

# Sustainable energy system for achieving novel carbon neutral energy communities



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# How smart energy technology lands in society

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Now we are halfway through both SUSTENANCE and SERENE. Here at the University of Twente we have finalised our assessment of the state of things for them both. We have been working on reports on the analytical and evaluation frameworks, looking into the local situations at the demonstrator sites in Denmark, the Netherlands, and Poland (in case of SERENE), and additionally in India (for SUSTENANCE). Furthermore, we investigated the initial understandings of the business model components that are present. We are currently working on a preliminary overview of the social acceptance of the projects' innovations.

Building on these initial assessments, it is now time to prepare for the social-scientific accompaniment of the local developments, and to set up data collection methods that will help us understand the changes brought about by the local innovations. While we are planning to interview both project partners and local citizens in the demonstrator sites about the innovations, we have also prepared a survey to be published and shared widely among a large group of respondents.



From a social-scientific perspective, it is always useful to have a group of respondents outside the actual participants to compare the results with.

With this survey, we intend to capture citizens' views and attitudes towards local, clean, and secure energy provision. The results of this survey will enable us to understand people's energy use and their attitude towards sustainable and green energy transitions. Then, we can relate these outcomes to the interventions at the local demonstrator sites to learn more about how attitudes towards energy transitions are linked to the willingness and effectiveness of using smart local energy technology.

We are therefore, also interested in your perspective, and invite you to take part in our survey. So, if you have some time to spare and are willing to fill out our questionnaire, just use the following [LINK](#).

It will take approximately 20 minutes of your time. Note that survey is available in 4 languages!

Looking into our future work, we will assess the effect of the interventions in SERENE and SUSTENANCE on the local development of business models, social acceptance, local interactions with energy technology, and (new) forms of governance. ■

# A new dimension to the intelligent energy management system in the Municipality of Skanderborg

**Author: Morten Veis Donnerup,**  
Project Manager, NEOGRID TECHNOLOGIES

**All demonstration systems in the SUSTENANCE project are now installed in the villages of Voerladegaard and Dørup. Situated within the Skanderborg municipality, 20 households have become pioneers in sustainable energy practices. These households have been equipped with new heat pumps connected to an innovative, intelligent energy management system (EMS), developed by NEOGRID TECHNOLOGIES, a project partner in SUSTENANCE, renowned for its expertise in energy solutions.**

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The energy management system plays a pivotal role in this project by enabling the intelligent control of the heating system. It goes beyond conventional heat pump systems, incorporating advanced algorithms that reduce heat consumption by using weather forecasts to proactively adjust the supply temperatures from the heat pump, and optimize the operating times of the heat pumps. This optimization is based on the actual hourly electricity costs, ensuring efficient energy usage while considering cost implications. The preliminary test results during the past heating season show a reduction in heat demand, enabled by the PreHeat control algorithm in the range of 12-18%. Combined with the PriceOptimizer we're able to reduce the cost of the energy being consumed by another 15%.

## COMMUNITY ENERGY MANAGEMENT SYSTEM (CEMS)

By having the EMS gateways installed in many households in the community, we gain greater control of the whole community. Multiple EMS' in the community become a Community Energy Management System (CEMS). The 20 households which constitute the Danish demonstration can provide sufficient data to Aalborg University to simulate the effect on the local grid if there were 20%, 80% or even 100% of the households connected to the CEMS. Of course, this simulation makes the assumption that the test hosts are representative of the future technology in the village.

### AVERAGE ENDUSER ELECTRICITY COST:

€ 0,31 €/KWH

	Estimated savings %	kWh (varme)/yr	kWh (el)/yr	Est. Yearly cost	Est. savings (EUR)
Baseline heat demand	-	20.000 kWh	6.667 kWh	€ 2.067	-
PreHeat optimized heat demand	12%	17.600 kWh	5.867 kWh	€ 1.819	€ 248,00
PriceOptimized control	15%	-	-	€ 1.546	€ 272,80
Total reduction:	25%	-	-	-	€ 520,80

Fig. 3: Example of cost reduction on a single-family house (Neogrid Technologies, 2023)

## BENEFITS OF INTELLIGENTLY CONTROLLED ENERGY SYSTEMS

Since the primary objective of the SUSTENANCE project is to explore how intelligent optimization can reduce the load on the grid, the project orchestrates various large electricity components within households, including heat pumps, EV chargers, PV systems connected to electrical batteries. By synchronizing the operation of these components, the project aims to maximize energy efficiency and minimize strain on the electrical grid.

The benefits of intelligently controlled heat pumps and energy management are multifold. Firstly, these systems contribute to the reduction of heat consumption, resulting in decreased energy waste and improved energy efficiency. By intelligently adjusting the operating times of heat pumps based on real-time electricity costs, households can save on energy expenses while ensuring optimal comfort levels

Moreover, the integration of multiple electricity components through the CEMS offers an exciting opportunity to optimize energy consumption on a broader scale. By coordinating the usage of heat pumps, EV chargers, PV systems, and electrical batteries, the project aims to achieve a more balanced and sustainable grid. This



**Fig. 1: Example of the upgraded installation at a testhost (Neogrid Technologies, 2023).**



**Fig. 2: The outside installation of a testhost - with both heat pump and PV system (Neogrid Technologies, 2023).**

approach enhances grid stability, promotes efficient resource allocation, and supports the integration of renewable energy sources.

