LIVING LABS MODEL AS A TOOL TO FACILITATE BEHAVIOURAL CHANGE FOR DECARBONISATION

DELIVERABLE 1.3.1 BY UNIVERSITY COLLEGE CORK HYBES TEAM:
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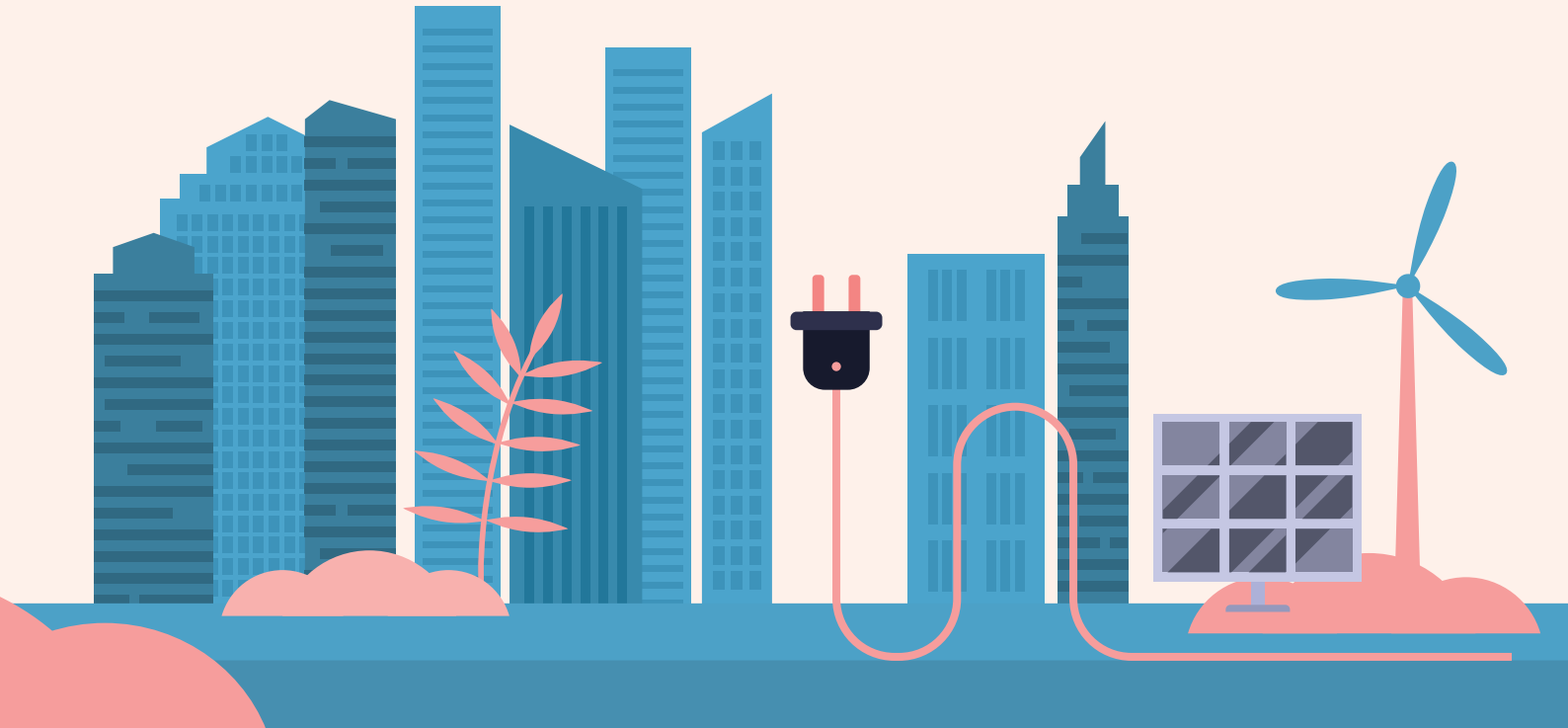

Content

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1. Overview

1.1. Summary

The HYBES project (Hybrid Energy Solutions for buildings, and infrastructure) will use the Quadruple helix approach to jointly create knowledge-based tools and activities for promoting improved energy efficient solutions to achieve substantial reduction of greenhouse gas emissions within the NPA region.

