



# ENERGY EFFICIENCY

THE FIRST FUEL FOR EU ENERGY TRANSITION

Energy management solutions: successful projects  
in Europe



*October 2025*

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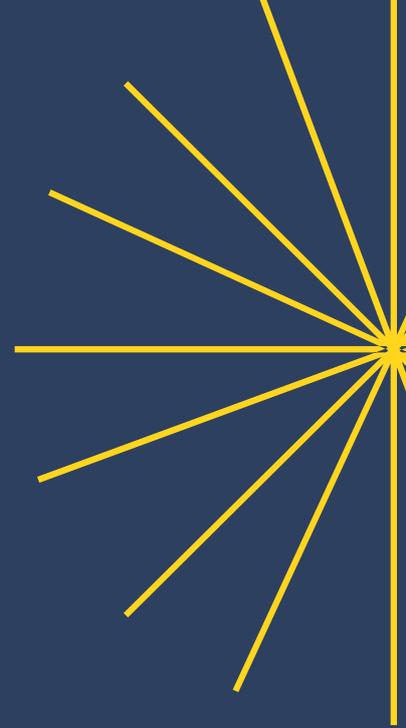
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# ENERGY EFFICIENCY FOR EUROPE

— The voice of ESCOs —

Energy Efficiency for Europe\* represents Energy Service Companies (ESCOs) and their national associations across the EU.

Our members gather more than 100 000 professionals committed to designing and implementing energy efficiency measures in public and private buildings and industrial facilities.

Several Energy Efficiency for Europe members are also engaged in the efficient operation of district heating and cooling (DHC) networks.

Energy management solutions they provide contribute to deliver on EU climate and energy targets through CO<sub>2</sub> and energy savings.

This document illustrates some of our members' key achievements in various sectors and countries.

# Key Concepts



**Energy management solutions** combine actions and technologies designed to optimise energy consumption, minimise energy loss, and enhance overall efficiency across the whole value chain of both buildings and industry sectors. They include monitoring energy consumption, operating energy systems and maintaining them, and, in addition, providing energy coaching to educate consumers. From building automation systems that regulate heating & cooling to advanced metering infrastructure that provides real-time energy data, energy management solutions offer a comprehensive approach to sustainability and cost reduction.

**Energy Performance Contracts (EnPCs)** are contractual agreements increasingly used to implement energy management solutions. They involve outsourcing of energy efficiency projects to an ESCO (Energy Service Companies), with guaranteed energy and, for some projects, CO<sub>2</sub> performance over the whole term of the contract. The works and services provided by the ESCO are paid for in relation to the agreed performance objectives and savings. EnPCs may include in the same contractual instrument all of the following project-related features: investments, operation and energy management, financing arrangement, needed measures, and contractually guaranteed actual energy performance over time.

**Efficient heating and cooling** is a key component of energy efficiency efforts, ensuring that thermal energy is produced and used as efficiently as possible. One key approach is **DHC (District Heating and Cooling)**, which is a local, centralised system that produces and distributes heat and cooling through a network to multiple buildings or sites. Efficient by design, it also leverages various local sources of heat, including waste heat from industrial processes or from renewable sources like geothermal energy or biomass. Furthermore, DHC provides flexibility and storage solutions.



# FLORENCE, ITALY

## Public buildings



## RENOVATION AND RENEWABLES INTEGRATION IN PUBLIC BUILDINGS

ENGIE



### PROJECT SPECIFICATIONS

**Contract type:** Global public procurement contract

**Object of the contract:** 433 buildings owned by the municipality of Florence

**Duration of the contract:** 9 years

**Objective of the contract:** Reduction of heat loss and the resulting consumption, integration of energy from renewable sources

**Investment:** 20M EUR



### ACTIONS UNDERTAKEN

- Renovation of **buildings and heating systems**
- Installation of **photovoltaic panels**
- Installation of **LED lamps**



### GUARANTEED RESULTS

**Thermal energy savings:** 30%

**Reduction of electricity consumption:** 23%

**Reduction of CO<sub>2</sub> emissions:** 50 000 tonnes

# MILANO, ITALY

## Public buildings



## ENERGY EFFICIENCY MANAGEMENT IN PUBLIC BUILDINGS

Veolia Italy



### PROJECT SPECIFICATIONS

**Contract type:** Energy Performance Contract through CONSIP SIE scheme

**Object of the contract:** 1 200 public buildings in Milano

**Duration of the contract:** 6 years

**Objective of the contract:** Reduce CO<sub>2</sub> emissions and energy consumption of real estate through the redevelopment and modernisation of technical systems

**Investment:** 15M EUR



### ACTIONS UNDERTAKEN

- Installation of **180 new heat generators** in 62 buildings and **10k thermostatic valves**
- Replacement of oil heating systems with **systems powered by natural gas**
- **575 buildings** with new **digital remote control system**



### GUARANTEED RESULTS

**Reduction of energy consumption:** 25%

**Reduction of CO<sub>2</sub> emissions:** 27%

# SAINT-CHRISTOL, FRANCE

## Public buildings



## REDUCTION OF ENERGY CONSUMPTION AND CO<sub>2</sub> EMISSIONS OF A MILITARY BASE

Idex



### PROJECT SPECIFICATIONS

**Contract type:** Energy Performance Contract – multi-EnPC public-procurement

**Object of the contract:** Military base (housing & offices) – 86 700 m<sup>2</sup>

**Duration of the contract:** 11 years (2016–2027)

**Objective of the contract:** Final energy savings and reduction of CO<sub>2</sub> emissions

**Investment:** 1.3M EUR



### ACTIONS UNDERTAKEN

- Installation of a 10 MW **biomass/oil boiler plant**
- Installation of a **solar thermal panels** (550 MWh/year)
- Implementation of a **Centralised Technical Management**
- Creation of a **customer portal** (Web)
- Raising **users' awareness**
- Optimised **management of the energy supply**