### **A MILESTONE IN THE LOCAL ENERGY TRANSITION**

In conclusion, the demonstration of intelligently controlled heat pumps in the SUSTENANCE

project marks a significant milestone in sustainable energy management. Through the integration of an intelligent energy management gateway, this initiative offers enhanced energy efficiency, cost savings, and a more resilient grid. The project's exploration of intelligent optimization presents a promising path towards a greener and more sustainable future. ■



# Our greatest asset is our capacity to innovate.

– Frans Timmermans, Executive Vice-President, European Green Deal, Commissioner for Climate Action Policy (CA.2)

**Author: Gerwin Hoogsteen,**  
Lead Researcher, department of EEMCS, University of Twente

**The clock keeps on ticking when it comes to climate change. Innovation in both the social and technical aspects of energy, the main driver of our daily lives, is therefore of the utmost importance. Various new innovative social theories and technical concepts have been developed and are being tested in the Dutch demonstration sites. But it is also clear that the new, sustainable, energy system comes with a fresh wind of change. Within SUSTENANCE's Dutch Demonstrator we had the pleasure to welcome none other than Frans Timmermans as our first user of the renewed smart charging app.**

In the Netherlands, the sharp increase of natural gas prices experienced over the last year made us all aware of how important a warm and cozy house is. Just switching to electric heating, e.g., by using a heat pump, is not enough. To ensure that the future energy system, based on renewables, still delivers the comfort we all expect, Saxion has set up a lab environment. Hereby a specific setup is a scale model of a house with multiple rooms that can be heated individually through smart radiator valves and a smart thermostat. This environment allows to validate novel heating control methods, developed in collaboration with all project partners, in a well-controlled environment. Thus, we aim to get absolutely convinced that residents of the Vriendenerf demonstrator will not notice any change in comfort levels whilst helping the society by applying our control.

The end-users of the new technologies have been and remain to be the focal point of attention for the technical developments within the project. Over the last year we have received helpful feedback from the users of the smart parking lot demonstrator at the University of Twente. As a result, in co-creation with the users, we developed a new version of the smart charging app (Fig. 1). *The new version now shows how the actual charging is progressing.*' says

Johann Hurink, and he adds that the *research team has been receiving many requests from users to check their charging process.*

Of course, the new version of the smart charging app needed a first user. We had the pleasure to welcome Frans Timmermans, First Vice President of the European



**Fig. 1: Smart Charging app (Twente University, 2023).**



**Fig. 2: Frans Timmermans visiting the Dutch Demonstrator (University of Twente).**

Commission, as our first user on the 12th of May as part of the University's 'Dies Natalis' (Fig. 2). Frans Timmermans showed a lot of interest in our efforts and was happy to hear that the share of directly used solar energy rose from 33% to 71% through the smart charging enabled by the introduction of the first version of the app. Timmermans remarked *What would be great is if we could make our washing machines do the same, and also have them communicate with the electric cars!*, which is exactly what we are trying to achieve in this project. However, standardization in communication is still an issue, a point that Timmermans takes back with him to Brussels.

In the meantime, we already have created ideas on how such communication and coordination between multiple devices have



to take place. In the next period of the project, the developed puzzle pieces will be put together to create an intelligent management and control system. Hence, we have to realize that real change is required to achieve the energy transition, something that people may feel uncomfortable with. Timmermans addressed this point with the bold statement: Our greatest asset is our capacity to innovate. We should not just fear the future, or be dissatisfied, but be curious about what the future brings us. ■

# A Smart Secondary Substation at the Polish demonstration site

**Author: Joanna Ptak**, Energa-Operator SA  
& **Sebastian Bykuć**, The Szewalski Institute  
of Fluid-Flow Machinery Polish Academy of Sciences (IMP PAN)

**The T-2846 Mickiewicza Sopot secondary substation built back in 1970 (Fig. 1). There was one 400 kVA transformer inside the substation, which had a traditional MV switchgear (4 bays) and an LV switchgear (14 bays). An AMI cabinet was installed in the station. Energa-Operator, a DSO and a SUSTENANCE partner, has modernized the MV/LV secondary substation simultaneously taking advantage of the synergy effect through using innovative solutions and experience developed under another H2O2O funded project, namely EUniversal.**



**Fig. 1. Interior of the T-2846 Mickiewiczza Sopot secondary substation BEFORE modernization (Robert Klein, Energa-Operator SA, 2023).**

## **RECENT MODERNIZATION WORKS ENABLE THE LOCAL ENERGY TRANSITION IN THE MICKIEWICZA HOUSING ASSOCIATION IN SOPOT**

The substation modernization included adapting it to the requirements of the SUSTENANCE project to enable further works towards the local energy transition (Fig. 2). The old switchgear was replaced with a 3-bay MV switchgear equipped with line disconnectors, voltage sensors and a circuit breaker in the transformer bay. A new 15-bay LV switchgear with current transformers

and network parameters meters in each feeder was also installed. The modernized substation now has a PLC data concentrator, MV line bay controllers and a central controller.