Informed by UNIC CityLabs, the project combines the concept of 'Living Labs' and the roll out of innovative tools to establish dedicated Decarbonisation Zones (DZ) in rural and peripheral regions.

HYBES aims to build a knowledge-based ecosystem within rural communities to promote decarbonisation opportunities and to build citizen capacity to achieve carbon neutral goals.

HYBES will refine the 'Living Lab' concept in five partner regions; Norway, Sweden, Ireland, Iceland and the Faroe Islands. Through these Living Lab projects partners will build citizen knowledge and understanding about the importance and benefits of decarbonisation.

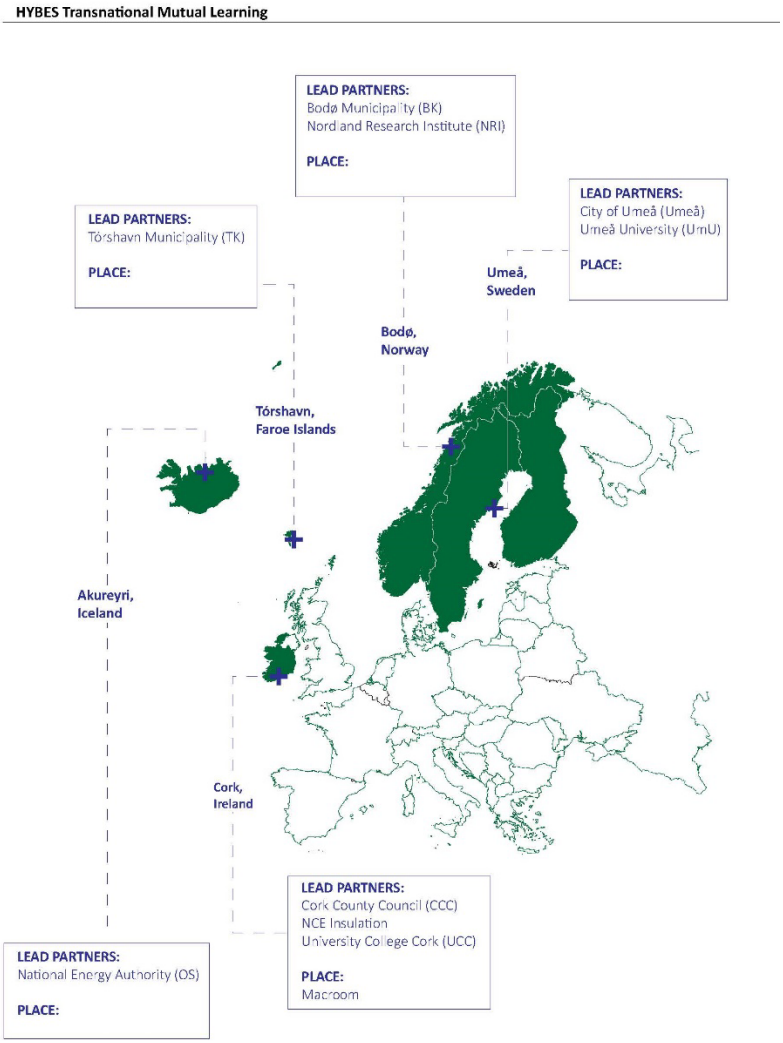
HYBES will engage with communities who often feel marginalised by carbon neutral policies. HYBES will demonstrate how decarbonisation measures can benefit communities and individual households both financially and environmentally using existing best practices and novel innovations.

The critical element will be to demonstrate through tangible outputs and education the value of decarbonisation.

