Elevator Pitch

Presentations of current ideas and projects from selected EU regions

Berlin Partner for Business and Technology

Bavarian Research Alliance

enterprise europe network
Business Support on Your Doorstep

European Commission

Elevator Pitches - Overview of Participants

		Title	First Name	Surname	Organisation
1.	Mr.		Guy	Baret	EDILIANS
2.	Mr.		Xavier	De Moor	Condugo
3.	Mr.		François	Fouquet	DataThings S.à.r.l.
4.	Ms.		Cinthya	Guerrero	Brandenburg University of Technology
5.	Mr.		Tudor	Mircea	ICE Gateway GmbH
6.	Mr.	Prof.	Vincenzo	Mulone	University of Rome Tor Vergata
7.	Mr.		Alberto	Pozzi	Pozzi Leopoldo S.r.l.
8.	Mr.		Pavel	Praks	Technical University of Ostrava
9.	Mr.		Gerhard	Schilling	TherMotive
10.	Mr.		Cosme	Somogyi	I-care
11.	Mr.		Renzo	Taffarello	Tune - ASCOTRADE
12.	Mr.		Miklós	Tallián	Semilab Semiconductor Physics Laboratory Co. Ltd.
13.	Mr.	Dr.	Subhasis	Thakur	National University of Ireland, Galway
14.	Mr.		Avigdor	Luttinger	bztec GmbH

EDILIANS is a French company

- clay tiles and building components
- 1 000 people
- 300 M€ turnover
- in the PV market for 17 years

EDILIANS
LE NOUVEAU NOM D'IMERYS TOITURE

Present products

✓ **Photovoltaic roof tiles**

- ✓ PV on clay subtrate
- ✓ 30 years garantee
- ✓ Full roof integration (city cultural heritage)
- ✓ Including the whole energy system (inverters and storage)

✓ **Heat collection dedicated to Domestic Hot Water**

- ✓ Thermodynamic system (di-phasic fluid and heat pump)
- ✓ Down to -10°C
- ✓ Operates anytime, efficiency improved under solar irradiation
- ✓ Heat storage in water
- ✓ HYBRID : combination with PV on the same module

Contact : EDILIANS guy.baret@edilians.com +33 6 31 50 87 36

EDILIANS is looking to join consortiums on

EDILIANS
LE NOUVEAU NOM D'IMERYS TOITURE

- ✓ **PV tiles :**
  - ✓ reduce cost - increase efficiency - improve design
  - ✓ on flat tile and roman tiles
  - ✓ add storage system (lithium batteries ??)

- ✓ **Heat production for DHW and Heating:**
  - ✓ partially based on the present heat collector from EDILIANS
  - ✓ integrating heat storage in Phase Change Materials or thermochemical storage
  - ✓ coupled with PV for supplying power to the heat pump (hybrid system) → zero CO2 footprint
  - ✓ showing nice aesthetic integration in building (including facade)
  - ✓ having low installation cost (quick and secured fluid connection)

Contact : EDILIANS guy.baret@edilians.com +33 6 31 50 87 36

Possible calls

EDILIANS
LE NOUVEAU NOM D'IMERYS TOITURE

- ✓ **LC-SC3-B4E-8-2020:** Renewable and energy efficient solutions for heating and/or cooling, and domestic hot water production in multi-apartment residential buildings
- ✓ **LC-SC3-B4E-10-2020**: Self-assessment and self-optimisation of buildings and appliances for a better energy performance
- ✓ **LC-SC3-RES-1-2019-2020** : Developing the next generation of renewable energy technologies
- ✓ **LC-SC3-RES-9-2020** : Next generation of thin-film photovoltaic technologies
- ✓ **LC-SC3-RES-33-2020 :** Increase performance and reliability of photovoltaic plan
- ✓ **LC-SC3-B4E-1-2020 :** Towards highly energy efficient and decarbonised buildings (CSA)

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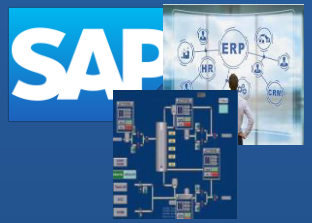
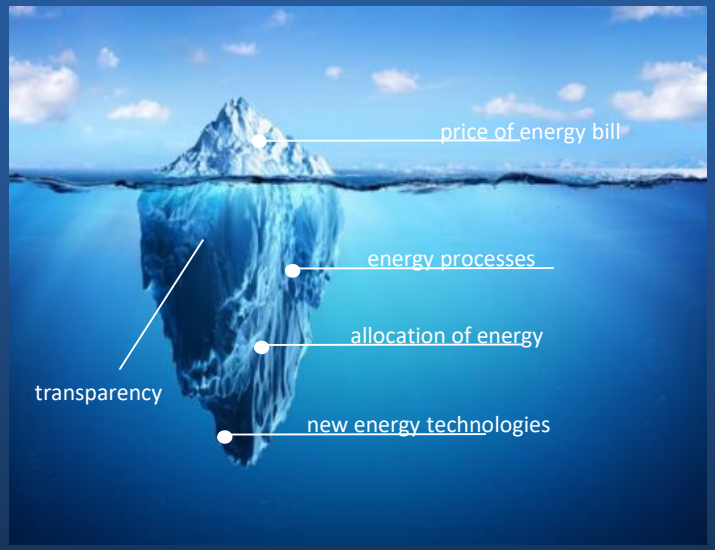
Dream versus reality

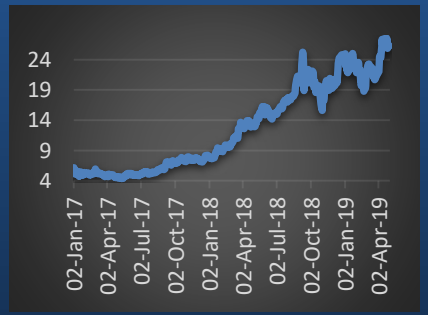
1. Energy intelligence platform:
   reduce CO2 with 10%
2. EU : < 500 industrial companies produce 25% of CO2
3. Within 10 years: 150 companies
   Who represent +/- 10% of total consumption

Large **industrial** sites have energy challenges

Despite largest variable cost …





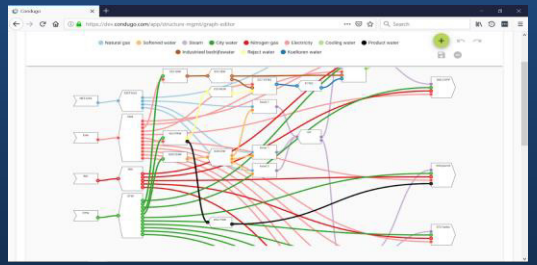


The first company wide integrated energy intelligence platform:

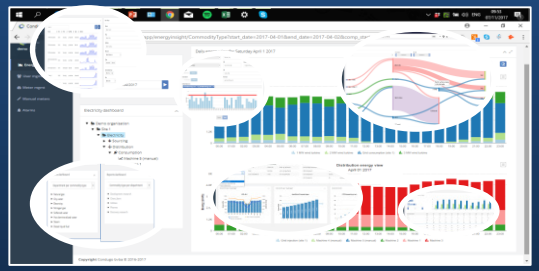
The Energy Hub

Tackle the energy challenges of industrial processes

Energy flow modelling
Integrating systems
Artificial intelligence
Machine learning



1. Reduce consumption with 10%
2. Predict energy usage
3. Create transparent sustainable energy strategy



Condugo

References

Looking for industrial companies to validate our platform

Xavier De Moor
Xavier.demoor@condugo.com

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A L V A

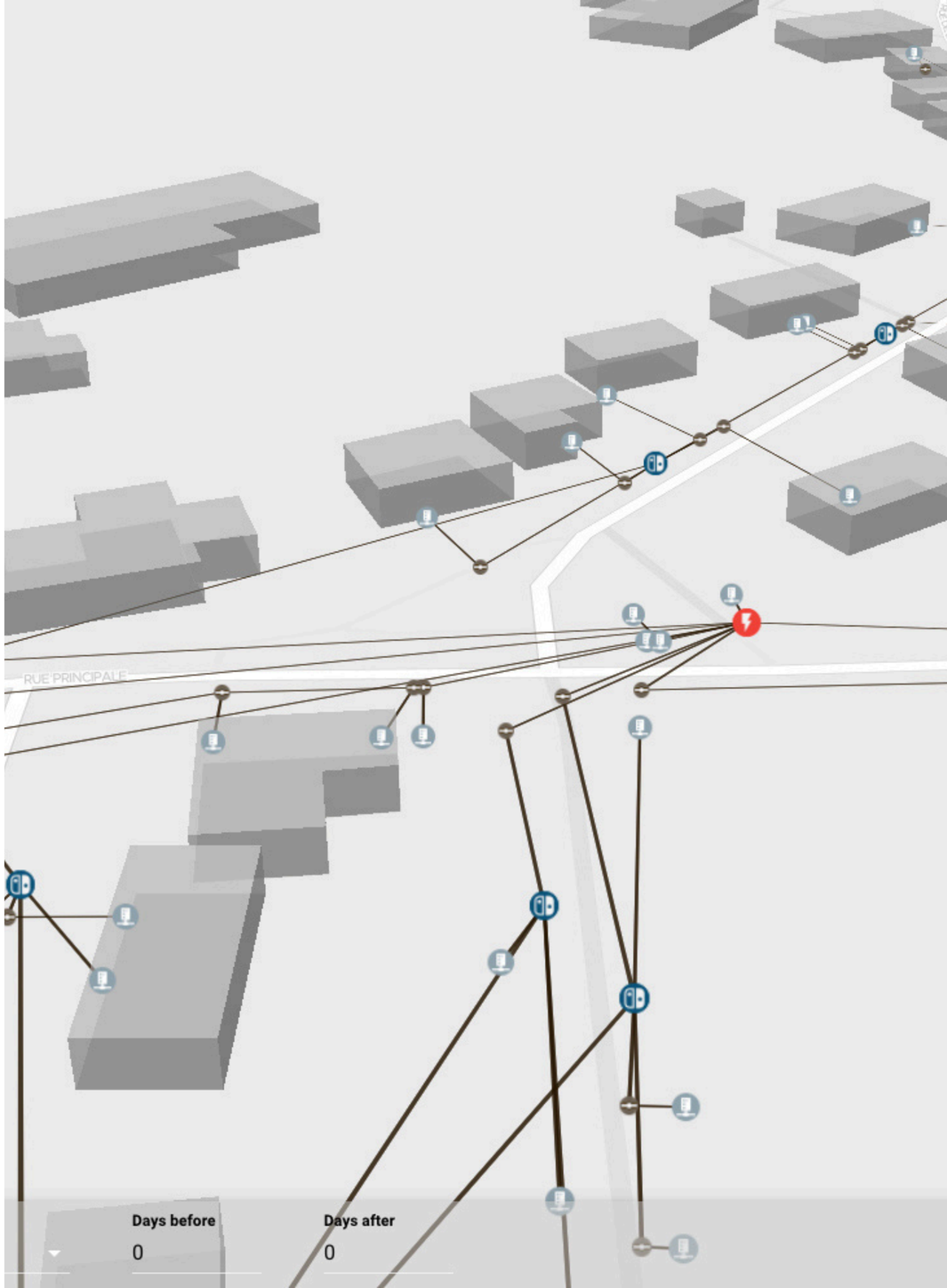
A MI-Powered Operational Platform For Smart Grids

Dr. Francois Fouquet, Dr. Thomas Hartmann / Datathings

The Alva Platform

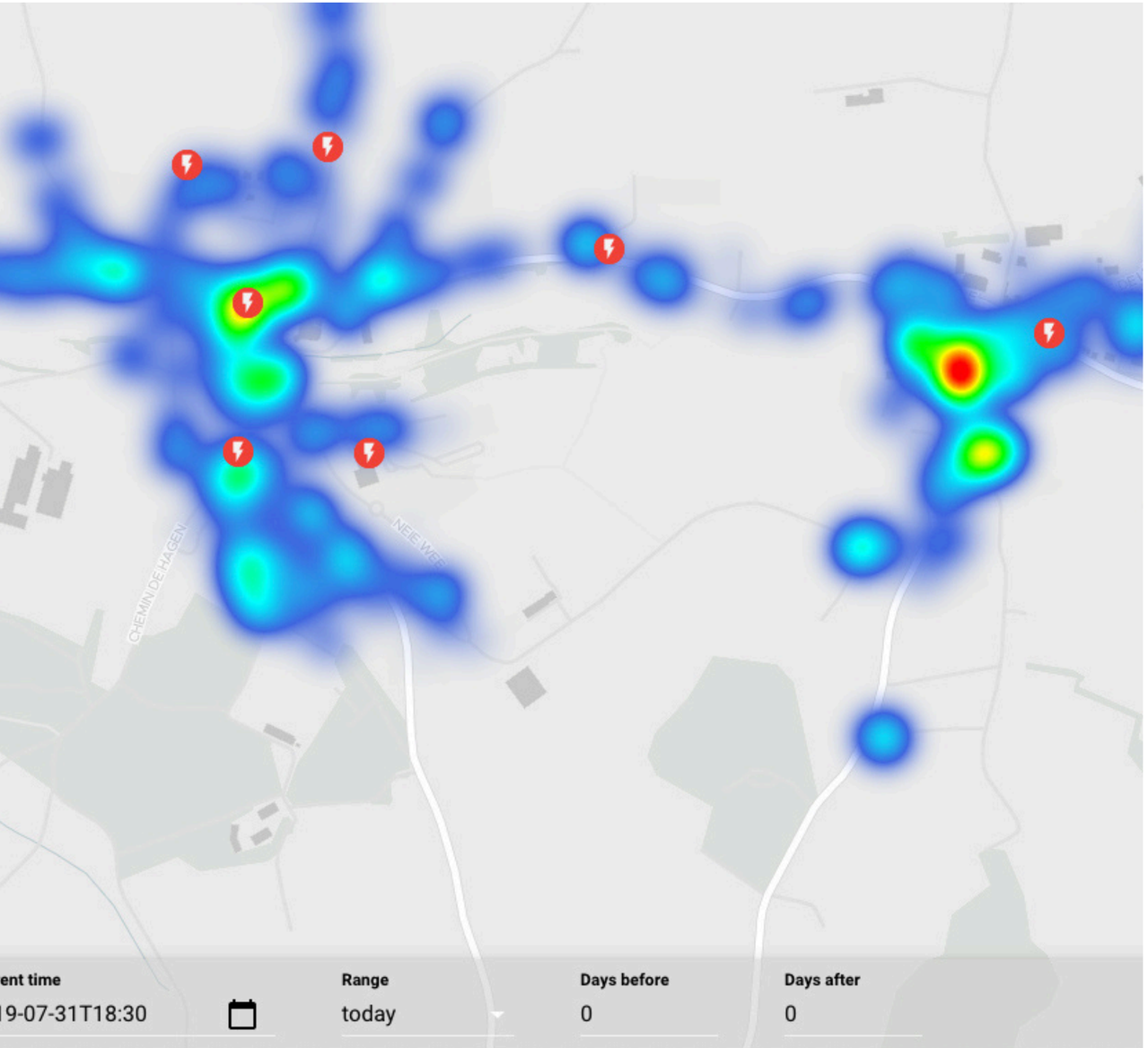
- **Collecting, aggregating, cleaning and visualizing data** from different systems: *GIS, sensors, data concentrators, consumption data collection systems, …*
- Applying **inference algorithms**, e.g. to **approximate the electric load** in cables (in near real-time), **inferring the physical topology** from PLC communication data, …
- Using state-of-the-art **machine learning** to learn and predict, e.g. **consumption behaviour** of customers, **load in cables**, **peak consumption times**, **clustering of customers**, etc.
- Combining all of this to an **information visualisation and decision-helper system**