*Its functionality includes the measurement of phase voltages and currents along with recording after short-circuit detection, short-circuiting current flow detection, transformer circuit breaker control and line connectors. The heart of the station is the central controller, which is responsible for controlling the voltage of the LV network and communicating*

with the SCADA system as well as detecting damage to the fuse links. In addition, current and voltage parameters are monitored in all low-voltage outgoing bays from the substation – explains Mirosław Matuszewicz from Energa Operator.

But what does this modernisation mean for inhabitants of the Mickiewicza Housing Association? A new, smart secondary

substation will ensure advanced monitoring and control of the low-voltage network and faster failure detection – Mirosław Matuszewicz concludes.

Furthermore, thanks to the analysis of the measurement data obtained from the substation, which is performed as a part of the works in the Polish demo, it will be possible to test energy consumption forecasting models



**Fig.2 Interior of the T-2846 Mickiewicza Sopot secondary substation after modernization, including the information board, transformer and MV/LV switchgear, (Energa-Operator SA, 2023).**



**Fig. 3 SUSTENANCE Consortium meeting in Sopot as of 1 June 2023 (IMP PAN, 2023).**

and EMS intelligent energy management systems for multi-energy communities for optimal energy balancing. As a result, models for the flexible charging of electric vehicles will also be tested with the use of renewable energy and the possibility of island operation for the energy community – adds dr Patryk Chaja, IMP PAN, KEZO Research Centre, who is a co-leader of the Polish demonstrator.

### **GATHERING OF SUSTENANCE PROJECT PARTNERS AT THE POLISH DEMONSTRATOR**

Last but not least, it gives us immense pleasure to inform readers that the recent Consortium and General Assembly meetings of SUSTENANCE were held, between 1-2 June 2023, in the City of Sopot (Fig. 3).

As a result, the SUSTENANCE partners, were able to visit the Polish demonstrator and participated in a guided tour around the Mickiewicz Housing Association (Fig. 4, 5, 6).



**Fig. 4 SUSTENANCE Consortium at the Polish demonstration site of the Mickiewicza Housing Association in the City of Sopot, the 1st of June 2023 (Jarosław Kizło, Energa-Operator, 2023).**





**Fig. 5A, B SUSTENANCE Partners visiting the modernized T-2846 Mickiewicza Sopot secondary substation on the 1st of June 2023 (Energa-Operator, 2023).**



**Fig. 6 Sebastian Bykuć, IMP PAN, KEZO Research Centre, depicting works related with the modernized heat node for DHW production at the Polish site (Joanna Ptak, Energa Operator, 2023).**

Thank you – on behalf of all of the Polish partners – to all the participants (online and onsite), for their presentations on progress made in all the project demos located in the 3 participating EU countries (Denmark, the Netherlands and Poland) as well as in the 3 demos located in India. Meetings included fruitful discussions and planning of the upcoming tasks. ■

# The SUSTENANCE project aims to trigger a local energy transition in India

**Author: Prof. Zakir H. Rather, Soudipan Maity**  
Indian Institute of Technology Bombay (IITB)

**The project is focused on demonstration activities in each of the four countries participating. This is especially the case for India which has three different demonstration sites across three very different geographical locations. These consist of Barubeda village, (Ranchi, in the state of Jharkhand), Borakhai village, (Silchar, in the state of Assam), and IIT Bombay campus, (Mumbai, in the state of Maharashtra).**

In the first two demonstration sites, the overall goal is to develop a community-based integrated renewable energy system to enable smart energy solutions for supplying 24x7 reliable, low-carbon, sustainable energy for meeting the daily needs of the rural population. At IIT Bombay, the focus is to establish a carbon neutral system through a futuristic smart building and smart EV system at the campus.

## THE FIRST INDIAN DEMONSTRATOR: BARUBEDA VILLAGE

At the Barubeda site, a visit for around 15 of the villagers to a functional microgrid was organized (Fig. 1). The educational visit was held in Kashitoli, which is located 150 km from Barubeda, and it was organized at the start of the project in September 2021. This visit provided firsthand experience to the villagers about the benefits of a renewable energy based local electricity system. A stakeholder consultation was conducted on 25 June 2023 in the Barubeda village, where the villagers, the project partners and the experts from the Department of Science and Technology (DST), Government of India, visited the site to review and examine the field implementation of the project.



**Fig. 1 Stakeholder consultation meeting conducted at Barubeda on 25 June 2023 in the presence of the village residents (IIT Bombay, 2023).**



**Fig. 2 Deployment of electricity distribution connections to the households in Borakhai (IIT Bombay, 2023).**

## **THE SECOND INDIAN DEMONSTRATOR: BORAKHAI VILLAGE**

At the Borakhai site, more than 10 visits and discussions have been conducted with the village community. These meetings play a crucial role in establishing local initiatives and driving change. In addition, meetings with the state distribution utility, Assam Power Distribution Company Limited (APDCL), have been carried out, these were focused on the grid connecting cluster for the demonstration site.



**Fig. 3 Metering and household wiring activity in Borakhai (IIT Bombay, 2023).**

To establish the proposed smart energy management system, the identification and acquisition of the land for the location of the clusters has been completed, along with the necessary administrative approval from the local village authorities (Fig.2, Fig. 3).

Additionally, a software tool has been developed under the initiative of the National Institute of Technology Tiruchirappalli for the design, sizing, and optimization of solar photovoltaic water pumping systems (SPVWPS). Finding the optimal location for installing the SPVWPS will be essential in the work being carried out at the demonstration sites.