1.2. Goals and Objectives

- To refine five 'Living Labs' in regions to promote and develop dedicated Decarbonisation Zones in rural and peripheral areas which can be replicated across the NPA region & beyond.
- Identify good practices and techniques that can address decarbonisation challenges and help achieve carbon neutrality.
- Facilitate co-creation and citizen engagement as a means of building citizen knowledge around the benefits of decarbonisation
- Offer interaction with communities and stakeholders within NPA region.
- Develop a 'carbon school' initiative which will enable school children to see first-hand the benefits of decarbonisation initiatives with the aim of developing curriculum change.

1.3. Local Living Labs: Locations and Partners



2. Developing the Living Labs

2.1. HYBES Living Labs Aims

The Living Lab is an essential component of HYBES as it sets the overall tone for engagement and capacity building as a means of delivering designated Decarbonisation Zones in rural and peripheral locations across the partner regions with a strong focus on enabling citizen engagement and capacity building to engage actors across the Quadruple Helix (public, government, business and academia).

The aim is to develop and refine a coherent co-creation process that is:

- Informed by the different NPA regional cultural, societal, environmental, and regulatory contexts impacting decarbonisation.
- Informed by 'design thinking' approaches
- Supports citizen engagement and capacity building
- Develops an impact-by-design research platform that engages QH actors in:
    - Collective ideation
    - Co-creation of solutions
    - Collective implementation

2.2. Overview - A Framework and Model

A Local Living Lab Model

This report provides a contextualised, evidence informed **Local Living Lab Model** for Open Innovation (OI) to be established in the five partner regions - where the public, government, business and academia (Quadruple Helix) work together to identify environmental opportunities and solve challenges around decarbonisation in the NPA region.

The HYBES Local Living Lab model is outlined in Section 3 informed and underpinned by:

1. European best practice and standards for Living Labs
2. Social practice theory and approaches to socio-technical transition paths
3. Theory of Change led-logic modelling
3. Citizen centred and participatory design principles
4. Challenge based, design thinking-led approaches and co-creation methodologies

A Trans-national Framework

We situate the development and embedding of a local living lab model in the five partner regions in a wider conceptual framework for HYBES Living Labs towards enabling an inter and intra regional knowledge based eco-system and impact by design research and innovation platform for co-creating decarbonisation solutions.

The framework will facilitate the trans-national work for Living Labs to contribute to the Capitalisation Plan (D1.8.1) and integrate learning and knowledge exchange across HYBES pilots and activities (WP 3, 4, 5). It creates the wider conditions for actors within and across the regions to co-operate and maximise the innovation and capitalisation potential of HYBES Living Labs linked to the UN Sustainable Development Goals, New European Bauhaus and the European Green Deal.

This 'HYBES Living Lab Framework - A Knowledge Based Ecosystem for Co-Creating Solutions' provides an overall framework for systematically embedding and building capacity for stakeholder engagement, partnerships and co-operation as a means to deliver designated Decarbonisation Zones in the NPA region. It is outlined in Section 3 informed and underpinned by:

1. Mutual Learning approaches as model to facilitate transnational mutual learning through hands-on project-based exchange of good practice
2. Research and Innovation policy context and environment
3. Key relevant policy and best practice for Effective Results Frameworks for Sustainable Development, Public Sector Innovation and Social Impact Measurement.

Working together with wider project deliverables, the proposed living lab model and enabling framework for a knowledge based eco-system allows project partners to harness co-creation practices, participatory design principles and partnership approaches for local and trans-national research, learning and innovation to:

- jointly create knowledge-based tools and activities,
- promote improved energy efficient solutions,
- promote decarbonisation opportunities,
- build capacity to engage citizens as positive actors in achieving carbon neutral goals.

Validation and Iteration

The Framework and Model for HYBES Living Labs, as articulated in this report, will be reviewed and refined in an iterative process throughout the duration of the current project, towards creating a sustained and enduring knowledge-based ecosystem for co-creating solutions to decarbonisation challenges in the NPA region. Document version control procedures will be used. The Framework and Model was presented at the project partners meeting held in Akureyri in September 2023.

During the Period 2 and 3 a Validation Process will capture three stages of Feedback and Review from project partners aligned with initiating stakeholder workshops.

