITY AND CULTURE CENTERS IMPLEMENTATION

Aligning ENGIE brand with social causes to be connected to future consumers.

Since 2011, ENGIE Brazil chose to develop Culture Centers in small Brazilian Cities with Low Human Development Index, as a vector of innovative Social Responsibility.

With the 5 existing Centers and 4 more under construction for 2018/2019, we have been an innovative and recognized player nationwide for fostering local development and social transformation: more than 500,000 visitors yearly, 1,500 children enrolled monthly, school evasion lower, crime rate reduction, community qualification, employment & income generation, implementation of photovoltaic energy systems.

398 - Brazil



## A TRUE PARTNERSHIP MODEL

Collaborating and creating communities in Waltham Forest.

The London Borough of Waltham Forest's (LBWF) collaboration with ENGIE is an excellent example of a mutually beneficial partnership, from pre-planning and public consultation, through to after care.

A traditional procurement approach to this project would not work for LBWF - it needed to be collaborative, redefining the commercial model into a focus on outcomes, rather than the conventional monetary outputs.

586 - United Kingdom

## FLEXIGAZELEC

FLEXIGAZELEC encourages energy self-consumption thanks to blockchain technology.

By combining the power of blockchain technology with cogeneration, FLEXIGAZELEC enables energy sales to be secured and individualized while decarbonizing production.

574 - ENGIE Cofely - France



# Smart Buildings

Energy efficiency, air quality, building renovation, Facility Management..., BIMs and digital twins bring an extra performance to our offerings for buildings.

## RINO

**Robotic Indoor Navigation Outlook for Smart Building Operations.**

Competitive advantage by digitizing building's information in Facility Management: a cost-efficient and easy-to-perform digital measurement of an existing building (measures, mapping, technical and room equipment) by 3D Indoor Laser Scan. Robotic trolley RINO delivers centimetre-accurate positions ("point cloud") and high resolution panoramic images of the facility's interior to reduce calculation uncertainty at the initial phase of a FM contract.

**356 - NECST - Germany**



## THE FIRST INDOOR AIR QUALITY SERVICE AVAILABLE FOR LOCAL AUTHORITIES

By 2023, every establishment open to the public in France will have to manage its Indoor Air Quality (IAQ). Aimed at local authorities, this solution responds in an innovative manner both to regulatory requirements and to new public health issues.

**218 - ENGIE Cofely - France**

## A VIRTUAL BUILDING FOR THE QUALIFICATION OF INTELLIGENT CONTROL

A digital avatar of an existing site, the "virtual building" is a simulator that enables the user to visualize the impact of any control system (for heating, air conditioning, air treatment, etc.) in order to optimize its operation.

**271 - ENGIE Cofely - France**

## METEORE

**Optimized solution for the evaluation of the building envelope performance.**

METEORE allows to quantify the thermal characteristics of building envelope and thus give full control of the technical and financial risks associated with a building renovation project to provides a better position for ENGIE in the building renovation market, valued in France at €74m. €55.7m of these are dedicated for building envelope renovation. The cost of an audit with our tools is less than € 1/m<sup>2</sup>.

**451 - ENGIE Lab CRIGEN & ENGIE Cofely - France**

## FLEXIBIM: THE DIGITAL SOLUTION FOR BUILDING LAYOUTS

FlexiBIM combines virtual reality and artificial intelligence, offering the possibility of virtual immersion in the reorganisation project in order to adjust and adapt it in real time spaces to the needs of the staff and comfort of tenants.

**573 - ENGIE Axima - France**

# Clients & Partners



To boost the energy transition, our customers – whether industrial, private, or local authorities – are turning into partners.



## EFF'EASE AND EPC B2T BE

**Financial leveraging of the energy transition.**

EFF'ease and Energy Performance Contracts (EPC) B2T BE are new standardized turnkey solutions for international industry clients or public infrastructures clients, enabling the sale of energy efficiency projects as a service without using ENGIE's CAPEX. The investment amounts covered range from €0.1-0.5m to €5-10m for contract terms of up to 12 years (15 years on request). Standardization of the solution's entire process should accelerate the emergence of mass demand.

**160 - 448 - New Corp & Benelux**



## REMOTETARIFF

In the United Kingdom, electricity tariffs for businesses vary according to a 100kW peak load demand threshold, making pricing complicated and on a case by case basis. RemoteTariff is an innovative software solution that reduces commercial risk and shortens the sales cycle for business customers by delivering quick, easy pricing of electricity tariffs through accurate forecasting.

**259 - United Kingdom**

## ÉNERGIE FUTÉE (SMART ENERGY)

Énergie Futée is a digital platform designed to accompany – from A to Z – the seven million private consumers in France who still use domestic heating oil or propane and who wish to change to more economical, cleaner heating solutions offering greater comfort.

**289 - New Corp & France BtoC - France**

## POSI+ (INTELLIGENT OPTIMAL SUBSCRIBED POWER): CONTROL, ALERT, MONITOR AND INVOICE

With POSI+, ENGIE Networks can limit the use of non-renewable / non-recovered energy in district heating plants during daily peak periods. This new service, offered to licensors and subscribers, is based on optimal subscribed power and encourages energy savings by limiting instantaneous power.

**306 - France Networks**



## Clients & Partners



### boxx

**From commodity delivery to customer intimacy.**

With boxx, we are able to establish a real and valued relationship with our customers, enter the home, and transform energy in the household step by step and hand in hand.

**384 - Benelux - Belgium**



### ENGIE DAYS

ENGIE DAYS / COUNTRY DAYS:  
Innovative tools for strategy & stakeholder engagement  
Lean, simple, and smart in-house solutions to address strategic, branding, and stakeholder management challenges in the Middle East.

**537 - MESCAT - United Arab Emirates**

### CÉKOICECHANTIER

GRDF has to dig up the roads of the Île-de-France Region 15,000 times every year. By using the CéKoiCeChantier mobile application, Local Authorities and residents can obtain real-time information about progress with the works, backed up by photos, in a single click.

**405 - GRDF - France**



### “PACK CHAUDIÈRE TOUT INCLUS”

**An all-Inclusive Boiler Pack: a disruptive heating solution accessible to all... plus energy savings, too!**

An innovation in the field of heating, inspired by new consumption patterns identified in the Automotive and Telecoms sectors, with packaged solutions. It's a simple, turnkey solution with a controlled budget that meets client expectations Energy savings thanks to a selection of high-performance boilers and thermostats, including maintenance with 5 years clients assistance.

**388 - France BtoC**



## AX'CIS

**Optimized post-incident reconstruction solution for industrialists and recommended by insurers.**

AX'CIS (Axima/Consulting/Industries/Solutions) is an engaging service solution, new on the market, for industrialists for the management of post-incident situations, assisting them all along the value chain of our business lines and for turnkey building reconstruction.

**169 - ENGIE Axima - France**

## CREATING VALUE FOR CUSTOMERS BY COORDINATING OUR ACTIONS

Together ENGIE Resources and ENGIE Services worked to deliver two energy efficiency projects for the customer Alsip Minimill, saving hundreds of thousands of dollars on the customer power bills. In so doing, ENGIE extended its relationship with Alsip, signed a new supply contract, and financed the upgrades on the customers electric utility bill, creating value for all parties involved.

**302 - North America - USA**

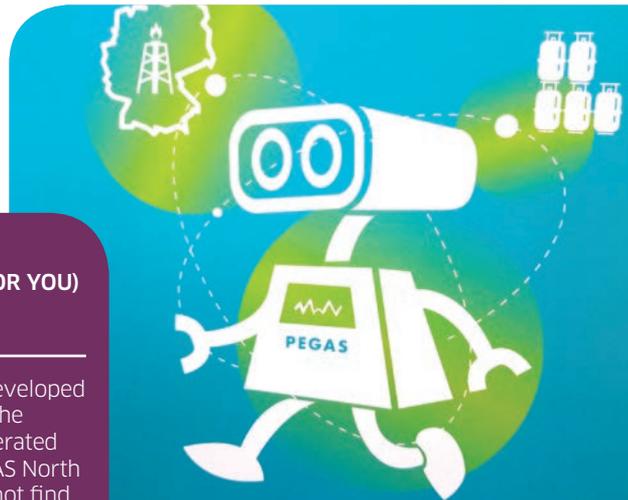
## BETSY

**(BALANCING ENHANCED ON TRANSMISSION SYSTEM FOR YOU)**

**An almost totally successful buzz.**

A new short-term flexibility product for the gas market, developed in partnership with Powernext a robot automating the contractualization of the spread legs. Launched and operated for 2 years on the Within Day/Day Ahead spread on PEGAS North directly on the PEGAS Spot market, it unfortunately did not find its economic balance. However, this innovation has given us the expected recognition and improved our knowledge of our customers, the regulator and the market.