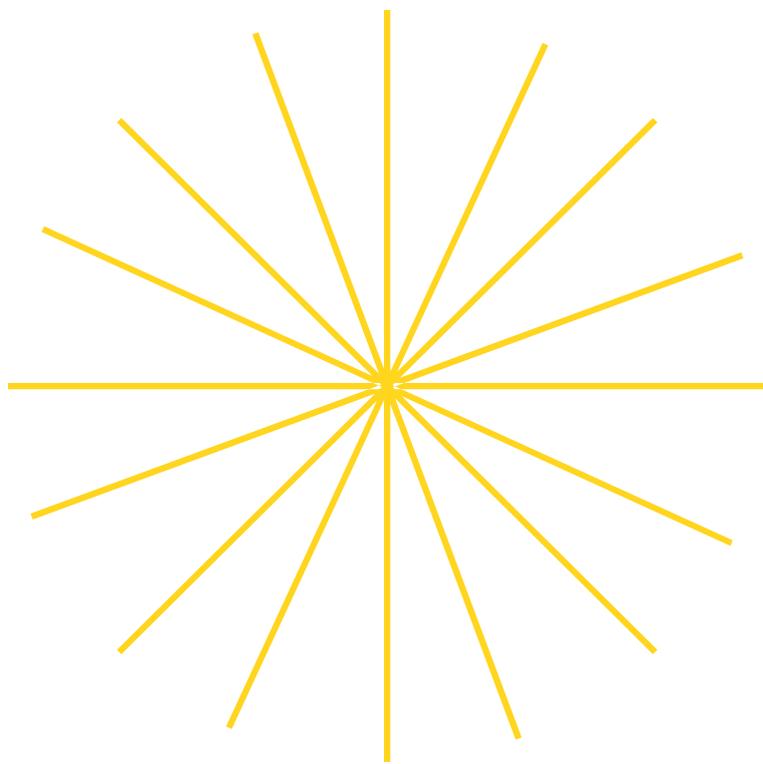


### GUARANTEED RESULTS

**Reduction of final energy consumption:** 21%

**Reduction of CO<sub>2</sub> emissions:** 20%

**Reduction of energy costs:** 38%



# CENTRE-VAL DE LOIRE, FRANCE

## Schools



## RETROFITTING AND OPERATION OF A CULTURAL CENTRE AND HIGH SCHOOLS

### ENGIE



#### PROJECT SPECIFICATIONS

**Contract type:** Public procurement

**Object of the contract:** 62 high schools and 1 cultural centre - 1.1M m<sup>2</sup>

**Duration of the contract:** 17 years

**Objective of the contract:** Reduction of energy consumption and CO<sub>2</sub> emissions

**Investment:** 27M EUR



#### ACTIONS UNDERTAKEN

- Works: **thermal insulation** of buildings, **renovation** of boiler rooms and **controlled mechanical ventilation (CMV) systems**, installation of **thermostatic valves**, and installation of **rooftop photovoltaic panels**
- Multi-technical **operation and maintenance**
- **Raising users' awareness** on energy and environmental issues (45 000 students, 5 000 teachers and administrative staff)



#### GUARANTEED RESULTS

**Reduction of energy consumption:** 30% over 17 years

**Reduction of CO<sub>2</sub> emissions:** 35% over 17 years

# ROMANIA

## Schools



## DEEP RENOVATION OF PUBLIC SCHOOLS

### OMV Petrom



### PROJECT SPECIFICATIONS

**Contract type:** Public procurement

**Object of the contract:** România Eficientă – public schools from different regions of Romania

**Duration of the contract:** 6 years (2020–2026)

**Objective of the contract:** Transform public schools into Near Zero Emission Buildings and foster a culture of energy efficiency in Romania



### ACTIONS UNDERTAKEN

- **Information, education and awareness campaigns** for households, pupils and students
- **Training modules** for the public administration on energy efficiency in buildings
- Creation of an **online platform, repository of information** and knowledge about energy efficiency in buildings
- **Deep renovation** of schools to turn them into nearly zero energy buildings – 3 school renovations completed so far



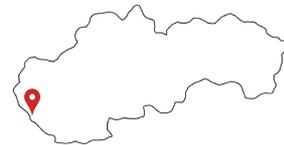
### GUARANTEED RESULTS

**Annual reduction of energy consumption:** 30%

**Annual reduction of CO<sub>2</sub> emissions:** 45%

# BRATISLAVA, SLOVAKIA

## Schools



## UNIVERSITY OF ECONOMICS - STUDENT DORMITORY

Veolia Slovakia



### PROJECT SPECIFICATIONS

**Contract type:** Energy Performance Contracting - public

**Object of the contract:** Student housing

**Duration of the contract:** 15 years (2022-2037)

**Objective of the contract:** Reduction of energy consumption (heating, hot water, cold water and electricity)

**Investment:** 505K EUR\*

**Payback:** 13 years



### ACTIONS UNDERTAKEN

- Façade and roof **insulation**
- **Windows replacement**
- **Refurbishment** of the **heating system**,
- Installation of **heat recovery ventilation** (HRV) and **thermostatisation**
- **Heat pumps** installation



### GUARANTEED RESULTS

**Guaranteed savings:** 39K EUR\*

**Achieved energy cost savings in 2022:** 45K EUR\*

**Achieved energy cost savings in 2023:** 41K EUR\*

*\*Rounded values, excluding VAT*

# PARMA, ITALY

## Schools



## PUBLIC-PRIVATE PARTNERSHIP FOR A UNIVERSITY CAMPUS

Veolia Italy



### PROJECT SPECIFICATIONS

**Contract type:** Public-Private Partnership with Energy Performance Contract

**Object of the contract:** University campus

**Duration of the contract:** 15 years

**Objective of the contract:** Making the campus more sustainable and technologically innovative, through a decarbonisation and energy independence path

**Investment:** 18M EUR



### ACTIONS UNDERTAKEN

- Extension of **photovoltaic plant** (+74kWe)
- Introduction of **2 geothermal heat pumps** (2 135kWth)
- Installation of **CCHP\* plant** (1.5 MWe) coupled with a **wood-cellulosic biomass gasification plant** (125 kWe)
- Groundwater extraction well with **water purification plant** and **digital monitoring** to identify water leaks

*\* Combined Cooling, Heating and Power*

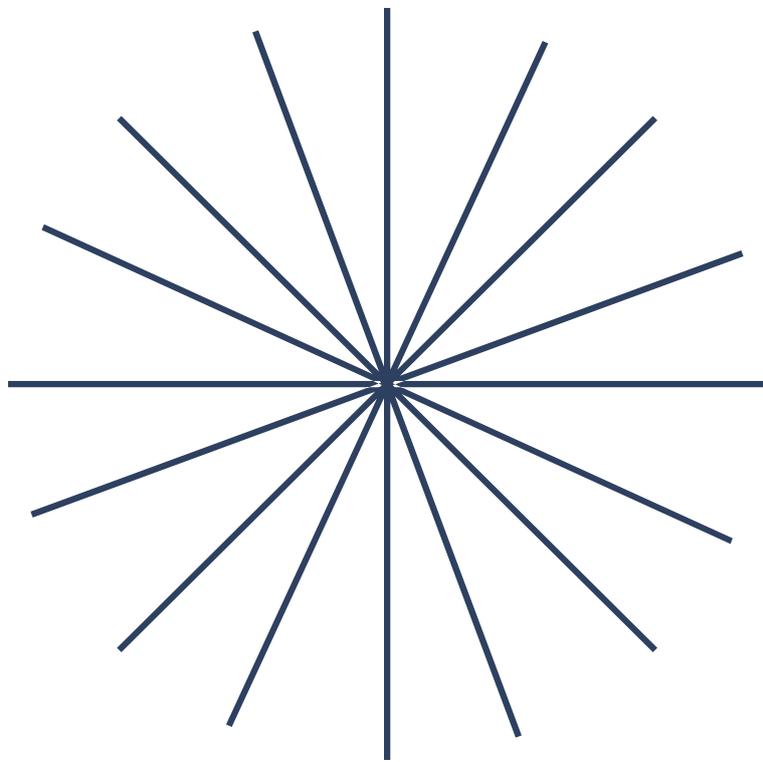


### GUARANTEED RESULTS

**Reduction of energy consumption:** 20%

**Annual reduction of CO<sub>2</sub> emissions:** 20% (2 500 tonnes)

**Renewable self-production:** 50%



# SAINT-ÉTIENNE, FRANCE

## Hospitals



## REDUCTION OF ENERGY CONSUMPTION OF A HOSPITAL

Dalkia



### PROJECT SPECIFICATIONS

**Contract type:** Energy Performance Contract – public procurement

**Object of the contract:** Hospital – 38 building units – 80 700 m<sup>2</sup>

**Duration of the contract:** 15 years (2018-2033)

**Objective of the contract:** Increasing final energy savings

**Investment:** 1M EUR



### ACTIONS UNDERTAKEN

- Installation of a **cogeneration unit** adapted to the thermal and electrical consumption profile
- Installation of a **condensing boiler** combined with **improvement of the network**
- Deployment of **monitoring and traceability tools** for customers, **management of heating and cooling**, development of an **appropriate metering plan, and remote management** via DESC (Dalkia Energy Savings Center)
- Rigorous **control and monitoring of installations**