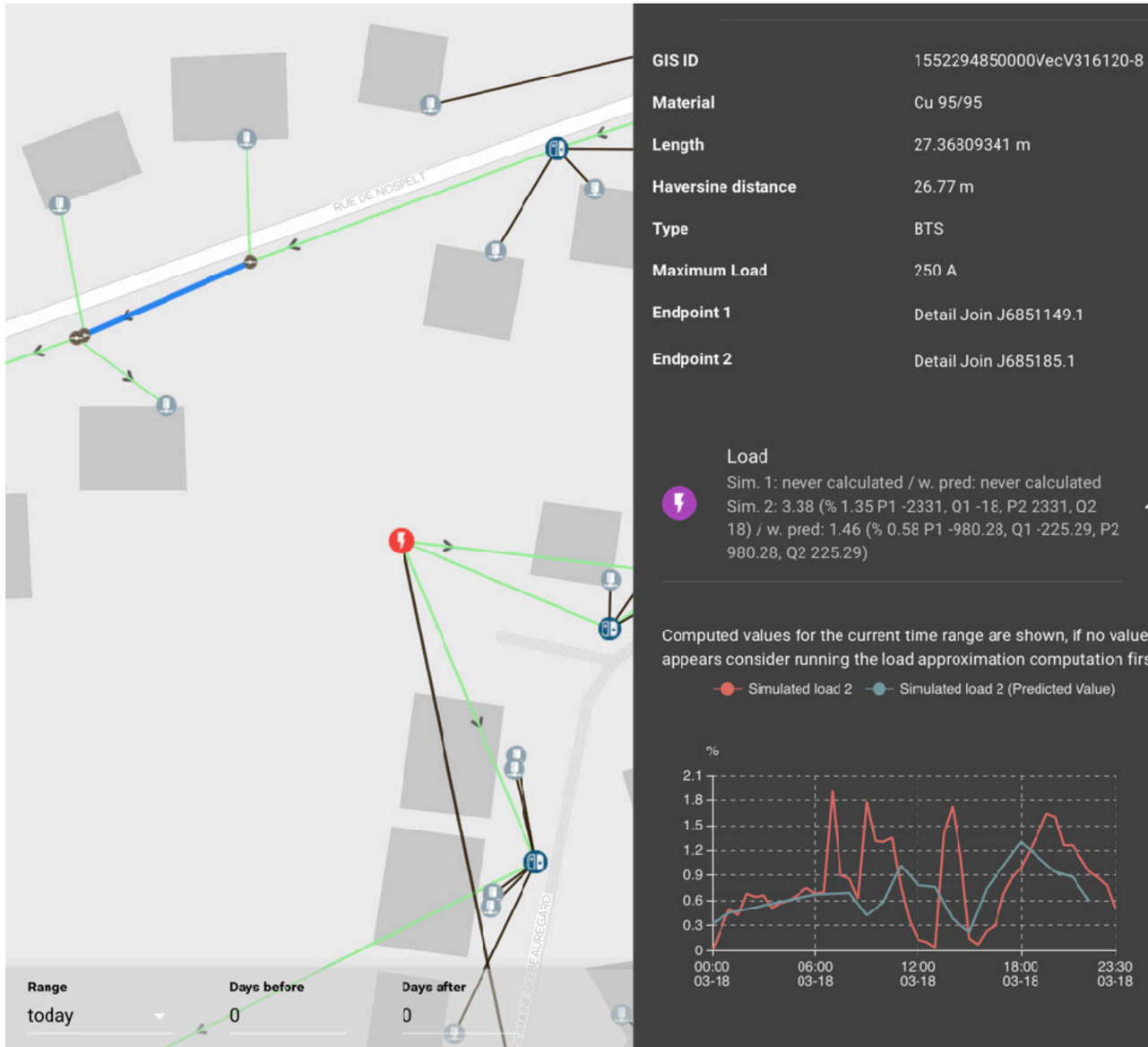
> Who? We are **DataThings** a startup dedicated in Data Analytics platforms for various industries: Industrie 4.0, Finance, Environmental and Weather monitoring… we develop Alva together with Luxembourg main DSO



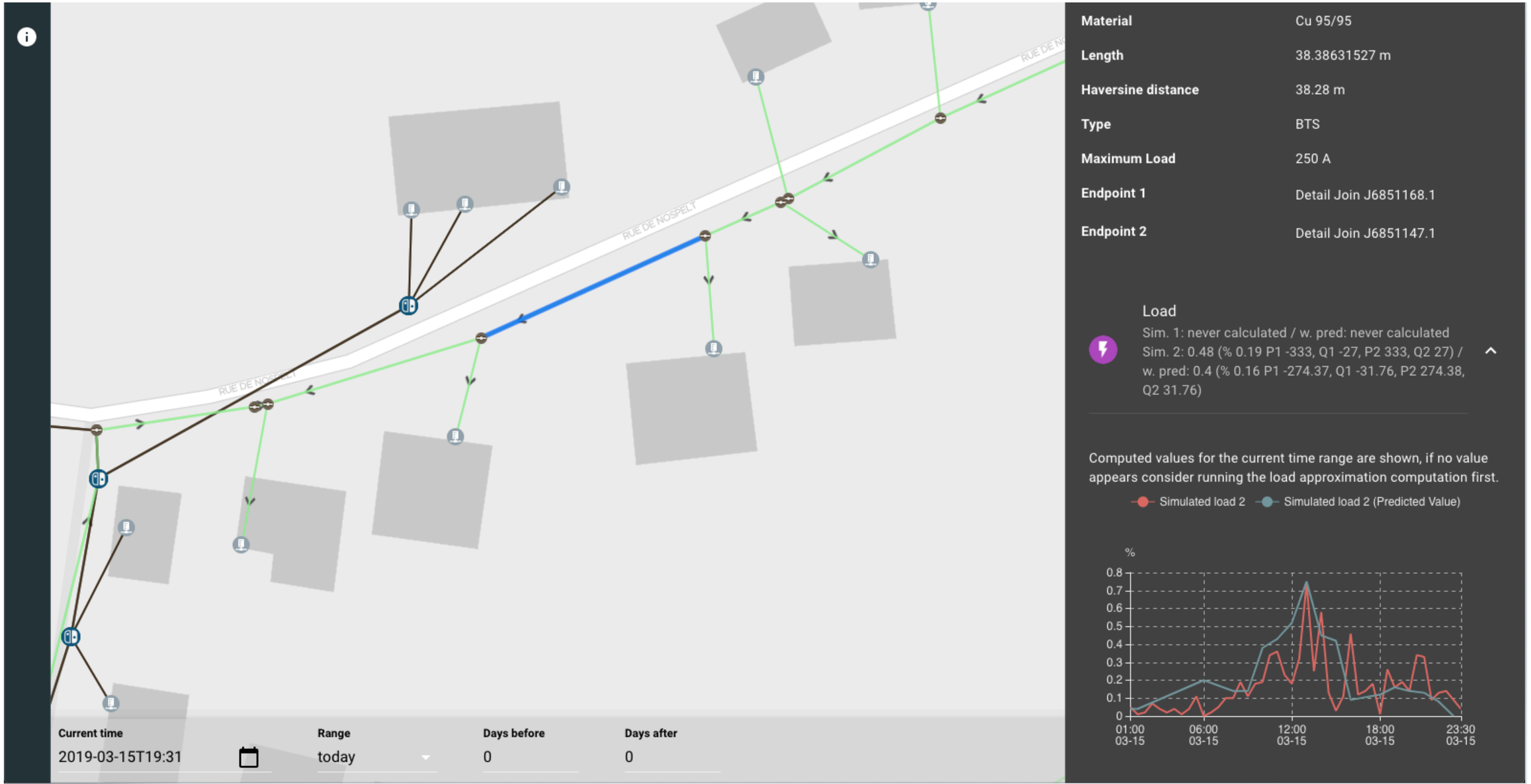
ADVANCED OPERATIONAL DECISION FEATURES

Customer Consumptions Prediction And Clustering



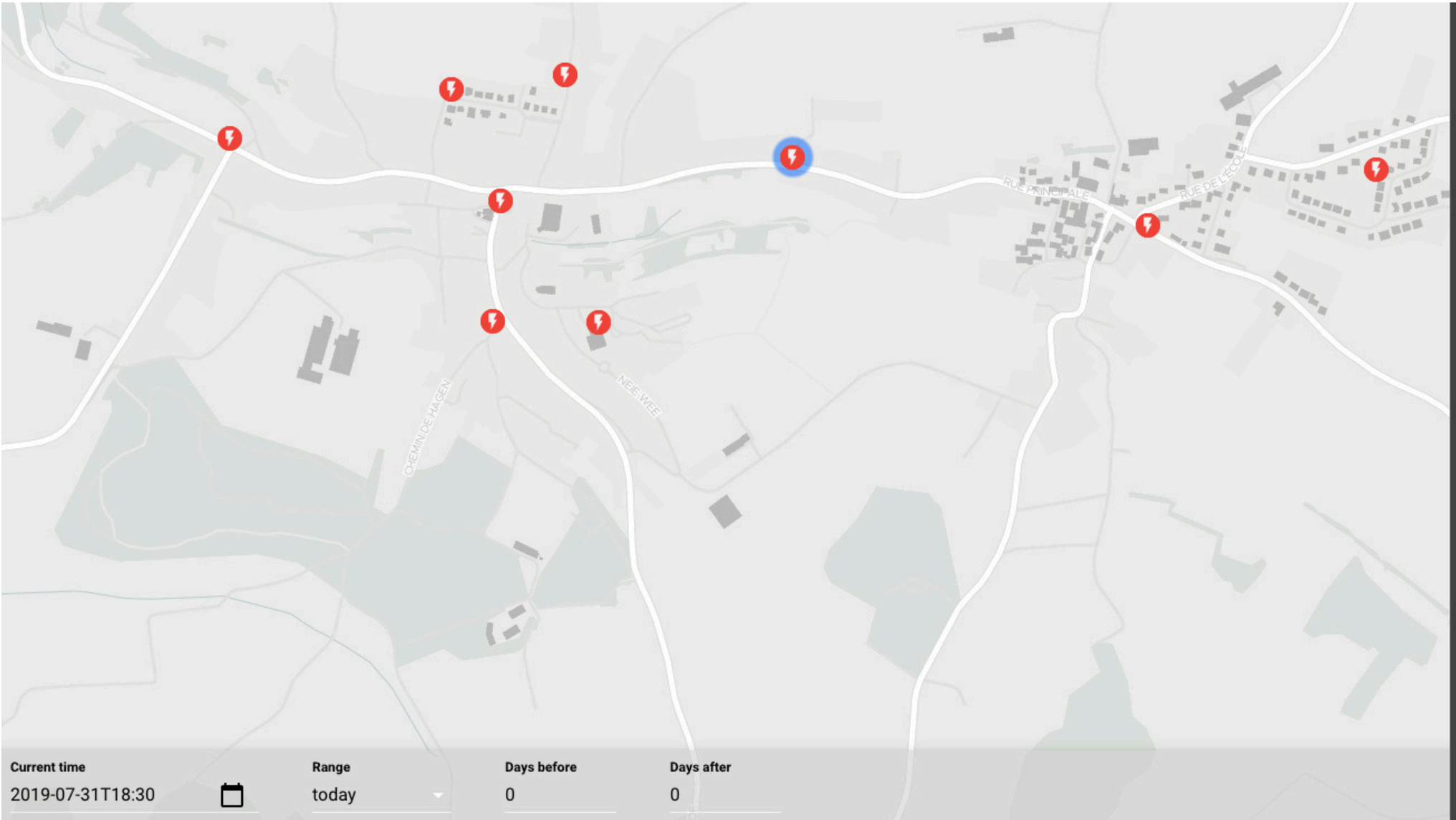


Inferring The Flows Direction (Real Or Predictions)