**580 - Storengy - France**





# Circular Economy

Our innovators play the game of circular economy and are brimming with ideas for recycling, reusing parts and materials in production activities.



## RE-USE & RE-POWER

### A second life in all power.

The 1 MW unit for Umicore was purchased in April 2018, creating a cradle2cradle reference.

The 150 kW unit delivered FCR proving the technical viability of the concept. Purchase price evolution has been agreed between ENGIE and the Integrator Connected Energy which proves the economic viability. The supply chain will be further optimized with Renault, Connected Energy and ENGIE resulting in an efficient market product.

**380 - Generation Europe - Belgium**

## NEW TOOLS FOR RECYCLING BOILERS

L'Atelier (The Workshop), a unit of ENGIE Home Services dedicated to the recycling of used boilers (20,000 every year), reconditions spare parts for re-use. By industrializing this process, thanks to a machine developed by the team, handling time has been reduced by 80% and the unit cost of reconditioning the parts has reduced by more than €2.

**200 - France BtoC**

## NOMAD - RELOCATION OF A LARGE GAS TURBINE

A technical and economic performance in thermal generation industry: the relocation of a more recent design 450 ton gas turbine from a closed power plant to reduce lifecycle costs and increase flexibility & performance of the receiving power plant.

**456 - Generation Europe - Belgium**

## TOWARDS A CIRCULAR ECONOMY FOR ASHES

The objective is to make biomass ashes a genuine, constant-quality raw material to be used in environmentally-friendly formulations that can replace expensive fossil products such as activated carbon. Thanks to a local and circular economy, our process offers solutions that are financially efficient and environmentally virtuous.

**509 - ENGIE Cofely - France**

# Green Energy



Hydroelectricity, geothermal or wind power... fluid renewable energies become more efficient thanks to the predictive science.



## OPEN-SNOW

An innovative snow cover estimation to improve hydro-power valorisation.



Based on artificial intelligence and image processing, OPEN-Snow forecasts the flows released by snowmelt. Such information is key in order to optimize hydro-power production in mountainous and cold regions.

OPEN-Snow is testing the prediction of day-ahead snow melt thanks to an improved processing of satellite data and additional images with expected gains ranging from 400 to 500 k€/year.

OPEN-Snow has already provided results challenging other solutions with satellite images as sole entry parameters. Such data are available for free all over the world, making us confident in the development of future services in the field of energy sales.

**137 - France Renewable Energy**



## WELLIFT MONITORING

The WellLift Monitoring system is the control panel for submersible geothermal production pumps located 300 meters underground. Its set-up enables anticipation of the ageing of systems, and the award of additional contractual warranties on equipment.

**382 - France Networks**



## HYDROMAX VLH PAPANOO 1

On the island of Tahiti, the Papanoo Valley has been equipped with new-generation, fish-friendly "Very Low Head" turbines that respect the environment, installed on the tailrace of another turbine. They produce 650,000 KWh per year or 0.4% of additional renewable energy.

**300 - France Networks - Tahiti**

## IF IT'S HOT, IT LEAKS! LEAK DETECTION SYSTEM IN HOT WATER NETWORKS

The water in district heating system pipes can reach 180°C. The introduction of ambient temperature sensors in the network valve chambers, linked to the Sigfox IoT network, enables leaks to be detected rapidly if the temperature rises.

**485 - France Networks**



## YAWPERFORM

**A comprehensive strategy to correct yaw misalignment.**

Wind turbines are not always aligned with the wind (“yaw misalignment”), this causes important losses in production – €8m per year for ENGIE.

YawPerform new end-to-end O&M service offer is based on two technological innovations: a detection algorithm called “Yawscan” based on DARWIN data and a new measurement system that reduces the cost-to-serve of the yaw misalignment correction.

**048 - Tractebel - Laborelec**



## LES ROSES DU NORD

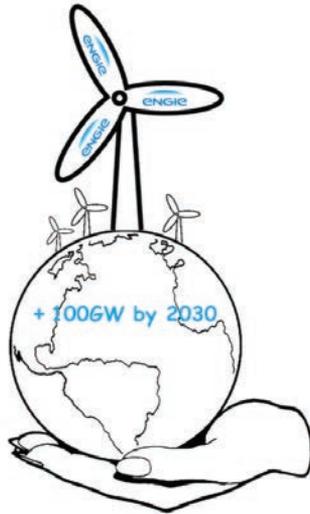
**A digital compass to redirect wind turbines.**

Wind turbines are losing their North reference! An app has thus been developed to help them retrieving it.

A producing wind turbine is collecting energy from the wind. Therefore this energy is not available downstream for other wind turbines in the farm, causing a production deficit that can be linked to respective alignment between turbines.

By correcting the reference measurement it is possible to realign the turbines considering their wake. More than 400 wind turbines of the ENGIE Green fleet have benefited from it, accounting for more than 800 MW.

**199 - France Renewable Energy**



## GOYA PROJECT

**New Business Model to succeed in RES development.**

GOYA is an innovative way to make compatible the Group ambition to scale up in renewables with a new and unavoidable reality of increasing exposure to market prices. GOYA business model creates a competitive advantage by bringing together all our know-how within the renewables value chain.

**095 - NECST - Spain**



## OPTINOISE

**Produce more wind energy but not more noise !**

OptiNoise is a digital solution which optimizes the energy yield of wind plants subject to noise constraints: it finds the best settings for the turbines among hundreds of millions of possibilities, taking their environment into account in a realistic way. OptiNoise potential gain is up to €1 million per year from 2018 for ENGIE Green assets only.

**454 - France Renewable Energy**

## DATAWIND

DataWind is software for predicting windfarms productivity, developed by employees of the Group. Using a workflow process, DataWind brings together around 30 evaluation studies and a 15 years track record to reduce the risk of error and fasten implementation.

**428 - France Renewable Energy**

## BATS ALERTS FOR WIND TURBINES!

To improve the preservation of bats (Chiroptera) living near wind turbines, authorities compel operators to limit their production. Such restrictions are applied on the basis of impact studies. The project developed with Biodiv Wind uses a real-time infra-red detector of bats, enabling the windmills to be slowed or stopped only in the case of a proven risk.

**311 - France Renewable Energy**



# Hydrogen, Biogas & Green Mobility

Vehicle autonomy can be increased with biogas  
and hydrogen to promote green mobility.



## COLLECTIVE TRANSPORT GOES FOR HYDROGEN

Convinced that battery-powered vehicles will not be enough to replace diesel, cities expect zero-emission public transport. GNVERT offers them a production and refueling solution allowing buses to run at competitive costs thanks to renewable hydrogen. In few months, two cities have already chosen this solution. Our solution developed for Pau in France, is a world first “at the parking space” H2 refueling station for bus. As a result of our CNG experience, it automatically refuels buses during the night.

**110 - ENGIE Cofely - France**



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## MOBILE NGV STATION

A mobile NGV (Natural Gas for Vehicules) station on a platform to enable local authorities and transport companies to test the use of NGV and its benefits at full scale.

**284 - GRDF - France**

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## CHARGE AND GO

Managing the charging of a large fleet of electric buses is complicated for operators. Charge and Go is a “plug and play” solution that enables up to 20 buses to be charged simultaneously and up to 40 to be connected. This breakthrough innovation will contribute to the transition towards electrically-powered transportation.

**343 - ENGIE Ineo - France**

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## E-MOBILITY REVOLUTION IN ITALY

Electric mobility is a fast-growing segment in Italy and if electric vehicles don't need petrol, their batteries still need to be charged. Here comes the “Charging as a Service Electric Pack”: an all-in-one proposition of 360° e-mobility services such as rental, maintenance, consumption monitoring, etc. for a fixed monthly fee.