## THE THIRD INDIAN DEMONSTRATOR: SMART EV-CHARGING, FUTURISTIC SMART ENERGY HOUSE, AND MULTI-UTILITY HEAT-PUMPS AT THE IIT BOMBAY CAMPUS

Meanwhile at the IIT Bombay site, the development and demonstration of electric vehicle (EV) charging technologies are being carried out to build a smart charging infrastructure within the campus. A detailed analysis on the EV integration in the campus distribution system has been done. Interestingly, a smart, futuristic building, i.e., a functional net-zero carbon, net-positive energy and net-zero water house (Fig. 4) has been completed by the Team Shunya at the IITB campus, SHUNYA stands for "Sustainable Habitat for Urbanizing Nations by Young

Aspirants", and their aim and mission is "to build affordable pre-fabricated net zero solar powered houses, making India's future energy secure" [LINK](#).

The simulation and design aspects for the multi-port converter and solid-state transformer planned for the smart electrical building has also commenced. In this context, the researchers aim to develop unified chargers for EVs of a wide variety with different specifications to enable a charging infrastructure comprising of multiple 2, 3 and 4-wheeler chargers. These chargers will be installed at the IIT Bombay demonstration site and are expected to pave the way towards futuristic interoperable unified charging stations, with the objective to promote and accelerate EV adoption in similar urban localities across India.



21 Fig. 4 Team Shunya Building inside the IIT Bombay Campus (IIT Bombay, 2023).



**Fig. 5 Multi-Utility Heat Pump of 1TR with provision for Milk Chilling/Water Chilling, Water Heating and Drying (IIT Bombay, 2023).**



**Fig. 6 Multi-Utility Heat Pump of 1.5TR rating with provision for Milk Chilling/Water Chilling, Water Heating and Drying (IIT Bombay, 2023).**

Also, at IIT Bombay, multi-utility heat pumps (Fig. 5, 6) for rural applications of different ratings have been developed and tested with the provision for milk chilling/water chilling, water heating and drying with promising scope for mass production.

## **E-RICKSHAWS – WORKS TOWARDS E-MOBILITY AT THE IIT KHARAGPUR**

Finally, the development of motor controllers and solar chargers for e-rickshaws is in progress at the Indian Institute of Technology (IIT) Kharagpur. The prototype for the power electronic interface for integrating a second-life EV battery and solar photovoltaic system has already been tested on an e-rickshaw at the campus premises. IIT Bombay is also developing an indigenous drivetrain system



**Fig. 6 Multi-Utility Heat Pump of 1.5TR rating with provision for Milk Chilling/Water Chilling, Water Heating and Drying (IIT Bombay, 2023).**

for the e-rickshaw, shown below in (Fig. 7).

Last but not least, the Indian Partners of SUSTENANCE are delighted to share that the Department of Science and Technology (DST) of the Government of India organized (on 8 May 2023) an Industry Oriented Stakeholder

Workshop on Green Powered Future , which included an industry-oriented stakeholder workshop on Affordable and Sustainable Heating and Cooling of Buildings (on 9 May 2023) at the Malaviya National Institute of Technology, Jaipur. These two events were organized as a part of the activities being conducted under India’s G20 leadership, where prof. Zakir H. Rather from IIT Bombay participated as a speaker.

Furthermore, he also presented on the role of local energy systems in the energy transition in developing economies in the light of the experiences from the SUSTENANCE project during the ‘12th EU-India Smart Grid Workshop’ at the India Smart Utility Week 2023, held from 28th February to 4th March 2023 in New Delhi (Fig. 8). (Read more about this exceptional event in the “Project News” section of this newsletter).



**Fig. 7 An E-rickshaw being used for research purposes (IIT Bombay, 2023).**

Many activities are currently ongoing in the three Indian demo sites that are meant to trigger the local energy transition, and it gives immense pleasure to witness this green change as it happens. ■



**Fig. 8 Prof. Zakir Hussain Rather from IIT Bombay participating in the ‘12th EU-India Smart Grid Workshop’ in the Indian Smart Utility Week 2023 [IIT Bombay, 2023]**

# SUSTENANCE at the TechConnect event at IITB, Bombay campus in India in December 2022

We are also pleased to inform the readers that one of the 90 exhibition booths at the TechConnect event, held between 16th and 18th of December at the campus of Indian Institute of Technology Bombay (IIT Bombay), was devoted to communication and dissemination of the SUSTENANCE project to the visitors. TechConnect is IIT Bombay's largest research outreach activity inspiring, influencing, and kindling the scientific temperament of children, students, and adults of all ages alike. Conducted as a part of Techfest, the annual science and technology festival of IIT Bombay, this exhibition showcases the institute's R&D achievements in reaching out to critical societal needs and industry requirements, as well as contributions to fundamental research.