ADVANCED OPERATIONAL DECISION FEATURES

What-If Simulation Of Fuses



Data Concentrator

Serial # 1000506460

Departures

Ident	GIS	Inf.	Sim. 1	Sim. 2
N02				
N03				
N04				
N05				
N06				
N07				

CANCEL APPLY

Current time	Range	Days before	Days after
2019-07-31T18:30	today	0	0

Contact Us

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WRLAUSITZ

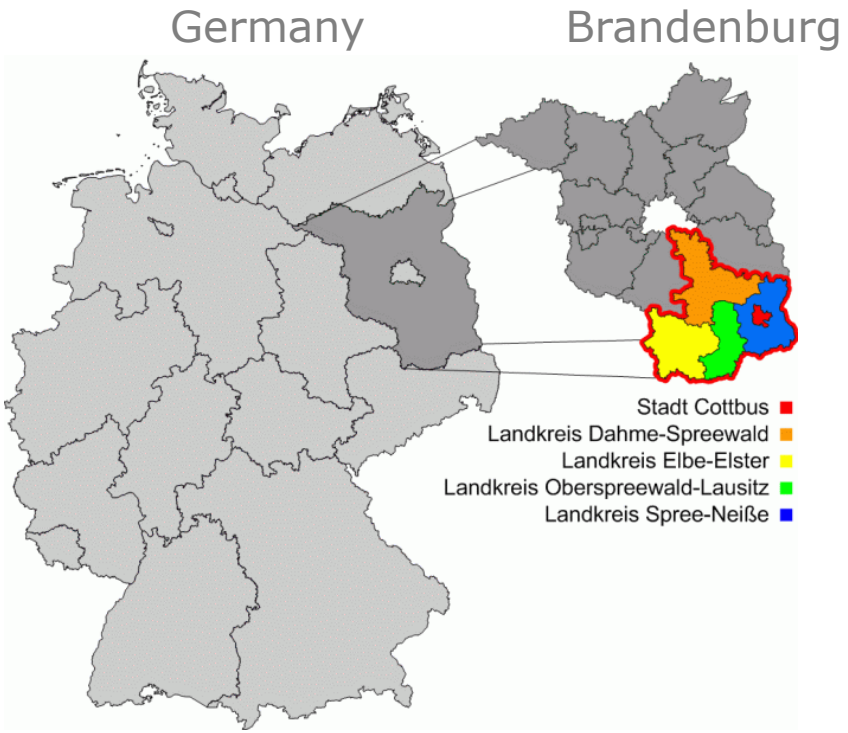
HYDROGEN REGION LAUSITZ

Brussels, 1.10.2019

IKEM ENERTRAG energiequelle ENERGIE MIT ZUKUNFT. ontras

Lausitz: A model region for structural change

- For decades: Lignite-based energy region
- Latest developments: German Energy Transition → Coal phase out
- Today: Lausitz is set to become an Europa-wide pioneer **in renewables, energy storage and sector coupling**
- Perspectives: Structural change to continue securing energy supply



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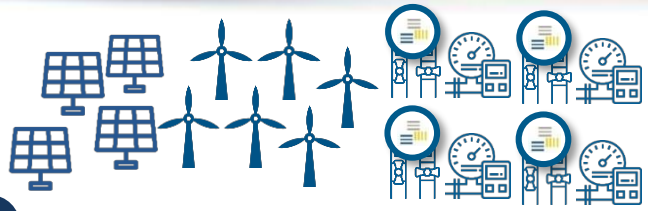
Technical concept of the Hydrogen Region Lausitz



1

Hydrogen hub Bahnsdorfer Berg
50 -100 MW electrolyzer capacity

ontras Gastransport GmbH

3

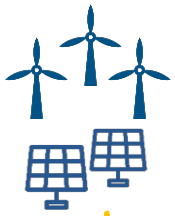
Gas transport network

Electricity | H_2 | Green H_2 gas | Natural gas

Local gas grid

2

Urban customer
Green H_2 gas for heat



2

H_2 Mobility
H_2 filling stations
50 buses for public transport

Local hydrogen generation
Each 5 -10 MW electrolyzer capacity

2

Industrial customer
Green H_2 gas for the industry

2

Direct marketers
Green H_2 gas for customers

IKEM ENERTRAG energiequelle ENERGIE MIT ZUKUNFT. ontras

Holistic energy transition

Hydrogen region Lausitz

1 Generation: Green H_2

- Bahnsdorfer Berg (Lausitz): 50 -100 MW Electrolysis with feed into the gas network
- Utilities and administrative district in the Lausitz: 5-10 MW electrolysis for public transport per location
- Local wind and solar power generation

2 Use: Sector coupling

- Industry: Green H_2 gas as natural gas substitute (BASF, ArcelorMittal in Eisenhüttenstadt, etc.)
- Heat: Green H_2 gas as natural gas substitute for heat (Cottbus, Potsdam, Leipzig, Lübben, etc.)
- Transport: 100% H_2 locally produced for public transport

Reconversion

- Local: Fuel cells at today's end customers with gas heaters
- Central: Gas power plant

3 Gas transport network as year-round storage for green H_2

4 System control

- *Sales of locally produced green hydrogen per blockchain*
- *Planning the conversion of individual quarters to 100% hydrogen*

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Next-generation IoT infrastructure for the Energy sector & more

Brussels, 1 October 2019

ICE Gateway GmbH

- SME founded in 2013
- HQ in Berlin, Branch Office in Prague
- 30 employees, 10 nationalities
- Focus on innovation: 15 patents, 17 pending
- Winner of Cisco and Alperia innovation prizes

- Implemented projects in 6 EU countries
- Top partners in the field of energy distribution, LED lights, telecommunications, system integration, facility management, IoT devices
- Experience in developing and implementing projects with large companies & SMEs

Expertise: Plug & Play IoT infrastructure..

Gateway

Ecosystem

Devices

ICEG & Partners

iceMEC

- Edge Computing unit
- Any device: All protocols & RS485/USB/Ethernet
- DC power for sensors
- Wi-Fi, Bluetooth, BLE, Ethernet, PoE, Beacons, Wireless Module (M2M), LoRa, W-MBus, DALI
- Intra-Cloud & GPS
- Watch dog
- Remote maintenance
- 2048 bit authentication & 256 bit encryption

iceNET

- Secure connectivity: iceM2M networks
- Private APN
- Secure connection
- DNSSEC
- Thresholds for cost control
- Internet: SIM/Wi-Fi/Ethernet
- 24/7 monitoring
- Alert systems
- Notifications
- Encrypted communication

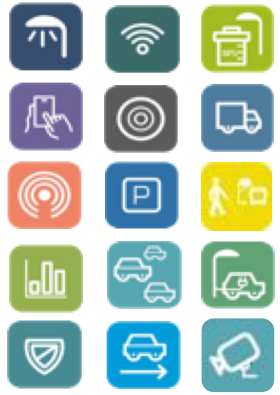
iceCLOUD

- Cloud portals for data visualisation & commands
- Tier III Hosting / On-premise
- Database / big data
- Backups
- Data usage control
- Data analytics
- Auto recovery
- Over-the-air Firmware Updates

Open API

- Partner Platforms
- Data & commands
- **AI** systems

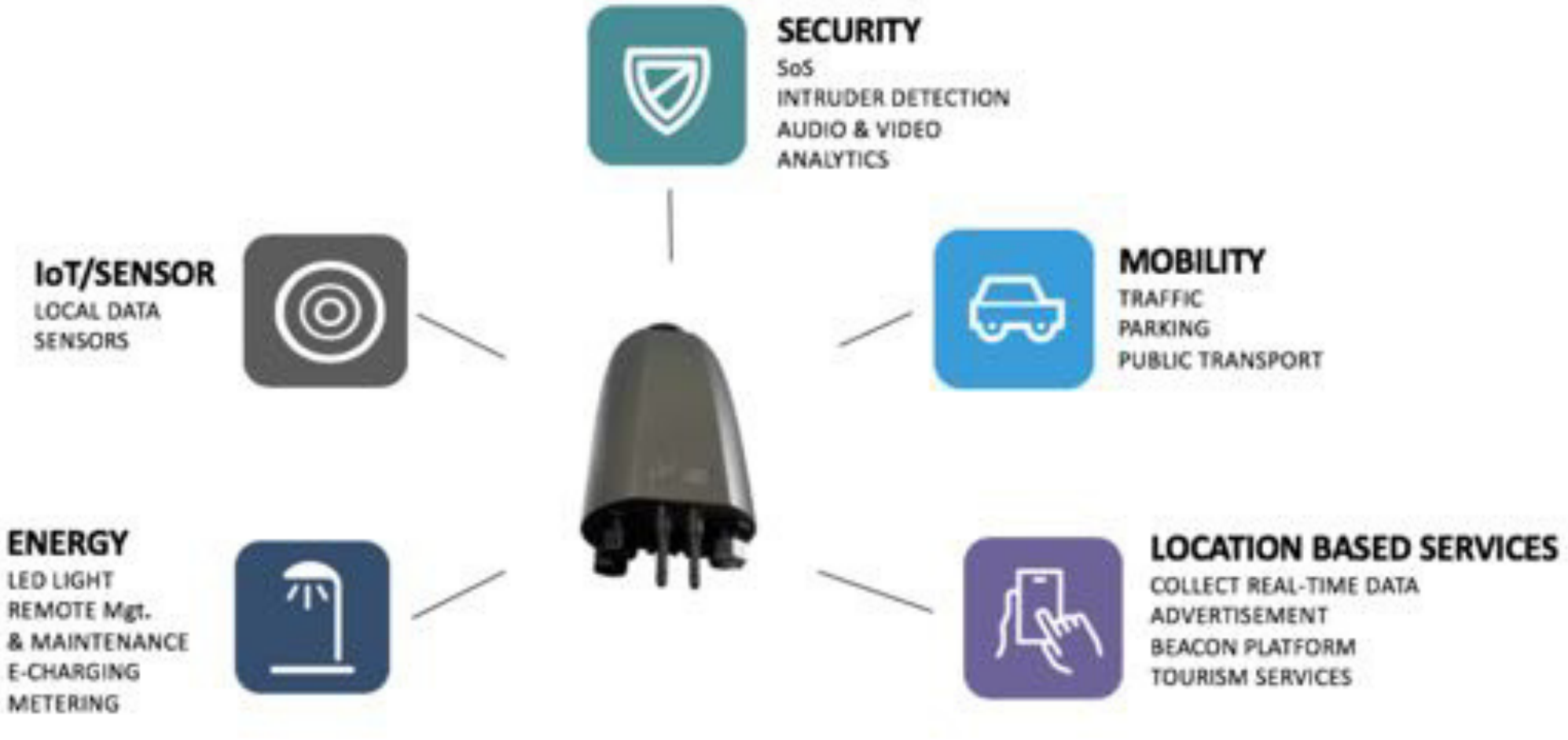
iceSTORE



ICE & Third party **IoT-Apps**

24/7 **support** : iceTICKETING

..for projects covering Energy & more



Expertise & Offer

- ✓ A **turn-key test-bed infrastructure** for sensors or use cases in the field of energy
- ✓ An **innovative edge gateway** for multiple sensors at the same time (wired or wireless) : smart meters, equipment monitoring, environmental data, traffic monitoring, tracking, security, etc.
- ✓ **Integrated connectivity** : flat rate data rates, cost thresholds, data hosting included
- ✓ **Highest security** for data collection & transmission: M2M networks, no IP address, private VPN, encryption, 256-authentication, data backup and recovery
- ✓ **Open system**: compatible with any (legacy) data platforms via open APIs
- ✓ **Ready-to-use IoT solutions** in the field of energy efficiency, security, smart mobility, IoT sensors, etc
- ✓ Framework for **developing new IoT apps & easy OTA deployment**
- ✓ Large **portfolio** of own sensors and from reputable partners to apply in novel use cases
- ✓ New **business models** for energy utilities, infrastructure managers, cities, lighting producers, sensor manufacturers and IT&C companies.

Thank You

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The University of Rome Tor Vergata and the SCERG Research Group

The University of Rome Tor Vergata

- **600-hectares campus**
- **33.000** students
- **3.000** academic and administrative staff
- **6** Schools
- **18** Departments
- **6** libraries
- **29** computer labs
- Conference centre **Villa Mondragone**
- **106** graduate programmes (A.Y. 2018-2019)
- **140** postgraduate courses
- **50** specialisation schools
- **32** PhD programmes
- **10%** of the students enrolled from over 120 countries

http://web.uniroma2.it

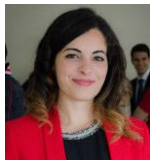
SCERG Research Group

Sustainable and Clean Energy Research Group

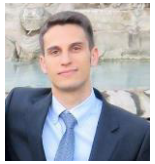
Prof. Stefano Cordiner
Full Professor

Prof. Vincenzo Mulone
Associate Professor

Dr. Lorenzo Bartolucci
Research Assistant



Marina Santarelli
PhD Student



Stefano Pasquale
PhD Student

The group is active in the following research fields

- Renewable energy (PV and wind integration, biomass fuel production, wind turbines)
- Hydrogen (Fuel Cells, Electrolyzers and system integration)
- Sustainable mobility (Design of Hybrid and Electric Vehicles including fleet management)
- Clean combustion (Dual fueling, lean natural gas)
- More details available on http://macchine.uniroma2.it
- Contact: mulone@uniroma2.it

Hybrid Renewable Energy Systems (HRES) (1/2)

http://fcpoweredrbs.eu/

Background

the project FCPoweredRBS has been funded in the FCH-JU to demonstrate H2-based power supply solutions for telecom stations through Fuel Cell Technologies

Organizations involved: ERICSSON, University of Rome Tor Vergata (Uniroma2), Dantherm, GreenHydrogen.dk, JRC

Facts

12 units have been installed and demonstrated in Italy, for 1 year operation.

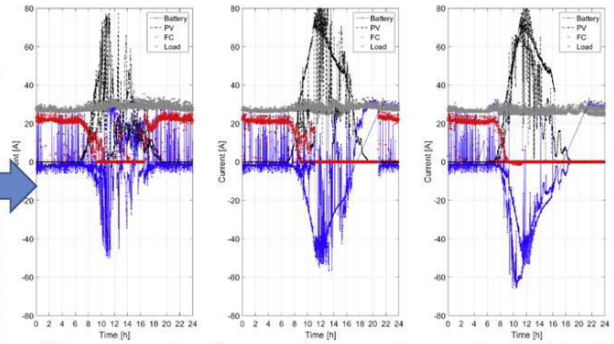
Data have been analysed and synthesized through the use of dimensionless performance parameters for design purposes (see Cordiner et al., Applied Energy, 2017; Bartolucci et al., Applied Energy, 2019).

Plans for the future

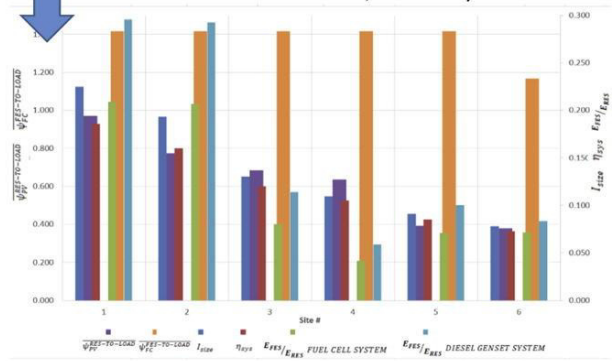
The experience gained in this project will be used for the application of further proposals extending the number of units, hours operation, or to better assess performances of similar systems with the experimental data collected.