**330 - NECST - Italy**

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## CARGAZ

French law has fixed an objective of 10% of green gas in the grid by 2030. Therefore, producers want to develop injection projects. With CARGAZ, GRDF now has a tool enabling it to calculate and visualize the networks' capacity for injecting biomethane.

**156 - GRDF - France**

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## THE POWER TO MAKE THE GAS GREENER

Renewable energies are intermittent. When more energy is produced than consumed, Méthycentre, the first Power to Gas demonstrator in France coupled with a methanisation unit, comes handy for storing it. Located on a gas storage plant of Storengy it increases carbon efficiency from 55% to more than 95%.

**563 - Storengy - France**

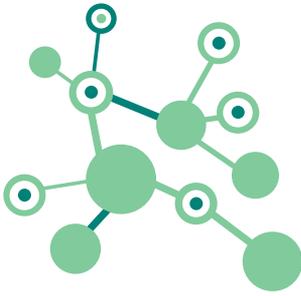
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## PARHYS

PARHyS (Permanent Analyses of Renewable Hydrogen with Sensors) offers affordable, easy to deploy, small, robust and remote nano-sensors to measure during a long period natural hydrogen flow, in order to obtain a long-range series to understand subsurface hydrogen generation and its potential opportunities.

**032 - ENGIE Lab Crigen - Africa, Brazil, France**

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# Grid

The power grid can be balanced with green energies thanks to photovoltaics, storage and the power of robots and DataScience.



## PV GRID BALANCING

**Opening new possibilities for Renewable Energy Assets.**

In a world in which energy is becoming ever cheaper, the value of a reliable grid will become as valuable as the energy itself. Renewable Energy, known to be a stress factor for the grid due to its variability, can actually help to stabilize the grid by providing essential security services, called ancillary services, usually provided by conventional power plants.

In a first-of-its-kind test in Latin America, ENGIE Laborelec collaborated with First Solar to demonstrate, with a 141 MW PV plant in Chile, that Renewable Energies can provide essential ancillary services for grid balancing such as fast frequency regulation and fast voltage regulation. High capacity for increasing grid flexibility by renewable power plants was found.

RES plants will participate in future ancillary markets, generating additional revenues streams and generating a competitive advantage against conventional power plants. This test performed by Laborelec will change the current sector mindset, showing how ENGIE is the leader of the Energy Transition to a fully sustainable generation portfolio.

**072 - Tractebel-Laborelec - Chile**

## RETAIL-INTEGRATED ENERGY STORAGE

Overcoming prohibitive cost barriers for commercial energy storage, ENGIE retail solution develops a sophisticated revenue optimization method that realizes values across seven retail and wholesale services. A first 1.5 MW energy storage system (ESS) project is developed with a manufacturer in New England.

**488 - North America - USA**

## MICROGRID BUSINESS CASE TOOLBOX

Flexible “multifluid” simulation software tools for all stages of microgrid business implementation that bring new capabilities to the existing Group skill set in microgrid as-a-service and decentralized energy management.

**521 - Tractebel Energy Transition - Belgium**

## BASE9 - VIRTUAL SOLAR POWER PLANT

A virtual renewable energy power station consisting of 9 solar power plants in the south of France, equipped with battery storage which will enable the testing of optimal sales strategies for energy, by pooling and grouping assets.

**358 - France Renewable Energy**



## ARKENS - THE FUTURE NETWORKS INTELLIGENCE

**ARKENS optimizes and secures the (de)centralized, digitalized and carbon-free electric networks.**

Regarding the massive emergence of renewable energies with their unexpected and delocated energy flows, the network topology is modified and the spread intelligence becomes crucial. ENGIE Ineo developed intelligent calculators with advanced digital architectures with innovative, stable, and safe algorithms.

**295 - ENGIE Ineo - SCLE - SFE - France**

## FLINT (FLEXIBILITY INTEGRATION)

In Europe, there is an increase of small scale distributed generation units that transform the regulatory power reserve schemes. Currently operational at the European Frequency Containment Reserve (FCR) platform, FLINT is a software/hardware development that activates small distributed flexible third-party assets into a reliable balancing product generating revenues for them.

**340 - Generation Europe - Belgium, The Netherlands**

## DRONES FOR CLEANING HV ELECTRICAL INSULATORS

In order to reduce both costs and risks for agents, a drone solution for cleaning High Voltage Insulators has been developed by ENGIE Lab CRIGEN and ENGIE Fabricom. Tests suggest that a 8,000 HV Tower could be safely cleaned in 3 days and that this solution would slash costs by 30%.

**219 - ENGIE Lab CRIGEN - France**

## THE SIMPLY ENERGY VIRTUAL POWER PLANT (VPPX) PROJECT

The establishment of a 1,200 residential customer Virtual Power Plant in South Australia combined with the development of a "decentralised energy exchange (deX) platform" subsidised by the Australian Government to make renewable energy solutions more accessible and valuable to consumers.

**495 - Asia Pacific - Australia**

## RURAL ELECTRIFICATION PLANNING SUITE

Access to electricity is still limited in some developing countries. This project, implemented in several African countries, presents a new software Suite for planning rural electrification at a region or at a country scale. It capitalizes on decades of experience of Tractebel in Power System and allows new services supported by international donors such as the SE4ALL initiative.

**319 - Tractebel Energy Transition - Africa, Belgium**

## SELF-LEARNING TOOL FOR MINI-GRID OPTIMAL DESIGN

Using a drone image of one village in rural Africa, to automatically generate an optimized and tailored design of a mini-grid taking into account the specificities of the community.

**055 - Africa - France, Belgium**



# Greener Smarter Industry

Carbon footprint and energy performance are key components of the industry of the future. Sustained development efforts combined with good partnerships and ingeniousness offer efficient and cost-effective solutions for us and for our customers.

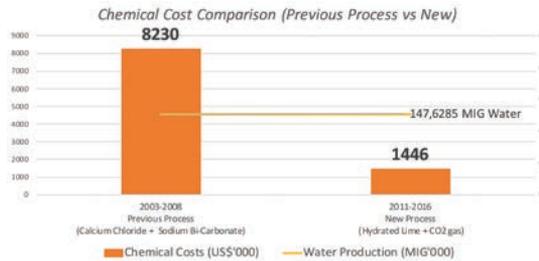


## ECRIN

For an automated control of biomass boilers.

The first solution adapted to the technical and economic context of ENGIE Cofely biomass boilers, which automatically and precisely adjusts the combustion parameters, depending on the type of fuel burned, for greater safety and better energy and environmental performances.

034 - ENGIE Cofely - France



## REDUCING OUR CARBON FOOTPRINT WHILE SAVING COSTS

Modification of the Potabilization of Desalinated Water using CO<sub>2</sub> Recovery from the Desalination Process & Chemical Change.

Significant sustained cost savings and reduction of our carbon footprint with minimal investment have been achieved by adapting the installed equipment on the Umm Al Nar plant to a different technology for Potabilization of the Desalinated Water, by using excess CO<sub>2</sub> from the desalination process located 1.5 km away.

085 - MESCAT - United Arab Emirates

## MAD MAX

Shaft line Brake for large steam turbines.

Did you know that the unavailability cost of our largest turbines are around €1m/day? Large steam turbines take a long time to stop from turning gear speed. This waiting time is a direct loss of availability. The use of Mad Max brake system enables to reduce the braking time from 20 hours down to 30 minutes.

518 - Generation Europe - Belgium





## AUXILIARY INJECTION SYSTEM (AIS)

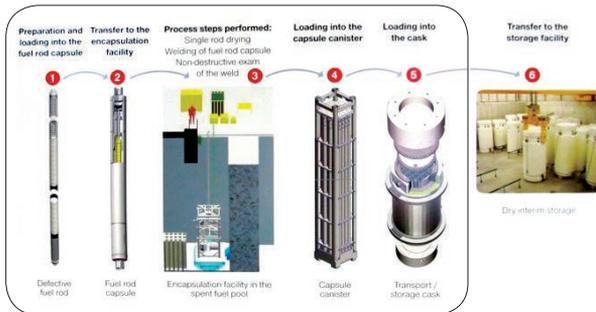
An innovative combustion solution by ENGIE to reduce NO<sub>x</sub> emissions by 40% in Glass Industry.