The feedback and insights during this key period of work will inform a Revised Framework and Model for HYBES Living Labs which will be updated in line with Document Control and to inform further project activity.

The Framework and Model for HYBES Living Labs will be reviewed annually thereafter for ongoing continuous improvement.

Validation Process (Period 2 and 3)

During Period 2 – the validation process will enable feedback, reflection and review from Project Partners through three stages:

- Stage 1: Presentation of Draft Model and Framework to Project Team. Feedback and discussion at partners meeting in Iceland September 2023.
- Stage 2: Local reporting out from local QH Workshops and One to One 'Review and Reflect' meetings with partners to capture lessons learnt from local experience during this start up period.
- Stage 3: Dedicated Online Meeting with all partners on optimising potential for Mutual Learning from Living Labs.

2.3. Background to Living Labs

Open Innovation and the Quadruple Helix

In short, a Living Lab is an orchestrator of open innovation processes. It operates as an intermediary and orchestrator among citizens, research organisations, companies and government agencies.

The term open innovation emerges from organisations not just relying on internal knowledge and resources for innovation, but instead opening up to including external sources to drive innovation. Open innovation theory refers to three different models of open innovation, depending on the direction of the knowledge flow that is aimed to be leveraged They are:

- Outside-in open innovation (or inbound knowledge flow)
- Inside-out (or outbound knowledge flow)
- Coupled open innovation (combining knowledge inflows and outflows).

Over recent years innovation practices increasingly refer to the Quadruple Helix Model of innovation. This recognizes four major actors in the innovation system: science, policy,

industry, and society. It emphasises the importance of society participating in research and innovation as well as the importance of innovation generating societal value.

Living labs involve stakeholders from the quadruple helix to co-create shared ambitions with and for their stakeholders and to realise multiple different innovation projects existing out of co-creation activities. Considering these more dynamic knowledge flow, Living Labs have been described as facilitators of Interactive Coupled Open Innovation (Schuurman, 2015),(Piller and West, 2014),(Schuurman, Marez and Baccarne, 2016).

Living Labs are therefore involved in supporting and enabling an innovation eco-system where all stakeholders contribute to and benefit from innovations.

“An innovation ecosystem is the evolving set of actors, activities, and artifacts, and the institutions and relations, including complementary and substitute relations, that are important for the innovative performance of an actor or a population of actors.” (Granstrand and Holgersson, 2020)

Living Labs therefore focus on (a) co-creating innovations (b) in real-world contexts (c) by involving multiple stakeholders with (d) the objective to generate sustainable value for *all* stakeholders.

Using iterative feedback processes and involving interactive inflows and outflows of knowledge and resources, they focus on creating sustainable impact through co-creation, testing and piloting and scaling-up different types of innovations that have joint-value to stakeholders.

Working definition of HYBES Living Labs Model

Living Labs are defined as open innovation ecosystems based on a systematic co-creation approach that integrate research and innovation processes in real life communities and settings and use iterative feedback processes to create joint value and sustainable

Social Living Labs and Socio-Technical Transitions

Where living labs have previously been used to engage end users in technological innovation, the current dominant paradigm is what we might here fruitfully call a ‘social’ living lab. Here innovation is not focussed on products and technologies, but rather on innovation for broader systemic transitions in socio-technical systems.

'Social' Living Labs allow for social, technological and service innovation, including public service innovation, and are concerned with socio-technical transformation and systemic change to address the grand challenges of our times.

This reflects a shift in focus from linear models and innovation systems approaches concerned with technological or economic development, to research and innovation that can support socio-technical transitions. Socio-technical transitions can be understood to be the multi-dimensional shift from one socio-technical system to another, involving changes in both technological and social systems that are intrinsically linked and inter-related.

Social Living Labs re-orient the philosophical and theoretical underpinnings of research, innovation, knowledge production or behaviour change from individual theories and models to ones that are instead embedded in Social Practice Theory and practice approaches. Broadly, Practice theory is a body of social theory that explains culture and society as arising from a combination of and interaction between structure and individual agency.