We have extended the system purposes to more general applications to implement the Distributed Generation concept (see next slide).

Annual testing of 13 Hybrid Renewable Energy Systems (HRES) on the field for off-grid telecom applications coupled to real Radio Base Stations (RBS) in service

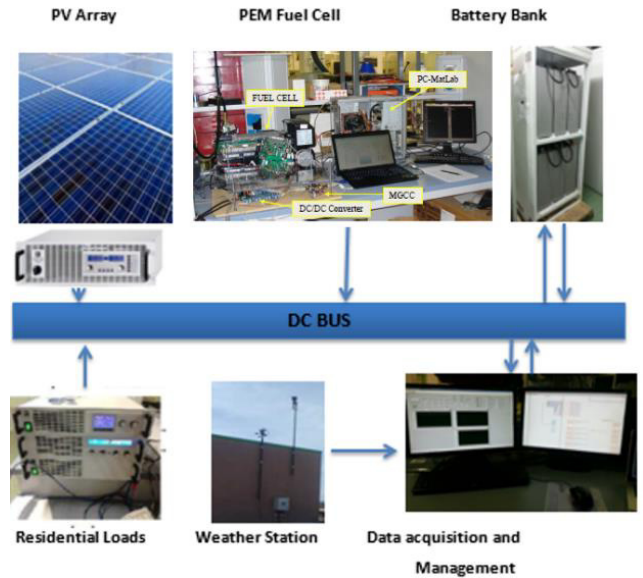


Measurements of power plots over time on the field for 6 HRES out of the total 13, over the year



Calculation of synthetic performance parameters describing the performance of the 6 HRES over the year

from Applied Energy, 2017



test rig at the Tor Vergata lab

Hybrid Renewable Energy Systems (HRES) (2/2)

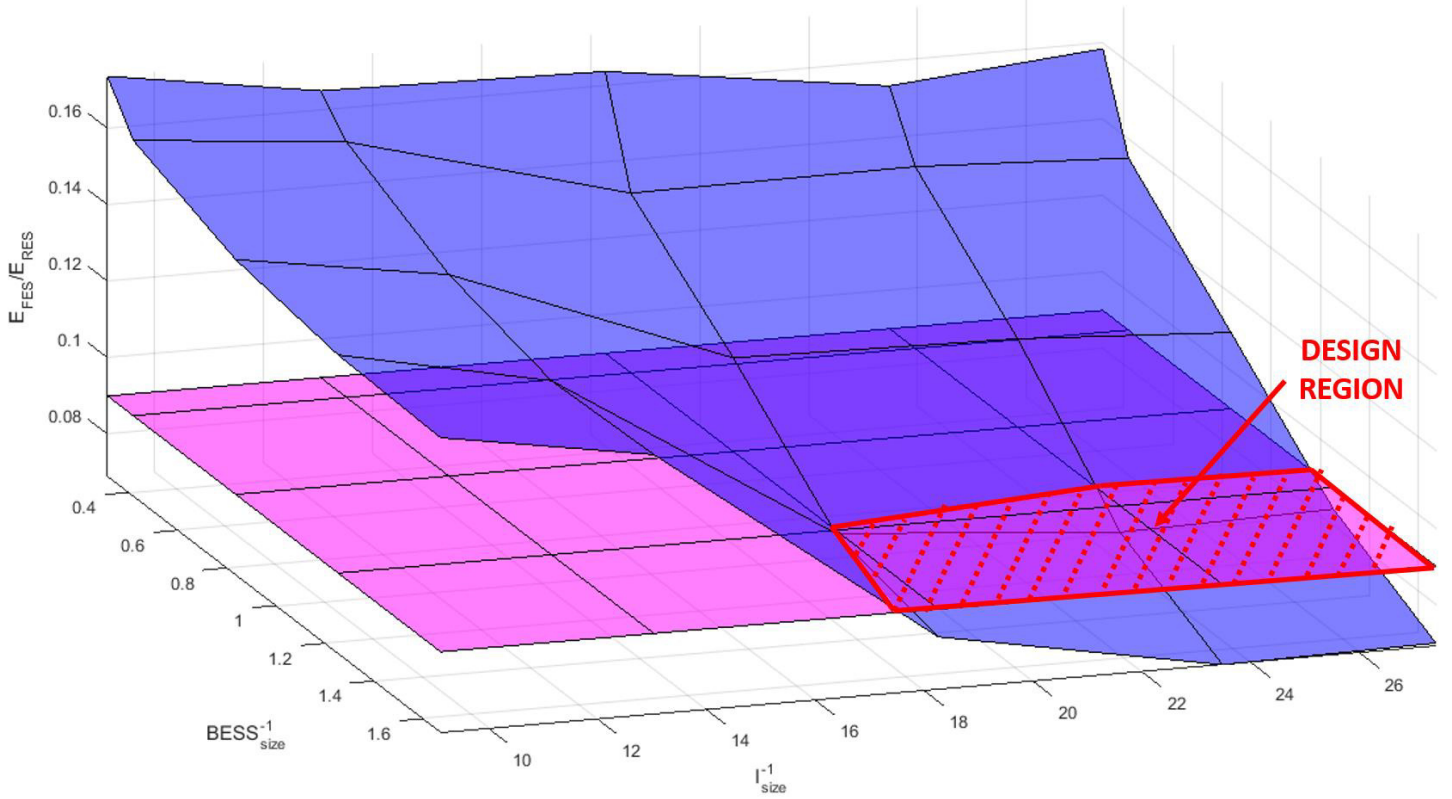
Application to Distributed Generation

Hybrid Renewable Energy Systems supply performances can be measured over the year in terms of independence on fossil fuels (Efes/Eres parameter in the figure).

Increasing the normalized battery capacity (1/BESS parameter) and the PV panels peak power (1/Isize parameter), the independence on fossil fuels gets to saturation.

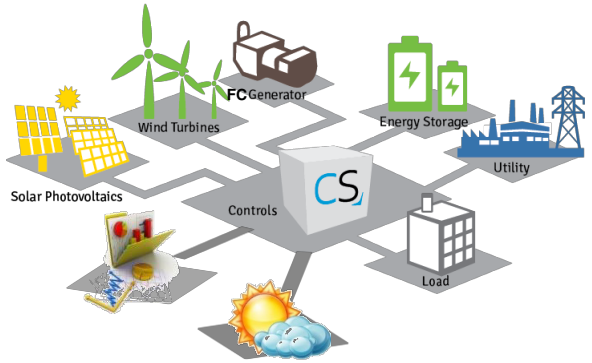
The system must be designed to operate in the optimal area (see Figure).

Also, the impact of the design choice on LCOE, CO_2 emissions and LCA in general must be considered toward the implementation on a significant scale of such solutions.



Target

We want to understand the variation of these surfaces in different regions of Europe, taking into account the influence of boundary conditions (e.g. network connections) and system control strategy (e.g. predictive controllers and load demand response).



Input:

- Actual load
- Actual production from renewables

Output:

- Fluxes with the grid, optimal FC generator output

Biomass conversion processes for efficient bio-fueling

Background

The use of bio-fuel has a keyrole in the decarbonization plans design to increase the sustainability of energy production for stationary or mobile applications. The selection of the most suitable biomass to fuel conversion path is key to achieve high techno-economical benefits.

Facts

In our lab we studied both bio- and thermo- chemical paths and their integration (see figure).

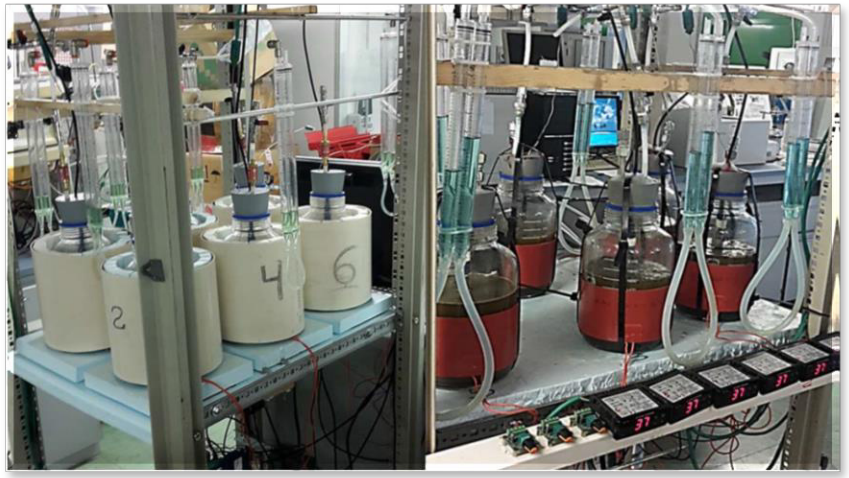
Target

We want to understand the potential of such technologies across different sites in Europe, characterizing the biomass availability and potential for integration with other renewable sources.

Plans for the future

Further investigation of the integration of different processes (fermentation + AD, HTC + AD).
Novel separation processes for bio-fuel (ethanol micro-filtration, biogas upgrade processes)
Study of performance in ICEs or GTs.

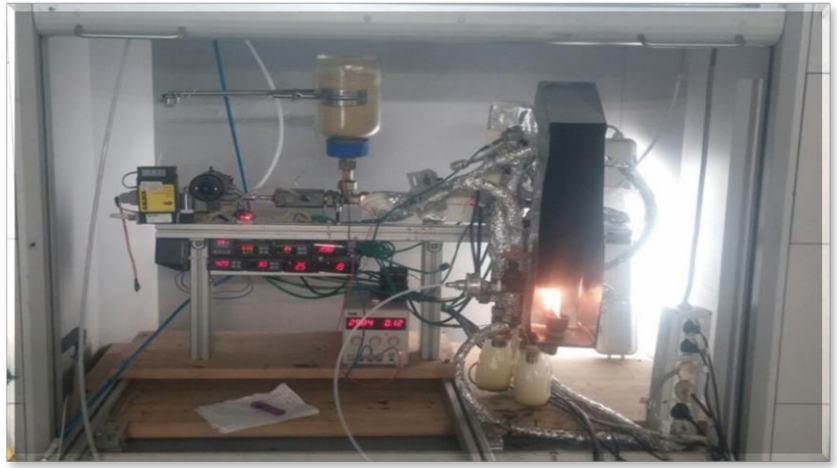
BIO-CHEM



High-efficiency anaerobic digestion process (up to 70% CH4 biogas yield)
Use of different biomass feedstock (organic solid waste, spent coffee), phytodepuration plants, etc): up to 254 ml CH_4/gVS

Integration between the two technologies: production increase up to 491 mL/gVS with hydro-char integration, and up to 500 mL/gVS with biochar from pyrolysis

THERMO-CHEM



Max bio-oil production at 500°C; pellet bio-oil yield of 66%; spent coffee yield of 56%.
Bio-char from pyrolisis of Ampelodesmos mauritanicus used in Anaerobic Digestion with LHV of 26 MJ/kg

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POZZI LEOPOLDO

With over 130 years of experience in manufacturing machines for the textile industry, POZZI also provides excellence in the field of ENERGY RECOVERY from polluted waters with the patented *RHeX* self-cleaning rotating heat exchanger.
In line with the drive for sustainability, POZZI has taken part in several EU-funded projects and activities:

LowUP

Low valued energy sources UPgrading for buildings and industry uses http://lowup-h2020.eu/

The LowUP project has received funding by the European Union's Horizon 2020 Research and Innovation Programme under Grant Agreement n°723930.

EUGATEWAY BUSINESSAVENUES

EU Gateway | Business Avenues is an initiative funded by the European Union helping European companies to establish long-lasting business collaborations in Asia. POZZI was selected four times to attend this kind of event, participating twice in Japan and twice in Korea.

LC2W CARBON BUSINESS ACTION BRAZIL

The project Low Carbon Business Action is a European-funded initiative that aims at engaging SMEs from Brazil and from Member States in Europe to promote the sustainable transition to low carbon technologies and resource-efficient processes.

Since 1885

POZZI

RHEX: ROTATING HEAT EXCHANGERS

Made entirely of 316L stainless steel, POZZI **self-cleaning**, **fouling-proof**, **maintenance-free** heat recovery unit has a central heat exchanging element continuously kept under rotation by a small motor.
Perfect for treating very dirty and/or viscous effluents, the simple, yet efficient *RHeX* design allows for implementation in many different fields of application while maintaining a high performance rate over the years.
We have installed more than 5,000 systems worldwide, proving that this one-of-a-kind technology is an excellent tool for circular economy and environment-friendly projects.

Increasing energy costs make the installation very effective, as every medium size POZZI exchanger, in a year use, can produce energy savings in excess of 4,000 MW, i.e. energy roughly similar to burning 400,000 Sm3 of natural gas. This would produce 800 tons of CO2 emission in the atmosphere.

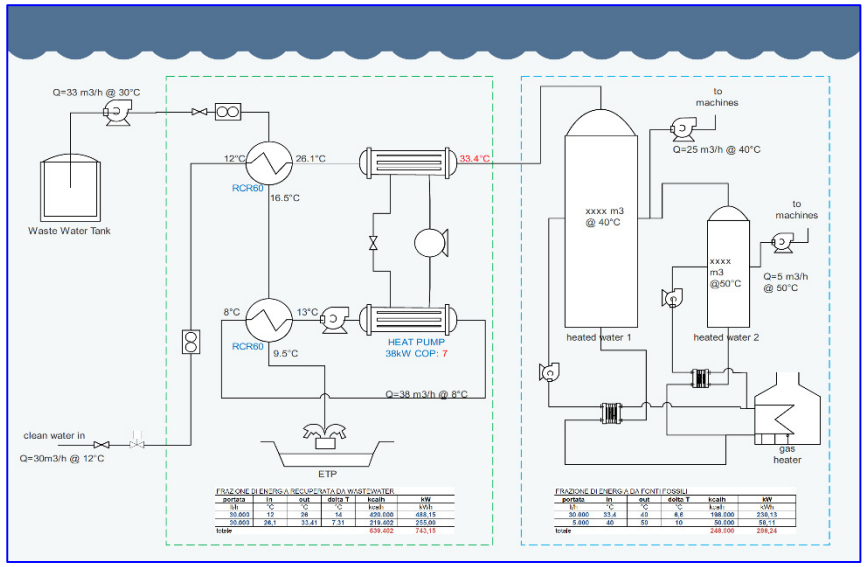
Should we want to counteract such release of CO2, we would have to plant 1,100 trees!