ENGIE and our partners have invested in the past 10 years to develop innovative Combustion solutions (AIS technologies is one of them) to meet the challenges of the energy transition in the Glass Industry and to anticipate a tighter regulatory threshold for NO<sub>x</sub> and CO<sub>2</sub> emissions.

Auxiliary Injection System (A.I.S.) is the only one primary technology in Glass Industry which permits to reduce the emissions without decreasing the glass quality and energy performances.

150 - GEM



## FREED

Restoration of the leak-tightness of defective nuclear fuel rods.

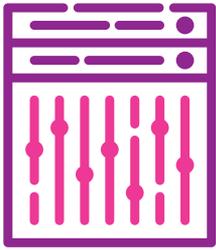
The FREED (Fuel Rod Encapsulation Execution in Doel) project demonstrated the capability of restoring the leak tightness of a defective nuclear fuel rod. This world premiere provides an evacuation route applicable to all seven Belgian nuclear units and eliminates a cost of €10m/year/nuclear unit.

101 - Benelux - Belgium

## RESIDUE STREAM VALORIZATION ON THE COVESTRO COMBINED HEAT & POWER PLANT (CHP)

Improved CO<sub>2</sub> footprint and energy efficiency of the chemical site of Covestro Antwerp (Belgium), by an innovative tailor-made combustor unit which converts Covestro's chemical residue stream into steam at very high efficiencies.

440 - Generation Europe - Belgium



# Data science

By combining different digital technologies, it strengthens our offers for BtoB, BtoT, BtoC customers, and also the efficiency of all our processes.



## AGATHE



**Data intelligence for HVAC maintenance performance.**

Climatic engineering system predictive maintenance helps doing more with less and committing contractually thanks to the perfect blend of technical expertise and data science! With Agathe, the maintenance technician optimizes the moment to change the unit's filters, clean its dampers and batteries, grease and service its motor. Systematic maintenance is no longer required to keep a HVAC unit at peak efficiency.

**945 - ENGIE Axima - France**

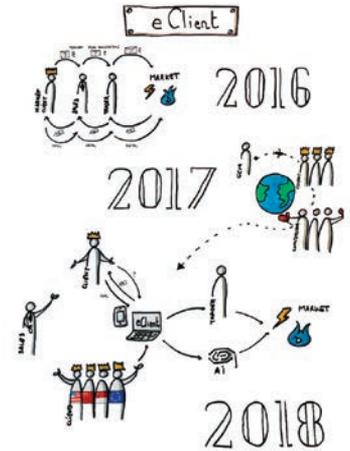


## ENGIE eClient by GEM

**Automate transactions.**

ENGIE eClient simplifies energy markets access for our large industry customers, by combining our trading expertise with automated (IA) transactions to be more competitive and capture an enlarged customer base.

**514 - GEM**



## ASSURED

The energy use by Data Centers worldwide represents a significant amount of the total energy use. Currently, Data Centers energy use is assessed via past experiences and information provided at the designing stage. assuRED is a web application providing climate classification information and the associated Power Usage Effectiveness (PUE) of a data center in a given location for different weather conditions with the aim of promoting key discussion points with clients.

**112 - Tractebel Energy Transition - United Kingdom**

## SAM-E DIGITAL PRICING PLATFORM

The French B2B energy market is particularly competitive for both gas and electricity. To distinguish itself from its competitors, ENGIE is launching "SAM-e", a platform aimed at SMEs. SAM-e improves its clients' digital experience and gives them a role in their own energy purchases by offering them all the advantages of digital technology to construct their own price depending on changes in the market. Launched in December 2017, the first contracts based on SAM-e were signed at the beginning of 2018.

**114 - GEM - France**



## OPEN WIND FARM

The first open data wind farm worldwide is ENGIE's!



We have made publicly available the operating data of La Haute Borne wind farm in France (ENGIE Green).

For a year, this initiative has catalyzed the creation of an ecosystem of partners dedicated to the optimization of the performance of all ENGIE wind turbines worldwide. We have gained new approaches to detect underperformances on our wind turbines and assess their health, which foster the development of Darwin algorithms.

427 - France Renewable Energy



## SOLARMAPPER

Photovoltaic (PV) stations performance analysis.

Considering the development of even bigger PV stations and the decrease of the buyback prices, the installations efficiency has become a major issue.

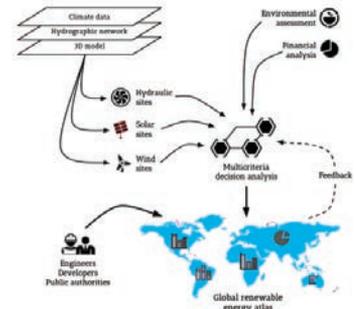
SolarMapper allows the worldwide PV farms owners to improve the performance of the PV panels. With the capacity to conduct the inspection of 13 control points on 16,302 panels in 6 hours instead of 407 hours for a technician, costs can be drastically reduced both in control & maintenance permitting a quick return to optimized production.

550 - ENGIE Ineo - France



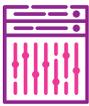
## SHERLOCK

An innovative spatial data analysis tool for identifying renewable energy sites.



Sherlock is a powerful spatial data analysis tool developed by Tractebel for identifying renewable energy sites. Developed since 2014, Sherlock is built on modern spatial analysis technologies and algorithms. Today, it allows a fast and exhaustive identification and classification of small and large hydropower sites at a country level. Constantly improving, it allows us to be proactive towards our current and future clients, and to substantially expand our activity. Sherlock transforms the costly, tedious and uncertain manual inventory process into a fast, exhaustive, semi-automatic and reliable study.

585 - Tractebel



## Data science



### DATASCIENCE AS A SERVICE

**From raw data to exploitable information without heavy investments.**

Allows cities to use data science in order to improve their territory daily functioning. Pilot demonstrators enables to identify solutions for local urban issues.

**589 - ENGIE Ineo - France**

### APPLICATION OF AI AND MACHINE LEARNING TO IMPROVE DATA GOVERNANCE AND QUALITY

Accurate and timely assessment of electric usage data is critical in the retail power business. The solution proposes automated and improved deal analytics flows, leading to more competitive offerings, improved risk determination, higher margins and better pricing strategies.

**531 - North America - USA**

### MASTERMIND

ENGIE offers energy coaching to its BtoC clients, unknown elsewhere on the French market, in order to monitor, compare and understand their day-to-day consumption, thus reducing it and making savings of up to 10%. Nearly 40% of those clients equipped with a smart meter consulted the energy coaching service in 2017.

**047 - France BtoC**

### INDUSTRIAL PROJECTS PROGRESS MONITORING WITH VISUAL TOOLS

When implementing an industrial project, one of the biggest issue is access to information. This project brings together two features often not associated in project management: KPI and images of actual progress. Viewer friendly standardized visual tools and KPIs are then consolidated into dashboards, easy to interpret and circulate.

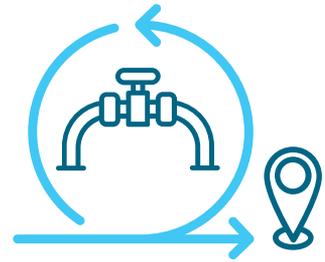
**329 - Brazil**

### RPA IMPROVING OUR OPERATIONAL PERFORMANCE

The implementation of RPA (Robotic Process Automation) technology at ENGIE optimizes the day-to-day operational performance of the Group's employees by automating certain parts of processes and by adapting to many internal, web, and office applications.

**232 - Global Business Support - Belgium, France, Luxembourg**

# Logistics & Procurement



The widespread use of digital and mobile technologies makes it possible to further optimize logistics and supply.

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## TRANSPORT OPTIMIZATION - "IN NIGHT-IN CAR" SERVICES

Optimize logistical process to delivery parts (including spare parts/tools/material) from the centralized warehouse towards the residence of the technician and directly delivered into the vehicle of the technician during the night.