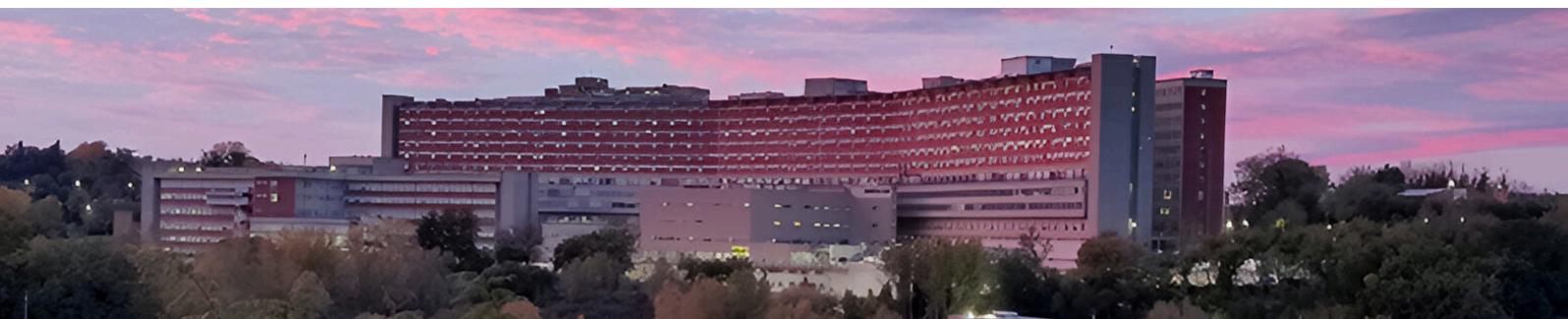


### GUARANTEED RESULTS

**Reduction of final energy consumption: 28%**

# SIENA, ITALY

## Hospitals



## RENOVATION AND ENERGY MANAGEMENT OF A UNIVERSITY HOSPITAL

Renovit



### PROJECT SPECIFICATIONS

**Contract type:** Public-Private Partnership & Energy Performance Contract

**Object of the contract:** Azienda ospedaliero-universitaria Senese (University Hospital) - 700 beds - 3 000 employees

**Duration of the contract:** 16 years (2023-2039, including 15 years of facility energy management)

**Objective of the contract:** Renovation and energy management of the university hospital

**Investment:** 20M EUR



### ACTIONS UNDERTAKEN

- Renovation of the **heating and ventilation systems**
- Upgrading of the **hot water production system** (pathogens prevention)
- Installation of a new 1.5 MWe **trigeneration system**
- Installation of **photovoltaic panels on roofs** (total peak power of 265 kWe)
- New **BMS (Building Management System)** systems for the remote monitoring and management (24 hours/day)
- Replacement of **4 000 lighting points** with **LED lighting fixtures**



### GUARANTEED RESULTS

**Annual reduction of energy consumption:** 30%

**Annual reduction of CO<sub>2</sub> emissions:** 4 700 tonnes (10%)

**Gains in comfort, air and water quality**

# COSENZA, ITALY

## Hospitals



## PUBLIC-PRIVATE PARTNERSHIP FOR HOSPITALS

Veolia Italy



### PROJECT SPECIFICATIONS

**Contract type:** Public-Private Partnership with Energy Performance Contract

**Object of the contract:** 12 hospitals and 86 health facilities

**Duration of the contract:** 12 years

**Objective of the contract:** Reduction of energy consumption and CO<sub>2</sub> emissions

**Investment:** 10.8M EUR



### ACTIONS UNDERTAKEN

- Supply of **200 Battery Electric Vehicles (BEV)** and **240 charging points**
- Installation of **1.4 MW photovoltaic panels** on roofs and shelters coupled with **1.8 MWh storage system (BEES)**
- 130 energy efficiency interventions, including **heat pumps, HVAC renovation** and introduction of **advanced building energy managements systems (BeMS)**



### GUARANTEED RESULTS

**Annual reduction of final energy consumption:** 930 TOE (19.5%)

**Annual reduction of CO<sub>2</sub> emissions:** 2 500 tonnes (21.5%)

# GHENT, BELGIUM

## Hospitals



## HOSPITAL ENERGY INSTALLATION MANAGEMENT AND MAINTENANCE

Veolia Belgium & Luxembourg



### PROJECT SPECIFICATIONS

**Contract type:** Energy Performance Contract

**Object of the contract:** UZ Ghent (2nd largest hospital in the country) - 40 buildings - 350 000 m<sup>2</sup> - 42 hectares

**Duration of the contract:** 10 years (2024-2034)

**Objective of the contract:** Technical management and maintenance with optimisation of energy management



### ACTIONS UNDERTAKEN

- **Management and supervision of installations**
- **Maintenance and repairs**
- **Provision of a total warranty** for part of the installations
- **Implementation of energy management measures** to optimise gas, steam, electricity and water consumption
- **Upgrading of the building management system** and **improvement of day-to-day administration**



### GUARANTEED RESULTS

**Reduction of energy consumption:** 20%

**Improved comfort of patients, visitors and personnel** through reliable energy supply

# BRETAGNE SUD, FRANCE

## Hospitals



## HOSPITAL ENERGY INSTALLATION MANAGEMENT AND MAINTENANCE

### ENGIE



### PROJECT SPECIFICATIONS

**Contract type:** Multi sites energy operation contract with guaranteed performance and energy mix transition

**Object of the contract:** Operating and optimising heating, ventilation, air conditioning, and energy mix systems across 14 sites

**Duration of the contract:** 8 years

**Objective of the contract:** Achieve energy and financial savings by reducing energy consumption and engaging in the energy transition



### ACTIONS UNDERTAKEN

- ENGIE Quantum **cooling unit**
- **Hybrid boiler rooms (heat pumps / gas)**
- Specific **upgrades** and **High-Efficiency Boilers (HPE)**
- Recommissioning of **biomass boiler room**
- **Photovoltaic systems** studied on 2 sites (to go further)