RESULTS	Q = 172,974 kcal/hr	Power (kcal/hr)
	Q = 201 kW	Power (kW)
	Ɛ = 80.5 %	Efficiency

Th in= 75.0°C Tc in= 32.0°C

Tc out= 66.6°C Th out= 40.4°C

OUR GOAL

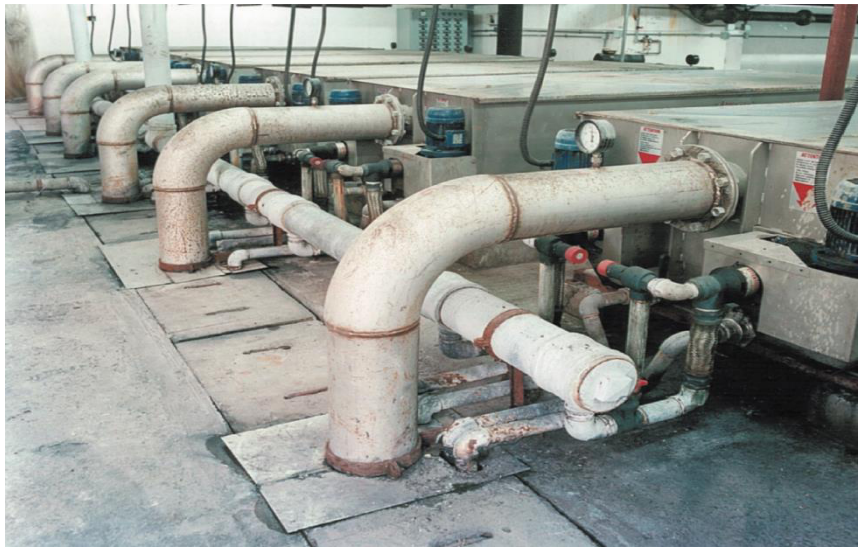


What we are looking for:

- Find partners in projects that could employ our rotating heat exchanger for dirty effluents in combination with heat pumps for highly efficient heat or chill recovery and/or city sewage wastewater treatment plants.
- Contribute to a safe and sustainable low-carbon and low-input economy

What we offer:

- Expertise in energy-saving projects
- A patented, highly efficient system for heat recovery
- Familiarity with the procedure of EU projects
- Engineering consultancy



CONTACTS

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Via Paganini, 14
I-20825 Barlassina MB
ITALY

T: +39 0362-90811 E: info@pozzi.it

www.pozzi.it www.pozzienergy.it

Follow us !

Contact person:

Mr. Alberto Pozzi (CEO) – alberto.pozzi@pozzi.it

Ms. Maria Antonella Leone (COO) – antonella.leone@pozzi.it

Mr. PierLorenzo Bowen (Engineering/Sales) – pierlorenzo.bowen@pozzi.it

Ms. Giulia Ratti (Sales) – giulia.ratti@pozzi.it

Member of WORLD ALLIANCE for EFFICIENT SOLUTIONS by SOLARIMPULSE FOUNDATION

ACIMIT ITALIAN TEXTILE MACHINERY

Elevator Pitch

Presentations of current ideas and projects from selected EU regions

Berlin Partner for Business and Technology

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Business Support on Your Doorstep

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VSB TECHNICAL UNIVERSITY OF OSTRAVA | IT4INNOVATIONS NATIONAL SUPERCOMPUTING CENTER

IT4INNOVATIONS NATIONAL SUPERCOMPUTING CENTER & ENERGY

- 736 nodes
- R_HPC 13,6 PFlops/s
- R_AI 100-150PFlops/s

ARTIFICIAL INTELLIGENCE

EuroHPC Joint Undertaking

EUROPEAN UNION
European Structural and Investment Funds
Operational Programme Research, Development and Education

MINISTRY OF EDUCATION, YOUTH AND SPORTS

Pavel Praks

pavel.praks@vsb.cz
420 597 329 572

IT4Innovations National Supercomputing Center
VSB – Technical University of Ostrava
Ostrava-Poruba, Czech Republic
www.it4i.cz

Brussels, 1.10.2019

ENERGY: HPC APPLICATIONS

MACRO

MEZZO

MICRO

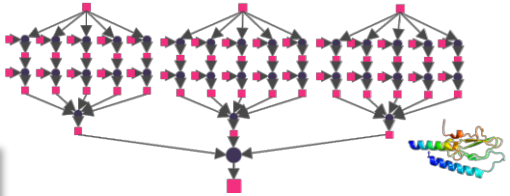
NANO (Å)

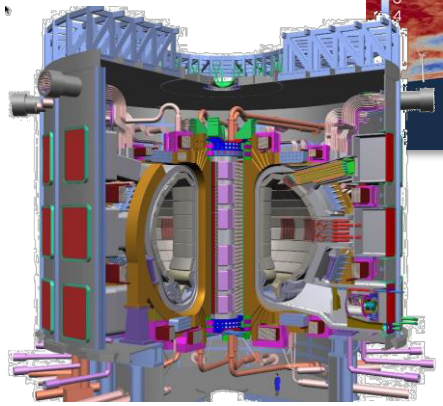
SCALE

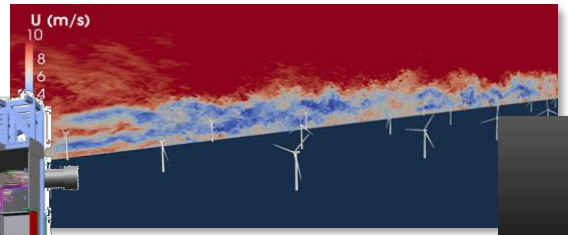
NCE NÁRODNÍ CENTRUM PRO ENERGETIKU

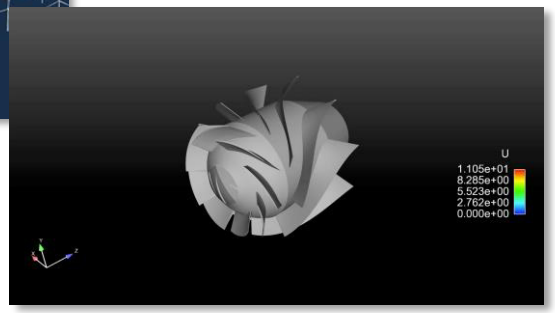
ARTIFICIAL INTELLIGENCE

HyperLoom

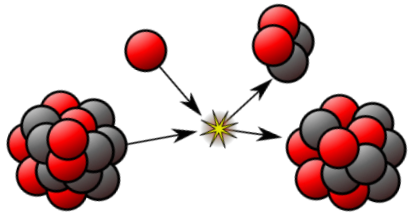


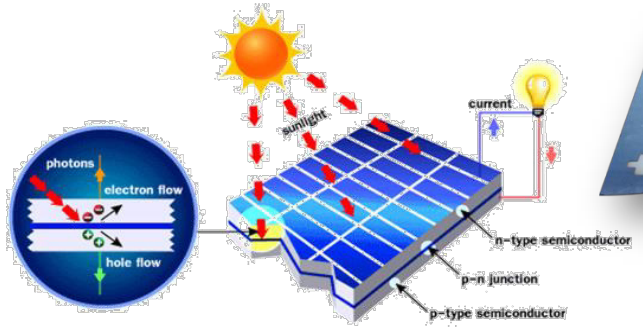


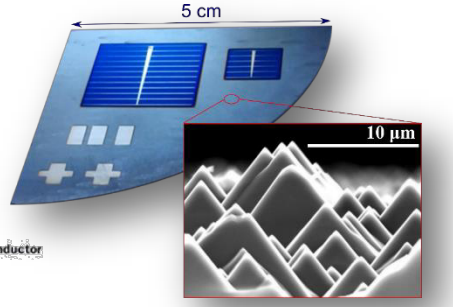




EXCAPE







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Co-funded by the Horizon 2020
Framework Programme of the European Union
Grant Agreement Number 825532

Large-scale EXecution for Industry & Society

www.lexis-project.eu

Topic:	HPC and Big Data enabled Large-scale Test-beds and Applications / ICT-11-2018-2019 (IA Innovation action)
Target:	**LEXIS project will build an advanced engineering platform** at the confluence of **HPC, Cloud and Big Data which will leverage large-scale geographically-distributed resources** from existing HPC infrastructure, employ Big Data analytics solutions and augment them with Cloud services. Driven by the requirements of the pilots, the LEXIS platform will build on best of breed **data management solutions** (EUDAT) and **advanced distributed orchestration solutions** (TOSCA), augmenting them with new efficient hardware capabilities in the form of **Data Nodes and federation**, usage **monitoring and accounting/billing supports** to realize an innovative solution.
Coordinator:	Jan Martinovič, IT4Innovations, VSB-TU Ostrava
Budget:	14,036,272.5 euro
EC Contribution:	12,218,545.5 euro
Partners:	16
Project duration:	January 2019 – June 2021

INTERNATIONAL PROJECTS

Large-scale EXecution for Industry & Society

Performance Optimisation and Productivity

Superheroes4Science

- supported by
- Visegrad Fund

Elevator Pitch

Presentations of current ideas and projects from selected EU regions

Berlin Partner for Business and Technology

Bavarian Research Alliance

enterprise europe network
Business Support on Your Doorstep

European Commission

Invention: Pneumatic controlled ORC Motor

THERMOTIVE

Advantages:

- High efficient engine with few moved parts
- No mechanic valve control required
- Boxer-Motor → Vibration Compensation
- Double acting piston → low piston velocity

Energy Conversion:

- Wet ORC operation possible
  → only little evaporation energy required
- min. Input Temp 90 °C → 8% el. Power
- Low power applications possible → 5 kWel

About THERMOTIVE

THERMOTIVE

Company status:

- Founder Gerhard Schilling 53 yrs. Dipl. Ing. (FH)
- Protype of ORC Engine tested
- Development partners for Motor- and ORC-components found
- info@thermotive.de Tel. 0179-245588

What are we searching for?

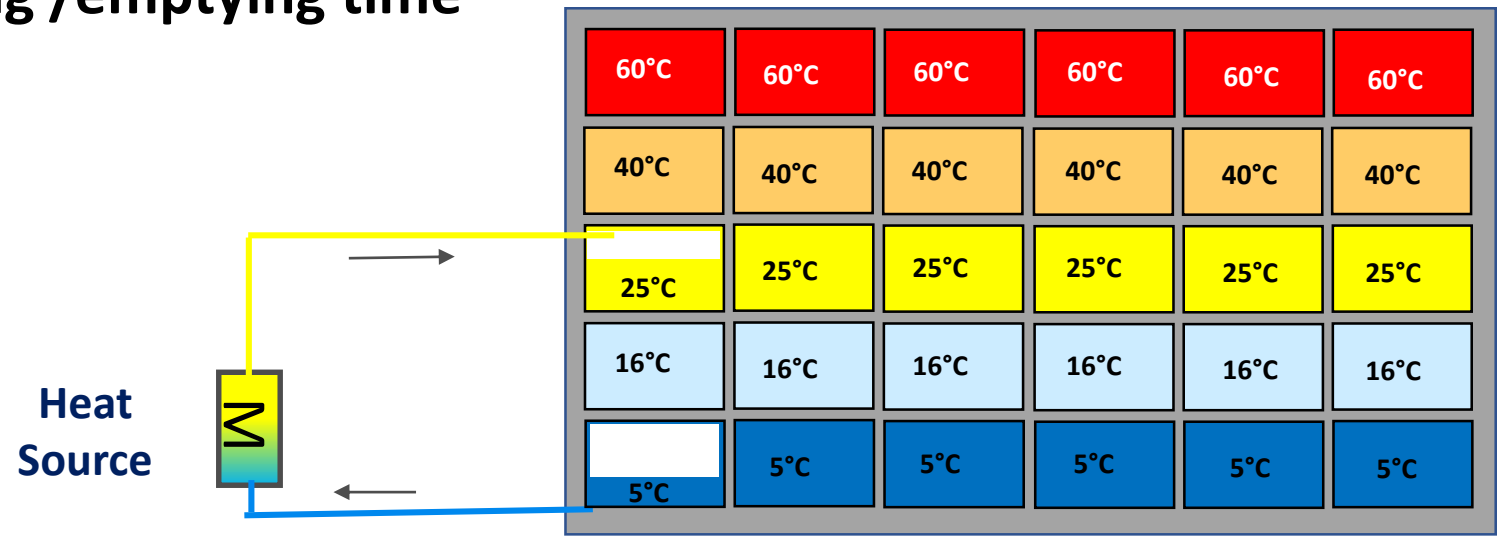
- Target applications with 50 – 500 kW_th waste heat >90°C and an operation time >5000 h per year
- Partner for national or EU funding programmes together with ThermoCube

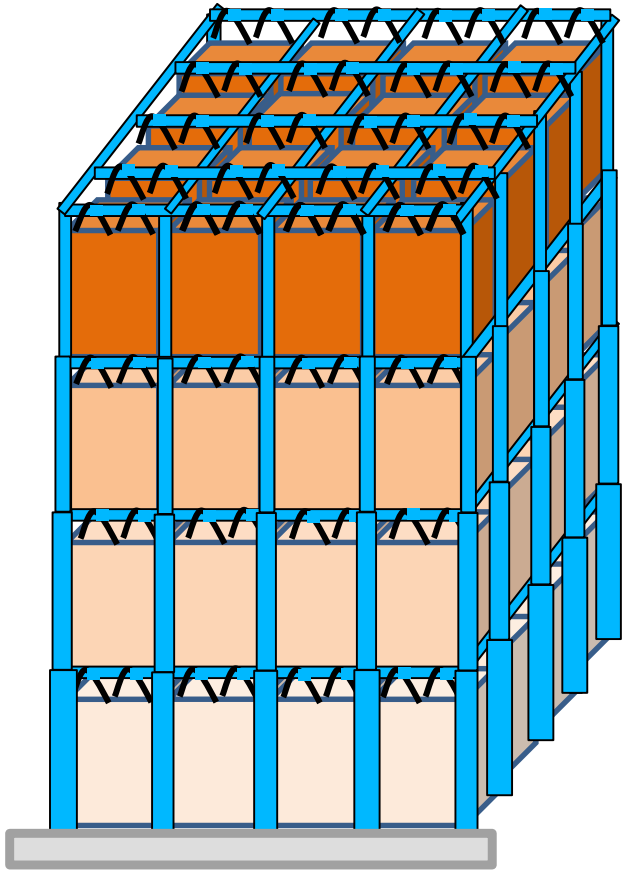
Invention:

Pressureless Plastic-Foil Heat/Cold-Storage

- Consisting of multiple low cost heat-cells (max. 100°C)
  →material cost only 10% of current Metal-Storages (1.000 – 10.000 m^3)
- Parallel usage as Heat- and Cold-Storage System
- Only one empty cell for transfilling required

→ No mixture of hot and cold medium → Highest Efficiency and extremely short charging /emptying time





ThermoCube

1. Adavantage:

Simple metal carrier (and not the container walls) carry the weight of a Cell

→ Stackable Cells

2. Adavantage :

Cheap plastic bags with simple isolation can be used

What are we searching for?

