SUSTENANCE e-Newsletter 2/7
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Sustainable energy system for achieving novel carbon neutral energy communities

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In This Issue:

SUSTENANCE involvement in the European Commission BRIDGE H2020 Initiative

Author: Prof. Birgitte Bak-Jensen,
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When participating in European projects within the area of smart energy systems, the project should take advantage of cooperation via the EC's BRIDGE initiative. This initiative fosters cooperation between H2020 project's working on Smart Grids, Energy Storage, Islands and digitalization. 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.

The BRIDGE Initiative has 4 working groups each of which is followed by a representative from SUSTENANCE:

- **DATA MANAGEMENT** which is working on Communication Infrastructure, Cybersecurity and Data Privacy, as well as Data Handling. The activities are focused on the data needed to provide flexibility, and the associated use cases and frameworks including integration of storage. **Birgitte Bak-Jensen, Aalborg University** is member for the SUSTENANCE project.
- **BUSINESS MODELS**, which is working with defining common language for business model descriptions and valuation, evaluation of business models as well simulation tools for comparison of business models. Here **Lisa Sanderink, University of Twente** coordinates our inputs.
- **REGULATION**, working with regulator frameworks for energy storages and smart grids for instance in relation to demand response, commercial arrangements, ownerships, smart meter data etc. **Frans Coenen from University of Twente** is our representative here.
- **CONSUMER AND CITIZENS ENGAGEMENT**, which look into consumer segmentation, analysis of cultural, geographical and social dimensions, engagement activities and what triggers behavioral changes and set up ideas for regulatory innovations to empower consumers. This WG has **Ewa Domke from IMP PAN** as our representative.

Opening article

The BRIDGE General Assembly was held from 22nd – 24th March 2022. Here the SUSTENANCE project was introduced together with other new projects. The meeting also drew conclusions and findings from the working groups and for completed projects were presented and discussed. Finally, new ideas for work in the coming year was set up.

SUSTENANCE will ensure a good cooperation with the BRIDGE initiative to identify possible synergies and avoid starting from scratch in areas where much work has already been done and reported via BRIDGE. The contributions from SUSTENANCE will feed into the four working groups, and the following main areas have been identified as most relevant for our contributions.

DATA MANAGEMENT:

- Use cases, framework and architectures with cross-sector coupled systems and flexibility – Micro-grids in rural areas – integration of RES.
- GPDR-issues in relation to exchange of data outside EU (India).
- Learning about standards and rules outside EU (India).

BUSINESS MODELS:

- Local markets – Multi carrier – market/sector integration – local communities in rural areas as well as in cities.

REGULATION:

- Regulatory factors that influence the realization of low carbon citizen centered integrated energy systems in rural areas as well as in cities.

CONSUMER-CITIZEN ENGAGEMENT:

- Socio-cultural Drivers and Indicators of Engagement both in rural remote areas as well as in cities.
- Smart tools for Engagement.

The SUSTENANCE project consortium is very happy with the BRIDGE initiative and looks forward to cooperating during the project period. ■

Follow-up on the Danish demonstration in SUSTENANCE – introduction of Voerladegård village, Skanderborg Municipality

Author: Susanne Skaarup, Skanderborg Municipality,
Hans Bjerregaards, Bjerregaards Consulting

The shocking and tragic war in Ukraine, has also made its impact on the SUSTENANCE project. The subsequent increase in prices for natural gas resulted in Danish households, currently heated by natural gas, to seek alternatives. Their first choice has been to change to district heating (typically based on biomass or large-scale heat pumps) as a safe and reliable heating source. This includes the village of Stjær where 20 households had originally planned to switch to individual heat pumps as part of the SUSTENANCE project. As a result, Skanderborg Municipality took immediate action to find a new demo site. Hence, it gives us pleasure to introduce Voerladegård village.

Fig. 1 Voerladegaard and Dørup villages south of Mossø lake, Skanderborg, DK

The village of Voerladegård also includes the smaller village of Dørup (Fig. 1), together there are around 600 residents, mostly living in villas and a few in townhouses. Houses in Voerladegård and Dørup are currently heated by individual gas boilers.

On May 5th, 2022, an information meeting attended by around 70 residents was held in cooperation with the local residents´ association (Fig. 2). During this meeting, the residents could sign up to be a demonstration host for individual air-to-water heat pumps with salt PCM[1] heat storage (Fig. 3) or stratified heat temperature water tank heat storage together with Neogrid's smart management system (Fig. 4). Thanks to this system, Neogrid has access to needed data for controlling the heat-pump in an optimized way ensuring a good consumer comfort in an economical way.

