Positive Energy Districts and Neighbourhoods

Joint Call for Proposals

Proposal: Consortium and General Information[1]

1. Project Overview

Project Short Title/Acronym: FLEXPOSTS			
Project Full Title: FLEXible energy POSitivity districTS			
Project Coordinator/Main Applicant: Hanze Hogeschool of Applied Sciences, Dr. Marten van der Laan			
Topics: (tick the relevant topic(s)) ☐ Topic 1: PEDs towards climate neutrality: transforming existing urban neighbourhoods ☒ Topic 2: Making PEDs happen: process innovation and business models			
Keywords (max. 5): energy flexibility, business area development, energy system planning, access conditions, sustainable urban development			
Type of project: ☐ Applied research ☐ Innovation/implementation ☒ Applied research and innovation/implementation			
Total Project Costs in EUR:	€823.910,60	Requested funds in EUR:	€645.253,04
Duration of the Project in months (max. 36):	30	Expected start:	09.2022
Total Effort in Person Months:	76	Expected end: (MM.YYYY)	03.2025

[1] Detailed financial information must be given in the separated Excel sheet.

2. Abstract

PEDs can play an important part in the energy transition for urban areas. Implementation of PEDs require integration of energy planning in urban planning processes, as well as a committed network of stakeholders from the public and private sector. The aim of FLEXPOSTS is to provide replicable strategies for improving the process of creating PEDs with a particular emphasis on stakeholder engagement, and to create replicable innovative business models for flexible energy systems. To do so, FLEXPOSTS will apply an interdisciplinary approach for integrating energy and urban planning. This approach is demonstrated in two demo sites, Zwette VI (Leeuwarden, the Netherlands), and Aalborg East (Denmark). In these demo's, the lessons learnt and new insights from research will be translated to practice and vice versa. More specifically, Zwette VI focusses on energy system planning issues hindering further urban development and application of flexibility. Aalborg East focusses on mixed-use neighbourhoods with partnerships between local stakeholders, seeking to implement solutions with the ambition of moving towards net-zero emissions. The project results will facilitate the emergence of PEDs as green energy solutions for urban areas, but also the enabling of PEDs as a solution for energy system planning issues, such as electricity grid congestion.

3. Summary for the General Public

Positive Energy Districts (PEDs) are areas with a net positive energy balance annually. These districts are crucial in the energy transition, but implementing them is difficult because of organisational, regulatory and planning issues. FLEXPOSTS aims to improve the implementation process of PEDs, focusing on flexible energy assets. This integrates PEDs into urban planning and energy system planning. Organisational structures are developed and assessed, providing decision-makers the toolkit for implementation. FLEXPOSTS puts findings into practice in two demonstration districts in Leeuwarden (NL) and Aalborg (DK), establishing a PED network with relevant stakeholders, business models, and strategies for facilitating development of PEDs.

4. Project Consortium

	Organisation	Type of organisation	Country / Funding agency	Principal Investigator
Project Partner 1 (main applicant)	Hanze University of Applied Sciences	REC	Netherlands, RVO	Marten van der Laan
Project Partner 2 (co-applicant)	Aalborg University	HES	Denmark, IFD	Kristian Olesen
Project Partner 3 (co-applicant)	New Energy Coalition	OTH	Netherlands, RVO	Dirk Kuiken
Project Partner 4 (co-applicant)	GreenHub Denmark	PUB	Denmark, IFD	Alex Moreno
Project Partner 5 (co-operation partner)	Gemeente Leeuwarden	PUB	Netherlands, RVO	Joep Poot

5. Quality of Work, Project Objectives and Targets (max. 4 pages including table 5.1)

5.1 Need for Solution and Competitive Edge

For urban areas to become energy positive, many challenges exist. For example, building design, development of renewable energy sources, energy system planning and stakeholder engagement should be aligned with other urban planning and sustainable development needs. These requirements go beyond the challenges faced in the energy transition, also including aspects such as economic development, facilitating business and job opportunities, social inclusion, environmental quality, air quality, affordable housing, welfare standards, digitization, etc. As such, inclusive and sustainable designs for future urban areas are being developed. FLEXPOSTS combines the multiple challenges for sustainable, affordable and accessible urban areas. In search of such designs, sustainable energy system planning should be embraced to facilitate these options. To do so, an interdisciplinary approach should be applied, combining multiple challenges in search for sustainable, affordable and accessible urban areas. The specific challenges for sustainable energy systems are especially in energy intensive and densely populated areas, as the integration of renewable energy is challenging. Renewable energy production requires development of new production (re)sources, and because of the intermittent character of e.g. solar and wind energy, also comes with a number of operational challenges. One of the challenges is the balancing of electricity systems, and steeply increasing demands for peak transport capacity in the electricity distribution and transport systems. In order for urban areas to become energy positive, these challenges need to be rapidly addressed. In the Netherlands, the increasing demand for sustainable electricity and the growing supply of fluctuating renewable electricity, is causing the electricity system to become congested. The existing methods to solve these congestions do not include flexibility (by applying congestion management), but only focus on increasing grid capacity. This problem presently occurs in the Netherlands and is expected to occur in many urban areas across the EU. Congestion puts a hold on the further development of renewable energy sources, as they cannot be integrated in the electricity system, but also on urban planning regulations and processes. All business, houses and public buildings need connections to the electricity system. Waiting for grid expansions is very time consuming, as it can take up to five or more years. This is a significant hurdle for further urban development. Another challenge is replacing fossil-based heat sources with sustainable alternatives. One of the solutions would be to use residual heat from industry. This requires coordination and planning of both space and the energy system. Such coordination is not common practice. Whilst in the Netherlands, district heating is just emerging, Denmark to a large extent already utilises district heating, that consists of supplying sustainable heating to urban areas. But here the challenge is shifting to lower temperature district heating to integrate more renewable heat sources, including industrial waste and geothermal heat and heat pumps, among others. Coupled with this is the need to refurbish buildings to lower heat demands. Denmark has a high share of renewable electricity already but to shift to high levels of renewable energy requires production of hydrogen-based fuels to replace transport fuels and this requires more electricity. This increased electricity again is expected to cause congestion issues in the future. The common challenge of FLEXPOSTS is to decrease electricity demand and to increase electricity flexibility where possible. For instance, by increasing cooling demands, which is a concern in Denmark. Yet, district cooling could limit the electricity demand increase.

FLEXSPOTS addresses the common challenges that both the Netherlands and Denmark face in various aspects of energy transitions, as well as integrating energy planning into existing urban planning processes. When these planning processes are not aligned, problems will arise, such as congestion, or inefficient use of energy. Aligning both processes will enhance efficient use of space, energy resources and infrastructure. In this setting, PEDs are considered as a challenge to be developed within the currently available energy infrastructure, and as a solution for creating more energy flexibility. The challenges which accompany the alignment of urban and energy system planning are the main focus of this project. These challenges range from a lack of incentives or legislations for various stakeholders in investing in solutions for e.g., congestion, other than time and capital-intensive grid expansions, to a lack of renewable heat sources with sufficient reliability and flexibility, to a lack of integrated

planning procedures to align various requirements and aspects in developing PEDs. When stakeholders do invest in measures to reduce CO2 emissions, this is often done on ad hoc basis without any overall strategy. There is therefore a huge potential in identifying relevant stakeholders, networks and partnerships and joining these up in an overall PED network, which actions are guided by a PED strategy. Yet it requires a different approach from todays' current practises. FLEXPOSTS aims to develop and deliver such a 'different approach'. By including the existing energy system, and pathways for future energy systems, urban development could be facilitated; PEDs could become the standard. However, FLEXPOSTS does not only aim at the development of positive energy (urban) areas, but also to utilize urban planning for improving the planning of energy systems. For example to tackle congestion in the electricity system, or to make more efficient use of residual heat, etc. **FLEXPOST aims to introduce new methods and approaches for combined urban and energy system planning, including all relevant energy carriers. It aims to do so by using existing (state of the art) knowledge, tools (see 5.2), and experience from earlier projects (see 5.4), and combining them into a unique toolbox.** Moreover, inclusive, circular and sustainable business case designs, including flexibility, which are adapted to the relevant planning and decision-making processes, are aimed to be developed, tested, and implemented in FLEXPOSTS. To do so, state of the art knowledge is utilized, translated into practical arrangements, and tested in real cases. FLEXPOSTS will accelerate in both scientific and practical impact on combined urban and energy system planning, working further towards the implementation of PEDs. Ultimately FLEXPOSTS will contribute to a more fundamental, till date yet unanswered, question: **how to best align urban planning with energy system planning to facilitate the energy transition?**

5.2 Project Realisation

Integrated forms of planning are crucial to tackle these challenges, and could lead to many benefits, both for facilitating a more resilient and efficient energy system and for future sustainable urban growth and development. The results of FLEXPOSTS should contribute to more inclusive, sustainable planning strategies for future urban areas. Many different aspects play a role in planning the energy system and urban processes, such as: **stakeholder engagement; technical and economic considerations**, and the design of solutions, how to implement them, and their effectiveness and efficiency in addressing societal costs- and benefits; and **regulatory constraints** as on the potential of regulatory barriers or drivers for certain solutions over others. These aspects are relevant for integrating new energy solutions, e.g. energy sources, but also types of consumption and the flexibility needed to match energy sources (supply) and consumption, taking into consideration potential network constraints. As such, the specific layout of areas can be better defined; what types of consumption would be best for the energy system, what type of 'users' are needed? Consequently, the 'type of users' can be included in the urban planning process. In this process, planning of the energy system and urban planning go hand in hand. To better align the process of urban and energy planning, an integral approach is proposed, including:

Techno-economical assessment of various options for energy supply, consumption and flexibility. FLEXPOSTS aims to apply the EnergyPLAN platform (AAU) as well as its extension for urban energy systems, developed in the H2020 project MUSE GRIDs. The platform can provide an interface for energy system modelling by providing inputs and assessments for local-scale energy planning efforts. Hourly energy system data on electricity, heating and cooling, transport, and industry supply and demand can be processed by the tools to determine feasible renewable energy scenarios at national level and for regions and cities. The platform can be complemented by PowerNodes (HUAS), which can provide district level input to the current city-scale platform.
Various flexibility options and their techno-economical characteristics; to a) to increase overall energy efficiency; b) to make the system more flexible to increase resilience (e.g. by mitigating congestion). *PowerNodes* (HUAS) will be used to calculate the hourly energy balance and grid utilization. The model is fed with input from public data sources and collected data of renewable production and consumption profiles of the companies in De Zwette. Flexibility will be estimated based on the company's activities, and industrial process characteristics (inspections/data collection/interviews) and for the empty lots, based on a set of representative company types. Flexibility options such as batteries, P2G and P2H will be added via simulation. This way the

flexibility can be quantified, and its operating conditions (availability, robustness, response time etc.) can be determined. The (local) system will be optimized in such a way that 1) energy profiles adhere grid boundaries and 2) lowest price, taking into account national markets and grid usage fees (for electricity, gases and heat).
Mapping of stakeholder positions and interests, and designing cooperation forms to increase the output of local public-private stakeholder cooperation's. In each demo site, the relevant stakeholders for the implementation of a PED will be identified and mapped through a stakeholder analysis methodology, to identify individual stakeholders' interests, needs and potential contribution to the design and implementation of a PED. In each demo site, stakeholder engagement strategies and meetings with stakeholders will be held to build stakeholders' partnership capacity and involvement throughout the FLEXPOSTS project period.
Potential structural, technical and regulatory barriers. Potential barriers could for example be national legislation, financial conditions, stakeholder interests, local policies, etc. The analysis of structural, technical, and regulatory barriers will be carried out as a policy analysis of national and municipal planning policies and a legal analysis of national legislation, as well as the technical challenges and opportunities in each demo-site. Stakeholder engagement plays an important role: stakeholder experiences will be collected, analysed, and validated using e.g. legislative and policy documents, business case calculations. FLEXPOSTS will also analyse current urban development plans and identify relevant mechanisms that can facilitate the PED implementation.
Suitable business designs to engage the necessary and relevant stakeholders. The demo sites will be assessed using a business model design framework for viability (BMDFV), to result in suitable business designs that ensure stable local cooperations. BMDFV was validated in an industrial area, and reveals service concepts, focal actor perspectives and business model design options. A crucial element in BMDFV is a business ecosystem perspective, which is needed since a focal actor alone lacks the the capacity to implement complex business models.
Cross- and interdisciplinarity. Interdisciplinary knowledge co-production is urgent for structuring socioeconomic and spatial processes for urban sustainability through energy and environmental considerations and processes of urbanization that might converge in PEDs as strategical organization of the changes we can hope for the future. The consortium consists of experts from the fields of i.a. urban, energy and environmental planning, business design, legal studies, and system design. The consortium is highly experienced in working inter- and transdisciplinary.[2] The outcomes of the project will be translated into a replication toolkit, to support local stakeholders in their planning efforts.

5.3 Overall Project Type

FLEXPOSTS will build on applied research and innovation/implementation to guarantee interaction and have an iterative approach between research and practice. The approach for FLEXPOSTS is to gain more understanding into the process of implementing PEDs in real life scenarios. Therefore, the collaboration with relevant stakeholders (e.g. customers and end-users, system operators, public authorities) is carried out in the applied research phase. This guarantees that the research within the project will converge to usable results into practice and will avoid the end result to be theoretical only. The consortium will make sure to produce replicable solutions that are ready to be implemented, by involving all necessary stakeholders in an early stage. Including the two demo sites will be a key ingredient in sharing knowledge both ways, resulting in incremental improvement of both parts of the project. The innovation part of FLEXPOSTS is shown in the collaboration between actors in improving urban planning while integrating PEDs as regions within the city. Participation of multiple stakeholders in urban planning will result in higher acceptance of municipal plans and will provide good grounds for executing plans. FLEXPOSTS will demonstrate how PEDs can not only be used as a tool for a clean energy transition, but also as a vehicle for improving the life quality in urban areas. The demo sites in FLEXPOSTS have real problems in sustainable urban development, for example with respect to the availability of (sustainable) electricity and sustainable heat sources. The demo sites require solutions that allow for direct translation of designed solution from applied research. The involved local stakeholders can directly implement the outcomes of FLEXPOSTS. Feedback from implementation will be looped back to the applied research, providing real-world know-how and

[2] AAU and HUAS offer for example various bachelor and master's programme in Urban, Energy and Environmental Planning (AAU), and Sustainable Energy System Management (HUAS) in which all researchers of the respective organizations in the consortium are actively involved. NEC and GHD are focussing on developing and translating knowledge from various disciplines to societal, and business cases.

information about barriers that are still to be overcome. Implementation is also used to assess the scalability and replicability of the applied research.

5.4 Results from Other Projects

MAKING-CITY [1] **(H2020)** demonstrates the potential of the PED approach as the basis for efficient and sustainable planning and development of cities. Cities: Groningen and Oulu, plus six followers. Partners: HUAS (applied technical and social research, e.g. modelling of the PED, upscaling to city level, and social acceptance district heating) and NEC (developing long-term city visions and developing various innovative business cases) and. The publicly available project results will be used as input and added on throughout the execution of FLEXPOSTS. **PoCITYf** [2] **(H2020)** focusses on helping cities to become greener, smarter and more liveable while respecting their cultural heritage by implementing and testing PEDs. Cities: Alkmaar and Evora, plus six followers. Partners: NEC, (coordinator Alkmaar/management pilot activities; e.g. stakeholder engagement, technical implementation, political-legal decision making processes, and replication plans). **SMILE** [3]**: (H2020)** demonstrated different smart grid technologies to reduce peak demand and energy grid instabilities caused by high penetration of renewable energy. Partners: NEC (communication, dissemination, and exploitation) and AAU (energy system impact analysis, energy strategies, and energy market designs). **Environment++** [4] is an ambitious and innovative partnership aiming at creating new sustainable solutions in Aalborg East, which started in 2016. Partners: AAU, and local stakeholders.[3] Linked projects: "**Sustainable Synergies**: Facilitated industrial symbiosis for energy- and resource efficiency" (European Fund for Regional Development), in which industrial synergies in the local urban district have been explored. Furthermore, Environment++ investigated the location of companies in terms of exchange of materials and energy and developed a series of business models for increasing sustainability of the companies in the area. **SmartEnCity** [5] (H2020) focused on developing replicable systemic approaches for cities to achieve carbon neutrality, including energy technology demonstrations, network creation and the development of an integrated energy planning approach called Cities4Zero. Partners: AAU (developing Cities4Zero and testing its application within Sønderborg Municipality in Denmark). The activities in FLEXPOSTS further develops the urban planning knowledge gained in SmartEnCIty by broadening from integrating smart urban technologies to the multi-technology PED focus.

Table 5.1: Existing results and deliverables obtained from publicly funded projects which provide the basis of or feed into the proposed project.

Funding provider	Project number	Title	Description of results already obtained and relevant deliverables	Location and type of documentation
EU H2020	824418	MAKING-CITY	Tools for modelling energy demand, supply side, simulation of scenarios and estimation of impacts	https://bit.ly/3IaCVES
EU H2020	824418	MAKING-CITY	Guidelines for Positive Energy District Design	https://bit.ly/3s4Cyps
EU H2020	824418	MAKING-CITY	Positive Energy Districts Methodology and Its Replication Potential	https://bit.ly/3BzozLG
EU H2020	824418	MAKING-CITY	Collaborative Business Model for Local Energy Storage	https://bit.ly/3I8ke4A
EU H2020	864400	PoCITYf	End-User and Stakeholders Requirements Definitions	https://bit.ly/36mJmq9
EU H2020	864400	PoCITYf	Building & Grid Retrofit Regulatory Framework	https://bit.ly/3sTNYf8
EU H2020	731249	SMILE	Modelling Renewable Energy Islands and Benefits for Energy Planning	https://bit.ly/3I9fnjE
EU H2020	731249	SMILE	Guidelines for replicating Smart Grid solutions	https://bit.ly/3I8b3RE
European Fund for Regional Development	878091	Sustainable Synergies:	Sustainable Synergies: Facilitated industrial symbiosis for energy- and resource efficiency	https://bit.ly/357sO4V
EU H2020	691883	SmartEnCity	SmartEnCity replication toolkit that provides practical help for cities to successfully implement similar activities or measures in other contexts	https://bit.ly/3s3HoTT

[3] Port of Aalborg, Aalborg Municipality, the business network of Aalborg East, the public energy and water utilities, and the public waste management company.

6. Added Value of International Co-operation (max. 1 page)

In the Danish case, in Aalborg (East), a living lab for social sustainability, green transition and innovation has been developed over the years. Social housing has been made more energy efficient, close cooperation between the various stakeholders in the area has emerged. Waste heat from industry is being utilized in district heating, and stakeholders in the area are actively working towards becoming energy positive. Current and future projects include a pilot project with low-temperature district heating in social housing, the development of prototypes of energy neutral buildings, and ambitions of implementing district cooling. At the moment, there are a lot of initiatives and projects in the area, but these are developed ad hoc without an overall strategy or focus on potential synergies. There is a huge potential in linking and joining up these projects in a formalised PED network and by implementing a PED strategy. Relevant stakeholders supporting the PED agenda include: GreenHub Denmark, Aalborg Municipality, Aalborg Utility Company, Himmerland Housing Association, Business Network 9220 and the Port of Aalborg.

The ambitions are similar to those in Leeuwarden. Both cases aim to develop an attractive area for business and citizens to live, work and relax in an energy positive manner. However, whilst the ambitions are similar, the context is different. In Aalborg, the focus is on making heat networks more sustainable by making use of residual heat. In Leeuwarden, the focus is on moving to increased electrification, and replacing heating based on natural gas, on alternatives, such as aquathermal or geothermal energy, or increased electric heating, using e.g. heat pumps. The innovations which are proposed and implemented are different. Also, Aalborg is already more experienced in industrial symbiosis, active interaction between industry, social housing, and public buildings when compared to the case in the Netherlands. More specially, Zwette VI will consider implementing the lessons learned and best practices related to stakeholder engagement from Aalborg East. This way synergy is being created between both cases.

In the Netherlands case, in Leeuwarden (Zwette VI), the problem is primarily related to congestion management, the integration of renewable energy sources (RES) and future urban developments. This is an actual and concrete problem. At the moment, there is tension between development of business areas and industry on the one side, and housing and public buildings on the other side, because of lack of transport capacity for renewable electricity. This tension also has a broader impact on the area, in which people work, live and relax. This hinders development, in which future energy demand should be fitted in such a manner that it will contribute to the broader implementation of renewable electricity in the existing energy system. One of the problems is the organization of such options. Technical options exist, but the organizational tools (e.g. cooperation's of energy users), shared (societal) business cases (e.g. for congestion management – which is a societal problem) current decision making process, legal and planning procedures, are inadequate for providing sufficient traction for taking the energy transition in the urban area to the next level. Through the international co-operation with Aalborg, these gaps can be addressed, and Leeuwarden could learn from Aalborg, while giving insights to a separate set of challenges. In relation to the current problems, PEDs are not only a solution to making the area more energy positive, but also facilitate further development in the city, and contributing to economic and regional development. Consequently, Zwette VI should not only be developed for business, but also a sustainable energy hub, interacting with other areas and contribution to making the city of Leeuwarden energy positive, and allowing for further economic development.

Having international cooperation between both cases will help in identifying: universal planning strategies for PEDs, innovative business cases, calibrated to public interests, local social conditions and broader stakeholder engagement, exchanging experiences on best practices, and finding new effective innovative solutions that improve local circularity, stakeholder engagement, social inclusion, and planning efficiency.