**071 - Global Business Support - Belgium**

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## MAG-AUTO

**Optimize the provision of tools at the heart of our activities**

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MAG AUTO now allows the operational staff to check out their tools in complete autonomy, 24/7, while maintaining their traceability. The goal was to eliminate the time without value added spent on tooling movements for 80 users.

**408 - ENDEL ENGIE - France**

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## ENGIE INEO SHOP

ENGIE Ineo Shop is an e-catalogue with an ergonomic and intuitive user interface providing operational staff with a technical guide to electrical equipment and pointing them towards the best products at the best prices. Savings in the tens of millions of euros are being achieved.

**466 - ENGIE Ineo - France**

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# Health & Safety

In prevention, health & safety, new technologies offer innovative solutions that can save lives.



## SMART HARNESS

**Safety of workers at a height is a high priority for ENGIE.**

At “ENGIE Global Care’s” request we have equipped a safety harness and its lifeline with sensors, to ensure that the harness is correctly adjusted, and that the lanyard is securely attached to an anchor point. A proof of concept (POC) demonstrated that it was possible to equip a harness with pressure, electrical continuity and presence sensors, and that alerts could be broadcast either locally (light signals) or via wireless networks (Bluetooth).

**155 - ENGIE Lab CRIGEN - France**



## MOTION CAPTURE TO PREVENT MSDS

**When technology protects.**

Motion Capture makes it possible to objectively evaluate the efforts on the joints during an intervention using wireless sensors positioned on the operator. Once the binding postures are identified, appropriate preventive measures are proposed. Motion Capture provides easier, faster and more reliable MSDS prevention.

**571 - ENDEL ENGIE - France**



## MINAC

**Towards the replacement of radioactive sources.**

A mobile system, powerful, safer, and unique in the world. On-site X-ray inspection for high-thickness components and reduction of examination time through the use of a miniaturized accelerator to substitute the use of gamma rays with X-rays.

**583 - ENDEL ENGIE - France**



## SAVEC

An innovative solution for our global safety solutions.

SAVEC is an automatic and controlled vehicle stopping solution for any vehicle weighting less than 10 tons. The automatically deployed net will roll around the front part of the chassis and will stop the vehicle without destroying it. Solution marketable by all the Group entities in France and abroad, it offers an innovative solution four our global safety solutions.

**174 - ENGIE Ineo - France**

## CARE

What's the value of using drones for safe inspections ?

The "CARE" project aims to develop visual inspections of our asset equipment like boilers and piping by UAVs (drones) reducing risk for personal injury to ZERO. This technique increases safety by replacing humans with drones in activities where the injury risk is high and allows knowledge sharing throughout the Group, thus finding new ways of working inspired by our Life Saving Rules. In 5 years, there have been approximately 50 flights over 14 power plants resulting in a reduction of the maintenance period by 4 days on average.

**470 - Generation Europe**

## SHUNT WITH INTEGRATED SINGLE-POLE DETECTOR

The shunt with integrated single-pole detector warns and protects a technician working on a rising gas line of an electrical risk without requiring additional technical activities.

**012 - GRDF - France**

## INTERNATIONAL FM BENCHMARK TOOLSET

An international benchmark toolset to support ENGIE Facility Management services across the world, encourage cooperation within the Group and give a strategic and global vision of market prices.

**455 - United Kingdom**

## SAFETY AND INNOVATION AS LEVERS OF PERFORMANCE WITH CONTRACTORS

The solution consists in developing dialogue and commitment around four main aspects of health, safety and innovation with all the Business Unit's external contractor partners in mainland France.

**529 - France Networks**



# Serious Game

To develop the digital uses, to apprehend the new concepts, to stimulate cooperations, nothing is better than gaming!



## STORENPLAY

The Storage Game.

Storenplay is the Storengy board game: it explains and popularizes its activities in a fun and educational manner. This game collaboratively simulates the functioning of an underground storage facility, integrating the different constraints and hazards inherent in an industrial activity.

309 - Storengy - France



## LA TECHNIQUE DU GEEK

The digital revolution is not rocket science!

*La Technique du Geek* is the collaborative community that provides and disseminates excellence and know-how on the new digital tools to the operational BU, and all with a unique and offbeat tone that creates commitment! A way to accompany all employees in the digital revolution, notwithstanding their profiles (to limit the stress of change and promote well-being at work).

433 - ENGIE Axima - France



## ENIGM4, A DIGITAL SERIOUS GAME TO FOSTER INTER-ENTITY COLLABORATION WITHIN BU TRACTEBEL.

Enigm4 is a virtual team building in the form of an online collaborative game that can be played by a team of up to five players anywhere in the world, promoting the core values of Tractebel's Golden Rules.

560 - Tractebel



## DC VIRTUAL ONE

International Training Tool for Datacenters Management

Datacenters are at the core of digital and energy transitions. ENGIE is a key player in DC operational management and delivers €400m yearly turnover in 21 countries. ENGIE Cofely developed joint training courses for internal operator based on an innovative tool that simulates in 3D operational conditions: DC Virtual One.

This serious game is used by 230 employees in 8 countries. Supported by the ENGIE Datacenter Centre d'Excellence, it is contributing to the progressive development of this international activity.

301 - ENGIE Cofely

# New Ways of Work



Experimentation, collaboration, peer-recognition foster a professional dynamic that links people through interactions both digital and warmly human.



## EMERGING TALENTS PROGRAM

**Driving innovation and customer value creation bottom-up.**

Our Emerging Talents program is a self-nomination program, based on self-driven development and discretionary effort, for all our employees who want to get “on the radar”. Driving innovation and customer value creation bottom-up is the core concept of our program.

We created a unique Talent program – inspired by our ENGIE “By People For People” baseline – opened to all our employees; everyone – likely to have potential and add extra value to the business – is welcome to self-nominate (unlike most talent programs where employees are nominated by management).

**038 - APAC - Australia**

## NEW TECHNOLOGY TO MAKE TRAINEES' EXPERIENCE MORE FULFILLING

Using new technologies such as drones and robots to arouse interest, capture attention, encourage memorizing and learning.

**377 - GRDF - France**

## U.CAMP

Bring together hundreds of colleagues (from different countries, professions, business units and jobs) on a temporary campus for one week, providing a learning experience that is innovative, collaborative and strengthens the feeling of belonging to the Group.

**061 - New Corp - France, Belgium, Brazil, Peru, Singapore, USA**

## KUDOS

Kudos is a digital platform accessed by all employees to provide open recognition and feedback to one another while highlighting shared values across the organization.

**167 - North America - USA**

## FIDI

Fidi is a “tailor-made” mobile application created to promote a culture of transversal collaboration and performance by enabling employees to provide instant feedback, instant feedforward and to reward colleagues who are acting according to the new ENGIE Leadership Model. 1,000 users are expected by the end of 2018.

**296 - LATAM - Chile**



# Fab & Labs

ENGIE renews its approach to ecosystems to better work with start-ups, develop digital uses, transfer and capitalize on its knowledge, bring its laboratories closer to the needs of the field, and vice versa.

Here are some innovations resulting from this approach.



## ENGIE FACTORY

**A compass towards future sustainable business.**

ENGIE Factory is the first multi-country company builder in the LATAM energy sector, that has developed infrastructure and processes to attract talent and accelerate startups in countries with immature innovation ecosystems.

It's a hybrid platform of early stage corporate venture capital and company builder. In 1.5 years ENGIE Factory has created nine startups, killed one, and took minority participations in three more. Total sales is increasing at an average of 22% per month.

**245 - LATAM**



## ENIGMA : ENGIE INNOVATION GLOBAL MARKETS

ENIGMa is the first Innovathon organized by GEM with freelancers and seven B2B clients to ideate and co-innovate, leading an increase in their volume of deals with ENGIE.

**438 - GEM - France**

## DBD - DIGITAL BUSINESS DEVELOPMENT

Thanks to the customer and consumption data mining solution C3NTINEL, DBD dramatically shortens business opportunity identification of valuable solar projects and decentralised, decarbonised onsite generation projects from 6-12 months to 1 month.