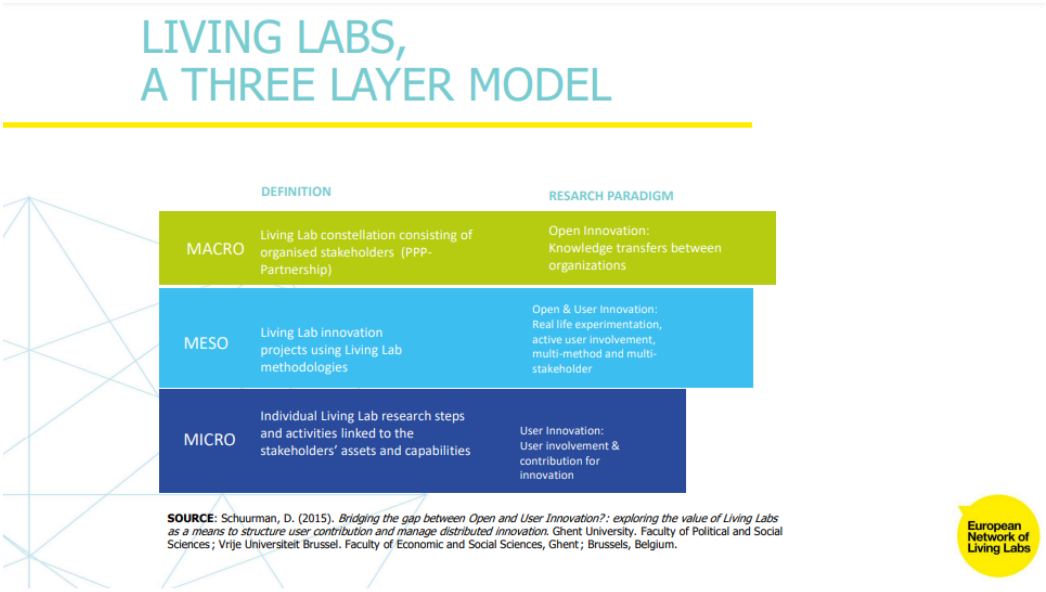
European Missions focussed Research and Innovation Policy is increasingly turning to these Living Labs as a way to frame, co-ordinate and orchestrate the types of radical multi-directional innovation that goes beyond current university-industry-policy sectoral innovation systems. The opportunity being to realise the mix of radical technical, grassroots social, business, public sector and infrastructural innovation needed to rise to the challenge of achieving low carbon and sustainability transitions.

Complementing technology focussed innovation, social living labs support social innovation that integrates citizens, publics and communities as active participants in the process of change to co-create more sustainable futures.

A Three Layer Model

A 3-layered Living Lab model was introduced by Dr. Dimitri Schuurman in 2015. This best practice model is widely recognised and used within ENoLL, the European Network of Living Labs[1] - the leading organisation driving best practice and standards for living labs. It describes living labs as organisations acting at three defined levels – macro, meso and micro – each having its own research paradigm. (Schuurman, 2015) This three layer model is employed in the HYBES approach.

[1] https://enoll.org/



3 LEVELS OF RESEARCH IN LIVING LABS

	Definition	Research aspect
MACRO	Living Lab constellation consisting of organised stakeholders (PPP-Partnership)	Open Innovation: Knowledge transfers between organizations
MESO	Living Lab innovation projects using Living Lab methodologies	Open & User Innovation: Real life experimentation, active user involvement, multi-method and multi-stakeholder
MICRO	Tools and activities linked to the stakeholders' assets and capabilities	User Innovation: User involvement & contribution for innovation e.g. co-design

Source: Living Labs Luzern

2.4. Theoretical and Methodological Underpinnings

In establishing and refining local Living Labs in the five partner regions, projects partners will work in local contexts and with local stakeholders to enable open innovation and knowledge transfer between organisations across the quadruple helix.