7. Key Activities (Work Programme)

Overall Strategy Work Plan

To implement the goals and ambitions of FLEXPOSTS, and in applying the approaches mentioned in section 5 of the proposal, FLEXPOSTS proposes clear structures for knowledge development, testing, and implementation. The structures ensure the incorporation of the insights, experience and interests of various stakeholders and cooperates with other projects, addressing PEDs.

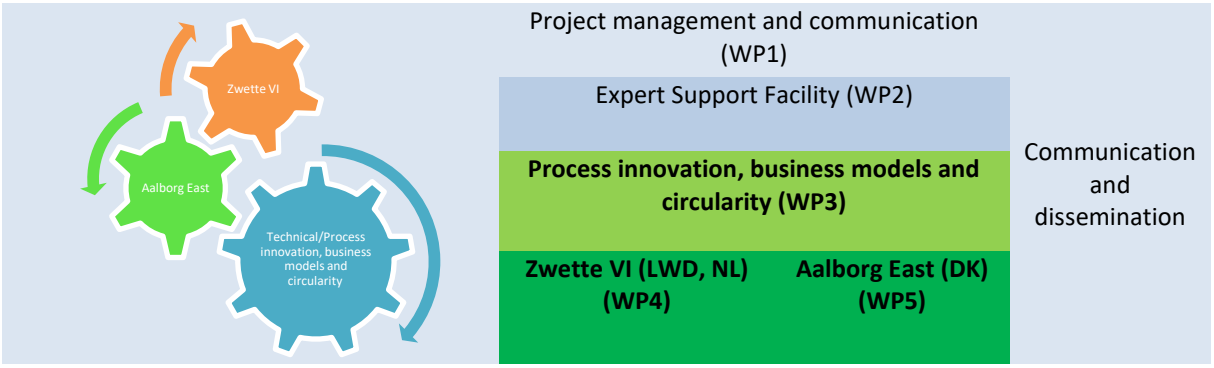


Figure 1. FLEXPOSTS work structure.

As depicted above, FLEXPOSTS proposes to work with 5 WPs, in which applied research and innovation and implementation are combined. The WPs also include various communication (WP1) and dissemination tasks (WPs 2-5) to ensure knowledge sharing with the relevant stakeholders, including the expert support facility. **WP1 Project Management** relates to project management and the assessment of progress and results. It is specifically designed to facilitate the execution and alignment of the work in and between all different WPs (according to the work plan), to ensure the planned activities are executed accordingly, and can be reported. **WP2 Expert Support Facility** is equipped to support the Expert Support Facility (ESF). The FLEXPOSTS expert will ensure knowledge exchange between FLEXPOSTS and the ESF. To do so, the ESF expert is part of the PMB (see 12.2), in which the progress of all WPs is discussed, and ensures knowledge transfers to the other WPs. **WP3 Technical/process innovation, business models and circularity** functions as the 'scientific hart' of FLEXPOSTS. In this WP, the partners involved in the research activities (HUAS, AAU, NEC, GHD), work on joint and common knowledge, which can be translated to the demo site: Zwette VI and Aalborg East. The research output to be translated, tested and implemented into practice, is not simply designed 'on the table' in WP3. FLEXPOSTS will utilize a feedback loop, in which the learnings from the testing and implementation in the test cases, will be brought back to the drawing table in WP3. Also the demo site hosts, LWD and GHD, will help to facilitate this feedback loop, and bring in the relevant (practical) aspects. **WP4/WP5. Demo Sites Zwette VI Leeuwarden and Aalborg East** is utilized to test, implement and further tweak the knowledge gained in WP3. Relevant national conditions are researched here. Also, the local hosts of the demo, the municipality representatives (LWD and GHD), together with the local stakeholders in the demos,[4] play important roles here and are actively involved in the assessments and implementation of the gained knowledge and outputs. They will generate learnings and findings from the implementation process, which are vital for the quality of the work done in WP3. As such, the learnings from WP4/5 are also brought back to WP3, to further develop the common findings in FLEXPOSTS.

[4] Aalborg Forsyning; Business Network 9220; City of Aalborg; Energiecampus Leeuwarden; Municipality of Alkmaar; Himmerland Boligforening; Port of Aalborg; Province of Fryslân; Municipality of Groningen;

FLEXPOSTS Gantt Chart

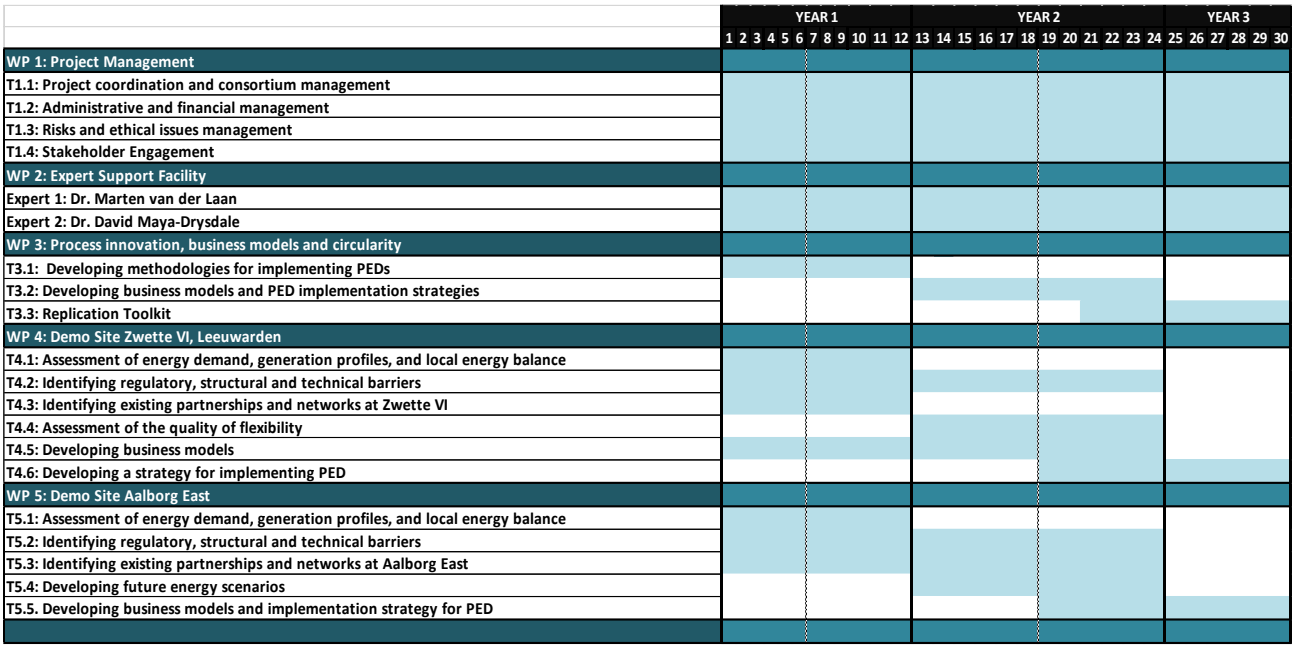


Figure 2. FLEXPOSTS Gantt Chart.

Table 7.1: Work package list

Work package No[5]	Work package title	Lead project partner No[6]	Lead project partner short name	Person-months[7]	Start month[8]	End month
1	Project management	1	HUAS	7,5	1	30
2	Expert Support Facility	1	HUAS	4	1	30
3	Process innovation, business models and circularity	2	AAU	26,5	1	24
4	Demo Site Zwette VI Leeuwarden	1	HUAS	18,5	4	30
5	Demo Site Aalborg East	2	AAU	19,5	4	30
			TOTAL	76		

[5] Work package number: WP 1 - WP n.
[6] Number of the project partner leading the work in this work package.
[7] The total number of person-months allocated to each work package.
[8] Measured in months from the project start date (month 1).

Table 7.2: Deliverables List

Del. no.[9]	Deliverable name	WP no.	Delivery date[10]
D1.1	Project Management Plan - first version	WP1	M3
D1.2	Project Management Plan - second version	WP1	M12
D1.3	Risks and ethical issues monitoring report	WP1	M28
D1.4	Stakeholder Engagement Report	WP1	M30
D3.1	Methodological Guideline for PEDs	WP3	M12
D3.2	Business Models and PED implementation strategies	WP3	M24
D3.3	Replication Toolkit	WP3	M30
D4.1	Local Energy Balance Assessment	WP4	M12
D4.2	Barriers for Implementing PEDs in The Netherlands	WP4	M24
D4.3	Mapping of Existing Partnerships and Networks	WP4	M12
D4.4	Flexibility Assessment Report	WP4	M24
D4.5	Business Models	WP4	M24
D4.6	Implementation Plan	WP4	M30
D5.1	Local Energy Balance Assessment	WP5	M12
D5.2	Barriers and potentials for implementing PEDs in Denmark	WP5	M24
D5.3	Mapping of existing partnerships and networks	WP5	M24
D5.4	Future energy scenarios in Aalborg East	WP5	M24
D5.5	Business models and implementation strategy for PED in Aalborg East	WP5	M30

[9] Deliverable numbers in order of delivery dates. Please use the numbering convention <WP number>.<number of deliverable within that WP>. For example, deliverable 4.2 would be the second deliverable from work package 4.
[10] Measured in months from the project start date (month 1).

Table 7.3: List of milestones.

Milestone number	Milestone name	Work package(s) involved	Expected date [11]
1	Management structure established and project webpage online	WP1	M3
2	Readiness of the Stakeholder Engagement Strategy	WP1	M3
3	Methodologies ready for implementing PEDs	WP3	M12
4	PED business models and implementation strategies ready	WP3	M24
5	PED Replication Guidelines	WP3	M30
6	Completion of the Dutch demo-site	WP4	M30
7	Completion of the Danish demo-site	WP5	M30

[11] Measured in months from the project start date (month 1)

Work package number	1	**Start date or starting event:**			Month 1		
Work package title	Project management						
Project partner number	1	2	3	4	5		
Project partner short name	HUAS	AAU	NEC	GHD	LWD		
Person-months per applicant:	2	2	1	2	0,5		
Research type	*Applied research and Innovation/implementation*						

Objectives - The main goal of WP1 is to deploy an efficient governance structure guaranteeing the overall coordination of the project and coordination among WPs and tasks, thereby contributing to the achievement of objectives and to the delivery of high-quality results within the established timeframe and budget. All the project partners will be highly involved in all tasks of WP1.