Fig. 2 Information meeting 5th May 2022 for possible demonstration hosts in Voerladegård and Dørup (Susanne Skårup, 2022)

[1]) Phase Changing Material

As a result, around 40 households volunteered and among those, 20 households were eventually selected to become demonstration hosts. The following were chosen:

- 3 households with PV and EV charger;
- 5 households with EV-charger;
- 6 households with PV;
- 1 household with solar collector and
- 5 households with no heavy consuming or producing electrical installations.

All were visited in June'22 to register their status quo regarding actual heat consumption, current heating systems, and available space for the new heat storage systems. In addition, the visits allowed further discussions with the house owners on issues like when to install the heat pumps, and to follow-up on their interest to install PV and/or EV-charger(s). Based on this dialogue, it is now expected that nearly all of the 20 demonstrations households will be established by the autumn of 2022.

Fig. 3 PCM storage: Diameter/75 cm, height/170 cm, 500 liters storage, 440 pieces of PCM elements, capacity/15-20 kWh.

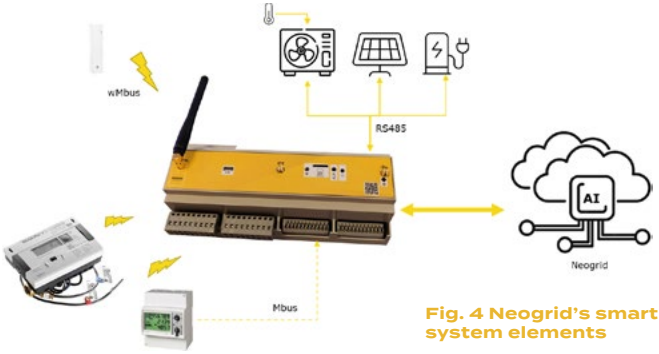

Fig. 4 Neogrid's smart management system elements

Fig. 5 Electricity grid around Voerladegaard and Dørup

In summary, we are proud to announce that the following energy system elements will be demonstrated in SUSTENANCE for the villages of Voerladegård and Dørup: 20 households with air-to-water heat pumps with PCM heat storage (Fig. 3) and Neogrid's smart management system (Fig. 4). EV smart PV-powered charger stations with battery storage (several hosts are expected to install this system); 10 out of 20 demonstration households will be members of a virtual smart PV grid energy community; PV-power supplied from Voerladegård's PV smart grid system will increase PV production with 40 MWh/year from the 10 demonstration houses.

The figure below (Fig. 5), shows that the electricity grid around Voerladegaard and Dørup can be formed as an "electricity grid island". Which is exactly what the SUSTENANCE project strives for – to find efficient, optimal and economical ways for the operation of energy carriers and infrastructures in local integrated 'energy islands' or integrated community energy systems, where citizens can be actively engaged to enable de-carbonized energy communities. ■

Energy management redefined: Bottom-up cooperation

Author & Photos: Gerwin Hoogsteen,
PhD, University of Twente

Intelligent, flexible, and adaptable systems are the key to a sustainable and reliable energy system. Within SUSTENANCE's Dutch demonstrators, we have continued with the development of an energy management system that aims to be versatile, and support a multitude of energy communities within the context of their local requirements . Our vision is to reach a fully inclusive energy system, both from the perspective of its users, and their devices. The ultimate goal is to provide the developed platform as an open-source solution for the deployment of management systems so that users all around the world are empowered and able to transform their local energy needs into a sustainable reality.

In order to achieve this, a flexible architecture of embedded computers has been developed by Saxion, called IoT Edge Computing for carbon Neutral communities (IECON) (Fig. 1). Each energy efficient embedded computer sports a software framework based on open-source software, that allows the deployment of local energy management algorithms, data storage and security. By following the edge-computing centric paradigm, these computers collectively form a system which is robust to the failure of single nodes possibly resulting from hardware or communication failure.

Based on this edge-computing centric concept, the University of Twente has ported custom made algorithms for optimal charging of electric vehicles and batteries to the Espressif ESP32 platform (Fig. 2). It is found that such 5 dollar chips are capable of running complex algorithms within the blink of an eye. Placing multiples of these nodes, together with other mini-computers such as a Raspberry Pi, can form a local mesh network, wherein each device can communicate directly with each other. These mesh networks also allow the nodes to easily join or (temporarily) leave the network. Through consensus algorithms, a collective of energy management nodes seek for a common solution to balance the local energy system in a cooperative manner. This way the system is scalable from devices within the house, to houses within a street, to streets within a village, and so on.