- **Partner for development and production of ThermoCubes**
- **Target applications**
- **info@thermocube.de Tel. 0179-245588**

Elevator Pitch

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Business Support on Your Doorstep

European Commission

I-care™ | PASSIONATE ABOUT RELIABILITY, COMMITTED TO YOUR PERFORMANCE ! |

I-care Company Presentation

I-care™

PASSIONATE ABOUT RELIABILITY, COMMITTED TO YOUR PERFORMANCE !

www.icareweb.com

WHAT DO WE DO?

Set up a new standard of excellence in predictive maintenance and reliability

Condition monitoring

- Measurement of:
  - Vibration,
  - Lubricants,
  - Thermography,
  - Ultrasounds,
  - Electrical
  - …
- Training
- Remote Data Analysis
- …

Reliability

- Long Term Operation
- Lubrication Excellence
- Total Productive Maintenance
- Energy Efficiency
- Reliability Engineering
- Inventory Optimization
- Training
- …

Engineering

- IT and R&D
- Engineering of New products
- R&D of new methods
- Technology Follow-up
- Wireless products
- Long-life industrial sensors
- Big Data collection for predictive maintenance
- …

ASSET MANAGEMENT

Improve and increase Asset Availability

Before & During & After Equipment Delivery

http://www.icareweb.com Cosme SOMOGYI E-mail: CMS@icareweb.com Mobile: +32 470 96 25 99

I-care™

PASSIONATE ABOUT RELIABILITY,
COMMITTED TO YOUR PERFORMANCE !

1. What do we do
2. Who do we Serve
3. Asset Management & Industry 4.0
4. H2020 Skills & Projects

www.icareweb.com

Who do we serve?

PROCESS

Oil & gaz (upstream/downstream), Chemical, Petrochemical

POWER GENERATION

Nuclear, Wind, Hydro, Combined, Coal/Fuel

MINING & EXTRACTION

Ciment, Mine, Quarry

OEM

Original Equipment Manufacturer

FOOD & DRUGS

Pharma, Biopharma, Food

MORE INDUSTRIES

We also operate in many other sectors

ISO

VCA VGM CHECKLIST ANNEMERS

Ex

MASE

IECEx

ASSET MANAGEMENT & Industry 4.0

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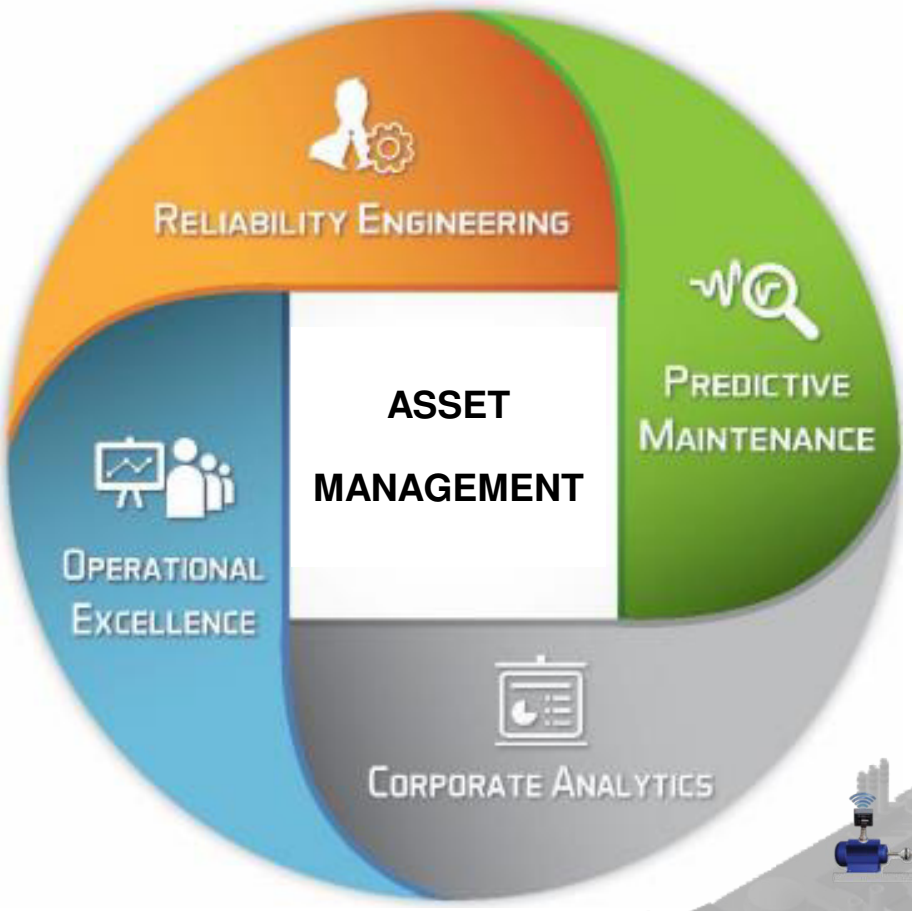

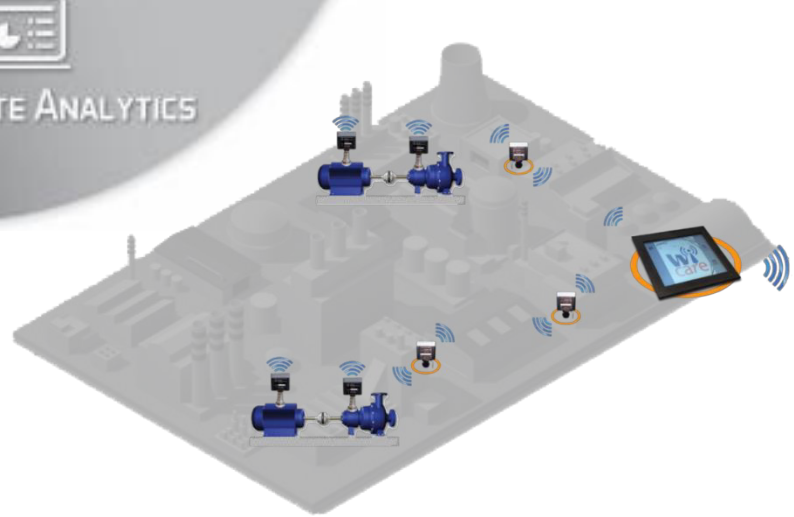

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www.icareweb.com

Skills/Knowledge as a partner

- Monitoring specific industrial assets
- Maintenance optimisation
- Providing tools for analysing the data
- Maintenance 4.0
  - Industrial IoT Sensors (see www.wirelessvibration.eu)
  - NoSQL databases
  - M2M communication technologies and frameworks for connecting various industrial sensors

Current H2020 Funded Projects in Industry 4.0

- H2020 PROPHESY project - Platform for rapid deployment of self-configuring and optimized predictive maintenance services
- Manunet Cofund BigDataMA project - Big Data application at MAnufacturing industry

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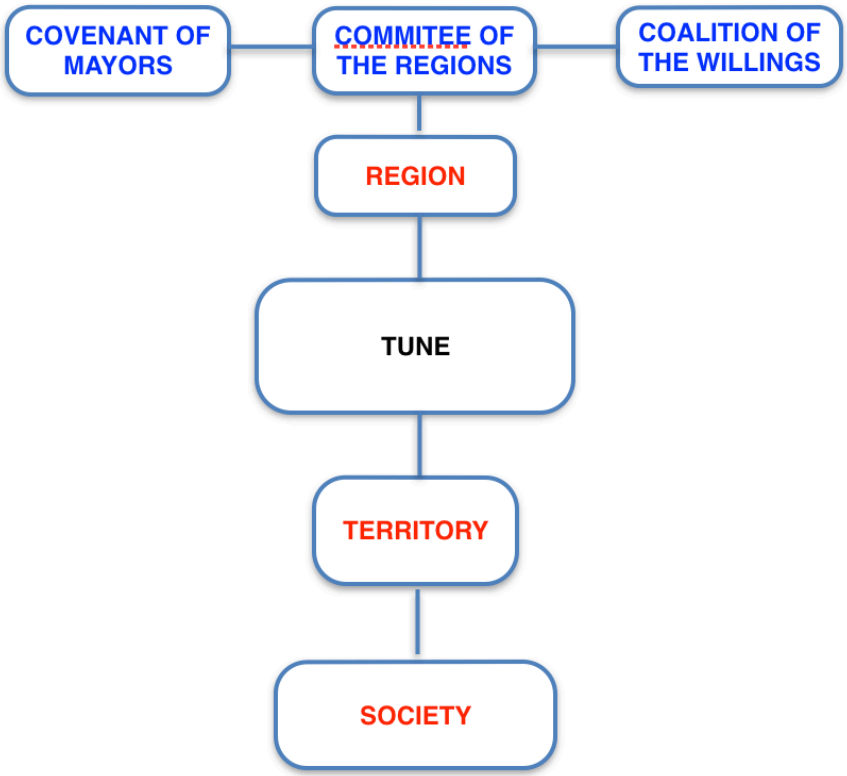
Elevator Pitch

Presentations of current ideas and projects from selected EU regions

TUNE Territory Utilities Network - Veneto

Tune is a Territory Utilities Network that operates in agreement with local Municipalities for the innovation of the community



Bruxelles 1 oct 2019

Renzo Taffarello, mob +39-348-2600413, email renzotaffarello@hotmail.com, www.tune-eu.it

WHERE

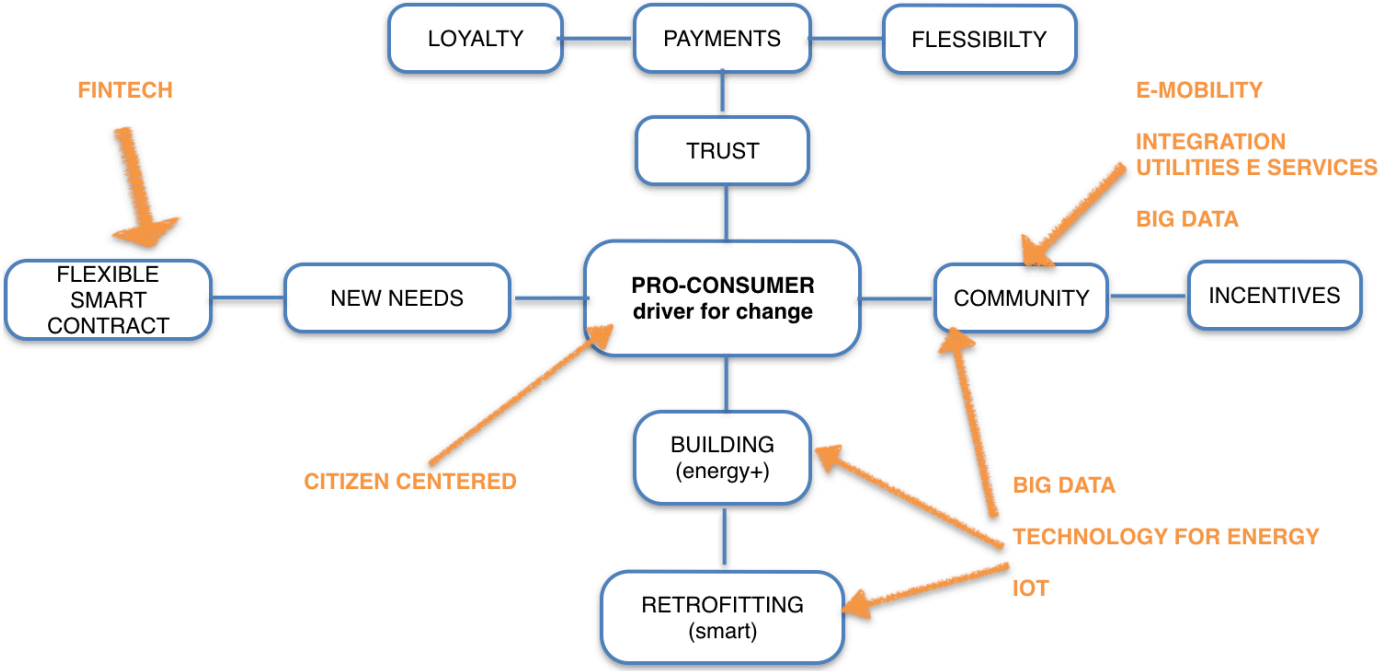
TUNE is the network of local utilities (water, waste, energy, transportation, social housing) that has the aim of enhancing the quality of the territory focusing innovation on digital platform, energy building and urban district management, smart mobility.

Shareholders of the Tune's utilities network are the local municipalities serving 750,000 citizens of the area of Treviso. Treviso area is north of Venice and spans from the Dolomite mountains to the Adriatic Sea, bordering Austria. It is one of the most active entrepreneurial area that has a company every 10 inhabitants, ranging from industrial to agricultural economic sectors, among them it is the heart of the Prosecco DOCG production, to the tourism industry.

Treviso area is top ranked in the export in Italy. The area counts Treviso airport (part of Venice airport), local department of Venice university and Padova university, and an international MBA program granted by the Iowa University (USA). Treviso hosted clusters of high-tech start-ups and spin off from companies and academic institutions.

Each utility works and operates independently but recently (2017) the need of moving into the digitalization of the economy took all utilities together in facing the challenges of incorporating the PRO-SUMER in their future plan (according the Eu policy), thus considering digital platform, IoT, Building energy management, smart microgrid, smart mobility challenges that need to be tackled working together: TUNE consortium has been formally set up in 2018 with that purpose, and represent a very unique situation across Italy and, in some degree, also in the Eu scenario.