During this event, the visitors could familiarise themselves with all the 6 project demonstrators in the SUSTENANCE project (including 3 from India), by means of the project's promotional materials such as the project posters and leaflets. The project details were presented in form of videos informing

people about the demonstrators from Denmark, the Netherlands and Poland. Last but not least, it was an excellent opportunity for the partners to have onsite discussions directly involved in the realisation of the SUSTENANCE project from the Indian side. ■

Source: [WWW.IITB.AC.IN](http://WWW.IITB.AC.IN)



**Fig. 1A, 1B** The SUSTENANCE project booth at the TechConnect (IIT Bombay, 2022)



# SUSTENANCE at #ISUW2023 in New Delhi

This year's 9th edition of the "International Conference and Exhibition on Smart Energy and Smart Mobility" was held entirely onsite in New Delhi, India between 28th of Feb and 4th of March 2023 (in sharp contrast to last year's online-only edition).

It is with great pleasure that we can inform readers that Prof. Zakir Hussain Rather, from the Indian Institute of Technology, Bombay, participated in this excellent event with a presentation focused on SUSTENANCE, which he gave during the "12th EU-India Smart Grid Workshop", at the session entitled: "EU – India Smart Grid Demonstration Projects" at #ISUW2023. In his speech he briefly summarised the works carried out by the SUSTENANCE partners from Denmark, the Netherlands, Poland and India with respect to actions taken at local demo sites, which are aimed at the development of integrated, sustainable energy systems dedicated for local communities (Fig. 1, Fig. 2).

SUSTENANCE is already looking forward to the next year's edition of this exceptional networking opportunity!



**Fig. 1 Prof. Zakir Hussain Rather introducing SUSTENANCE at #ISUW2023 (Source: @India Smart Utility Week (ISUW) at LinkedIn)**



**Fig.2 Prof. Zakir Hussain Rather (first from the right ) at the "12th EU-India Smart Grid Workshop" at #ISUW2023, 2nd of March 2023 (Source: @India Smart Utility Week (ISUW) at LinkedIn)**

More information about this year's conference and exhibition, including pictures as well as videos from the thematic sessions, will be available soon at the event website:

[www.isuw.in](http://www.isuw.in)

# SUSTENANCE at Enex Fair and ENERGIAPL Conference 2023 in Kielce, Poland

SUSTENANCE was present at the 25th "International Power Industry and Renewable Sources of Energy Fair" ENEX held on 8-9 March 2023 in Targi Kielce in Poland.

Not only was the SUSTENANCE promotional video displayed at STAY-ON's Stand (E-20)

(Fig. 1), but most interestingly it was possible to meet Pawel Grabowski, President and CEO at Grupa STAY-ON there, and discuss with him about energy management systems and energy storage solutions under development in the polish demonstrator of the SUSTENANCE project.



**Fig. 1 SUSTENANCE project video display at the STAY-ON's Stand (E-20) at the ENEX Fair.**



**Fig. 2 Patryk Chaja from IMP PAN/ KEZO Research Centre presenting SUSTENANCE during the 5th edition of the "ENERGIAPL Conference".**

Furthermore, the works carried out under SUSTENANCE were also disseminated during the 5th edition of the "ENERGIAPL Conference", which is an event associated with the ENEX Fairs. Patryk Chaja from the Institute of Fluid-Flow Machinery Polish Academy of Sciences (IMP PAN) KEZO Research Centre, gave a dedicated presentation about the SUSTENANCE project and particularly its Polish demonstrator located in the Mickiewicza Housing Association in Sopot in Poland. (Topic of presentation: "A vision of an energy community with the example of an association of multi-family buildings – SUSTENANCE project"; In Polish: *Wizja wspólnoty energetycznej na przykładzie osiedla budynków wielorodzinnych – projekt SUSTENANCE*".

*"The 25th Enex turned out to be record-breaking in many respects. 248 companies from 15 countries presented their offers at Targi Kielce. The Kielce exhibition and congress centre hosted 22,000 visitors. The exhibitors showcased and presented the latest energy-saving and ecological technologies for renewable energy sources' sector. The Exhibitors brought together for the power industry meeting offered a plethora of modern heating and ventilation systems, the latest photovoltaic and energy storage solutions, schemes designed to improve energy efficiency, and even hydrogen technologies."* ■

Source and more about event:

[WWW.TARGIKIELCE.PL](http://WWW.TARGIKIELCE.PL)

# SUSTENANCE at #SPPMeetupBrussels2023



Dr Weronika Radziszewska from KEZO Research Centre PAS|Institute of Fluid-Flow Machinery Polish Academy of Sciences (IMP PAN) participated in the "SCIENCE: POLISH PERSPECTIVES Meetup Brussels" event, held on the 9th-10th of March 2023 in Brussels, Belgium. Dr Radziszewska took this splendid opportunity to present SUSTENANCE during this exceptional networking event.

"SCIENCE: POLISH PERSPECTIVES Meetup Brussels" is a joint initiative of the Polonium Foundation, Polish Science Contact Agency "PolSCA" of the Polish Academy of Sciences in Brussels, the Office of Centre of Research and Development in Brussels – Business & Science Poland and the Embassy of Poland in Brussels. ■

More about #SPPMeetupBrussels2023:

[WWW.POLONIUMFOUNDATION.ORG](http://WWW.POLONIUMFOUNDATION.ORG)

# Meeting with citizens in Voerladegård, in the Municipality of Skanderborg in March 2023



**Fig. 1** prof. Birgitte Bak-Jensen (project leader from Aalborg University) presents the obligations of Aalborg University within the project.