Fig. 1 IECON system installed at Vriendenerf

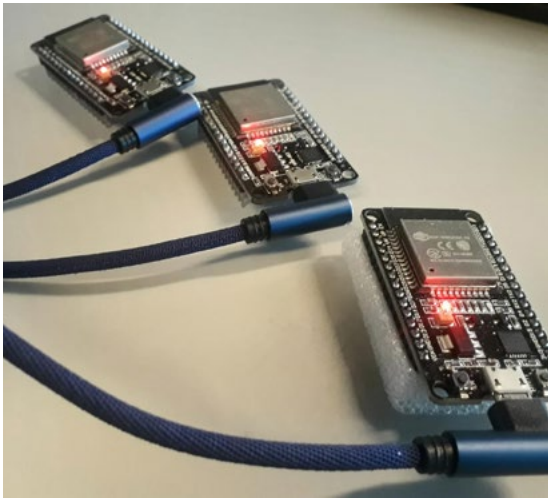

Fig. 2 Three ESP32s running test algorithms

The aforementioned electric vehicle scheduling algorithms, together with a battery management system and continuous monitoring of electricity production from the solar panels, are deployed in the smart charging carpark "SlimPark" (SmartParking) at the University of Twente. With the data being collected and smart charging actions being executed on behalf of the EV owners, the developed algorithms ensure a stable operation of the local energy carpark. This is required since, neither the grid connection, nor the solar panels, are able to supply enough energy when all 9 smart charging stations request full power. However, currently, no guarantees are given to prevent overloading. Therefore, in the next step, we will research energy modii that can signal when an overloading event is occurring. This allows the vehicles, battery and solar panels to react accordingly.

Meanwhile, we organized a lively workshop with the Vriendenerf community (Fig. 3). The inhabitants were eager to share their knowledge on how to live a sustainable life using clever "life hacks". Despite living in sustainable houses, the community is eager to further reduce their carbon footprint and share their wisdom with their neighbouring citizens in Olst. Based on their wishes, we will create a bottom-up decentralized energy system driven by their needs. This includes the already started co-creation of energy dashboards and intuitive small helper devices. These smart tools will be integrated within the IECON ecosystem. ■

Fig. 3 Figures taken at the Vriendenerf community.
Left: The initial (temporary) charging station that is now replaced
Right: A meeting and mini-lecture for the community.

First steps towards the „green" transition of the old-fashioned energy system in the Mickiewicza Housing Association (WSM) in Sopot, Poland

Author: Sebastian Bykuć,
KEZO Research Centre, IMP PAN

The last months were very productive for the Polish Team in SUSTENANCE. Having finalized the planning phase for the set-up of the local "energy island", the most exciting and challenging period of actually „getting things done" has finally started. Let us tell you the story about the „small big" steps taken so far to enable the local „green" energy transition in the Sopot demo site.

As part of the works carried out so far, an inventory and analysis of the energy and measurement infrastructure in the WSM was made. After analysing the existing power grid by the local operator and project partner ENERGA-OPERATOR SA, building number 59 at the Mickiewicza street was selected as the demo site (Fig. 1, Fig. 2). The experiences from this building will be used for further work planned by the WSM.

One of the main tasks in the Sopot demo site is to change the system for heating the domestic hot water (DHW) supply in building 59. Specifically, to eliminate the use of natural gas from this system. Given the current geopolitical circumstances, this objective is extremely relevant. Apart from the wider benefits of reducing emissions and increasing safety levels, a very important benefit from shifting away from natural gas is the avoidance of the drastic increase in natural gas prices related to the war in Ukraine and Polish dependence on Russian gas supply.

Discussions focused on the scope of the required modernisation works for the heat node in building 59 actually kicked off the implementation phase of the project. As a result, the scope of the design and needed modernization of the GPEC[1] heat substation with an additional

Fig. 1 Demo building in WSM Sopot (Sebastian Bykuć, 2022).

Fig. 2 Demo network diagram in Sopot – KOMIT system. Demo buiding location marked

[1]) GPEC - Gdańskie Przedsiębiorstwo Energetyki Cieplnej Sp. z o.o. - supplies heat in the territory of Gdańsk and Sopot, deals with sales of electric power and general power services.

heat exchanger for DHW production, coupled with the change of the control system and output of measurement signals were discussed. Further, the scope of the design of the thermal installation distribution system in the building was agreed.