WHY/WHAT TUNE



DIGITAL PLATFORM (Big Data, IoT, BlockChain)

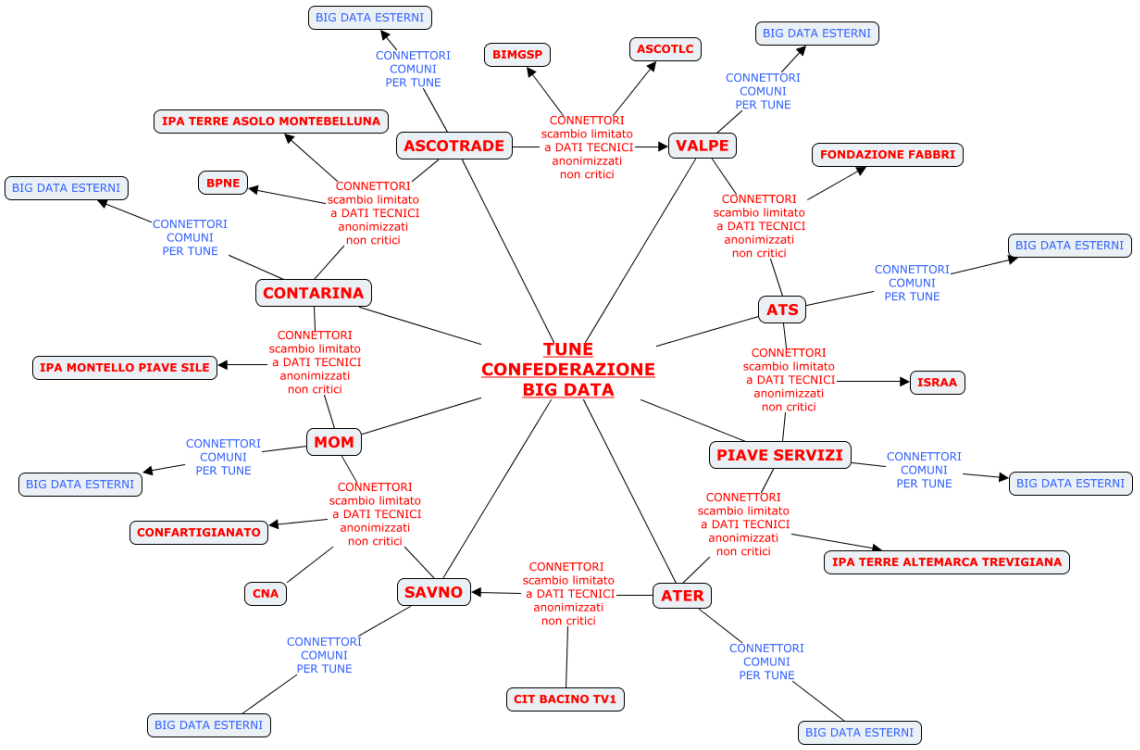
ENERGY (building, districts, energy poverty, efficiency, peer to peer)

SMART MOBILITY (e-mobility, sharing, community)

FOCUS ON BIG DATA CONFEDERATION

To create a B**ig Data Confederation** among Utilities data set of the Territory, to share data in a safe and interoperable way, useful to enable new services, better engagement of the citizen in using energy and local citizens centric local services, enabling ML/AI.

Big Data Confederation is about creating a **Common Big Data Infrastructure** to connect each company big data, open big data available, other data lakes and make the infrastructure available to each Tune's company, Municipalities and to the economic ecosystem of the area.



Elevator Pitch

Presentations of current ideas and projects from selected EU regions

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European Commission

Semilab Semiconductor
Physics Laboratory Co. Ltd.

www.semilab.com

Possible Semilab contribution to PV related EU projects

2019. 09. 24.

Standard, well established Measurement techniques

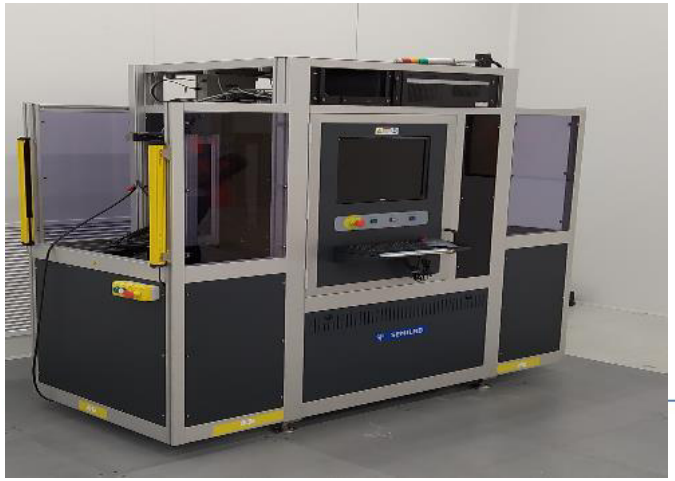
Measurement service / system / industrialization (integration to pilot lines)
using well established measurement techniques:

- **For bulk material / wafer characterization:**
  µPCD, QSS-µPCD, SPV, ePCD, IR imaging, PL imaging, Stress imaging, Optical inspection
  Mostly inline or integration is possible

- **For process / deposition / passivation control (line integration possible):**
  QSS-µPCD, non-contact sheet resistance (JPV), PL imaging, Ellipsometry

- Non-contact CV: D_{it} **characterization of dielectrics** (offline)

- Cell characterization: LBIC (offline), PL (inline)



Example: automatized PL system for HJT cells
at ENEL-GP (Ampere project)
With customized loading / unloading stations

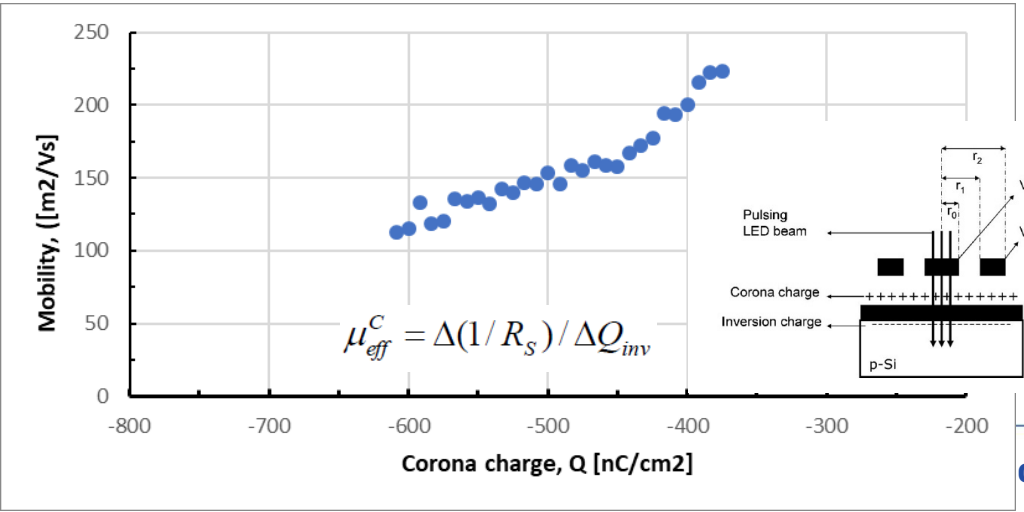
Novel characterization techniques for new applications

Using Semilab's versatile metrology experience we can **design, develop characterization techniques for new applications**. Not standardly accesible in PV labs.
Recent ideas / examples:

- Multi wavelenght / detector PL for tandem cells
- Non-contact sheet resistance and mobility for inversion layers
- Porosity / homogeneity characterization for epi-foil detachment
- High sensitivity µ-PCD for perovskites/ other thin film cells

Continous R&D activity in PV application, recent projects:

- Development of QSS-µPCD and QSS-PL
- Non-contact CV: D_{it} for modern dielectrics, Interface PID susceptibility
- Multi-metrology Study on oxide precipitate defects (SOLMAT, 2018)
- Differential JPV for modern Si PV cell concepts (2019)



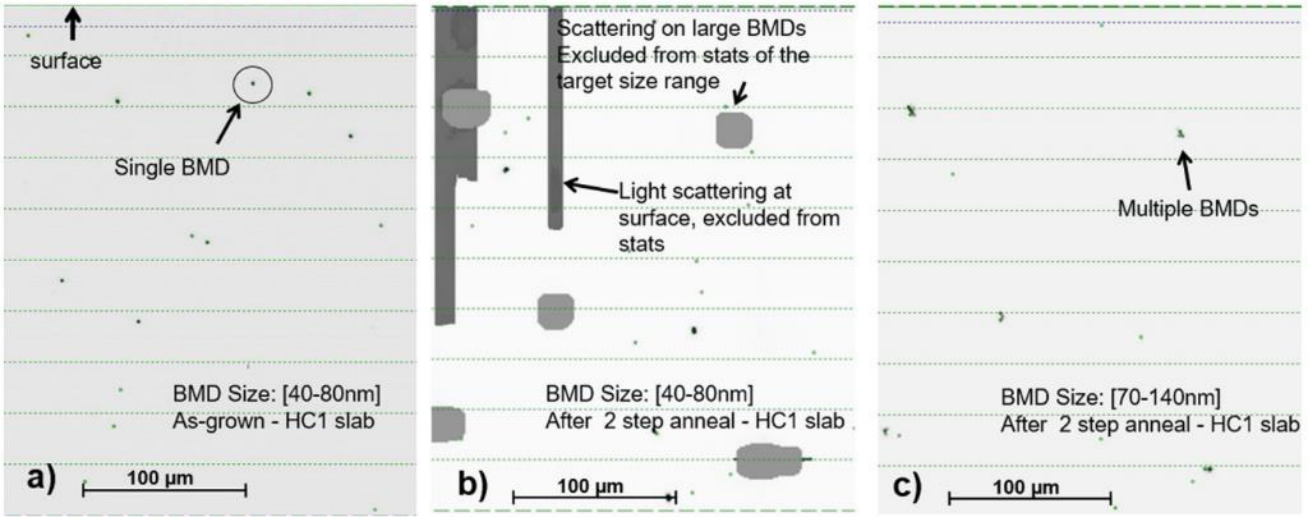
Example: Inversion layer mobility on PV dielectrics
Presented at PVQAT 2019 (China)

PV application of measurement techniques developed / used for IC industry

Semilab developed several measurement techniques for the IC industry. These methods are not accesible in PV labs. Semilab can provide measurement service for PV materials in EU projects.

Examples:

- Imaging polarimetry (stress imaging) to detect slip lines and other defects with stress field
- IR ellipsometry / reflectometry: e.g. for epi layers, porous layers, etc. (even with micron resolution)
- LST, Light Scattering Tomography for oxide precipitation studies
- Defect PL microscopy, micron resolution (EnVision) to reveal tiny crystal defects (e.g. precipitates)
- PDL Hall – Modulated Hall measurement for high resistivity / low mobility materials (e.g. perovskites)



Example:
LST images on silicon slugs before / after anneal (SOLMAT, 2018)

Elevator Pitch

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European Commission

Dr. Subhasis Thakur
Research Fellow
National University of Ireland, Galway
subhasis.thakur@nuigalway.ie

NUI Galway
OÉ Gaillimh

Past and current projects

Enerport: Irish Blockchain project for peer- to-peer energy trading

CENTS: Cooperative Energy Trading Systems

Scalable offline payment networks (IBM Ireland)

VistaMilk

Confirm
Smart Manufacturing

Insight
Centre for Data Analytics

Expertise we offer

Blockchains

- Scalability: Offline channels
- Interoperability
- Software development

Fintech

- Incorporation of payment and credit network into energy trade.
- Mining models to incorporate Banks.

IoT & Blockchains

- Scalability and Security
- Edge computing
- Machine to machine payment.

Market design

- Game theory
- Market models
- Mechanism design

Dr. Subhasis Thakur

subhasis.thakur@nuigalway.ie

Planned Projects

Better Blockchains

- Better Offline channels
- Efficient Interoperability
- Real time transaction confirmation

Fintech

- Inclusion of payment and credit networks into blockchain network for energy trade

IoT & Blockchains

- Machine to machine payments

Market design

- Better rules of sharing utility from energy trade (Enforcement, Fairness, Algorithm complexity)

Dr. Subhasis Thakur

subhasis.thakur@nuigalway.ie

Partner profile

- Electrical engineering.
- EV and EV charging station.
- Regulators (DSO, TSO).
- Fintech companies.

Dr. Subhasis Thakur

subhasis.thakur@nuigalway.ie

Elevator Pitch

Presentations of current ideas and projects from selected EU regions

Project Factory Presentation

September 2019

Electriq Global

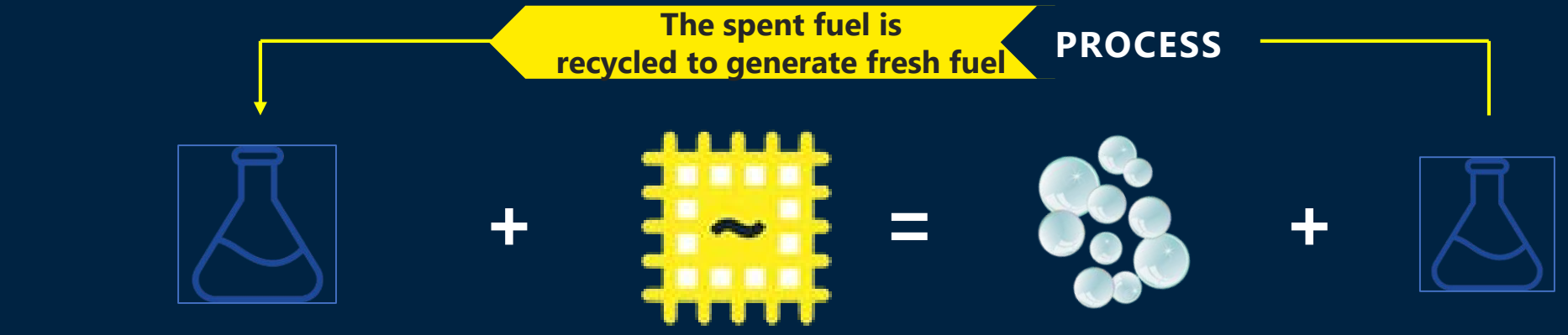
Inorganic Hydrogen Carrier (IHC) Technology

The race is on for the cost-effective, emission-free alternative to fossil fuels.