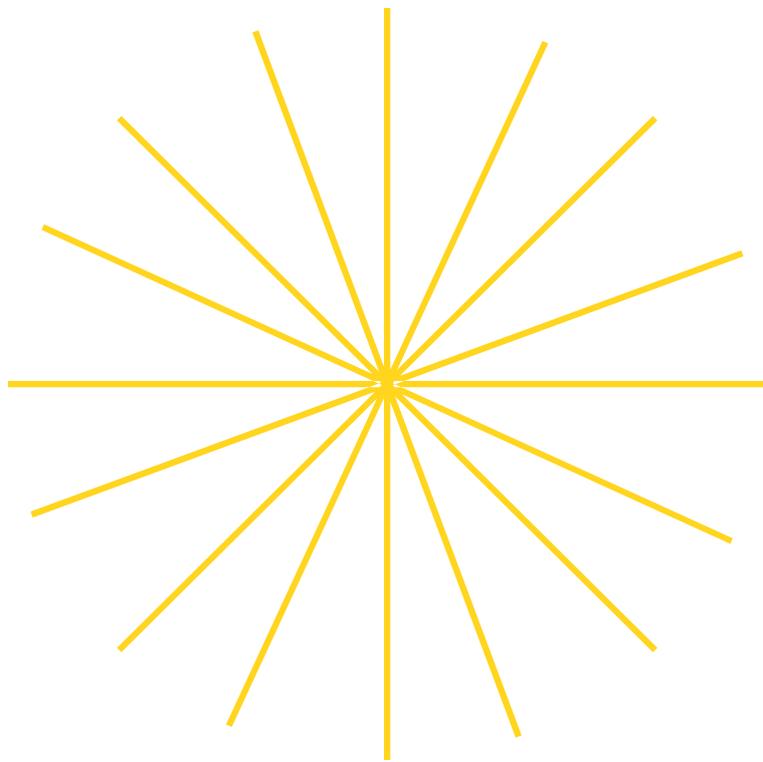


### GUARANTEED RESULTS

**Reduction of electricity consumption:** 11%

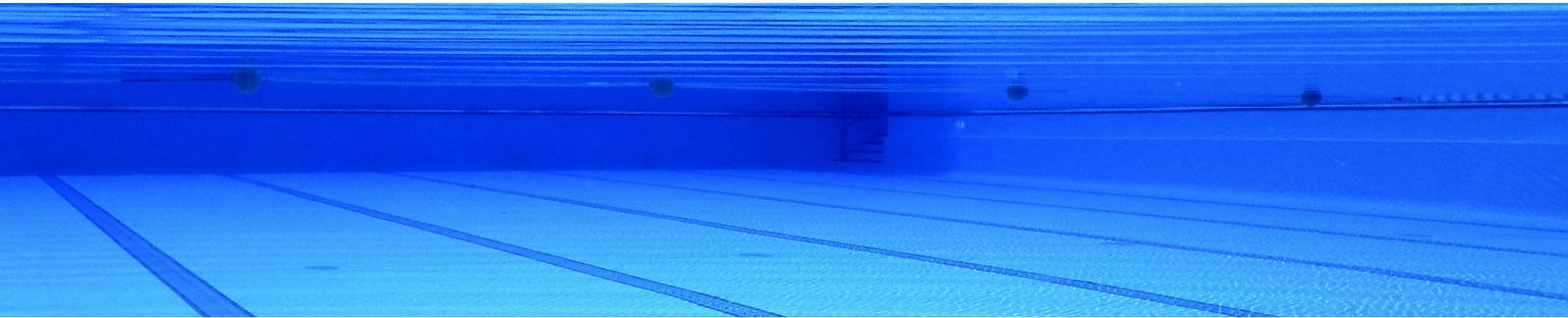
**Reduction of gas consumption:** 9%

**Annual reduction of CO<sub>2</sub> emissions:** 930 tonnes



# PAYS DE L'OR, FRANCE

## Sport facilities



## ENERGY PERFORMANCE OF SWIMMING POOLS

Dalkia



### PROJECT SPECIFICATIONS

**Contract type:** Energy Performance Contract – public

**Object of the contract:** 4 swimming pools – 16 000 m<sup>2</sup>

**Duration of the contract:** 8 years (2019–2027)

**Objective of the contract:** Energy savings in heating, domestic hot water, ventilation, cooling, water, and lighting

**Investment:** 1.5M EUR



### ACTIONS UNDERTAKEN

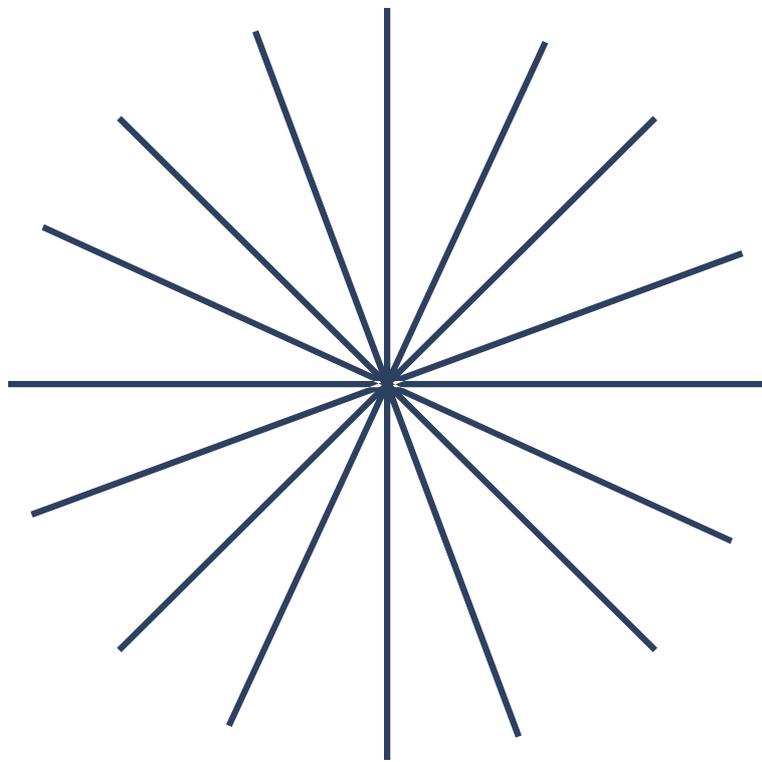
- Work on **heating, cooling, air treatment, water treatment**
- Installation of a **centralised technical management system** and **remote management**
- Internal bulletin and display screen in the reception area to raise **user awareness**.
- Use of **geothermal and photovoltaic solar energy**
- Optimised **management of the energy supply**



### GUARANTEED RESULTS

**Guaranteed annual reduction of energy consumption:** 30% over 8 years

**Achieved annual reduction of energy consumption:** 32%





## ENERGY REHABILITATION AND PERFORMANCE ENHANCEMENT

ENGIE



### PROJECT SPECIFICATIONS

**Contract type:** Energy Performance Contracting with Energy Supply

**Object of the contract:** Residential housing (50 sites in Arcueil and Gentilly, others in Vitry-sur-Seine)

**Duration of the contract:** 5 years

**Objective of the contract:** Implementation of an energy performance plan and dedicated support for the decarbonisation of the client's residences

**Investment:** 1.5M EUR in works



### ACTIONS UNDERTAKEN

- **Supply of fuel** for heating and domestic hot water
- **Operation and maintenance** of heating, air conditioning, and ventilation systems
- **Full warranty and replacement** of equipment
- **Compliance and site improvement** works
- **Deployment** of a recognised operations team
- **Optimised energy purchasing management** through the "Swap" offer



### GUARANTEED RESULTS

**Annual reduction of CO<sub>2</sub> emissions:** 575 tonnes

**Annual reduction of energy consumption:** 2 600 MWh

# MIRIBEL, FRANCE

## Housing



## REDUCTION OF ENERGY CONSUMPTION OF A CONDOMINIUM

Hervé Thermique



### PROJECT SPECIFICATIONS

**Contract type:** Energy Performance Contract – private

**Object of the contract:** Multi-apartment buildings – 100 flats – 8 350 m<sup>2</sup>

**Duration of the contract:** 8 years (2015-2023)

**Investment:** 600K EUR



### ACTIONS UNDERTAKEN

- **Replacement of carpentry**
- **Building's envelope for external insulation**
- Installation of **ventilation systems**
- Works on **heating systems**
- Rigorous **monitoring and control** of installations
- **Users' awareness** campaigns
- Optimised **management of the energy supply**



### GUARANTEED RESULTS

**Reduction of final energy consumption:** 43% over 8 years

**Reduction of CO<sub>2</sub> emissions:** 56% over 8 years



## ENERGY PERFORMANCE CONTRACT IN SOCIAL HOUSING

ENGIE



### PROJECT SPECIFICATIONS

**Contract type:** O&M and Full warranty and replacement of equipment

**Object of the contract:** Residential housing (68 buildings)

**Duration of the contract:** 10 years

**Objective of the contract:** Reduction of energy consumption (heating, hot water)

**Investment:** 80K EUR in works



### ACTIONS UNDERTAKEN

- Operation and maintenance of **heating, domestic hot water, mechanical ventilation, and renewable energy systems**
- Creation of a **single contact point across all sites** to simplify communication
- Implementation of an **Energy Management System (EMS)** integrating over **700 smart sensors**
- Installation of a **Building Management System (BMS) on 48 sites**
- Deployment of **predictive heating control on three pilot sites** (EFFI CAP programme)
- Proposal for **solar installation audits**