The hosts from the Danish demonstration site in SUSTENANCE, located in Voerladegård village in the Skanderborg Municipality, participated in a project status meeting held on 16th of March'23.

The aim of this meeting was to inform the involved citizens about the status with the implementation of heat pumps, the related supervision and control units, and importantly - to give the local community

an opportunity to provide direct feedback of their experiences.

Presentations were made by representatives from Aalborg University (Fig.1), Neogrid Technologies ApS (Fig.2) as well as the Municipality of Skanderborg. A lot of questions were raised both related to the actual set up of the heat pumps and control equipment, but also with respect to the app set up for the supervision of the actual status of the parameters to be measured in the houses. As a result, it was agreed that another workshop to present the app will be required as soon as most of the citizens (i.e. hosts of the demo) have received the equipment.

Last but not least, the Municipality of Skanderborg also informed participants about new initiatives in Voerladegaard concerning working groups on district heating and Termo nets.

Such meetings are very important to keep up the good cooperation between SUSTENANCE's partners and the hosts of the Danish demonstrator. ■

**THANK YOU ALL**

**FOR GOOD DISCUSSIONS!**



**Fig. 2 Morten veis Donnerup (Neogrid Technologies Aps) presents the status of the set-up of heat-pumps and implementation of control units.**



**Fig. 3 Rikke (master student in Techno Anthropology) present ideas for upcoming survey about user interaction and expectations for the app development.**

# SUSTENANCE at the 1st Polish-Ukrainian Local Administration Forum

It gives us pleasure to inform readers that the representatives of 21 local self-governors from Ukraine visited Poland to participate in the 1st Polish-Ukrainian Local Administration Forum held on 21-24 of March

2023. On Friday, 24th of March, the Ukrainian representatives visited the KEZO Research Centre PAS of the Institute of Fluid-Flow Machinery Polish Academy of Sciences (IMP PAN), which is located in Jabłonna.



**Fig. 1 Site visit at the KEZO Research Centre. (Jorg Verstraete, KEZO Research Centre, 2023)**





**Fig. 2 Weronika Radziszewska presenting SUSTENANCE project. (Jorg Verstraete, KEZO Research Centre, 2023)**

The 1st Polish-Ukrainian Local Administration Forum was organised by the city and municipality of Serock, the Association of the Social Committee for Assistance to the City and Municipality of Serock, the organisation "Serockie Inwestycje Samorządowe", the Center for Development of local administration and the Polish-Ukrainian Agrarian Association.

During the site visit of the Ukrainian delegation at the KEZO Research Centre on 24 March 2023, Paweł Zawadzki gave guests a tour around the KEZO facilities (Fig.1), whereas Weronika Radziszewska talked about the undergoing European

and International projects, in which IMP PAN and its KEZO Research Centre PAS are actively participating, including (among others) the SUSTENANCE H2020 project (Fig.2).

The Ukrainian delegation was interested in the potential to use the presented technologies and solutions in their municipalities as a part of rebuilding of the infrastructure. ■

More about this Forum:

[WWW.SEROCK.PL](http://WWW.SEROCK.PL)

Photos: Jorg Verstraete, KEZO Reserach Centre.

# SUSTENANCE at the #bridgeEU General Assembly in Brussels, March 2023



**Fig. 1 The #bridgeEU initiative General Assembly in Brussels, March 2023 (CINEA, 2023)**

Ewa Domke from the Institute of Fluid-Flow Machinery Polish Academy of Sciences, who is a SERENE representative with respect to the Consumer and Citizen Engagement Work Group, participated in the onsite meetings in Brussels. Members of the remaining Working Groups joined thematic sessions online.

The Bridge initiative stimulates cooperation between H2020 project's working

and digitalisation. The idea is to identify synergies between these different projects by fostering continuous knowledge sharing to make conclusions and recommendations about the future exploitation of project results. A high focus is placed on enabling the future energy system to gain flexibility in sector coupled systems and the future digitalization and application of energy storage in different forms – i.e. power to X, thermal storage and electrical storage. ■

# SUSTENANCE at The MIX Conference in Aalborg, Denmark

It gives us a pleasure to inform readers that prof. Birgitte Bak-Jensen, a project coordinator of SUSTENANCE, participated in the The MIX Conference: “Displacement, migration and integration – out of the silo”, which was held on June 6-7 in Nordkraft, Aalborg.

The MIX Center – i.e. the organizers of this exceptional event – had asked the question: „hat happens when we include technical sciences, design studies, health science and architecture in the discussions around migration? Can we produce new questions and new insights? Can we ‘see’ something that we did not understand before?” [1]

As a result, the recent MIX Conference consisted of four panels, and Birgitte Bak -Jensen was among the panelists of the debate focusing on “Environmental changes, resilience and integration”.