**559 - United Kingdom**

## ROXY

Imagine that robots for the industry are easy to use, robots that are not only available for the largest producers, but for the entire production industry; ROXY by ENGIE is the disruptive robotics software platform to operate industrial robotics that makes this reality!

**018 - Benelux - Belgium,  
The Netherlands**



## COLLABORATIVE MARKETPLACE WITH ENGIE MEXICO AND ENGIE FACTORY'S STARTUPS

An easy, scalable and replicable Marketplace between ENGIE México and two of ENGIE Factory's specialized startups, focused in enhancing the overall customer experience of our domestic clients.



ENGIE Marketplace will not be a mere transactional e-commerce; its goal is to enhance the customer experience by delivering a 360° shopping process and a greater perception of service & care. This project is made possible by working with two ENGIE Factory startups: by outsourcing development processes with both startups, the risk for ENGIE has been lessened and the delivery times will be excelled by the agility in their nature (flexibility & know how).

596 - LATAM

## DIGIPLACE : AN INNER-SOURCE PLATFORM REDUCING YOUR TIME TO MARKET

Advocating for an inner-source and reuse practice, Digiplace is a web platform for all ENGIE employees. It showcases digital B2B/B2C projects with their corresponding toolbox of business winning recipes, design and development tools along with learnings from the user community!

555 - Global Business Support - France

## GAS STOPPLES

In Turkey, gas saddles were not equipped with a stopple device before 2009. New pipings are now equipped with it but old service lines are not. Thanks to ENGIE patented gas stopples, the retrofitting of Turkey's gas service lines without stopples can be done proactively. 10,000 stopples will be installed in 2018 alone.

261 - MESCAT - Turkey



## UNIVERSAL VALVE STOP

Success Story triggered by a frugal innovation resulting from the GRDF GazLab deployment.

The Universal Valve Stop: a patented innovation blocking the movement of a valve, thus preventing industrial safety risks related to inappropriate valve use. The "rebound" project is the development this "universal" solution enabling blocking of all types of valves, in the wake of the 2016 3D printed Frugal Innovation Prize-Winner.

471 - GRDF

# NOMINEES INDEX



## SUCCESS STORY

301  
DC Virtual One //p.30

398  
Sustainability  
and culture centers  
implementation //p.9

470  
CARE //p.29

471  
Universal Valve Stop  
//p.33



## BEST FAILED IDEA

580  
BETSY (Balancing Enhanced  
on Transmission System  
for You) //p.13



## OPERATING PERFORMANCE

034  
ECRIN //p.22

048  
YawPerform //p.16

072  
PV Grid balancing //p.20

085  
Reducing our carbon footprint  
while saving costs //p.22

101  
FREED //p.23

137  
OPEN-Snow //p.15

199  
Les Roses du Nord //p.16

356  
RINO //p.10

382  
WellLift Monitoring //p.15

408  
MAG-AUTO //p.27

451  
METEORE //p.10

454  
OptiNoise //p.17

518  
Mad Max //p.22



## NEW BUSINESS MODEL

053  
Delivering the campus  
of tomorrow : Ohio State  
University P3 Energy  
Management project //p.7

083  
Weechain //p.8

131  
SIMPLY CITY //p.7

174  
SAVEC //p.29

182  
Ôgénie //p.6

189  
TouchPoint //p.6

239  
ENGIE "Canvas Lifestyle"  
Retirement Living //p.6

295  
ARKENS - The Future  
Networks Intelligence //p.21

380  
Re-Use & Re-Power //p.14

589  
DataScience As A Service  
//p.26



## BUSINESS DEVELOPMENT

- 095  
GOYA Project // p.17
- 110  
Collective transport goes for hydrogen // p.18
- 150  
Auxiliary Injection System (AIS) // p.23
- 440  
Residue stream valorization on the covestro combined heat & power plant (CHP) // p.23
- 583  
MINAC // p.28
- 585  
Sherlock // p.25
- 945  
AGATHE // p.24



## CUSTOMER RELATIONSHIP

- 102  
Energy Community // p.8
- 160-448  
EFF'EASE AND EPC B2T BE // p.11
- 169  
AX'CIS // p.13
- 384  
boxx // p.12
- 388  
"Pack Chaudière Tout Inclus" // p.12
- 514  
ENGIE eClient by GEM // p.24
- 550  
SolarMapper // p.25
- 586  
Waltham Forest & ENGIE A true partnership model // p.9
- 596  
Collaborative Marketplace with ENGIE Mexico and ENGIE Factory's startups // p.33



## MANAGERIAL EXCELLENCE

- 038  
"Emerging Talents" program // p.31
- 155  
Smart harness // p.28
- 245  
ENGIE Factory // p.32
- 309  
Storenplay // p.30
- 427  
Open Wind Farm // p.25
- 433  
La Technique du Geek // p.30
- 571  
Motion capture to prevent MSDS // p.28

# GENERAL INDEX



## Silver Economy

PAGE 6

182

### Ôgénie // p.6

Benoît DESCOQS, Laetitia KOUADRIA, Wafa MRHIR

239

### ENGIE "Canvas Lifestyle" Retirement Living // p.6

Paula BROADBENT, Yvette DELAHUNT, Moya JONES, Kate PHIPPS

189

### TouchPoint // p.6

John MCKENZIE, Katy LONGHURST, Larence DE CAINES, Mike COLLINS



## Cities

PAGE 7

053

### Delivering the campus of tomorrow : Ohio State University P3 Energy Management project // p.7

John GIVENS, Santanu KHAN, Jean-Baptiste DUBREUIL, Anderson LEE, Olivier RACLE

118

### L'îlot frais (the cool island) // p.7

Vincent DARDET, Maxime BOUCAUD, Olivier TURC

131

### SIMPLY CITY // p.7

Thierry ROUSSEL, Michel NGUYEN, Géraldine POTIN, Paul BEZARD FALGAS, Christophe ROGER

139

### 360° City Scan // p.7

Bram VANDENBOOM, Géraldine TONDREAU, Anneleen DHONDT, Isabel TEJERO FERNANDEZ, Jean-Philippe BOLLET



## Community

PAGE 8

083

### Weechain // p.8

Thierry MATHIEU, Sophie DUFAUX, Nicolas LERICHE, Julien BOURDETTE, Aurélie PRADEAU

102

### Energy Community // p.8

Boudewijn BOEVE, Arjen LOOS, Erwin BOERS, Rogier BREMER

398

### Sustainability and culture centers implementation // p.9

JULIO LUNARDI, José MAGRI, Luciane PEDRO, Eduardo VIEIRA

574

### FLEXIGAZELEC // p.9

Fabien FERRARIS, Joseph COUDERT, Nicolas BLANDIN, Alexis TAWFIK

586

### Waltham Forest & ENGIE A true partnership model // p.9

Melissa CROLEY, Rob YOUNG



## Smart Buildings

PAGE 10

218

### The first Indoor Air Quality service available for local authorities // p.10

Priscilla PETINGA, Sandrine VILON, Christophe PASCUAL, Maria-Paula SANCHEZ

271

### A virtual building for the qualification of intelligent control // p.10

Mariane GOCZKOWSKI, Mouchira LABIDI

356

### RINO // p.10

Andreas KNUPFER, Frank HOEPNER, Karsten SCHOLL, Kathrin BRUNN

451

### METEORE // p.10

Valentin GAVAN, Maxence BUREAU, Julie COUSIN, Victoria BOGDANOVA, Sophie THEVENON

573

### FlexiBIM // p.10

Christelle DUVERGER, Kees BOEKEL, Benjamin LEPINEUX



## Clients & partners

PAGE 11

160 - 448

### EFF'EASE AND EPC B2T BE //p.11

Marie GERARD, Pierre JOSSIER, Carine LAVERGNE, Sandrine LEMPERRIERE, Geert MAGERMAN, Gregory TILTE, Annelies LEPLA

169

### AX' CIS //p.13

Frédéric FONTAINE, Bruno GILLES, Nadine CHAUDIER

259

### RemoteTariff //p.11

Jonathan STACEY, Paul O'CONNOR, Joseph MAYCOCK

289

### Énergie Futée (Smart Energy) //p.11

Benoît DENEAU, Maxime DELILLE

302

### Creating value for customers by coordinating our actions //p.13

Mike LISKEY, Ryan BLAIR, Jeff NIELAND, JD BURROWS, Sean FULLER

306

### POSI+: control, alert, monitor and invoice //p.11

Cyril GUESTIN, Corentin ALLAIN, Mathieu BONNET, Pierrick HAMARD, Alexandre GUERIN