### GUARANTEED RESULTS

**Improved monitoring** of energy performance and control of operating costs

**Improved user satisfaction**

**Reduction of energy consumption for the three largest buildings: 10%**



## ENERGY AND CARBON PERFORMANCE CONTRACT IN SOCIAL HOUSING

Dalkia



### PROJECT SPECIFICATIONS

**Contract type:** Energy and Carbon Performance Contract – public

**Object of the contract:** Social housing – 29 000 housing units

**Duration of the contract:** 8 years (2024-2032)

**Objective of the contract:** 10% of additional energy savings

**Investment:** 14.3M EUR (12.5M EUR for decarbonisation and 1.8M EUR for energy efficiency)



### ACTIONS UNDERTAKEN

- **Construction of two district heating networks (DHN)** using 85% local renewable energy (wood energy), **22 biomass boilers**, **8 heat pumps** and **100 m<sup>2</sup> of solar panels**. 130 GWh of heat for heating and 47 GWh for domestic hot water
- **280 housing units connected to the DHN**, supplying heating and domestic hot water to over 500 residences
- **2 500 connected sensors and widespread remote management** enabling real-time monitoring of consumption
- Implementation of an **Energy Manager**



### GUARANTEED RESULTS

**Annual reduction of CO<sub>2</sub> emissions:** 4 300 tonnes

**Annual savings for housing units connected to the DHN:** 450 EUR



## ENERGY PERFORMANCE CONTRACT IN THE LE PANORAMIC & LE TOIT CO-OWNERSHIPS

ENGIE



### PROJECT SPECIFICATIONS

**Contract type:** Energy Performance Contracting

**Object of the contract:** 240 housing units

**Duration of the contract:** 20 years

**Objective of the contract:** Building renovation, energy performance, long-term operation of installations, cost reduction, single point of contact

**Investment:** 870K EUR in works - 7.7M EUR in order intake



### ACTIONS UNDERTAKEN

- Creation of a **biomass boiler room**
- Creation of a **heating network** for both co-ownerships
- Installation of **mechanical ventilation**
- Installation of **balancing valves**
- Insulation of **façades, roof, and lower floors**
- **Balcony refurbishment**
- **Long term operation and maintenance** with energy performance commitment after the works

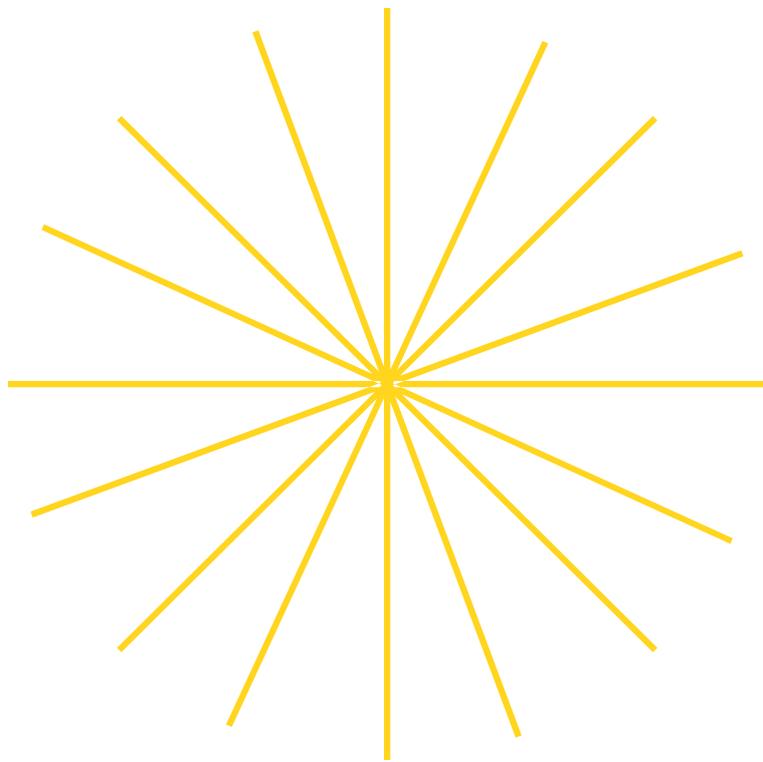


### GUARANTEED RESULTS

Turnkey solution: A simplified process via a **single contact point**

**Guaranteed energy price** with optimised aid and financing

**Reduction of energy consumption:** 40%



# LIDZBARK WARMIŃSKI, POLAND

## District Heating



## DECARBONISATION OF HEATING SYSTEM BASED ON RENEWABLE ENERGY SOURCES

Veolia Term



### PROJECT SPECIFICATIONS

**Object of the contract:** heating system for a 28 000 m<sup>2</sup> housing estate

**Timeline of the contract:** Prepared over the period 2021-2024.  
Commissioned in 2024

**Objective of the contract:** Decarbonising by replacing coal with 100% Renewable Energy Sources (RES)



### ACTIONS UNDERTAKEN

- Installation of the “**Heating Plant for the Future**”
- Includes **high-efficiency heat pumps, photovoltaic panels and heat storage systems**
- **Seasonal storage** to guarantee **efficient operation of the heat pumps**
- **Modernisation of the district heating and cooling network** to operate under, up to 80°C
- Powering the system through **PV farms and solar collectors**
- During winter, **support by electricity** purchased with RES-guaranteed origin



### GUARANTEED RESULTS

**100% energy in the heating system from RES** on Astronomów estate

**Supply of heat and hot water utilities** to 3 500 inhabitants

**Annual reduction of CO<sub>2</sub> emissions:** 1 300 tonnes (equivalent to the yearly absorption capacity of 260 ha of forests)

**Annual reduction of coal usage:** 660 tonnes

# CASSINO, ITALY

## District heating



## CREATION OF A SMART COMMUNITY BETWEEN AN INDUSTRIAL PLANT AND THE UNIVERSITY OF CASSINO

Renovit



### PROJECT SPECIFICATIONS

**Contract type:** Energy Performance Contract

**Object of the contract:** High-efficiency trigeneration plant combined with a district heating and cooling network

**Duration of the contract:** 10 years (2021-2031)

**Objective of the contract:** Development of a "smart community" through an energy efficiency intervention at an industrial site (a paper factory), involving the installation of a new combined heat and power plant. The energy generated will be used for heating and cooling the nearby University of Cassino campus via a newly established district heating and cooling (DHC) network



### ACTIONS UNDERTAKEN

- Installation of a new 7 MW **trigeneration system** (electricity, steam & hot water)
- Building of a **new DHC network**, connecting the paper factory to the university campus situated nearby



### GUARANTEED RESULTS

Entire coverage of **the steam and electricity consumption of the factory**, with high energy efficiency gains

**Reduction of CO<sub>2</sub> emissions:** 10%

# POZNAŃ, POLAND

## District heating



## CONSTRUCTION OF A HEAT STORAGE INSTALLATION ON VEOLIA'S CHP FACILITIES

Veolia Poland



### PROJECT SPECIFICATIONS

**Contract type:** Energy Performance Contract with a consortium – private

**Object of the contract:** District heating network – heat storage system

**Objective of the contract:** Improved efficiency and reliability of the heating system



### ACTIONS UNDERTAKEN

- Construction of a **water-filled tank maintaining atmospheric pressure inside**, capable of supporting 1/3 of Poznań's district heating system
- The tank **distributes surplus heat when demand increases** and **optimises system performance** through AI-powered software and control systems