Description of work - **Task 1.1: Project coordination and consortium management (HUAS|M1-30) -** Project coordination and management activities will be undertaken by HUAS that will be responsible for the overall project development, planning, performance and financial control, quality assurance, risk management, contingency planning, and administration of the funding. Furthermore, this task aims to take measures to assure a well-organized flow of communication between partners by having regular meetings including a kick-off, mid-term and final event. **Task 1.2: Administrative and financial management (HUAS|M1-30) -** The aim of this task is to ensure efficient financial, administrative and contractual management of the project. The administrative and financial management activities will be concerned with the fulfilment of these objectives as well as with their reporting in compliance with the general conditions and provisions set within the Consortium Agreement guidelines for successful project implementation. **Task 1.3: Risks and ethical issues management (HUAS|M1-30) -** This task aims at continuously monitoring the progress of the project and its alignment with the initial objectives, including with the objective to prevent the occurrence of critical risks or define measures for mitigating their impact in case risks would occur. Moreover, it will perform ethics management activities in order to apply contingency actions when necessary taking into account the guidelines provided in Section 8 and 10. **T1.4: Stakeholder Engagement (GHD|M1-30)** – To increase the impact of the project results and facilitate the spread of new knowledge, solutions, and services through dissemination and communication channels, towards key stakeholders (section 11.1) a logo, e-newsletter, webpage, report and presentation templates will be developed. Project partners are committed to disseminate the project (results) among their industrial, research, and community networks.

Deliverables - **D1.1: Project Management Plan - first version (HUAS|Report|Confidential|M3) -** Report including the first version of the Project Management Plan including Gantt chart and Work Breakdown Structure (WBS) and particularly a schedule per task, responsible partner, related subtasks, related deliverables, and dependencies on other tasks. Result of: T1.1 and T1.2. **D1.2: Project Management Plan - second version (HUAS|Report|Confidential|M12) -** Report including the second version of the Project Management plan, including Gantt chart and Work Breakdown Structure (WBS) and particularly a schedule per task, responsible partner, related subtasks, related deliverables, and dependencies on other tasks. Result of: T1.1 and T1.2. **D1.3: Risks and ethical issues monitoring report (HUAS|Report|Confidential|M28) -** Report describing the outcome of the monitoring activity over potential risks and ethical issues. The report will include a risks register, where potential risks or ethical issues are recorded and countermeasures are defined. Result of: T1.3. **D1.4: Stakeholder Engagement Report (GHD|Report| Public|M30) -** Report describing all the results of the communication and dissemination activities, including a stakeholder network based on T4.3, T5.3, local and regional consortium partner contacts, previous project consortia and communication activities, and key Target Groups as discussed in section 11.1, who are interested in implementing the projects PED strategies. Result of: T1.4.

Work package number	2	**Start date or starting event:**	Month 1
Work package title	Expert Support Facility		
Project partner number	1	2	
Project partner short name	HUAS	AAU	
Person-months per applicant:	2	2	
Research type	*Applied research*		

Expert 1: Dr. Marten van der Laan - Experienced energy professional, expert in renewable energy, distributed energy resources, smart grids, demand-side management and energy communities. Participated in the USEF Foundation [6], focusing on demand-side flexibility market organization across Europe. Professor in system integration, conducting research on hybrid energy systems, conversion and storage, flexibility, the heat transition and role of energy communities. Currently participating in the H2020 Making City project establishing PED districts in the city of Groningen. Past career in information technology (20 years), consumer electronics and research.

PED Definition: Focus on system boundaries as local energy systems interact with systems on other levels and scales. Local balancing can positively impact the energy-infrastructure. Energy regulation (incentives, tax schemes, P2P markets, flexibility markets) may support local balancing. Marten van der Laan has expertise in EU regulation on demand-side flexibility.

Mapping of PEDs: Establishing clear models revealing local energy demand and generation profiles, based on open data and smart meter data, to determine the local energy balance, transport and storage needs for all commodities (electricity, gases and heat).

PED Toolbox: Energy Tariff schemes, Incentive schemes, flexibility markets. KPIs for local balance, utilization of flexibility, utilization of generation, conversion and energy infrastructure.

Explication of PEDs: Scale-up from PED's to a City approach is also ongoing research topic in the Making City project. Lessons learnt from this project can be directly used. Marten van der Laan is contact person on behalf of HUAS.

Expert 2: Dr. David Maya-Drysdale - Core expertise in energy system analysis for 100% renewable energy at national level - integrating electricity, heating & cooling, transport and industry within Smart Energy Systems, local energy planning development integrating energy scenarios into urban planning processes. Bridging technical energy data and institutional planning processes. Currently participating in the H2020 Seenergies project assessing the energy efficiency first principle for each European country within a smart energy system perspective.

PED definition: Focus on system boundaries of PEDs and integration in regional and national energy systems and the implications for urban planning requirements. Local energy policy can be informed by the boundary interplay and balancing of the energy system through flexibility.

PED Toolbox: Tools for technical energy system balancing and solving urban governance issues, quantitative and qualitative KPIs for energy system feasibility at different scales

Work package number	3	**Start date or starting event:**			1		
Work package title	Technical / process innovation, business models and circularity						
Project partner number	1	2	3	4	5		
Project partner short name	HUAS	AAU	NEC	GHD	LWD		
Person-months per applicant:	6,5	12,5	4	3	0,5		
Research type	Applied research						

Objectives - The main objective of WP3 is to establish a common methodological frame and understanding of analysis across the project and cases in WP4 and WP5. This will ensure a stringent research design and heighten the learning potentials across cases, networks and actors. The following tasks are planned to deliver this objective. All tasks in this work package will be a joint effort of all consortium partners coordinated by the respective task leaders

Description of work - T3.1: Developing methodologies for implementing PEDs (AAU|M1-12) – This task will develop five methodologies: T3.1.1: methodology for analysing the existing energy system and energy balance at neighbourhood level used in T4.1 and T5.1. T3.1.2: methodology for developing future energy scenarios used in T4.4 and T5.4. T3.1.3: methodology for identifying regulatory, structural and technical barriers for implementing PEDs at national and local level to guide the analysis carried out in T4.2 and T5.2. T3.1.4: interdisciplinary and transdisciplinary methodology for synergising energy planning and urban planning processes at neighbourhood scale towards the implementation of PEDs. This approach will form one of the cornerstones of the project in terms of devising strategies towards implementation of PEDs, as outlined in T3.2, T4.5 and T5.5. T3.1.5: methodology for local stakeholder engagement and establishing local partnerships and networks to support the establishment of public-private partnerships. This methodology will provide the backbone for T4.3 and T5.3. **T3.2: Developing business models and PED implementation strategies (HUAS |M12-24) –** The aim of this task is to develop an approach for outlining business models (T3.2.1) and an approach for PED implementation strategies (T3.2.2) including an assessment of the applicability of the PED model from a broad sustainability perspective, e.g. the construction of virtual neighbourhood boundaries vis-a-vis existing 'natural' boundaries of energy systems and urban planning processes. The sustainability of the business models will be assessed from a circularity and life-cycle perspective. This task will assist the analyses carried out in T4.5. and T5.5. **T3.3: Replication Toolkit (NEC|M20-M30) -** This task will aim to develop a Replication Toolkit near the end of the project to address the replicability guidelines for an effective replication of the FLEXPOST solutions developed and implemented in WP3, WP4, and WP5.

Deliverables – D3.1: Methodological Guideline for PEDs (AAU|Report|Public|M12) - Report outlining methodologies for: existing energy systems and energy balance at neighbourhood level (T3.1.1), future energy scenarios (T3.1.2), identifying regulatory, structural and technical barriers for implementing PEDs (T3.1.3), interdisciplinary and transdisciplinary methodology for synergising energy planning and urban planning processes (T3.1.4), and local stakeholder engagement and local partnerships and networks (T3.1.5). Result of: T3.1. **D3.2: Business Models and PED implementation strategies (HUAS|Report| Public|M24) -** Report outlining an approach for innovative business models, replicable PED implementations strategies and an assessment of the applicability of the PED model. Result of: T3.2. **D3.3: Replication Toolkit - (NEC|Report| Public|M30) -** Report describing all relevant technological and non-technological information needed for an effective replication of the developed processes, solutions, best practices of the two demo-sites. Results of: T3.3.

Work package number	4	**Start date or starting event:**			Month 1		
Work package title	Demo Site Zwette VI Leeuwarden						
Project partner number	1	2	3	4	5		
Project partner short name	HUAS	AAU	NEC	GHD	LWD		
Person-months per applicant:	8,5	3	2	0,5	4,5		
Research type	Applied research and innovation/implementation						

Objectives - The main objective of WP4 is to translate the findings and developments from WP3 into the specific case of Zwette VI. WP4 will demonstrate the concepts from WP3 by developing innovative business cases and organizational forms to be facilitated by public authorities and enhancing the local decision making process to facilitate the speedy implementation of PEDs. All tasks in this work package will be a joint effort of all consortium partners coordinated by the respective task leaders.

Description of work - Task 4.1: Assessment of energy demand, generation profiles, and local energy balance (HUAS|M1-12) – Analysing the current energy demand and generation profiles, based on open data and smart meter data, to determine the local energy balance, transport and storage needs for all commodities (electricity, gases and heat) including all flexibility options such as curtailment, demand response and local storage. **Task 4.2: Identifying regulatory, structural and technical barriers (HUAS|M1-24) –** Identifying regulatory, structural and technical barriers for implementing PEDs at Zwette VI and the applicability to the Dutch context, focussing on business parks in their relation to neighbouring residential areas. **Task 4.3: Identifying existing partnerships and networks at Zwette VI (LWD|M1-12) -** Identifying existing partnerships and networks in Zwette VI and explore how these can be utilised/expanded to foster the PED-agenda and to establish a PED network of relevant stakeholders. **Task 4.4: Assessment of the quality of flexibility (HUAS|M12-24) –** Using simulations and digital twinning to determine the flexibility characteristics that guarantee that the flexibility is delivered in the right quantity in due time. **Task 4.5: Developing business models (HUAS|M1-24) –** Developing innovative business cases to attract new entrants to become part of the PED. This includes optimal utilization of residual heat, conversion options storage and flexibility options. The focus will be on value of flexibility to mitigate congestion and business models that allow for utilization of this flexibility. **Task 4.6: Developing a strategy for implementing PED (NEC|M18-30) -** Developing a strategy for implementing a PED at Zwette VI which will showcase how the experiences this PED can be transferred to other mix-use neighbourhoods with similar characteristics and similar congestion problems including the development of organizational forms, and enhanced local decision processes.

Deliverables - **D4.1: Local energy balance assessment (AAU|Report|Public|M12) -** Assessment of the energy demand and generation profiles to establish the current energy balance and flexibility options in Zwette VI. Result of: T4.1 and T4.5. **D4.2: Barriers for implementing PEDs in The Netherlands (HUAS|Report| Public|M24) -** Preparation of report on the regulatory, structural and technical barriers for implementing PEDs in The Netherlands. Result of: T4.2. **D4.3: Mapping of existing partnerships and networks (LWD|Report| Public|M12) -** Mapping of existing partnerships/networks in Leeuwarden and strategies and targets to reduce CO2 emissions and transition to sustainable energy sources and coping with limited grid capacity. Result of: T4.3. **D4.4: Flexibility assessment report 4.4 (HUAS Report|M24) -** Flexibility assessment, describing the quality of flexibility options from DSO perspective. Result of: T4.4. **D4.5: Business models (HUAS|Report| Public|M24) -** Report on the business ecosystem including business case analysis for all local stakeholders. Result of: T4.5. **D4.6: Implementation Plan (NEC|Report| Public|M30) -** Preparation of implementation plan for implementing PED in Leeuwarden De Zwette. Result of: T4.6.