Our Electriq~Fuel is a competitive, clean-energy fuel alternative that is compatible with the present energy and petroleum infrastructure and business model.

Non-flammable, stored and transported in ambient pressure and temperature, this Hydrogen-rich fuel is used to generate electricity by feeding fuel cells with hydrogen, and is later reprocessed and recharged with hydrogen via our patented recycling process.

The Electriq Innovation



Electriq~Fuel

>83Kg H2 per M^3 (comparable to liquid H2 at 73Kg/M^3)

Electriq~Switch

Durable & cost-competitive

H_2

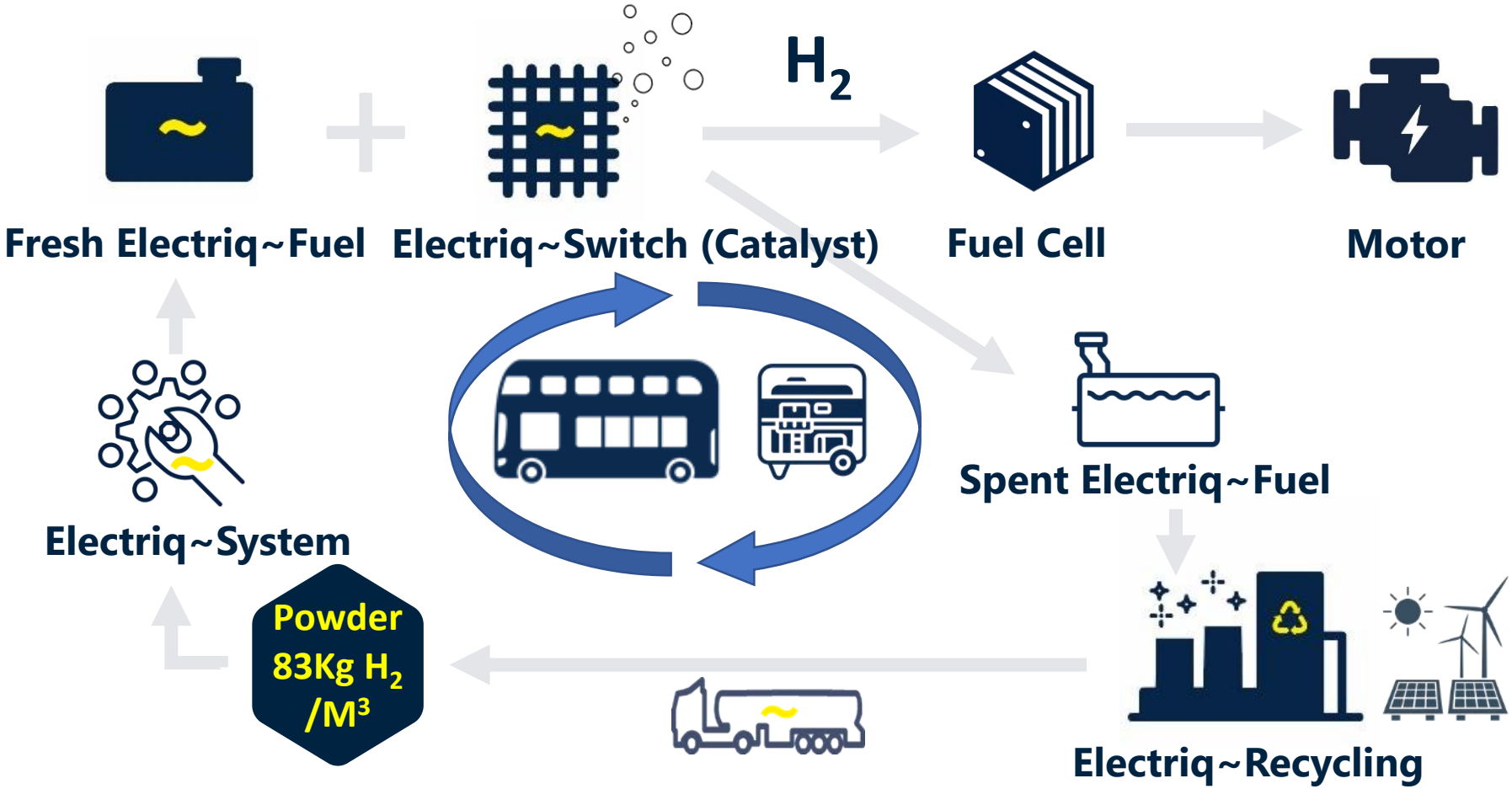
On-demand

Used Fuel

To be recycled

1. A process to produce and recycle a hydrogen-rich fuel (Electriq~Fuel) that is safer and as cost effective as diesel, in atmospheric conditions.
2. A catalyst (Electriq~Switch) to release the hydrogen on demand.

The Electriq~Global Eco-System



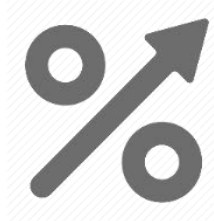
PROCESS The Electriq~System ensures the release of H_2 to feed Fuel-Cell

PROCESS The spent fuel is recycled to generate fresh fuel

Our Market Impact

Renewable energies industry

Operate in full capacity and recharge **Electriq~Fuel** when not feeding the Grid



Petrochemical industry

Produce & distribute **Electriq~Fuel**, retain market role and increase business

Transport industry

Competitive range & cost enable EV breakthrough

Infrastructure

Compatibility with the existing energy logistics infrastructure removes the key obstacle to broad electrification

Relevant Markets & TAM

Variety of markets & varying applications for implementing Electriq~Global's unique technology

$2.28B

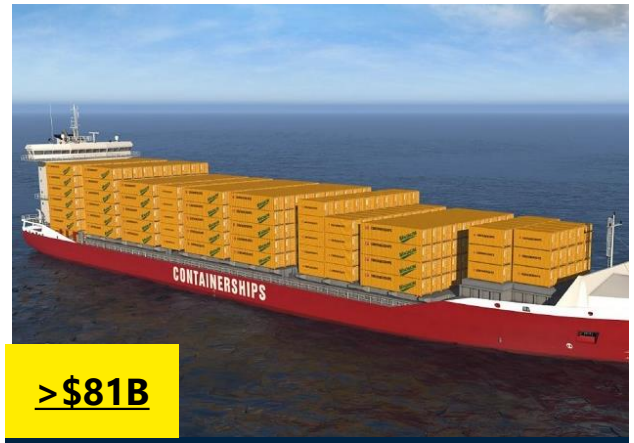
Portable Generators

>$26.25B

Military Applications

$172B

Automotive Long-Haul Applications



>$81B

Maritime Applications

$11.2B

Drone

~25B*

H2 Transport to H2 Refueling Stations

** Expected to reach this TAM by 2032*

Achievements to Date

Electriq-System

- Demonstrating EG's technology with a 30kW system

Fuel / Catalyst / Recycling

- Achieved first generation of working catalyst over 750 hours (filter-like replacement at low cost)
- Functional lab scale model for fuel recycling

Grants/Business Development

- Received grants from governmental institutions in Israel and the UK.
- Developed working relationships with leading industry corporations.

Partner Search

Electriq-System

- Develop applications that use the Elecriq Fuel (e.g. Portable Generator, Range Extender, …)

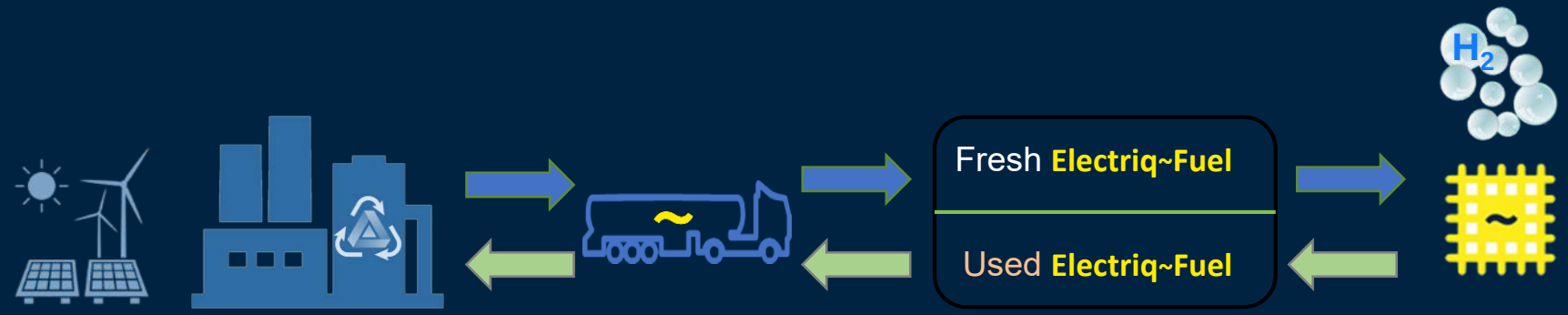
Fuel Recycling

- Implement Fuel Recycling / production plants, scaling up from current lab scale to industrial scale

Chemistry Optimization

- Improve and optimize the chemical processes

The Business Model



Electriq~Recycling
Facility

Electriq~Fuel
11% H_2

Electriq~Switch
Catalyst

JV / Rev-Share Licensing

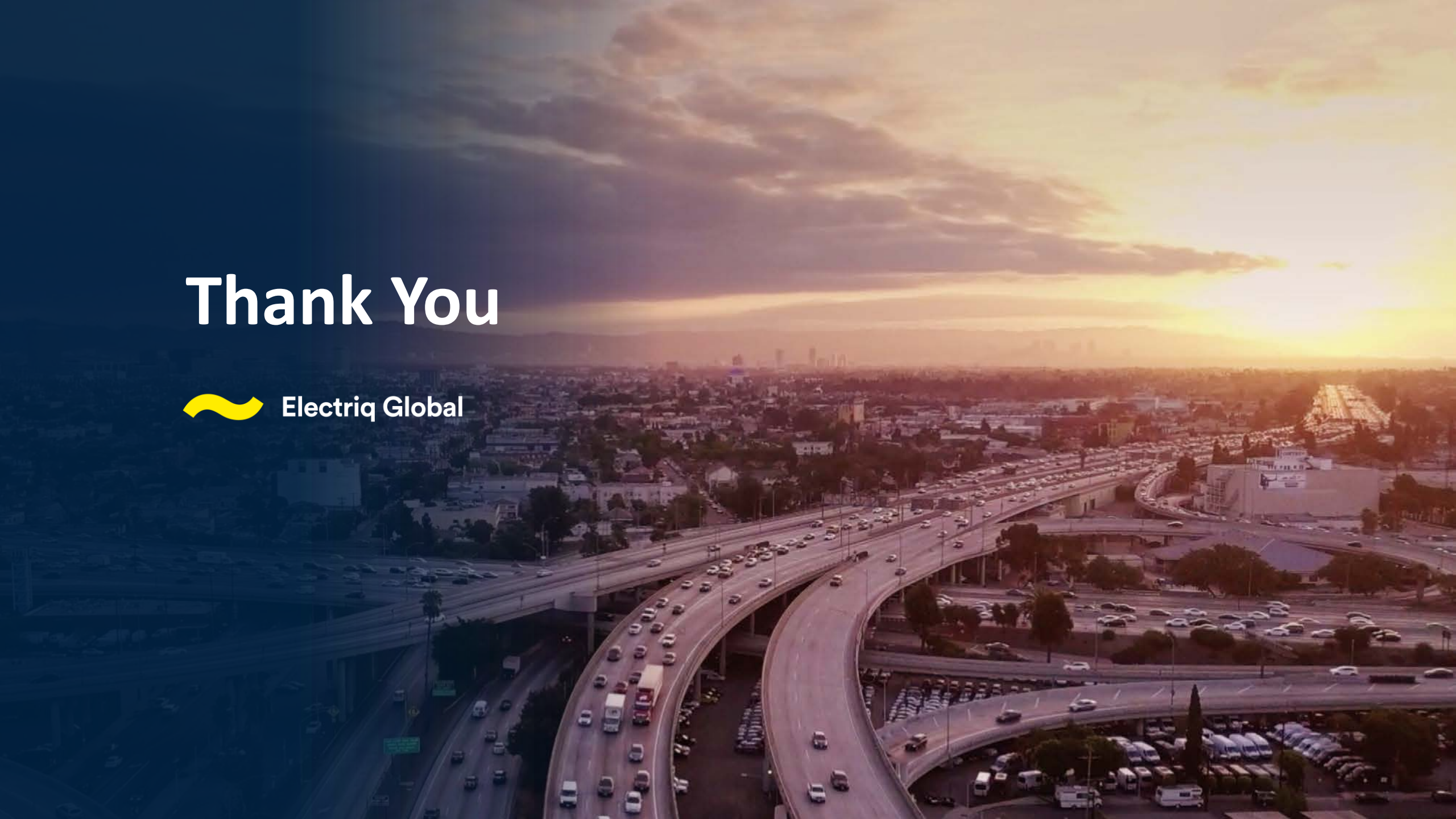
Establish **Electriq~Recycling** facilities with energy companies and H_2 as a by-product manufacturers to produce and recycle **Electriq~Fuel**.

Direct Sales

Sell **Electriq~Switch** to **Electriq~System** producers and integrators. The **Electriq~Switch** is replaced periodically (like a filter), target up to >90% gross margin.

Thank You

Electriq Global



Development Timeline

Activity	2019 Q4	2020 Q1	2020 Q2	2020 Q3	2020 Q4	2021 Q1	2021 Q2	2021 Q3	2021 Q4	2022 Q1	2022 Q2	2022 Q3	2022 Q4
Portable Power Pack													
System design	------>												
Initial bench testing			------>										
operational prototype testing					------>								
commercial production phase							------>						
Double Decker Bus Demonstrator													
System design			------>										
demonstrate working prototype						------>							
Demonstrator Validation											√		
Fuel Recycling Demonstrator													
NL team constitution	------>												
Development		------>	------>	------>	------>								
Pilot Plant						------>	------>	------>	------>				
Commercial Plant										------>	------>	------>	------>
Fuel price (€, Kg H2)	100	100	100	100	100	100	20	20	20	15	15	15	10