In building 59, the current system of 77 individual gas boilers is being replaced by a central system – the modernized heating node in the building supported by an air heat pump. In recent weeks, the procedure has been carried out and contractors have been selected for the modernisation of the heat substation and the DHW distribution system. Installation work has begun and is partially completed – the modernized heating node is ready (Fig. 4) and some DHW distribution pipes are already installed (Fig. 3).

Interestingly, the building 59 is supplied with fresh water from two sources: directly from the municipal network (to the lower floors) and from the hydrophore (up till 10th floor). Due to the 2-zone fresh water installation, after modernization, a problem may occur with back flow due to the difference in water pressure in the tap. In order to solve it, IMP PAN has performed pressure measurements on the water pipeline in the municipal network, which was transferred to the companies responsible for distribution system design and installation. Meanwhile, preparations are underway

Fig. 3 DHW distribution pipes (Sebastian Bykuć, 2022)

Fig. 4 The modernised heat node with DHW production (Sebastian Bykuć, 2022)

for the gradual dismantling of individual gas water heaters from the apartments. According to the schedule, all individual gas (water heating) boilers should be removed by the end of the first week in September 2022 (Fig. 6).

At the same time, the procedure for selecting a heat pump supplier to support the hot utility water preparation system is in progress. Until its installation, heat for domestic hot water will be supplied from the district heating network.

Another ongoing task is the modernization of the measurement system in the demonstrator facilities. The existing electricity meters have been supplemented or replaced with AMI smart meters (Fig. 6). Residents, who have remote reading meters installed can already use the e-portal "My Energy Meter", enabling them to monitor their electricity consumption at 15-minute intervals (Fig. 7). This knowledge will allow users, for example, to check which of the working household appliances consume the most electricity, which is very useful when we plan to reduce electricity consumption and thus reduce our electricity bills.

Another element of the demonstrator is an integrated system for generating and storing electricity from a photovoltaic installation located on the roof of a multi-family building. In order to make this happen, simulations of the arrangement of PV modules were performed, taking

Fig. 5 Individual gas boiler (used for preparation of DHW)- to be dismantled in late summer 2022 (Sebastian Bykuć, 2022)

Fig. 6 Smart electricity meter - AMI (ENERGA-OPERATOR, 2022)

Fig. 7 Benefits for end customers: mobile app (ENERGA-OPERATOR, 2022)

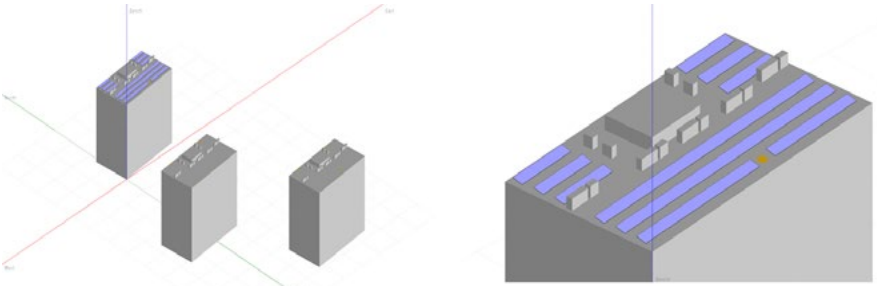

Fig. 8 PVsys simulations of solar PV installation on the roof of demo building in WSM Sopot (IMP PAN, 2022)

into account the insolation conditions and elements potentially shading PV modules on the roof (Fig. 8). The installation components were also initially pre-selected.

To evaluate the proposed solutions, simulations in PVsyst have been performed. Two variants were considered: 1) a PV system of 24.4 kWp supplying a heat pump working for hot water demand and 2) a PV system of 24.4 kWp supplying a heat pump working for hot water demand with a Li-ion battery pack of 21.4 kWh of useable capacity (80% of deep of discharge).

All of the installations mentioned above are going to be integrated and managed by the system developed within the project. STAY-ON is currently working on the development of an energy management system in the demonstrator (Fig. 9). In the meantime the technical dialogue with producers of flow batteries is being conducted.