Work package number	5	**Start date or starting event:**			1		
Work package title	Demo Site Aalborg East						
Project partner number	1	2	3	4	5		
Project partner short name	HUAS	AAU	NEC	GHD	LWD		
Person-months per applicant:	1	11,5	0	6,5	0,5		
Research type	Applied research and innovation/implementation						

Objectives - The main goal of WP5 is to translate the findings and developments from WP3 into the specific case of Aalborg East. WP5 will demonstrate a strategy on how to implement PEDs in a mixed urban neighbourhood by identifying barriers and develop innovative business cases and organizational forms to be facilitated by public authorities and enhancing the local decision making process to facilitate the speedy implementation of PEDs. All tasks in this work package will be a joint effort of all consortium partners coordinated by the respective task leaders.

Description of work - **Task 5.1: Assessment of energy demand, generation profiles, and local energy balance (AAU|M1-12)** - Analysing the current energy demand and generation profiles, based on open data and smart meter data, to determine the local energy balance, transport and storage needs for all commodities (electricity, gases and heat) including all flexibility options such as curtailment, demand response and local storage. **Task 5.2: Identifying regulatory, structural and technical barriers (AAU|M1-24) -** Identifying regulatory, structural and technical barriers for implementing PEDs in Aalborg East and its applicability to the Danish context. In addition, potentials for integrating energy planning into urban planning processes will be identified in the context of Aalborg East, with a focus on a highly integrated district heating network that could be integrated in urban planning policies at municipal level. **Task 5.3: Identifying existing partnerships and networks at Aalborg East (GHD|M1-24) -** Identifying existing partnerships and networks in Aalborg East and establish a PED network of relevant actors in Aalborg East. **Task 5.4: Developing future energy scenarios (AAU|M12-24) -** The digital twinning will be used in Aalborg East including an energy system analysis done for Aalborg Municipality considering the wider urban grid to assess flexibility outside the PED. **Task 5.5. Developing business models and implementation strategy for PED (AAU|M18-30) -** Develop business models and strategies for implementing PED in the mix-use neighbourhood Aalborg East. Business models with take circularity aspects and life-cycle principles into consideration to safeguard the overall sustainability of the PED implementation strategy. The strategy will showcase how the experiences from Aalborg East can be transferred to other mix-use neighbourhoods with similar urban characteristics.

Deliverables - **D5.1: Local energy balance assessment (AAU|Report| Public|M12) -** Assessment of the energy demand and generation profiles to establish the current energy balance and flexibility options in Aalborg East. Result of: T5.1. **D5.2: Barriers and potentials for implementing PEDs in Denmark (AAU| Report| Public|M24) -** Report on the regulatory, structural and technical barriers for implementing PEDs in Denmark and in Aalborg East, including an assessment of the potentials for integrating energy and urban planning in Aalborg. Result of: T5.2. **D5.3: Mapping of existing partnerships and networks (GHD|Report| Public|M24) -** Mapping of stakeholders and existing partnerships and networks in Aalborg East, and establishing a PED network in Aalborg East. Result of: T5.3. **D5.4: Future energy scenarios in Aalborg East (AAU|Report| Public|M24)** - Developing future energy scenarios for Aalborg East, including flexibility assessment, describing the quality of flexibility options from a municipal energy system perspective and DSO perspective. Result of: T5.4. **D5.5: Business models and implementation strategy for PED in Aalborg East (AAU|Report| Public|M30) -** Report outlining business models for implementing PED in Aalborg East by drawing on circularity aspects and life-cycle principles in assessing the overall sustainability of these models. Strategy for implementing a PED in Aalborg East. Result of: T5.5.

Risks and Contingency Plans;

Risk	Description of risk	WP	Proposed risk-mitigation measures
1	Failure in respecting planning.	WP1, WP3, WP4, and WP5	Expertise of the partners (technical skills and management experience) will allow to anticipate problems. Close monitoring of activities at the WP and Task level, with strict control on deliveries (including interim ones).
2	Unexpected delays in achieving milestones/ deliverables.	WP1	Support by the Coordinator and WP Leaders in getting additional partners involved to provide resources to complete activity in time.
3	Lack of communication among the partners	WP1	HUAS is responsible to facilitate communication among partners by establishing appropriate communication channels (e.g. periodic updates by phone, meetings, e-mail. However, probability is low due to previous successful collaborations between several key partners.
4	Loss of a consortium partner	WP1	All partners are committed to the project, but in case a consortium partner leaves, key tasks will be reassigned to other partners or an appropriately qualified partner will be involved in the consortium.
5	Recruitment of PED stakeholders	WP4, and WP5	GHD and LWD are already in contact with relevant stakeholders since there is a high level of interest and support for the project so the risk is low. However, mitigation is to contact a higher number of stakeholders to allow for drop out. Also a number of stakeholders have already provided their commitment in the proposal phase of FLEXPOSTS.

8. Ethical and Regulatory Considerations, Data Management

The project has a policy of protection of the project's results whenever results are expected to be commercially or industrially exploitable and whenever protecting them is possible, reasonable and justified. The project recognizes the value of regulating research data management issues. The beneficiaries will, to the extent possible, deposit the research data needed to validate the results presented in the deposited publications in a clear and transparent manner. Project sensitive data will be put at the disposal of relevant consortium partners by the stakeholders involved in the case studies for the purposes of the project and in accordance with ethics principles. However, they will not be disclosed in order to safeguard privacy of consumers and legitimate interests of all involved entities. All data is considered confidential information and must therefore be treated confidentially and will be stored in online cloud-platforms Microsoft Teams and Azure. The parties impose this duty of confidentiality on all natural and legal persons they engage to process Personal Data, including, but not limited to, Employees, Processors, third parties and other recipients of the Data. The project may collect personal data through its webpage, interviews, or surveys e.g. Personal data is any information relating to an identified or identifiable natural person. In order to guarantee the privacy of individuals the consortium always acts in accordance with the EU General Data Protection Regulation [7]. The consortium will only use personal data for services or communication purposes. Personnel data will be stored until the termination of the Main Agreement. As soon as the term of the Agreement and/or the retention periods has/have expired, the Parties jointly ensure that the Personal Data is destroyed. The beneficiary has different rights regarding its privacy and can submit any notice regarding its privacy rights to the consortium. The Parties will treat all Data confidentially and will not sell, distribute or lease any (personal) data to third parties disclose it in any way to internal or external parties, except in cases where:

(i) disclosure and/or provision of the Data is necessary for the performance of the Main Agreement or Agreement;
(ii) the Parties are required to disclose, transfer and/or transfer the Data pursuant to mandatory legal provisions or an order of a court of competent jurisdiction or by order of another governmental authority having authority over the Parties, although the Parties must first notify the other Parties of this obligation; or
(iii) the Data is disclosed and/or passed on with the prior Written consent of the other Parties.

All the project results are open-access and will be publicly accessible through the project's webpage to disseminate the best practices and lessons learned from the FLEXPOSTS project to interested stakeholders. After the project has ended the webpage will be kept accessible for at least three more years for dissemination purposes and to maximize the replicability potential of the project.

9. Relevance – Contribution of the Project to the Aims of the Call

FLEXPOSTS is focused on Topic 2: Making PEDs happen: process innovation and business models with the specific interest in implementing energy flexibility to ensure the fulfilment of electricity and heat demands.

General

Transnational benefit - Friesland and Denmark are complementary in their energy and CO2 profiles. Both sites can learn from each other and want to share knowledge through collaboration in this project. Besides similarities, there is mutual interest and respect for issues that one of both has solved, yet the other demo site is still struggling with. Hence the sites are complementary as well.

Interdisciplinarity - Many backgrounds fulfil a role within the consortium. The NL part will focus more on the energy topics from a technical perspective as well as regulatory frameworks and business cases, while the DK part will perform social studies, add to the circularity and assess environmental issues

Both demo sites have great contacts within the municipality.

Transdisciplinarity, involvement of stakeholders, practitioners, citizens, community groups, NGOs - Many stakeholders will be engaged in the project, varying from citizens to government on municipal and regional

level and with both businesses, utility companies and academia for local development of PEDs with a multilevel view on energy, sustainability and circularity.

Specific Topic challenges

Working together with the municipalities of Leeuwarden (NL) and Aalborg (DK) will ensure that decision-making within local government will be supported by this project. These findings can be used in other government or non-government environments as well for replication. Outside of local government, we ensure collaboration and replicable strategies by involving businesses. For example, FLEXPOSTS will provide options of quicker connections to the existing electricity grid through implementing energy flexibility. Thereby the decision-making process (e.g. deciding on a location) of businesses is supported by the findings of the project. Establishment and maintenance of broad support within government, business and the public at large for realising PEDs. Involving all stakeholders from an early stage will allow the project consortium to take into account most interests and convert the interests into support by addressing them properly. The main aim in this is to ensure that the broad (societal) cost-benefit analysis is convincing and is used in informing the public and businesses about possible positive influences. The safeguarding of circularity aspects and life-cycle-principles in business models and the regional energy system, while respecting (natural) system boundaries and considering public interest. In the establishment of new business areas, circularity and life-cycle principles are considered at three levels (considering local sustainability goals), while the region's natural system boundaries must be respected (e.g., in NL by regulation on nitrogen deposits). The municipalities in the consortium will provide the framework that needs to be respected, while other parts of the consortium will develop innovative strategies to meet these goals.

10. Gender and Diversity Aspects

The consortium will take all measures to promote equal opportunities between gender, age, ethnicity, race, or nationality in the implementation of the project at all levels of personnel assigned to the action, including at supervisory and managerial level. The consortium was made by taking into account technical and scientific competence, regardless of gender, age, ethnicity, race, or nationality. This resulted in the involvement of 9 women out of the 24 key staff members undertaking the work (i.e. 37%). Several positions in the organizational structure of the project are furthermore covered by women, i.e. the Project Leader, Project Officer, and legal, economic, urban planning, energy system analysis, environmental and stakeholder engagement researchers / professors. During the project implementation, all people working within the project will be treated fairly and irrespective of gender, race, or social status, in respect of equality and diversity policy. The project will take into account equal opportunity and the integration of gender aspects in all areas of participation and balance between work and family/private life for all participants (taking into account European, national or regional norms).

As project coordinator HUAS has a Gender Equality Plan [8] which will be used to guarantee equal opportunities between gender, age, ethnicity, race, or nationality in the implementation of the FLEXPOSTS project at all levels of personnel assigned to the action. Besides, also AAU has a GEP [9] and NEC is currently developing one, which will be delivered during the course of project.