### GUARANTEED RESULTS

**Annual reduction of CO<sub>2</sub> emissions:** 24 000 tonnes

**Annual reduction of coal usage:** 11 500 tonnes

**Annual reduction of oil consumption:** 310 tonnes

**Thermal storage capacity:** 24 000 m<sup>3</sup>

**Adjustment of production to electricity market demand** due to improved system flexibility

# CHIUSA, ITALY

## District heating



## OPTIMISATION AND THERMAL LOAD FORECASTING OF A DISTRICT HEATING POWER PLANT

Alperia



### PROJECT SPECIFICATIONS

**Contract type:** Energy Performance Contract

**Object of the contract:** District heating network - 13 km - 8 000 housing units connected

**Duration of the contract:** 10 years

**Objective of the contract:** Thermal load forecast and optimisation of a district heating power plant



### ACTIONS UNDERTAKEN

- Development of a **control algorithm** based on model predictive control technology that has been installed on a Supervisory Control and Data Acquisition (SCADA) located on site, **boosting automation**
- **Improvement of power** provided by biomass
- **Improvement of economic revenues** by bidding electrical energy produced from CHP plant into electricity market



### GUARANTEED RESULTS

**Annual savings:** 22.5K EUR

**Annual reduction of CO<sub>2</sub> emissions:** 3 200 tonnes

# OROSZLÁNY, HUNGARY

## District heating



## BIOMASS-BASED COGENERATION UNIT

### Veolia Hungary



### PROJECT SPECIFICATIONS

**Contract type:** Private

**Object of the project:** District heating and cooling network – power plant

**Timeline of the project:** Start 2024

**Objective of the project:** Transformation of a power plant based on local brown coal into a biomass-based cogeneration unit



### ACTIONS UNDERTAKEN

- **Modernisation of the power plant to produce electricity and district heating** from renewable energy (biomass), with a 2 x 50 MWe capacity



### GUARANTEED RESULTS

**Annual reduction of CO<sub>2</sub> emissions:** 536 000 tonnes

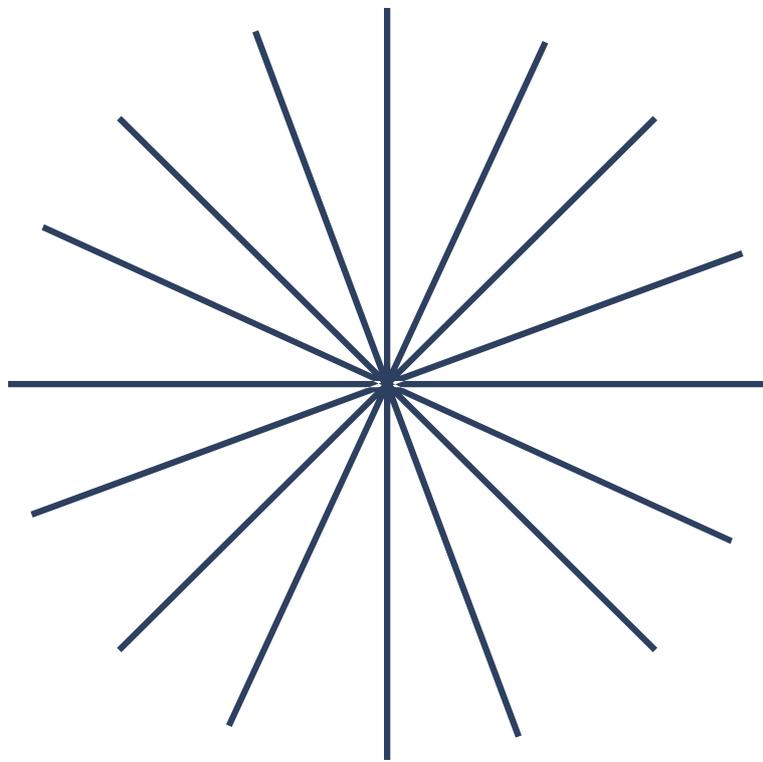
**Electricity production:** 2 x 50 MWh

**Annual heat production:** 345 TJ

**Direct jobs created:** 200

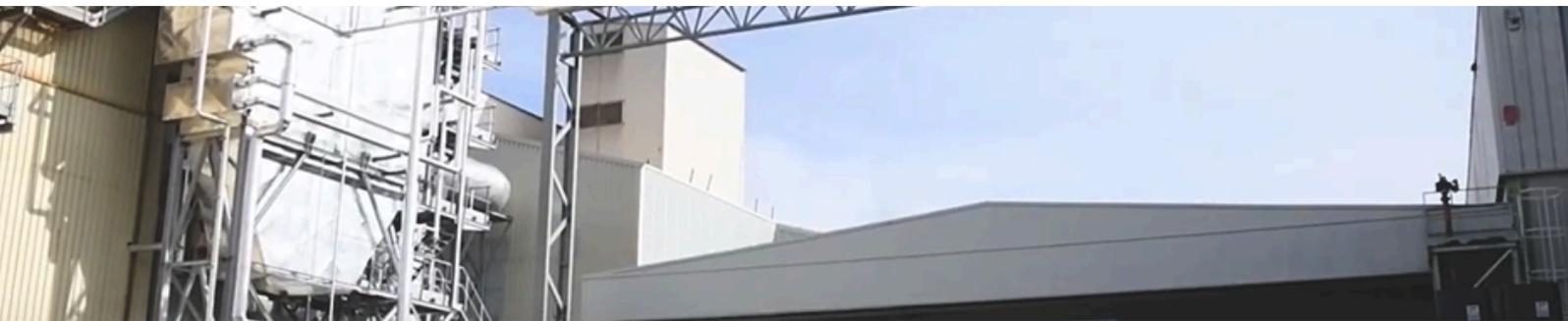
**Supply chain jobs created:** 300

**Flats supplied with district heating:** 4 300 (46 MWth peak demand)



# BURGOS, SPAIN

## Energy Efficiency in Industry



## WASTE HEAT RECOVERY AND COGENERATION

### ENGIE



#### PROJECT SPECIFICATIONS

**Contract type:** Design, Build, Finance, Operate (DBFO)

**Object of the contract:** Glass manufacturer - beer producer

**Duration of the contract:** 10 years

**Objective of the contract:** Reduction of natural gas consumption, CO<sub>2</sub> emissions reduction, sustainability guarantee

**Investment:** 1.8M EUR (0.49M EUR subsidised)



#### ACTIONS UNDERTAKEN

- **Installation, operation, maintenance, and financing** of a **waste heat recovery system** for Verallia (glass packaging manufacturer) to supply **hot steam** to Mahou San Miguel (Spain's leading beer producer)



#### GUARANTEED RESULTS

**Reduction of energy consumption:** 68%

**Production of steam per hour:** 8.8 tonnes

**Waste heat recovery for Verallia:** 40%

**Annual reduction of CO<sub>2</sub> emissions:** 4 300 tonnes

# ROVERETO, ITALY

## Energy Efficiency in Industry



## GLYCOL NET AND COLD DISTRIBUTION OPTIMISATION

Alperia



### PROJECT SPECIFICATIONS

**Contract type:** Energy Performance Contract – private

**Object of the contract:** Industrial plant – pharmaceutical sector

**Duration of the contract:** 5 years (2023–2028)

**Objective of the contract:** Maximisation of the coefficient of performance of chillers



### ACTIONS UNDERTAKEN

- **Development of Advanced Process Control (Sybil)** based on Model Predictive Control technology (automatic and optimised management of **3 chillers** and **8 pumps**)
- **Cooling energy consumption forecast**, useful for chiller control, and smart alarms