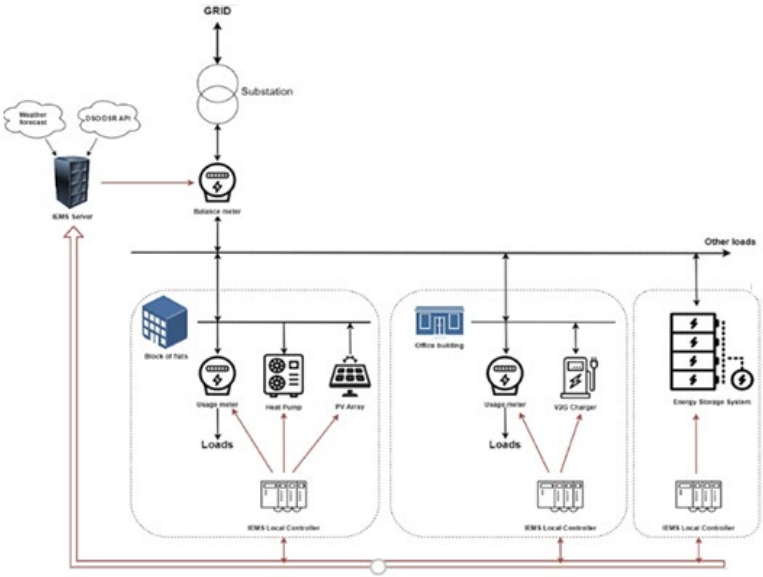

Fig. 9 EMS - energy management system scheme

The situation in eastern Europe and the rapid need to reduce the consumption of fossil fuels mean that in Poland delivery times for PV installations, heat pumps or batteries and other elements included in the energy system for the demonstrator are significantly longer than expected.

In addition to technical aspects, the demonstrator in Poland also includes socio-economic elements. In this regard, work has commenced on the legal possibilities of establishing a local energy community. In the light of the currently changing energy law in Poland, the need to look for low-emission solutions in energy production and the geopolitical situation related to the availability and prices of fuels and energy, this issue becomes extremely urgent.

It is worth mentioning that the Sopot case actually requires a lot of grassroot work, both in terms of technical aspects but also in terms of setting up a local energy community, which is a new topic for Poland in general. ■

SUSTENANCE aims to boost the energy transition in India – find out how 3 unique demo cases progress and build their path towards integrated local energy systems

Author: Zakir Rather,
IIT Bombay, India

The three different Indian demonstration sites in the SUSTENANCE project include: Barubeda Village, Jharkhand focusing on off-grid local energy systems; Borakhai Village, Assam – with a weak and unreliable grid connection, and IIT Bombay campus, Mumbai – connected to the grid and acting to achieve an integrated smart building and sustainable transportation system. At each site integrated local energy systems with multiple energy vectors fed with local renewables will be tested and validated. The method chosen for the control and demand side management will depend on the local conditions, inhabitants and regulations, hence each site is very different.

1) BARUBEDA VILLAGE AIMS TO BECOME A CARBON NEUTRAL "ISLANDED" ENERGY COMMUNITY

The primary source of income for the villagers in Barubeda Village comes from agriculture. There is currently limited access to water in general, and clean water in particular. Due to the lack of electricity, there is no water pumping system, which means that the inhabitants, primarily women, have to manually fetch water for its use in the community. Firewood is predominantly used for cooking, and kerosene lamps for lighting.

With this in mind, the main focus of the Barubeda demo site, over the past few months, has been on developing a solar PV based energy generation system along with energy storage and related infrastructure. In this regard various stakeholder discussions have been held with the villagers.

Electricity generation forecasting has been undertaken to demonstrate the potential of the reliable power generation from renewable sources such as solar and wind energy. The forecasting tool will also be used for scheduling levels of energy generation and load at the site. A sample output from the tool is shown below (Fig. 1). A parallel activity has been the analysis and design for the deployment of a solar PV powered water pumping system.

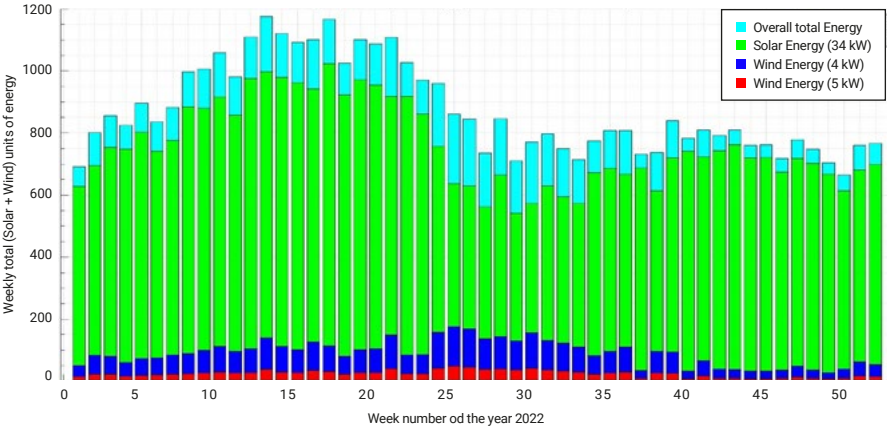

Fig. 1 Weekly total (Solar + Wind) units of energy generation at Barubeda Power Plant for 2022 [Source: IIT Bombay]