11. Impact of the Project

11.1 Expected Impacts

Sustainability of the solution, direct impact

Immediate impacts of FLEXPOSTS will foremost be visible at the demo sites. Economic benefits include increased business activities, as delays in grid connections will be reduced and therefore companies can start their business activities sooner. This especially applies to areas with congestion, such as Zwette VI. Energy benefits become

prominent due to better utilization of residual heat by cascading heat consumers. This benefits efficiency of the overall energy system. Implementing such findings in the demo sites is the immediate impact locally and will reduce energy costs and emissions. Implementing similar models in other demo sites will be relatively easy. Other energy related benefits are the result of local optimization of energy. As the local and regional scale of the demo site is working toward becoming Energy Positive, dependence on higher-level energy infrastructure (TSO level) decreases. This is both beneficial to infrastructure not needing to increase, as well as the possibility for enhanced energy trading, opting for the possibilities of decreasing energy cost locally. In places where the utility costs are borne collectively, this reduces potential costs related to the expansion of DSO/TSO infrastructure.

Value to potential user communities

By implementing energy solutions, such as flexibility and use of residual heat, FLEXPOSTS provides economic benefits in the PED through quicker expansion of economic hubs. Business locations, homes, leisure projects etc. can be realised sooner than was formerly possible. FLEXPOSTS brings value to potential user communities through inclusion of stakeholders to ensure local adaptation of project findings. The expansion of knowledge and results to implementation is driven by ownership from stakeholders, providing a well-balanced constituency locally. FLEXPOSTS results can be extrapolate to other regions including the strategies for promoting stakeholder engagement. One of the aims of FLEXPOSTS is setting up a network of relevant stakeholders that can work towards implementing the PED strategy after the project has finished. This ensures that the project has long lasting effects. This can potentially become a 'governance model' for implementation of PEDs, e.g. the Aalborg or Leeuwarden model.

Estimated market for implementing findings and broader geographical spread

FLEXPOSTS provides frameworks and approaches for local and regional governments in how to deal with challenging energy topics. These guiding principles cover the best practices for creation of PEDs and thereby adding to the amount of PEDs in total. Utility companies will be helped in the possible strategies of overcoming challenges in network congestion restrictions. Allowing a demo site to show possible benefits may incentivise new policies to be implemented where the service operator can design future proof operation of current infrastructure across the regions. The approach used in the Zwette VI and Aalborg East demo sites can be expanded and replicated into other regions. First of all, this is possible for areas with similar challenges. For example, in the Netherlands many regions are facing electricity network congestion, causing problems similar to the Zwette VI case. These problems can be identified in other areas of interest as well, including other parts of Europe. The same applies for the Aalborg East case, where other similar opportunities can be identified. Lessons learnt can be translated into consultancy work for other regions, disseminating knowledge and monetising it as a service. This will further increase the local impact, as new businesses arise and will export the findings of FLEXPOSTS. Finally, the FLEXPOSTS project addresses and contributes to several Sustainable Development Goals (SDGs) of the United Nations' 2030 agenda [10]: Affordable and Clean Energy; Decent Work and Economic Growth; Industry, Innovation and Infrastructure; Sustainable Cities and Communities; Climate Action.

11.2 Dissemination and/or Exploitation of Project Results, and Management of Intellectual Property

FLEXPOSTS will apply an impact-driven communication, and dissemination strategy consisting of three phases with a view to reach, engage and synergize key target audiences and stakeholders, maximizing the potential short-term outcomes and long-term impacts of the project results. **1) Raising interest among key stakeholders**: the project will focus on establishing a common project identity, raising awareness and interest regarding the project's expected results, **2) Enhance acceptance**: the project will disseminate its results with a view to clearly demonstrate the benefits of the proposed solutions, supporting future exploitation exchanging and promoting new knowledge, best practices, and lessons learnt, and **3) Fostering replication**: the project will promote its results in order to stimulate a broader scalability and engage wider audiences to facilitate the market uptake of

its results and ensure that the project's results will continue to be disseminated after the project ends. Exploitation activities will take place in the two demo-site WPs by identifying existing partnerships and networks and explore how these partnerships can be utilised/expanded to foster the PED-agenda.

The three key Target Groups (TG) addressed by the project are:

TG1: Consumers and end-users - tenants, buildings owners, SME's, start-ups - Consumers and end-users of Zwette VI (NL) and Aalborg East (DK) are the core beneficiaries of the PED cases and the projects solutions. Key messages shall focus on the user requirements and needs regarding their energy consumption profiles maximizing affordability, availability, sustainability, and comfortability. **TG2: System operators – energy suppliers, heating/cooling distributors, aggregators, and energy service companies -** Utilities companies and associations are also beneficiaries of the solutions of FLEXPOSTS, as these for example will support or are affected by the integration of RES and storage. Key messages shall focus on the successful cases of the demonstration activities as well as the benefits of the utilization of the projects PED concept. **TG3: Public authorities - EU policy makers, local/regional/national governments, and standardization/regulation entities -** Public authorities with competences in the field of FLEXPOSTS are also a key audience. The key messages related to them are the market evaluation, successful cases, regulatory aspects, lessons learnt and a socioeconomic analysis, including directives. It is also highly important to identify regulatory aspects that could hinder the project's dissemination potential (e.g., COVID-19 restrictions). **TG4: Researchers - technical experts, and scientific communities -** Researchers are also key stakeholders to enlarge replication and dissemination. The main messages to deliver are technical results, innovation and progress beyond the State of Art on the R&D and challenges emerged.

The following key dissemination and communication means/channels will be used to disseminate the project (results): **Visual identity:** At the beginning of the project (M3) a common public image/branding for the project allows an easier identification by the public and ensures visibility. FLEXPOSTS will adopt a captivating project logo and common graphics for the project template and any published or publicly presented material. **Online communication:** At the beginning of the project (M3) a captivating project webpage and Social Media (LinkedIn) will be developed giving public access to relevant non-IP-sensitive results, downloadable activity reports and other publishable documents. A biyearly e-newsletter will be sent to all interested stakeholders. All project results will also be presented on a local, regional and national levels. All partners will promote the project (results) among their industrial, research, and community networks targeting all TGs. All communication means/channels will include a proper acknowledgement of JPI Urban Europe, the PED programme, and the respective funding agencies.

It is expected that IPR will not be relevant in FLEXPOSTS since all the project results will be made publicly available to maximize the impact of its findings. Each partner owns its IP background and will provide free access to it, to project partners during the implementation of the project. IPR will be dealt with in the beginning of exploitation activities, starting with a joint exploitation workshop, feeding the Library of KERs. Overall, the approach is to make results available open access, while respecting private data.

12. Project Consortium and Management, Multi-actor Involvement and Trans-disciplinary Collaboration, Co-creation

12.1 Consortium Resources

The FLEXPOSTS consortium consists of five partners that collectively realise the project. This section elaborates on the capabilities of the project partners and shows how the consortium is well-balanced, complementary, and capable of achieving the objectives. The consortium is composed in such a way that all relevant stakeholders are

involved in the project. Either as project partner, or via a Letter of Support[12] / Letter of Intent[13]. The project partners have the relevant knowledge and experience to achieve the project objectives.

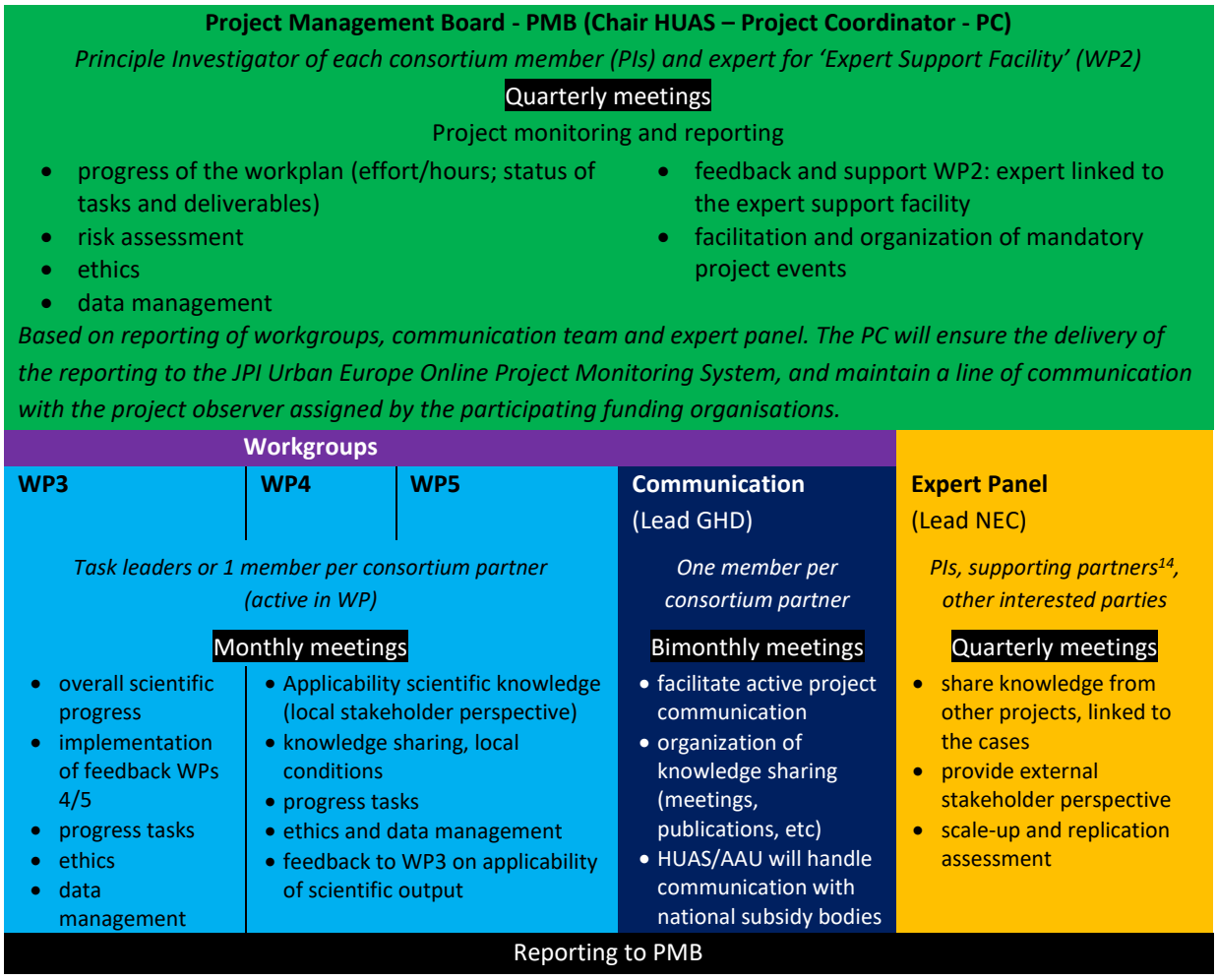
At HUAS energy research is carried out by researchers, students, businesses, authorities, and social institutions to accelerate the energy transition. HUAS is experienced in the development, management, and execution of energy research and innovation projects and is designated as the project coordinator of FLEXPOSTS. AAU is a dynamic interdisciplinary university focussed on research and education. AAU is experienced in working within interdisciplinary projects that concentrate on research and innovation and presents a unique combination of social and technological understandings Therefore AAU is appointed to be the WP leader on technical / process innovation, business models and circularity. NEC has experience in stakeholder engagement together with citizens, businesses and academia. NEC has many contacts in the Northern Netherlands regarding participation and energy system integration projects, network congestion, and regulatory issues. This makes NEC well-suited for the interconnection between various tasks and WPs. GHD is a strong public-private partnership in Aalborg, DK. Their focus is green innovation, sustainable business models and large-scale testing to mitigate climate challenges. GHD has strong connections and participation experience with SMEs. They will take the lead in the stakeholder engagement activities. LWD has experience in urban planning and wants to quickly harness FLEXPOSTS findings to implement energy planning into the urban development, providing research questions and direct feedback to the consortium. LWD is strongly connected to the stakeholders in Zwette VI and will be responsible for identifying (existing) partnerships and networks for developing PED implementation strategies.