*“(…) The decision to migrate is not only rooted in wars or differences in economic possibilities.*

*it is also rooted in environmental changes in the country of origin. The present and foreseen climate changes are likely to create heat waves and droughts, which especially deteriorate living conditions in the countries closest to the equator. From a European perspective,*



**Fig. 1 Birgitte Bak-Jensen introducing SUSTENANCE at the MIX Conference, 7 June 2023.**

**35** *Both historically and in contemporary societies*



Fig. 2 Discussion during the MIX Conference (Source: [www.linkedin.com](http://www.linkedin.com))

*this potentially increases the inflow of migration, especially from Africa. At the same time, it is widely acknowledged that countries might be more or less able to cope with environmental changes. The panel provide an interdisciplinary discussion of the major challenges and uncertainties connected to these processes”<sup>1</sup>*

In this light, the SUSTENANCE project and its ideas were brought into the discussion. SUSTENANCE can surely contribute to the prevention of climate migration, and hence Birgitte Bak-Jensen introduced ideas from the project, mainly with respect to the Indian demonstration sites, regarding the following issues: how local energy communities can be formed to enhance the living in remote rural areas? Can setting up energy systems ensure, for instance, water pumping? What is the potential of electric rickshaw mobility as well as cleaner cooking possibilities

in isolated areas? Importantly, these aspects could be additionally used for refugee camps to ensure the energy supply.

The Center for Displacement, Migration and Integration (MIX) is a forum for all social science and humanities reserachers at Aalborg University. The Center covers a wide varietu of reserach interests, methods and theoretical approaches related to displacement, migration and integration. The aim is to share knowledge and facilitate inter-disciplinary reserach that increases our understanding of how and why people move and re-settle, the integration of ethnic minorities and societal responses to immigration<sup>2</sup> ■

References & more info:

<sup>1</sup> [THE MIX CONFERENCE](#): „Displacement, migration and integration – out of the silo”

<sup>2</sup> [THE MIX CENTER](#)

# SUSTENANCE at CIRED 2023 in Rome, Italy

We are delighted to inform that prof. Birgitte Bak-Jensen, a project coordinator of SUSTENANCE, was among the panelists of the debate on „Power distribution systems fostering Sustainability”, which panel was held as a part of the Opening Forum of CIRED (International Conference & Exhibition on Electricity Distribution) on 12th of June 2023.

CIRED, the Leading Forum where the Electricity Distribution Community meets, holds the major International Electricity Conference & Exhibition every two years in different venues in Europe with a worldwide perspective and participation.

CIRED is always evolving and the 2023 event is the conference 27th edition, which this year takes place in Rome, located in the heart of Italy on 12-15 June 2023.

*„It was a great honor to be a member of the opening panel at the CIRED 2023. We had very good discussion on how the distribution grids have to participate in the green transition by providing capacity for flexibility provision from costumers for the overall balancing of the electricity system*

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**Fig. 1** Birgitte Bak-Jensen among the panelists of the Opening Forum of CIRED 2023 (Source: [www.linkedin.com](https://www.linkedin.com))

as well as for enhancing the hosting capacity of the grid. Some future focus areas seen from academia point of view is concerning local energy communities where private costumers can go together and use local produced energy as well as help in provision of flexibility for the local grid. This is for instance explored in the SUSTENANCE H2020 project, SERENE H2020 project and RE-EMPOWERED EU-India Project, where both technical solutions as well a more social aspects such as business cases, regulation as well as user engagement are considered” – concludes Birgitte Bak-Jensen (Fig. 1).

Further, “another future aspect is about considering multi-energy systems and how industry can contribute to the green transition and at the same time get benefits for their own companies. New very electricity consuming industries like P2X and data centers will be important new players, and the distribution infrastructure has to accommodate these together with the general electrification of other industries in port and industrial areas as well” – adds prof. Bak-Jensen.

Additionally, results from SUSTENANCE as well as SERENE H2020 projects were presented by prof. Birgitte Bak-Jensen during the last session of the CIRED Conference. Prof. Bak-Jensen discussed „how latent heat storage systems, together with heat pump applications, can be used for provision of flexibility in the distribution grid, still ensuring the costumers comfort and economy,

by enabling charging at low price period or under self-production and utilization of stored energy during high price periods. The thermal dynamics of the systems have to be considered, to get the best utilization of the systems, which was modelled in the presented paper” (Fig.2).

Participation in CIRED 2023 offers an opportunity to meet with up to 2500 experts and benefits from face-to-face interaction with key decision leaders in the field of Electricity Distribution.



**Fig. 2 Slide from presentation by prof. Birgitte Bak-Jensen at the CIRED 2023 Conference.**

An exhibition gathering over 140 companies will be running throughout the conference. ■

More information about the event:

[WWW.CIRED2023.ORG](http://WWW.CIRED2023.ORG)

# SUSTENANCE at the SUSTAINABLE ENERGY DAYS under #EUSEW2023



**Fig. 1** Banner introducing "Energy transition and its financing" conference.



**Fig. 2** Dr Krzysztof Rafał introducing SUSTENANCE project at the "Energy transition and its financing" conference, 22.06.2023.

It gives us pleasure to inform that Krzysztof Rafał has introduced SUSTENANCE project during a conference entitled "Energy transition and its financing" (Fig. 1, Fig. 2), which took place in Toruń Technology Park on 22 June 2023 in Poland, as a local event held under the Sustainable Energy Days of the EU Sustainable Energy Week (#EUSEW2023).

Sustainable Energy Days are activities and events organised by local public and private organisations around the world to promote

renewable energy and energy efficiency. They are a key component of the European Sustainable Energy Week.