Another significant element of the Barubeda site which has a high potential for improving the quality of life of the residents, includes the development of E-rickshaws for use over rough terrain. The figure below depicts the concept (Fig. 2)

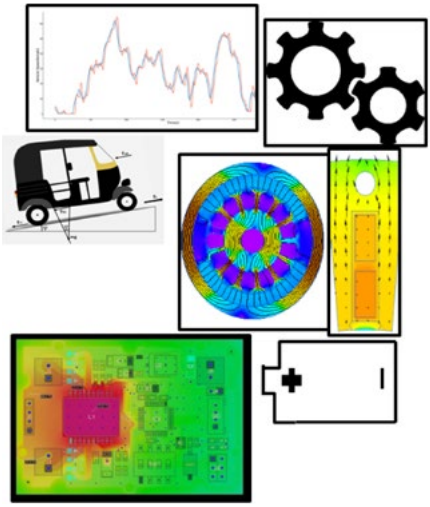

Fig. 2 Different component developments for the E-rickshaw at Barubeda

2) BORAKHAI VILLAGE AIMS TO DELIVER SMART CLUSTERS BASED ON A LOCAL ENERGY SYSTEM POWERED BY RENEWABLES

Borakhai Village can be described as being partly and temporarily electrified. For some houses, it means a connected load of less than 200 W, limited to only a few hours a day. Whereas for others it is a maximum power of 0.5 kW. Overall, the residents are only getting electricity for one third of the day .

Importantly for the realisation of the SUSTENANCE project, a village energy committee (VEC) has been constituted. This is expected to play a key role in the execution of the project in terms of supporting and facilitating the field installations, commissioning activities, collecting the energy/utility usage charges from the residents, and helping in the long-term establishment of the local energy system. To date there have been over 10 visits and discussions conducted with the village community at Borkhai.

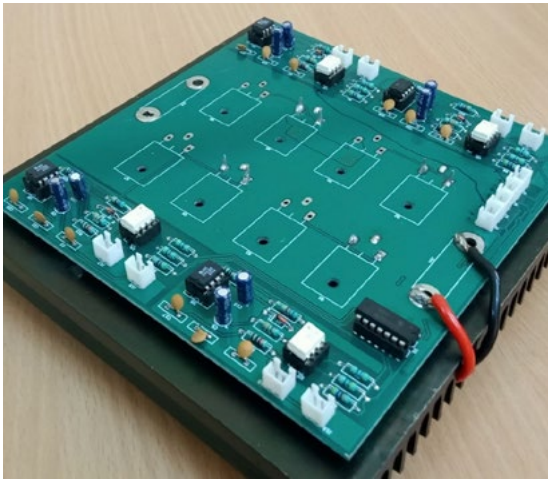

Fig. 3 Lab Prototype Development of Multi Port Converter (NIT Trichy)

Since a cluster-based energy system is planned at this demo site, it is important to have a smart electrical power exchange between and among the clusters. One of the key components required is a multi-functional electronic converter that can be used to perform energy exchanges within and among the clusters. A prototype for this converter is currently being developed and progress is being made (Fig. 3).

Another issue of great importance under consideration in Borakhai village, is the provision of a clean water supply system . In order to deploy an adequate water filtering system, a set of prerequisite tests are being conducted on the water collected from the site (Fig. 4).

Fig. 4 Water testing being conducted on different water samples collected from different locations in June'22 (NIT Silchar)

3) IIT BOMBAY CAMPUS IN MUMBAI ACTS TO ACHIEVE AN INTELLIGENT, GREEN, SUSTAINABLE TRANSPORTATION AND SMART BUILDING SYSTEM

At the IIT Bombay campus, the recent focus has been on developing the infrastructure for smart EV charging. One of the deliverables of this task is to develop an intelligent charger for 2, 3, or 4 wheeler and control their charging load. This includes the demonstration of smart charging of EVs, and measuring the impact on the distribution system (Fig. 5a, b).