The various disciplines will work jointly on the methodology in WP3 and on the pilots in WP4 and WP5, which makes it an interdisciplinary project. In addition, HUAS and AAU have complementary skills and fields of expertise, as well as experience with working in trans- and interdisciplinary research projects. HUAS has it main expertise in energy innovation and system integration, whilst AAU have strong expertise in and working across urban, energy and environmental planning. Adopting a trans- and interdisciplinary approach, which seeks to utilise the knowledge, skills and competences of the consortium members is of outmost importance for FLEXPOSTS. The task of developing a trans- and interdisciplinary methodology for FLEXPOSTS has therefore been integrating into WP3 (T3.1.4). The common methodological framework, and understanding of analysis across the project/cases will ensure a stringent research design and heighten the learning potentials across cases, networks and actors. Zwette VI started with the concept of a Learning Community (LC) where professionals work together with researchers, lecturers and students, in which interaction and mutual knowledge transfer are central. LCs aim to develop and share knowledge and to seek solutions that contribute to the acceleration of the energy transition. This concept will be applied throughout the project. In Aalborg East, there is a strong tradition amongst stakeholders for developing networks and partnerships, and for engaging with Aalborg University. In addition, it is part of Aalborg University's DNA to engage with the surrounding society and local community in both teaching and research through its problem-based learned model.

[12] Aalborg Forsyning; Business Network 9220; City of Aalborg; Energiecampus Leeuwarden; Municipality of Alkmaar; Himmerland Boligforening; Port of Aalborg; Province of Fryslân; Municipality of Groningen

[13] Municipality of Leeuwarden

12.2 Management Structure and Procedures



The above figure depicts the project management structure, tasks of the work groups, their composition, and frequency of the meetings in the project. All project members have a responsibility to report any relevant matters within scope of the workgroups to the workgroup chair (to be determined by the Workgroup). The PMB will ensure overview of the different tasks and responsibility and will facilitate information exchange between the different bodies of the project if needed. The workgroups are responsible for coordinating and executing the tasks within their WPs. They discuss the progress of the different tasks within their work group and communicate the progress to the PMB. The PMB assesses whether the execution of the tasks matches the work plan, and has the ultimate decision making right when the execution of the tasks does not correspond with the work plan, or when the work groups cannot reach consensus on the execution of tasks.

Body	Decision making rights	Voting rule	Escalation
PMB	1 vote consortium members for ultimate decision making on all matters in the project	Majority voting	HUAS/AAU consensus
Workgroups	1 vote workgroup on tasks	Consensus	PMB to decide
Expert Panel	None: advisory right to PMB	-	-

Figure 3. Decision making mechanisms and responsibilities

[14] Aalborg Forsyning; Business Network 9220; City of Aalborg; Energiecampus Leeuwarden; Municipality of Alkmaar; Himmerland Boligforening; Port of Aalborg; Province of Fryslân; Municipality of Groningen.

12.3 Individual Project Partners

Full name:	Hanze University of Applied Sciences	**Short name:**	HUAS
Website:	www.hanze.nl	**Organization type:**	HES
Department name:	Entrance | Centre of Expertise Energy	**Street:**	Zernikeplein 7
Town:	Groningen	**Postcode:**	9747 AS
Country:	The Netherlands		

Description of legal entity

Hanze University of Applied Sciences Groningen (HUAS) is a multidisciplinary university of applied sciences. Its mission is to deliver skilled and committed professionals and conduct applied research with societal impact. HUAS has proven to be an important partner, locally, in the northern Netherlands, and also nationally and internationally, in the development of entrepreneurship and innovative, applicable knowledge. Hanze UAS is made up of 16 schools, which offer a total of 71 bachelor's programmes, 17 master's programmes and 12 associate degree programmes. Hanze UAS currently has more than 30,800 students and more than 3,400 staff. It also has about 50 professorships, at which applied research is conducted. Energy is one of the three strategic themes of HUAS. Energy research is carried out at EnTranCe | Centre of Expertise Energy. Here we contribute to speed up the transition to clean, renewable and affordable energy. Scientists, students, businesses, authorities and social institutions all come together to share their knowledge at our centre of expertise. Together we develop the innovations that are much needed for the energy transition and strengthen the regional knowledge economy. Our research is characterized by a multidisciplinary approach.

Previous experiences	**Short description**
Making City [1]	MAKING-CITY is an H2020 smart-city project demonstrating the PED concept. Groningen is a Lighthouse City in this project, which implements a combination of different measures (retrofitting of residential buildings, solar PV, heat pumps, district heating, EV etc.) resulting in the creation of two PEDs. HUAS takes part with technical and social research, a.o. modelling of the PED, evaluation of KPI's, upscaling to city level and social acceptance related to the district heating.
IANOS [10]	European project for decarbonizing islands in Greece, Portugal and the Netherlands. CO2 reduction by adapting the energy system in relation to acceptance and participation of the island population. IANOS is built around three Island Energy Transition Tracks focused on: 1) Energy efficiency and grid support for extremely high RES penetration; 2) Decarbonisation through electrification and support of non-emitting fuels; 3) Empowerment of local energy communities (LECs). HUAS takes part mainly with social research
Wattflex	Development and field tests to set up a new type of 'hybrid' cooperative aggregator for aggregating decentralized flexibility and offering flexibility to TSO and DSOs. Focus on aFRR delivery from batteries and EVs. HUAS participates in this project with technical, social and economic research. Moreover HUAS leads the work package on algorithm development (Dutch funded project)
Publications	*Designing viable multi-commodity energy business ecosystems: Corroborating the business model design framework for viability* [11]. *Local Balancing of the Electricity Grid in a Renewable Municipality; Analyzing the Effectiveness and Cost of Decentralized Load Balancing Looking at Multiple Combinations of Technologies* [12].

Profile of the staff members involved

Dr. Marten van der Laan (m); professor system integration in the energy transition.

Dr. Daisy Tempelman (f); professor legal aspects of the energy transition.

Dr. Gertrud Blauwhof (f); professor economic aspects of the energy transition.

Dr. Austin D'souza (m); researcher business models.

Dr. Frank Pierie (m); researcher system integration.

Mrs. Henmar Moesker (f); project leader.

Mrs. Theda Copinga (f); project officer.

Full name:	Aalborg University	**Short name:**	AAU
Website:	www.aau.dk - www.plan.aau.dk	**Organization type:**	HES
Department name:	Department of Planning	**Street:**	Rendsburggade 14
Town:	Aalborg	**Postcode:**	9000
Country:	Denmark		

Description of legal entity

Breaking away from the traditional university concept and form of teaching, Aalborg University (AAU) emerged in 1974 with a profile very much its own. It is now a dynamic university with more than 20,000 students and 3,000 staff. The key concept in both research and teaching is interdisciplinary, and the study programmes are organized around problem-oriented group work. AAU emphasizes cooperation with businesses, organizations, and institutions within teaching as well as research. Likewise, internationalization has a very high priority at AAU. The employees at the university are (or have been) engaged in more than 150 Horizon 2020 projects. According to the Times Higher Education Young University ranking, Aalborg University was 23rd in the world in 2020. The Department of Planning works with planning, technology and society and focuses on creating a more sustainable future. The department engages with interdisciplinary research in technical, natural and social science disciplines and presents a unique combination of social and technological understandings. The department is committed to promote a sustainable development in accordance with UN's sustainable development goals.

Relevant experiences	**Short description**
Environment++ [14]	The partnership has among others explored industrial synergies, location of companies in terms of exchange of materials and energy, and developed a series of business models for increasing sustainability of the companies in the area.
The Housing Association of the Future [15]	The project seeks to develop a model/typology for how housing associations can work more strategically and develop partnerships when seeking to upgrade and retrofit housing areas.
SmartEnCity [16]	The main purpose of the project was to develop a replicable systemic approach for cities to achieve carbon neutrality. This involves numerous components including energy technology demonstrations in cities, city network creation and the development of the integrated energy planning approach called Cities4Zero. The approach was tested in numerous case cities to validate its usefulness.
Service	The Department of Planning offers bachelor (BSc) and master's (MSC) educations in Urban, Energy and Environment Planning, as well as a master's programme (MSc) in Sustainable Cities. Total yearly intake at bachelor programme: 90 students and master's programmes: 100 students [17] [18].

Profile of the staff members involved

Dr. Kristian Olesen (m); associate professor in urban planning: expertise in strategic planning, planning legislation and social housing.

Dr. Enza Lissandrello (f); associate professor in urban planning: expertise in governance and participation, including stakeholder engagement.

Dr. Rasmus Nedergård Steffansen (m); post.doc: expertise in sustainable urban planning, including stakeholder engagement.

Dr. David William Maya-Drysdale (m); assistant professor: expertise in energy system analysis, renewable energy systems and life cycle assessment.

Dr. Hannah Mareike Marczinkowski (f); post.doc.: expertise in energy system analysis.

Dr. Jakob Zinck Thellufsen (m); associate professor: expertise in energy system analysis.

Dr. Ivar Lyhne (m); associate professor: expertise in environmental impact assessment of the energy sector and experienced within business models for industrial symbiosis.

Prof. Lone Kørnøv (f); professor: expertise in environmental assessment and stakeholder engagement. Experienced within environmental planning and symbiosis development.

Dr. Søren Løkke (m); associate professor: expertise in life cycle analysis and system modelling.