384

### boxx //p.12

Jeroen VAN DAAL, Denis VAN BOECKEL, Peter SEVERS, Steven GEERINCK, Christophe ROCHEZ

388

### "Pack Chaudière Tout Inclus" //p.12

Laura JACQUEMONT, Elisabeth TROCARD, Fabien MARGUERON, David GRAVIER

405

### CéKoiCeChantier //p.12

Emmanuel KERMARREC, Pierre-Antoine GUILLOU, Isabelle HAROUNE, Christopher GOUSSARD

537

### ENGIE DAYS //p.12

Florence FONTANI, Majda SOUSSI, Stephan GOBERT, Brigitte DIERCKX, Laure ALAZET

580

### BETSY //p.13

Raynald DUTHOY, Blandine BATICLE, Marie DEVILLERS, Nicolas BERNASCONI



## Circular Economy

PAGE 14

380

### Re-Use & Re-Power //p.14

Marcel DIDDEN, Arie KLEIN HESSELINK, Mark BAILEY, Peter HEIJNEN, Marcel GRIEP

200

### New tools for recycling boilers //p.14

Thierry RANDOUX, Pascal TARLET, Ronald PAILLOTIN, Aurélien BREMEC

456

### NOMAD - Relocation of a large gas turbine //p.14

Nick LEMMENS, Luc KERREMANS, Rudi CORDENOS, Philippe GELISSEN, Frank VAN DEN SPIEGEL

509

### Towards a circular economy for ashes //p.14

Christophe PASCUAL, Michel BOYADJIAN, Pierre RENNESSON, Charly GERMAIN



## Green Energy

PAGE 15

048

### YawPerform //p.16

Bruno DECLERCQ, Guillaume TERRIS, Stephane BRONCKERS, Nicolas QUIEVY

095

### GOYA Project //p.17

Loreto ORDÓÑEZ, Paula DEL CASTILLO, Raúl RODRÍGUEZ, Daniel FERNÁNDEZ, Ignacio REY, Montserrat HERVÁS

137

**OPEN-Snow //p.15**

François-Xavier CIERCO,  
Ana DIAZ-SANCHEZ, Alexandre  
FALGON, Guillaume BONTRON,  
Sébastien LEGRAND

199

**Les Roses du Nord //p.16**

Thomas DUC, Sophie GUIGNARD,  
Lorraine ROCQUIN, Arthur PETIT

300

**Hydromax VLH  
Papeno 1 //p.15**

Rébecca WONG FAT DERVAL,  
Yann WOLFF, Moana GUILLOUX

311

**Bats alerts for wind turbines!  
//p.17**

Cedric BARBARY, Damien GIRARD,  
Daniel MONNIER, Henri-Pierre ROCHE

382

**Wellift Monitoring //p.15**

Damien OUTREQUIN, Nicolas  
MONNEYRON, Thierry VIALA,  
Nicolas BLANES, Alain DEBRUYNE

428

**DataWind //p.17**

Benoît BUFFARD, Aude PERRIN,  
Philippe ALEXANDRE, Aurélien  
CORVAZIER, Benjamin RIPOLL

454

**OptiNoise //p.17**

Simon COURRET, Guillaume ERBS,  
Ibrahim ABADA, Arthur PETIT,  
Colin LE BOURDAT

485

**If it's hot, it leaks! Leak  
detection system in hot water  
networks //p.15**

Vivien JAN, David MAILLET,  
Yves ARNAUD



**Hydrogen, Biogas  
& Green Mobility**

PAGE 18

032

**PARHy //p.19**

Diane DEFRENNE, Angelique  
D'AGOSTINO, Julien WERLY, Cleuton  
PACHECO, Emmanuel DELFOSSE

110

**Collective transport  
goes for hydrogen // p.18**

Raphaël GOMMENDY, Anne-Cécile  
BONNEVILLE, Philippe VAN DEVEN

156

**CARGAZ //p.19**

Emilie MALLARD,  
Maxence DELVINQUIER,  
Tibaut FOTSO, Stéphanie LEGRAND,  
Farahe M'RAIHI BERLKABIR

284

**Mobile NGV station //p.19**

Lucas TRUNTZER,  
Patrick FAUCOULANCHE

330

**E-mobility revolution  
in Italy //p.19**

Marco BARTOLINI, Hubert  
DUSAUSOY, Mario CARAVAGGI,  
Guillermo FUMANAL,  
Edoardo DANESI

343

**Charge and Go //p.19**

Nicolas CLERC, Laurent  
VILLENEUVE, Fabrice RONCIN,  
William LEFORT

563

**The power to make the gas  
greener //p.19**

Marion MANHES, Muriel SCHIBLER,  
Frederic GHYS, Jean-Claude PHILIPPE



**Grid**

PAGE 20

055

**Self-learning tool  
for mini-grid optimal design  
//p.21**

Lea TATRY, Esteban Manuel PEREZ  
GONZALEZ, Irene CALVÉ SABORIT,  
Mehdi OTHMANI, Ibrahim ABADA

072

**PV Grid balancing //p.20**

Sebastian FALKENBERG,  
Sebastian MICHELS

219

**Drones for cleaning HV  
electrical insulators //p.21**

Erwin GEORGE, David BERNELLE,  
Didier JANSSENS-PETIT

295

**ARKENS - The Future  
Networks Intelligence //p.21**

Jean-Philippe LE GOFF, Benoît  
CAMUS, Christophe FERRARO,  
François MASSARD,  
Mathieu PEYRON

319

**Rural electrification planning suite // p.21**

Sébastien LEYDER, Vincent LAMBILLON, Samuel WATCHUENG, Tanguy PORT

340

**FLINT // p.21**

Marcel DIDDEN, Albert KRAMP, Mark APPELS, Gaetan DECKERS, Jeroen HUMMEL

358

**baSe9 - Solar Virtual Power Plant // p.20**

Marc-Antoine COLLARDEAU, Philippe ALEXANDRE, Lina RUIZ GOMEZ

488

**Retail-integrated energy storage // p.20**

Daniel VICKERY, Ken LACKEY, Kyle GIBSON

495

**The Simply Energy virtual power plant (VPPX) project // p.21**

Greg TRAINOR, Carly WISHART, David MURPHY, Campbell HUTCHISON, Lam PHAN, Wayne RAU

521

**Microgrid business case toolbox // p.20**

Vincenzo GIORDANO, Francois-Xavier BOUCHEZ, Siebert BRESSINCK, Mathieu LESSINNES



**Greener Smarter Industry**

PAGE 22

034

**ECRIN // p.22**

Christophe PASCUAL

085

**Reducing our carbon footprint while saving costs // p.22**

Zahinuddin KIDWAI, P.V.R. MURTHY, A.C. NANDY, Virgilio CARAMUJO

101

**FREED // p.23**

Inge SULLS, Wim VAN ROMPAY, Luc JANSSEN, Gert DE WEERTD

150

**Auxiliary Injection System (AIS) // p.23**

Thierry GINIOUX, Philippe BUCHET, Isabelle ALLIAT, Jean Christophe TOUREL, Olivier SOLELHAC

440

**Residue stream valorization on the Covestro combined heat & power plant (CHP) // p.23**

Willem VANDAMME, Soufiane ZIZAOUI, Cedric VOLCKAERT, Carl VAN HONACKER

518

**Mad Max // p.22**

Bert MENSCHAERT, Renaud LAMBLIN TIHANGE, Renaud DESCLEE EMS



**Data science**

PAGE 24

047

**Mastermind // p.26**

Simon CASCARANO, Salma JOUSSEMENT, Gerard GUINAMAND, Caroline FISCHER

112

**assURED // p.24**

Robin SMITH, Julien De CHARENTENAY

114

**SAM-e digital pricing platform // p.24**

Franck CACHERO, Mathilde FERREIRA, Florence DUFOUR, Régis BOUCHE, Pierre-Henri PELLETREAU