Fig. 5a Electric Vehicle Charger (IISc Bangalore)

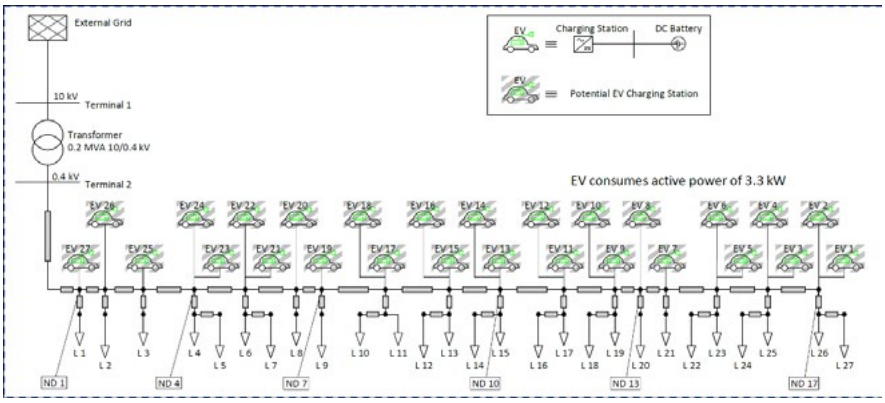

Fig. 5b EV integration with the distribution system (IIT Bombay)

The renewable-based integrated energy systems under development in SUSTENANCE aim to provide the remote village populations with a reliable energy supply, which will facilitate access to vital basic services such as clean water, safe cooking and improved cooling and heating systems. In addition, the energy system transition that the project will facilitate will support the communities farming activities boost access to transportation and thereby education, which will in parallel enhance the empowerment of women and children. ■

The SUSTENANCE Consortium finally meets for the first 'in-person' project meeting in Aalborg, DK

Although there are several advantages of virtual meetings over those in 'real life', only the latter can provide a level of contact which can boost communication between people who are working together. Therefore, it gives us pleasure to report that the first such SUSTENANCE project meeting was finally held 'in-person' in Aalborg, DK between 14-15th June 2022 (Fig. 1).

The SUSTENANCE Consortium Meeting as well as the General Assembly were organised as hybrid meetings in order to involve the Indian partners, who were unable to travel to Denmark. However, the majority of partners participated in person. This resulted in fruitful and forward moving discussions regarding the next activities planned in the project. Last but not least, this gathering made it possible for the Project Coordinator to provide an onsite lab tour (Fig. 2) Thank you the AAU Team for the splendid organisation!

Fig. 1 SUSTENANCE Consortium in Aalborg University, June 2022

Fig. 2 Lab tour at the Aalborg University

SUSTENANCE at #ISUW22

ISGF (India Smart Grid Forum) has been organising its flagship annual event, India Smart Utility Week (ISUW) since 2015 and it is considered as one of the top five international events on Smart Grids, Electric Mobility and Smart Cities.

The 8th edition of ISGF's flagship annual event, the India Smart Utility Week (further ISUW 2022), an **International Conference and Exhibition on Smart Energy and Smart Mobility** was held from 02 - 04 March 2022 on a 3D Virtual Platform. ISUW 2022 has witnessed participation of Visionary Leaders, Utility CEOs, Regulators, Policy Makers and Subject Matter Experts from 61 Countries. From the overwhelming feedbacks received by the organizers, we learned that ISUW 2022 was an outstanding success attended by 2744 Delegates including 740 Utility Officials from India and Overseas and 396 eminent Speakers shared their knowledge and ideas.

Fig. 1 Birgitte Bak-Jensen introducing SUSTENANCE during ISUW 2022 (March 2022).

Fig. 2 SUSTENANCE stand in the EU Zone Booth at ISUW 2022.

Therefore, it gives us immense pleasure to inform that prof. Birgitte Bak-Jensen, project coordinator, was among the speakers and introduced the SUSTENANCE project during the "11th EU - INDIA SMART GRID WORKSHOP" (Fig. 1). SUSTENANCE was additionally presented in the so-called EU Zone Booth with the dedicated project stand (Fig. 2)

To find out more about this exceptional event, we highly recommend you visit www.isuw.in and you will find plenty of post-event materials there.