Full name:	Stichting New Energy Coalition	**Short name:**	NEC
Website:	www.newenergycoalition.org	**Organization type:**	OTH
Department name:	not applicable	**Street:**	Nijenborgh 6
Town:	Groningen	**Postcode:**	9747AG
Country:	The Netherlands		

Description of legal entity

New Energy Coalition is a non-profit network and knowledge organisation that is committed to a smart and successful transition to the sustainable energy system of the future, in the Netherlands and the rest of the world. The foundation is a triple-helix organization funded by public and private parties as well as knowledge institutions. The organization was created in 2017 when three renowned energy institutes merged: Energy Academy Europe, Energy Valley and Energy Delta Institute. New Energy Coalition has a strong track record on stakeholder engagement, and realising replicable approaches to innovation problems through knowledge dissemination and communication. In previous (international) projects, NEC has been mainly involved in activities related to; capacity building, communication & dissemination, and the development of exploitable and inclusive business models. In FLEXPOSTS NEC is mostly involved in supporting the integration and validation of applied research in WP3 and WP1 (e.g. business models, regulatory aspects, replication and implementation strategies, and stakeholder engagement) and its translation and validation in the Dutch demo-site (WP4), together with HUAS, AAU and LWD.

Previous experiences	**Short description**
InCUBE HORIZON-CL5-2021-D4-01-02	InCUBE – NEC is involved in the Horizon Europe InCUBE proposal. InCUBE develops an inclusive toolBox for accelerating and smartening deep renovation and involves 23 European partners. NEC is responsible for the Communication and Dissemination activities and will support the Dutch pilot.
H2020 IANOS [10]	IANOS – NEC leads IANOS Energy Cooperatives and Stakeholders Engagement and is in charge of development and organisation of training sessions for islands looking for decarbonisation, best practices from citizen engagement and replicable business models, and crowdfunding approaches that foster deep decarbonisation of energy systems.
Net Op Groen [18]	Net Op Groen – NEC co-organized the Net Op Groen event which addressed the requirements for a smart energy network that coordinates supply and demand and delivers affordable and sustainable energy, preferably locally generated and used. This working conference took on October 3rd 2019.
Publications	*Energy Flexibility from Large Prosumers to Support Distribution System Operation –A Technical and Legal Case Study on the Amsterdam Arena Stadium* [19]. *Integrating demand side management into EU electricity distribution system operation: A Dutch example* [20].

Profile of the staff members involved

Mr. Dirk Kuiken (m); project manager / developer. LLM. PhD Researcher conducting legal research on smart energy systems. Project coordinator of ENSYSTRA - Energy Systems in Transition Innovative Training Network.

Mr. Luc Dirksen (m); project manager / developer. BSc. MSc. Experienced in Intelligent Market Research and Hydrogen.

Mrs. Deborah Groeneweg (f); project manager / developer. BSW. Project manager of ERIG - European Research Institute for Gas and Energy Innovation.

Full name:	Green Hub Denmark	**Short name:**	GHD
Website:	www.greenhubdenmark.dk	**Organization type:**	Public
Department name:	Business Aalborg	**Street:**	Boulevarden 13
Town:	Aalborg	**Postcode:**	9000
Country:	Denmark		

Description of legal entity

Green Hub Denmark is a strong public-private partnership, based in Aalborg, working with green innovation, sustainable business models and large-scale testing in order to mitigate climate challenges. Simultaneously, we contribute to the ambitious goal of the Danish government of reducing the CO2 emissions by 70 pct., attracting further investment and creating more green jobs. The partners behind Green Hub Denmark have an extensive national and international network and have collectively poured 7,5 billion DKK (approx. 1 billion EUR) into the initiative. Green Hub Denmark is connecting businesses, consumers, researcher, the utility sector and authorities in order for them to co-create a world class platform for green growth and a green societal transition through the development, testing, and application of sustainable technologies.

Previous experiences	**Short description**
INDDHEAT [21]	Project under EU Investment Bank, ELENA. District heating companies could apply for getting their cost for technical support 90 % covered by the project by comitting themselves to make actual green investments, it culc be in optimisation of pipes, heat pumps, switching from natural gas to green technology, district cooling etc. Project finalised 31.12.2021 with great results.
GREEN [22]	Company-orientated projected funded by EU Regional Development Fund. SMEs can get financial support to make a green master plan for their company identifying potential for green optimisation. After that the SMEs can apply for further financial support for implementing/investing in the identified potentials.
CCUS lighthouse North Denmark [23]	This project has a focus on the recommendations made by the Growth Council in North Denmark where the objective is to create a new business orientated lighthouse initiative related to CCUS. The project is to ensure that North Denmark will be an international recognised region for green business and show how a green transition can create growth, jobs, and increased export of green solutions.
GreenEdTech	The national and international (2030 and 2050) targets for CO2 reductions are likely to be challenged by a severe lack of a competent workforce in DK and globally. The all-encompassing nature of the green transition challenges calls for a varied set of skills to supplement and enhance the traditional STEM (Science, Technology, Economics, Mathematics) competences. To prevent this educational bubble from bursting, GreenEdTech launches innovative digital learning platforms, materials, and educational models to equip 7th – 10th grade students for authentic problem solving in collaboration with partners outside school. The project is about to start so no website has been developed yet.

Profile of the staff members involved

Mr. Michael Stie Laugesen (m): extensive experience in EU-funded projects. Team leader in Green Hub Denmark and responsible for strategic development and cooperation. Strong profile within urban planning and close contact to local authorities and companies working within the green sector.

Mr. Alex Søgaard Moreno (m): + 10 years' experience in EU-projects focusing on renewable energy, primarily Interreg, and Regional & Social Development Fund. Strong local network both in the public and private sector.

Mrs. Mette Larsen (f); responsible for all communication channels related to Green Hub Denmark, social media, LinkedIn, newsletters etc. Has a strong network and close collaboration with local and regional stakeholders.

Full name:	Gemeente Leeuwarden	**Short name:**	LWD
Website:	www.leeuwarden.nl	**Organization type:**	PUB
Department name:	not applicable	**Street:**	Oldehoofsterkerkhof 2
Town:	Leeuwarden	**Postcode:**	8911 DH
Country:	The Netherlands		

Description of legal entity

The Municipality of Leeuwarden is the local governing authority for the city of Leeuwarden (93.487 inhabitants) and its surrounding 35 villages (municipality in total 124.084 inhabitants). As the capital of the province, it has an important economic function to the region. The city is, among other things, responsible for urban planning, economy and facilitating the energy transition. In that capacity also responsible for developing new business districts, supporting the renovation of districts with low energy efficiency and developing a local energy strategy. Recently Leeuwarden has submitted her application to the EU Mission on 100 climate neutral and smart cities, signalling its commitment to the energy transition. Within FLEXPOSTS LWD will support the planned activities in WP3, WP4, ranging from providing the research questions and pilot and will function as a sounding board for the project.

Previous experiences	**Short description**
H2020 REFURB [24]	The REFURB project, in which Leeuwarden was a partner providing a pilot/research setting, was set up in response to the important Europe-wide challenge of improving energy efficiency in residential buildings, and especially in uptake of major renovation of houses. The project started in the beginning of April 2015 and ended in the end of March 2018. REFURB identified high-potential dwelling segments in which nearly Zero Energy Buildings (nZEB) can be realized and examined the barriers and drivers for renovation in these segments.
H2020 PATH2LC [25]	In the PATH2LC project, Leeuwarden works together with other public bodies within the framework of a holistic network approach (so called learning municipality networks), with the aim to achieve low-carbon municipalities. The core of the project activities are the SE(C)APs - Sustainable Energy (and Climate) Action Plans or similar climate protection plans developed by the municipalities.
GridRelief	The project GridRelief is funded by the EU City Facility and focuses on the development of a fully-fledged business and financial plan for a solution for the business park the Zwette, where locally generated energy can be stored and shared, for example through the use of a battery.
(SME) Energy Coach	LWD has experience with supporting SMEs in the energy transition. To focus the efforts, recently a specific SME Energy Coach was appointed. The coach supports SMEs with taking measures and finding financing for energy saving and other sustainability measures.

Profile of the staff members involved

Mr. Joep Poot (m): Project leader Energy Transition**.** Mr. Poot is an experienced project leader in the field of Energy Transition. He is responsible for projects ranging from establishing Positive Energy Districts, realizing sustainable Business Parks.

Ms. Charlotte de Boer (f): Trainee Energy Transition**.** Ms. De Boer has experience as an advisor in the energy transition and is Commissioner for Knowledge Exchange at the Young Regional Energy Strategy working group.

13. Justification of Resources

HUAS (1)	Costs (€)	Justification
R&D equipment's, infra-structure use	-	-
Costs of materials	-	-
Sub-contracting, third-party costs	-	-
Travel	5,250	Attending project meetings including kick-off event, mid-term event and final event. Estimated costs per person per trip are €750 (€300 travel + €150 * 2 nights accommodation + €50 * 3 days subsistence). WP1: 2 persons x 2 travel, accomodation & subsistance (2 nights) for project meetings = €3000. WP1: 1 person x 3 travel, accomodation & subsistance (2 nights) for mandatory events = €2250
Total	**5,250**	**Costs (€)**
AAU (2)	**Costs (€)**	**Justification**
R&D equipment's, infra-structure use	-	-
Costs of materials	5,120	WP5: €2800 (4 meetings for 20 persons incl. lunch). WP5: €800 (1 dinner for 20 persons) + overhead 44% + co-financing 10%
Sub-contracting, third-party costs	-	-
Travel	11,040	WP3-4: €4,650 (travel for 5 persons to the Netherlands, per person: travel: €400 + 3 nights/subsistence). WP1: 1 person x 3 travel, accommodation & subsistance (2 nights) for mandatory events = €2250. Overhead: 44% + co-financing 10%
Total	**13,104**	**Costs (€)**
NEC (3)	**Costs (€)**	**Justification**
R&D equipment's, infra-structure use	-	-
Costs of materials	-	-
Sub-contracting, third-party costs	-	-
Travel	5,250	Attending project meetings including kick-off event, mid-term event and final event. Estimated costs per person per trip are €750 (€300 travel + €150 * 2 nights accommodation + €50 * 3 days subsistence). WP1: 2 persons x 2 travel, accomodation & subsistance (2 nights) for project meetings = €3000. WP1: 1 person x 3 travel, accomodation & subsistance (2 nights) for mandatory events = €2250
Total	**5,250**	**Costs (€)**
GHD (4)	**Costs (€)**	**Justification**
R&D equipment's, infra-structure use	-	-
Costs of materials	3,333	WP5: €3,333 (5 meetings for 20 persons incl. lunch) + co-financing 10%
Sub-contracting, third-party costs	-	-
Travel	4,567	WP3-4: €2,067 (travel for 2 persons to the Netherlands, per person: travel: €400 + 3 nights/subsistence). WP1: 1 person x 3 travel, accommodation & subsistance (2 nights) for mandatory events = €2,500 + co-financing 10%
Total	**6,000**	**Costs (€)**

LWD (5)	Costs (€)	Justification
R&D equipment's, infra-structure use	-	-
Costs of materials	-	-
Sub-contracting, third-party costs	-	-
Travel	3,000	Attending project meetings including kick-off event, mid-term event and final event. Estimated costs per person per trip are €750 (€300 travel + €150 * 2 nights accommodation + €50 * 3 days subsistence). WP1: 2 persons x 2 travel, accomodation & subsistance (2 nights) for project meetings = €3000
Total	**3,000**	**Costs (€)**

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