To enable a coherency of approach, whilst allowing for local specificity, the Local Living Labs will need to employ a common approach, centred on the common ambition to support innovation for socio-technical transitions to decarbonisation.

Whilst other deliverables of the HYBES project will focus on project pilots and activities towards the technological and technical transitions for decarbonisation (such as energy efficiency modelling and analysis and new alternative technologies), the Living Labs stakeholder workshops and activities will

focus on developing capacity for social systems innovation. This will consider each of the three layers of the Living Lab model, with an emphasis on engaging across the quadruple helix and activities focussed on empowering community and citizens as active participants and agents of change.

Participatory Design and Co-Creation

Participatory design and co-creation approaches are a central axis of Living Labs and embedded across all levels. Participatory design and co-creation involve a democratisation of design or knowledge development processes, where stakeholders are not merely 'end-users' but are participating partners, involved and engaged throughout process and practice.

A defining characteristic of innovation is the creation of value, and these approaches are central in ensuring that all stakeholders are involved in both determining what 'value' is being created and in contributing to the value creation process.

A wide range of co-creation methodologies, tools and practices can be employed at a project level, to embed best practices as applicable to the project context. Within HYBES Living Labs, a core three step co-creation process guides and steers the broad approach for macro Living Lab coordination, whilst Co-Creation Cafes and Resources will support practical know-how, best practice tools and resources for project level practices.

Macro Level - Theory of Change and Design Thinking

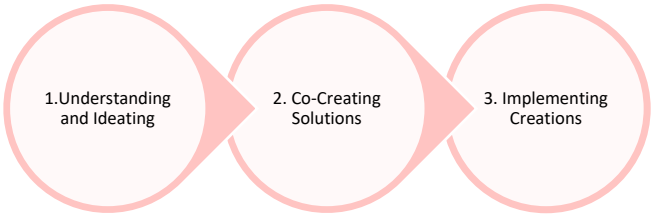
Theory of change is a method and approach that allows groups to plan, implement and evaluate a process of change. It provides a structured approach to developing a change model - determining what change is desired, to design a set of interventions, and to articulate how those interventions are expected to lead to specific development or desired change.

Theory of Change is particularly relevant and appropriate for participatory design for social change, engaging stakeholders in the process of modelling their desired outcomes before deciding on forms of intervention. As we are interested in socio-technical transitions, the utilisation of a change model is a critical and innovative part of the HYBES Local Living Lab approach.

A Theory of Change is a high order, or macro, If-Then statement: If this is done, then these are the anticipated results. It goes beyond traditional logic models, with a stronger focus on the complex social, economic, political and institutional processes that underlie social and societal change. It is also distinctive from other logic models in starting with a focus on the desired change and working backwards. This is well suited and aligned to design thinking approaches.

The co-design and development of a Local Change Model using Theory of Change at local level will be guided and managed by a three step co-creation process based on design thinking approaches.

Harnessing engagement and insights through Co-Creation Roundtables (Local Living Labs Quadruple Helix workshops in Period 2 [M7-12]) each partner will develop their own local change model. In this way the Theory of Change will be co-created with representation from actors across the quadruple helix. The core three step co-creation process to co-design a local theory of change is as follows:



Design Thinking is a human-centred process and set of methodologies used for practical and creative problem-solving, typically beginning with a challenge or problem statement. Widely used and recognised design thinking models include the Stanford Design School model and the UK Design Council Double Diamond model. Common across all approaches is an articulation of a design (or co-design) process as being iterative, beginning with divergent thinking to develop a deep understanding of the challenge or problem, particularly through empathy and exploring the issue from diverse perspectives. Progressing through key phases of divergent and convergent thinking helps to reframe, define the issue and, subsequently, to ideate, test or develop possible solutions. Typically, pilots or prototype activities then provide design feedback loops to refine solutions, design and implementation.

Beginning with a common Problem Statement in HYBES (e.g. 'How can we enable communities as change makers for decarbonisation'), a simplified three step co-creation process will engage and guide stakeholders to co-design their local Theory of Change.