SUSTENANCE is already now looking forward to the 9th edition planned for March 2023! ■

SUSTENANCE at #GSESRE2022

As one can read on the conference website, „GSESRE2022 aims to bring together the renowned researchers, scientists and scholars to exchange ideas, to present sophisticated research works and to discuss hot topics in the field and share their experiences on all aspects of Sustainable and Renewable Energy". Hense, it gives us pleasure to inform that prof. Birgitte Bak-Jensen, SUSTENANCE project coordinator, who was also among the Key Note Speakers during this excellent event, took this opportunity to introduce SUSTENANCE, next to the other international project, which is also coordinated by AAU, DK, namely SERENE. ■

AALBORG UNIVERSITET

Aalborg University (AAU), founded in 1974 in Denmark differentiates itself via a focus on interdisciplinary studies and problem-based learning. **AAU's department of Energy (AAU Energy)** is dedicated to research, innovation, and education within the broad field of energy. AAU Energy strives for excellence and impact by establishing strong, collaborative partnerships with industrial and academic stakeholders within the energy field and engaging in the public debate concerning one of the major challenges of our time: the green transition.

AAU Energy proudly hosts three Villum Investigator centres and one Poul Due Jensen Foundation centre. One of their research areas, power electronics, has consistently been rated in the global top 3 over the last 3 years. AAU Energy has several researchers among the top 1% most cited, and many more in the top 2%. Within their staff and guests, they count 30 nationalities, and potential PhD students with prestigious scholarships from their home countries actively seek them as a host institution.

AAU Energy are engaged in approximately 200 research, innovation and training projects funded by EU Horizon 2020, Innovation Fund Denmark and EUDP, the Danish Energy Development and Demonstration Program amongst others.

www.energy.aau.dk
www.energy.aau.dk/department/staff

Skanderborg Kommune

Skanderborg Municipality has approximately 60.000 inhabitants. The administrations consists of approx. 600 employees within both economically, socially and environmentally affairs. The work consist of both administration of laws, coordinating the work in all the about 200 institutions in the municipality and to perform the politics of the local City council.

www.skanderborg.dk

The City council has an ambitious climate policy with the aim to reduce CO^2 emmissions with 70% for the whole community before 2030. This work is coordinated by employees in the technical department, and steered by an interdisciplinary steering group. Some of this work can be solved by planning and rules, but much of the work is communication and cooperation with the public.

AURA energi

AURA is a cooperative-owned energy and communications company. We are locally based in Jutland just south of Aarhus, and we have more than 100 years of experience in building and delivering critical infrastructure to our customers. We contribute to the development of the local community, energy-efficiently and digitally.

We develop and operate three critical infrastructures; an electricity distribution network (60 kV, 10 kV and 0,4 kV), a digital fiber network and a public network of EV charging stations. Furthermore, develops and operates renewable energy plants, e.g. wind farms, solar parks and biogas plants. In addition to this, we offer our customers services within electricity trading, electrical installation work, sales of EV charging solutions and EV car sharing concepts.

www.aura.dk

Our latest initiative is about establishing AURA Ventures, where we invest in small digital and sustainable start-up companies and interact with the start-up environment in Denmark.

Being a cooperative means that our more than 109,000 members - who are thus owners - benefit from the company's profits when we invest in local infrastructure, innovation and sustainability, and when we support local initiatives.

Electricity distribution: More than 5,500 km of electrical cables connected to 29 pcs. 60/10 kV-tranformer stations and more than 2,600 pcs. 10 / 0.4 kV transformer substations. 33,460 cable cabinets and 110.000 electricity meters.

Our annual turnover is approx. 260 million Euro. ■

NEOGRID
TECHNOLOGIES

Neogrid Technologies is a cleantech company that offers intelligent heat management solutions for buildings. Our cloud-based heating control and energy management, PreHEAT, helps reduce the cost of heat by optimizing the heat pump or district heating operation in relation to demanded energy from the building, local energy prices and weather forecasts. PreHEAT continuously uses this data to stay ahead of the amount of heat that needs to be sent into the building to maintain the desired indoor temperature. By doing so, PreHEAT automatically regulates the flow temperature to ensure that only the required amount of heat is used. This way of utilizing energy more efficiently allows consumers to save energy and ensure less heat loss without compromising the indoor climate.

Neogrid was founded in 2009 in By Henrik L. Staermose and Per D. Pedersen in Aalborg Oest (Denmark) and currently employs 18 employees. ■

www.neogrid.dk

Bjerregaard Consulting

Bjerregaard Consulting (BJE) is a SME-company with many years' experiences of working with 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. ■

www.bjerregaardconsulting.dk

Project Factsheet

More info:
www.h2020Sustenance.eu
SUSTENANCE H2020 project

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Project Partners

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