### GUARANTEED RESULTS

**15% increase in the coefficient of energy performance** compared to manual control

# GHENT, BELGIUM

## Energy Efficiency in Industry



## GAS FERMENTATION PLANT USING STEEL FACTORY GASSES

Veolia Belgium & Luxembourg



### PROJECT SPECIFICATIONS

**Contract type:** Private energy and CO<sub>2</sub> contract

**Object of the contract:** Gas Fermentation Plant that uses the metallurgical gasses from a steel factory for ethanol production, which is the largest CO<sub>2</sub> emitter in Belgium (8% of the emissions)

**Duration of the contract:** 10 years (2022-2032)

**Objective of the contract:** Construction of a "Steelanol" pilot plant that converts 10% of the flue gasses of the steel furnaces to produce Bioethanol in a bioreactor



### ACTIONS UNDERTAKEN

- Conversion of the flue gasses of the steel furnaces to **produce bioethanol in a bioreactor**
- Conversion of **digested sludge into biogas**, which is then used in a **combined heat and power system** to generate 20 000 MWh of green electricity per year and produce green heat



### GUARANTEED RESULTS

**Annual reduction of CO<sub>2</sub> emissions:** 150 000 tonnes (the equivalent of removing 60 000 cars from the road)

**Reduction of CO<sub>2</sub> emissions:** 60%

# MARCO-EN-BAROEUL, FRANCE

## Energy Efficiency in Industry



## WASTE HEAT RECOVERY AND REUTILISATION

### ENGIE



#### PROJECT SPECIFICATIONS

**Contract type:** Design, Build, Finance, Operate (DBFO)

**Object of the contract:** Fermentation plant (yeast production – yeast drying)

**Duration of the contract:** 15 years

**Objective of the contract:** Reduce greenhouse gas emissions and water consumption on-site. Reuse of waste heat from the production process to limit the use of the gas boiler for yeast drying

**Investment:** 16M EUR



#### ACTIONS UNDERTAKEN

- **Connection** of the **yeast production floor** (exothermic process) and the **yeast drying floor** (heating of the drying air by two heat pumps installed on the cooling tower network)
- **Heat production/recovery:** 120 000 MWh/year



#### GUARANTEED RESULTS

**Water savings:** 150 000 m<sup>3</sup> (cooling towers)

**Annual reduction of CO<sub>2</sub> emissions:** 30 000 tonnes

**70% of heat demand** covered by **heat pumps**

# SZLACHĘCIN, POLAND

## Energy Efficiency in Industry



## HEAT RECOVERY FROM A SEWAGE TREATMENT PLANT WITH EFFICIENT COGENERATION

Veolia Poland



### PROJECT SPECIFICATIONS

**Contract type:** Private

**Object of the contract:** Waste heat recovery from a sewage treatment plant

**Objective of the contract:** Create synergies between heat generation and water treatment to save resources and limit CO<sub>2</sub> emissions



### ACTIONS UNDERTAKEN

- Veolia has created a system which enables the **use of heat coming from sewage**, supported by the installation of **high-efficiency cogeneration**, producing electricity and heat simultaneously
- **Waste heat is recovered** from both waste water (using a heat pump) and electricity production
- The heat is then fed into the **district heating network**



### GUARANTEED RESULTS

**Annual reduction of CO<sub>2</sub> emissions:** 8 600 tonnes

**Annual reduction of coal usage:** 4 600 tonnes

**Inhabitants supplied with recovered heat:** 5 000 inhabitants

# EINDHOVEN, NETHERLANDS

## Energy Efficiency in Industry



## HIGH-TECH CAMPUS POWERED BY 100% CARBON-FREE ENERGY

EQUANS Nederland



### PROJECT SPECIFICATIONS

**Contract type:** DBFMO. Utility Supply Contract, as Equans is shareholder of BIC Utility BV

**Object of the contract:** Brainport industries campus

**Duration of the contract:** 15 years

**Objective of the contract:** Security of supply of the utilities, carbon neutral utilities, congestion management



### ACTIONS UNDERTAKEN

- **DBFMO (Designing, Building, Financing, Maintaining and Operating) and exploiting utilities:** heat and cold, process cooling, vacuum compressed air, demineralised water and electricity)
- Installation of **assets: solar panels (2.7 MWe), battery storage (1 MWh), aquifer thermal energy storage, heat pumps, compressed air units, vacuum pumps, demineralised water system and chillers**

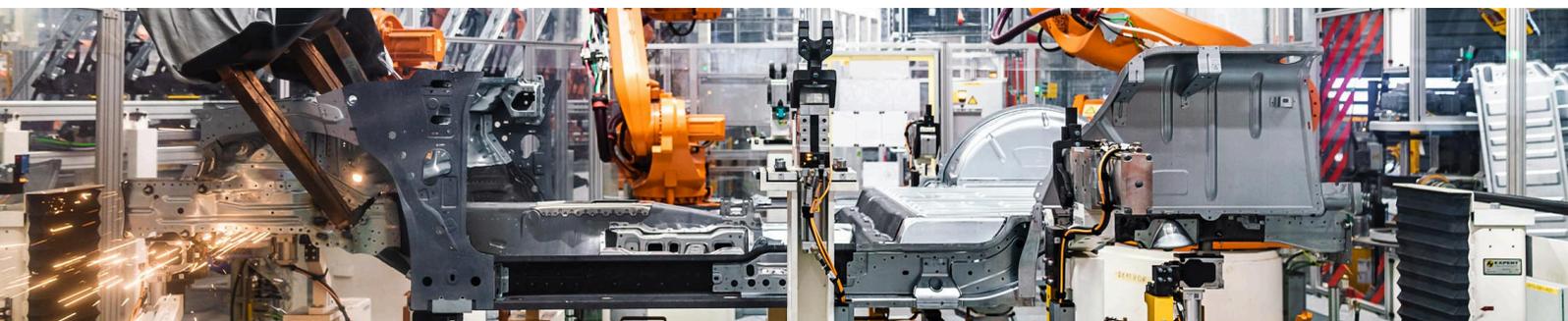


### GUARANTEED RESULTS

**100% carbon neutral utilities**

# POZNAŃ, POLAND

## Energy Efficiency in Industry



## INDUSTRIAL WASTE HEAT RECOVERY FROM A VOLKSWAGEN FOUNDRY

Veolia Poland



### PROJECT SPECIFICATIONS

**Contract type:** Private

**Object of the contract:** Waste heat recovery from a foundry's compressor unit

**Objective of the contract:** Alternative sources of heat to save natural resources



### ACTIONS UNDERTAKEN

- Veolia has developed a **system to recover the waste heat** generated by the compressor unit in the foundry of the Volkswagen plant in Poznań
- The investment in a system for the **recovery of heat into the district heating system** is **one of the first of such projects in Central and Eastern Europe**



### GUARANTEED RESULTS

**Annual reduction of CO<sub>2</sub> emissions:** 3 500 tonnes

**Annual reduction of water consumption:** 17 000 m<sup>3</sup>

**Housing units supplied with recovered heat:** 6 500

# VIELLE SAINT GIRONS, FRANCE

## Energy Efficiency in Industry



## BIOMASS STEAM AND COGENERATION PROCESS

ENGIE



### PROJECT SPECIFICATIONS

**Contract type:** Design, Build, Finance (DBF)

**Object of the contract:** DRT's production plant for resin-based derivatives

**Duration of the contract:** 22 years

**Objective of the contract:** Continuous steam supply (8 200 hours/year), reduction of steam supply costs, reduction of the operational carbon footprint and integrity of steam characteristics (pressure and temperature)