More details about this particular event, which was organized by the Enterprise Europe Network at the Toruńska Agencja Rozwoju Regionalnego - TARR S.A. can be found under those links:

Find a Sustainable Energy Day near you:

[WWW.SUSTAINABLE-ENERGY-WEEK.EC.EUROPA.EU](http://WWW.SUSTAINABLE-ENERGY-WEEK.EC.EUROPA.EU)

## Bjerregaard Consulting

Bjerregaard Consulting (BJE) is a SME-company with many years' of experience in working with the EU's research and development programs on renewable energy and energy savings. The company has a large network of leading Danish and European stakeholders in the energy sector, social housing companies and local authorities. ■

## UNIVERSITY OF TWENTE.

Founded in 1961 in Enschede, the Netherlands, the University of Twente (UT) is a young, entrepreneurial research university that stands for high tech with a human touch. At UT, 3.800 scientists and professionals conduct pioneering research and offer relevant, innovative and inspiring education to 13.000 students. UT focuses on nanotechnology, information technology, biomedical technology/technical medicine, governance, behavioural sciences, as well as geo-information science and earth observation. UT researchers have been involved in over 300 EU-funded research projects, and countless others. UT's research is highly regarded at national and international levels, and is accommodated within world leading research institutes. The research institutes combine scientific excellence with a sharp eye for economic and societal impact, leading to over 50 new spin-off companies annually. ■





Saxion educates approx. 28.000 students yearly and offers a broad variety of courses and provides knowledge that can be applied in society - both locally and globally. We encourage international and Dutch students to find and learn from each other. At Saxion you can learn how innovations affect your discipline and how you can apply technology and circularity in the development of your future profession and to contribute to a more sustainable world.

The slogan of Saxion is "Get Ready for a Smart World!" which relates to our vision that technology and digitisation have a major impact on our daily lives and are also changing the way we work. In a few years' time, the professions that we now practice will either no longer exist, or they will have taken on a different character. We see this as an opportunity and we encourage and support all of our students to anticipate those opportunities. The research groups of Saxion share a joined research agenda "Living Technology". Technology is being developed with increasing speed and the impact of technology on society is large. Technology is integrated into our thinking, daily life and work. The research agenda expresses the interaction between technology and society and in many of the research projects of which Serene is a good example, this interaction is embraced and worked out into our tasks and involvement of students, researchers, companies and inhabitants in order to realise the necessary societal impact. ■



The Szwalski Institute of Fluid-Flow Machinery Polish Academy of Sciences (IMP PAN), located in Gdańsk, is a leading centre of scientific technology in Northern Poland. It employs about 212 staff, including 100 researchers. IMP PAN was founded in 1956 for conducting fundamental research in the area of operating principles, design and construction of machines used for energy conversion in flows.

Currently, research is carried out in the following areas: fluid mechanics, multiphase flows, thermodynamics and heat transfer, combustion, plasma physics, laser technology, machine mechanics, mechanics of smart structures, technical diagnostics, tribology, aeroelasticity and other fields of engineering and technical sciences. The research of the Institute has always addressed the current needs of industry. In recent years IMP PAN has developed a new scientific specialisation: small-scale distributed power engineering based on renewable energy sources, especially domestic cogeneration power systems. IMP PAN has a long track record in managing and participating in European research projects such as FP5, FP6, FP7, H2020 as well as INTERREG programme.



KEZO Research Centre ("Energy Conversion and Renewable Resources" Centre), located in Jabłonna near Warsaw, is a laboratory base for IMP PAN in terms of research and cooperation also with other Institutes of Polish Academy of Sciences, universities, R&D units as well as with leading companies in the energy sector.

One of the main objectives of the Centre is to conduct research into new sources of renewable energy and energy conversion. KEZO Research Centre is a complex of laboratories (a facility), but simultaneously it also plays a role of a living laboratory itself, with all of its modern installations onsite in the building itself. Centre is a test-side for devices producing and storing heat, cold and electricity from RES as well as of software for management of generation and consumption of energy technologies, including a dedicated Building Management System designed for research purposes. KEZO also serves as a demonstration site for small-scale RES technologies and their application in energy systems.

IMP PAN has created an international network of energy stakeholders around the KEZO Research Centre (so called "Friends of KEZO") consisting of research and business partners as well as for policy makers, municipal authorities, NGOs, and wider public, including the youngest citizens. This network is an excellent forum for knowledge exchange, discussions and, through its members - for dissemination of up-to-date developments in energy sector. ■



ENERGA-OPERATORSA (EOR) is a distribution network operator (DSO) responsible for developing and maintaining the distribution grid located in the northern and central parts of Poland. EOR is also a member company of Capital Group ENERGA SA. ENERGA SA is the owner of 47 hydropower plants, Ostrołęka coal power plant with a rated capacity of 722 MW. The total capacity of wind turbines connected to EOR's grid is equal to 2540 MW. 9800 micro generations are connected to the LV network of 68,5 MW installed power. EOP supplies electricity in an area covering almost ¼ of Poland's landmass. EOP supplies electrical energy to 3.2 mln customers, including 0.29 mln business customers. The company operates 193 thousand km of power lines of all voltages, used to transmit 21.5 TWh of electricity to end-users annually. ■

# Project Factsheet



More info:  
[www.h2020Sustenance.eu](http://www.h2020Sustenance.eu)  
# SUSTENANCE H2020 project

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### Project Partners



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