232

**RPA improving our operational performance // p.26**

Michael GIRSZYN, Khadija PHILIPPE, Séverinne DUHAMEL

329

**Industrial projects progress monitoring with visual tools // p.26**

Guilherme MIRANDA MORESCO, Leandro MARCOS MAGRI, Murilo BOSELLI, Denilson RUZENE, Mauricio TREVISAN

427

**Open Wind Farm // p.25**

Paul PONCET, Raphael GENIN, Sébastien GAUTHIER, Nicolas GIRARD

514

**ENGIE eClient by GEM //p.24**

Igal MADAR, Reda MIKOU, Jonathan MANSENCAL, Christophe SOULIER

550

**SolarMapper //p.25**

Laurent RENAUDON

585

**Sherlock //p.25**

Hadrien RICCA, Boris JIMENEZ, Yanis OUKID, Nicolas TROLONGE

531

**Application of AI and machine learning to improve data governance and quality //p.26**

Cengizhan YENERIM, Gilbert FLORES, Jeff DORSEY, Jessica WRIGHT, Vasu KOLLA

589

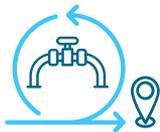
**DataScience As A Service //p.26**

Grégory WOLOWIEC, Laurent PITEK, Olivier LEGRAVERAND, Morgan KERDONCUFF, Julien TABARY, Philippe CALVEZ, Ajinkya CHANDRAYAN

945

**AGATHE //p.24**

Céline MALLET, Fabien ESCRIHUELA, Éric DESPATURES, Marc LEJEUNE



**Logistics & Procurement**

PAGE 27

071

**Transport optimization - "IN NIGHT-IN CAR" Services //p.27**

Joost LECOMPTE, Jochen DE BACKER, Ludwig ANTHONISSEN, Sylvie TULKENS

408

**MAG-AUTO //p.27**

Arthur DANTIER, Philippe DEPIERRE, Dominique BODIN, René DE LISLE

466

**ENGIE Ineo Shop //p.27**

Thierry VITO, Sébastien CADET, Clément GONCALVES, Violetta MARTIN



**Health & Safety**

PAGE 28

012

**Shunt with integrated single-pole detector //p.29**

Thierry ROCHAT

155

**SMART HARNESS //p.28**

Florence LIVREAU, Pierre BAUMANN, Cédric ROLLAND

174

**SAVEC //p.29**

Frédéric GINESTE, Michel TESSOT, Christian SOUDIN, Pierre SIVIRAGOL

455

**International FM benchmark toolset //p.29**

Jacques LE VAN

470

**CARE //p.29**

Marc EYCKMANS, Joris VAN PARIJS, Michel TURCHET, Tomas VAN ACKER, Florence STAHL

529

**Safety and innovation as levers of performance with contractors //p.29**

Abderrazak MOUSSADEK, Jean LEVEZAC, Emmanuelle PACITTO, Karim OUCHIKH

571

**Motion Capture to prevent MSDs //p.28**

Cyrielle BLONDÉ

583

**MINAC //p.28**

Lionel WOISEL, Arnaud PETIT



**Serious Game**

PAGE 30

301

**DC Virtual One //p.30**

Luis MARTINS, Bertrand LADMIRAL, Dominique SCHABAILLIE, Jacques TILQUIN, Alexandre CULAND

309

**Storenplay // p.30**

Pierre DUDIT, Nicolas MONTMIREL,  
Josiane LOURDAULT,  
Delphine LEDOUX

433

**La Technique du Geek // p.30**

Sylvain ROY, Henri BOCHEREAU

560

**ENIGM4 // p.30**

Isabelle ANDRE, Lise VANCUTSEM,  
Philippe DE SCHOUTHEETE, Yuliya  
BAYBORODINA, Alexander LESSER

167

**Kudos // p.31**

Joey MORELAND, Jeff DORSEY, Doug  
STEIN, Shirley ESPEY, Ginger GUICE

296

**Fidi // p.31**

Monica DELGADO, Juan Pablo ARCE,  
Francisca ARRIAGADA

377

**New technology to make  
trainees' experience  
more fulfilling // p.31**

Laurent LEVASSEUR,  
Ronan LEROUX, Yoann TRIBODET

Semih YILDIRIM,  
FIRATERBAYRAKTAR,  
TAYFUNŞAHİNER,  
FURKANKARAKOÇ,  
FAHRİKAZANCI

438

**ENIGMa: ENGIE Innovathon  
Global Markets // p.32**

Razvan DORDEA, Adrien KOENIG,  
Arnaud SANCHEZ, Livio DE NICOLA

471

**Universal Valve Stop // p.33**

Yvan TRIVINO, Alain JOYE,  
Jean-Michel SPRAUL, Romuald  
CARRE, Philippe FRONTERO

555

**Digiplace: an inner-source  
platform reducing your time  
to market // p.33**

Pierre-Henri PELLETTREAU,  
Charline GRENET, Duc DOAN,  
Gabriele RAINERI, Birger DE RESE

559

**DBD - Digital Business  
Development // p.32**

Joshua DUNN, Tony CRANE,  
Arthur QUINTARD, Jacob SNELLINGS,  
Chris THOMAS

596

**Collaborative Marketplace  
with ENGIE Mexico and ENGIE  
Factory's startups // p.33**

Pablo MARTÍNEZ, Miguel Angel  
MARTIN HERRERO, Arturo Johnatan  
HERNANDEZ ROSAS



**New Ways  
of Work**

PAGE 31

038

**“Emerging Talents” program  
// p.31**

Inge VAN DEN BOSSCHE, & starring :  
Jack ANDERSON-MCDONALD,  
Cate BARLOW, Heather BELL,  
Nick FINCH, Brendan FLYNN,  
Purnima GADIYAR,  
Andrew GODFREY, Nick KENNEDY,  
Ellen MCLORINAN, Mai NGUYEN,  
Lam PHAN, David RINGO,  
Viraj SALVI, Kashif SIDDIQUE,  
Devrim VAN DIJK, Guillaume  
VERCAUTEREN, Kimberly ZHA

061

**U.camp // p.31**

Diane De VIRON, Elisabeth AUBERT,  
Stéphanie SAGUEZ, Lucinda  
RATINHO, Renata TAVARES



**Fab & Labs**

PAGE 32

18

**ROXY // p.33**

Maarten ESSERS,  
Robbert CORNELISSEN,  
Sietse WIJNSTRA, Sven ROOKS

245

**ENGIE Factory // p.32**

Lodewijk VERDEYEN,  
Jacques DE T'SERCLAES,  
Dimitri LEBRUN, Ignacio URZUA,  
Eduardo GUZMAN

261

**Gas stopples // p.33**

Pierre MARZIN, Erdal KOŞEMEN,  
Ismail BİLGİN, Mehmet ÖZ,  
İsa TOLGAULUTAŞ, FATİHYAKŞI,



# Innovation at ENGIE

A major utility for over 150 years, ENGIE has set itself the goal of becoming Europe's leader in energy transition, in particular by focusing on innovation. This drive is at the core of the Group's efforts to transform good ideas into operational services for the benefit of its customers. The Group's internal organization also evolved to boost entrepreneurial creativity. New tools and processes have also been developed so that innovation can contribute sustainably to the Group's growth.

**150,000**

**EMPLOYEES**  
WORLDWIDE,  
GENERATING SALES  
REVENUE OF **€65BN**  
IN 2017.

**17**

**INVESTMENTS MADE  
BY ENGIE NEW  
VENTURES,  
TOTALING €65M.**

A network of

**50**

**innovation managers**  
Group-wide.

**14,500**

**EMPLOYEES,  
MEMBERS OF  
INNOV@ENGIE,**

the in-house  
innovation social  
network.

**530**

**innovation proposals**  
submitted  
by employees  
for the 2018  
“Innovation Trophies”.

More than

**80**

**calls for projects launched on ENGIE  
Innovation**, the Group’s open innovation  
platform, which received **2,500 applications**  
and picked **127 winners**.

**€ 165 m**

of “ENGIE New Ventures”  
corporate venture capital  
fund endowments.



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