**Investment:** 50M EUR



### ACTIONS UNDERTAKEN

- Installation of **biomass cogeneration**
- 50 MW of **heat capacity from biomass** for DRT's industrial needs and 17 MWe of **electrical capacity** directly injected into the grid
- **Steam production** (184 GWh/year) for DRT's industrial needs
- **Electricity production** (90 GWh/year) directly injected into the grid
- Management of the entire **biomass steam** and **cogeneration process**

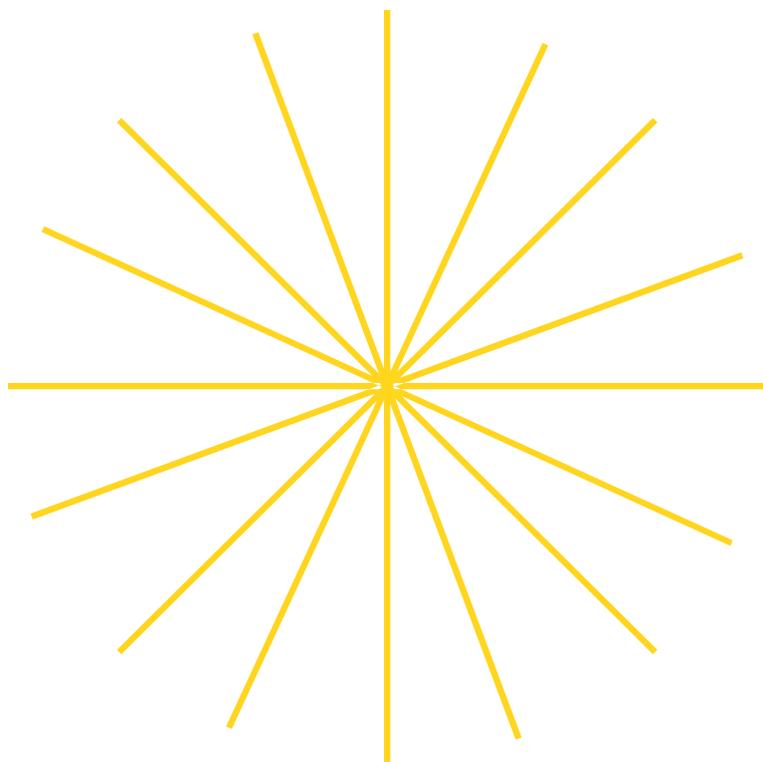


### GUARANTEED RESULTS

**30% energy efficiency**

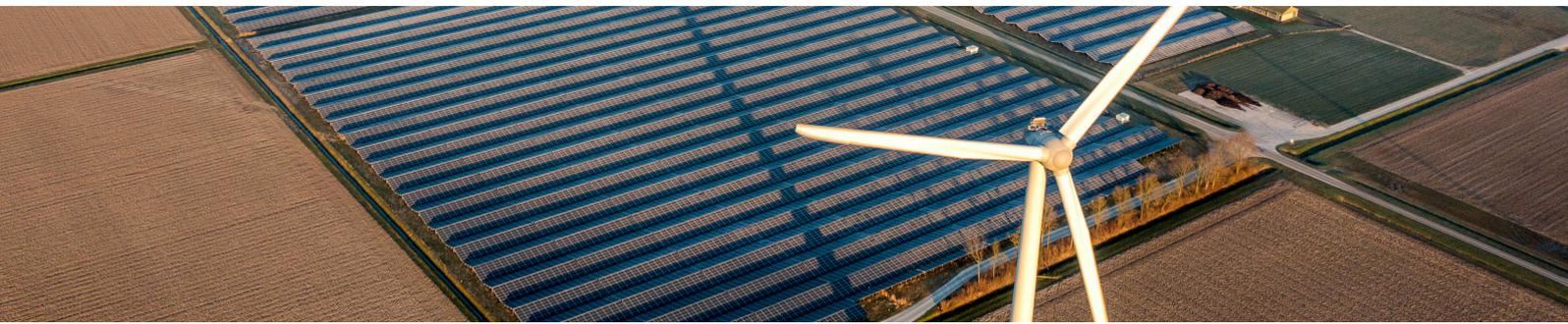
**Reduction of electricity supply costs: 16%**

**Reduction of steam supply costs: 13%**



# FLEVOLAND, NETHERLANDS

## Grids



## BRINGING DEMAND AND SUPPLY OF ELECTRICITY TOGETHER

### EQUANS Nederland



#### PROJECT SPECIFICATIONS

**Contract type:** Design, Build, Operate (DBO)

**Object of the contract:** Smart grid (network for real estate developers who wish to invest in solar PV, wind, or battery storage)

**Duration of the contract:** 15 to 20 years

**Objective of the contract:** Provide a solution for grid congestion and increase sustainable generation in areas with less grid capacity



#### ACTIONS UNDERTAKEN

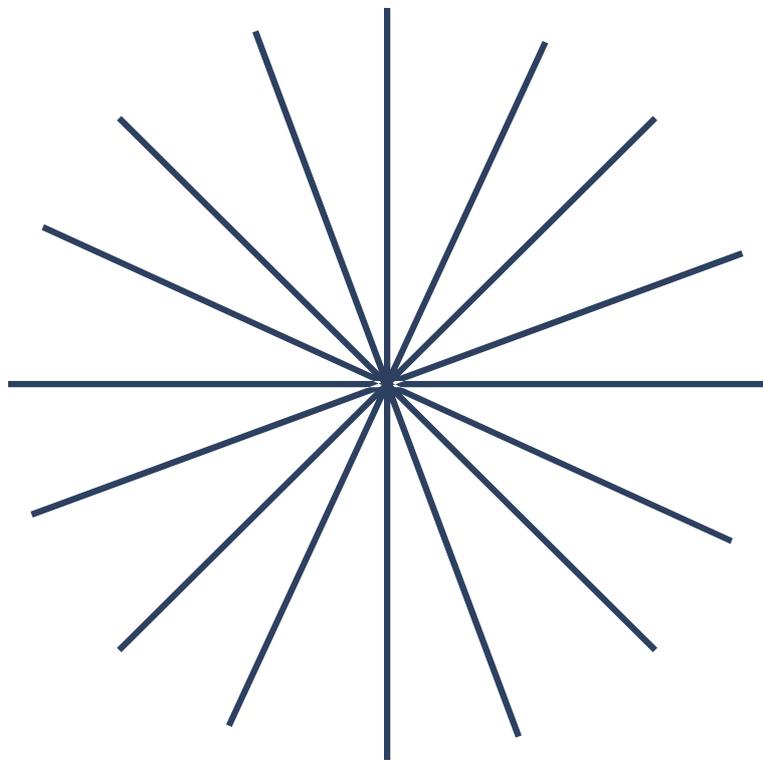
- Installation of **300 MWe of production units: 6 solar parks** with 500 000 solar panels with a total capacity of 163 MWe, **37 windmills** with a total capacity of 137 MWe
- **36 MVA of battery storage** on a 155 MVA grid connection
- **Smart energy management** (Energy Management System)
- **Future actions:** development of a **hydrogen plant connected to the Smart Grid** to ensure that the solar and wind farms can produce more energy and supply sustainable energy to consumers in the area



#### GUARANTEED RESULTS

**Annual energy production:** 600 GWh with smart metering and adjusting per second (0.6% of Dutch electricity production)

Similar solutions can **reduce the congestion in the Netherlands by 15%**





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[www.ener-efficiency.eu](http://www.ener-efficiency.eu)



[info@ener-efficiency.eu](mailto:info@ener-efficiency.eu)



+32(0)2 230 65 50



Rue de la Science 23, Brussels B-1040