- Step 1 of this 'problem-solving' process will be used to engage, frame, and ideate the 'desired change' as part of the local Theory of Change. It will consider assumptions and insights from diverse stakeholders as inputs to co-devising and planning interventions.
- Step 2 will engage stakeholders in co-creating solutions – i.e. planning and devising feasible activities and interventions and articulating what practical outputs are envisaged
- Step 3 allows stakeholders to work together to realise the planned outputs and desired outcomes.

The common use of a Theory of Change approach, developed through a structured co-design process, will enable each partner region Local Living Lab to assess existing arrangements and ambitions for the engagement of actors, communities and systems in a local Open Innovation eco-system, to benchmark them against the three layers of the living lab model, and plan locally appropriate activities and interventions to enhance successful citizen and community engagement.

Coupled with co-creation consultation with partners, a bespoke HYBES Theory of Change Template and Co-Creation Roundtable Workshop Tools will support this work.

This will support partner regions to develop and refine their local living labs in a common coherent and systematic co-creation process and approach that is locally contextualised.

Meso-Level – Real Life Experimentation through Place Based Approach

Once established, Living Labs may manage multiple innovation projects using Living Lab methodologies. For the purposes of establishing and refining the HYBES Living Lab model, through the Theory of Change work each region will identify a number of 'pilot' or 'test' meso-level citizen and community projects/activities/interventions that can be delivered during the lifetime of the HYBES.

Considering the potential learnings for realising decarbonisation zones, and the distinctive local environments, challenges and opportunities - the HYBES Living Lab model will root real life experimentation in a place-based approach. This takes a geographical place as a starting point for planning and development. It also means that Living Labs will be involved in the development of place-based knowledge, research and learning.

'A place based approach is about understanding the issues, interconnections and relationships in a place and coordinating action and investment to improve the quality of life for that community.' (*Place Based Approaches | Our Place*, no date)

Place based approaches are fundamentally rooted in a deep understanding of people and place and then planning, developing and co-creating responses, coordinated with co-benefits across a range of outcomes. This place-based approach aligns with Living Lab best practice, as well as policy and practice such as Climate Neutral and Smart Cities, sustainable energy communities or decarbonisation zones.

A coordinated place-based approach to knowledge development and management at local level will also facilitate transferability of innovations, making it easier to assess potential applicability or suitability to test, pilot, scale or replicate specific tools, methods, approaches in other areas.

Identifying local place-based activities and implementation of these projects will be supported, informed by and inform the development best practice skills, tools and knowledge sharing for professional co-creation practices. Mobilising actors around these projects will contribute to building capacity and local expertise for participatory, design-thinking led and challenge-based approaches for citizen and community engagement for decarbonisation.

In particular, local citizen and community engagement pilot activities, co-creation resources and best practice will focus on:

- Testing challenge based or problem solving approaches where specific local challenges are identified;
- Testing co-creation practices through engaged research and learning;
- Testing place-based, community-led actions;
- Testing cultural and creative partnerships to engage citizens and publics.

Over the lifetime of the project, these best practice skills, tools and knowledge will be nurtured through the delivery of three Co-Creation Cafes and a Resource Hub, supporting an emergent community of practice across the NPA partner regions.

Micro-Level – Citizen and Community Engagement

The local identification and delivery of citizen and community engagement activities in HYBES will be guided and supported by best practice and ethical interventions for peaceful, just and democratic civil society (SDG 16).

This includes Right to the City - a concept first developed by French sociologist Henri Lefebvre, which has been extended for wider use and emphasizes the need for inclusivity, accessibility, and democracy in villages, towns, cities. This will be considered core to the design and development of engagement activity in HYBES Living Labs, such that deliberate focus will be given to hearing from seldom heard voices and those who are most marginalised and at risk of being excluded.

> 'The Right to the City is the right of all inhabitants, present and future, permanent and temporary, to inhabit, use, occupy, produce, govern and enjoy just, inclusive, safe and sustainable cities, villages and human settlements, defined as commons essential to a full and decent life.' - Right2city.org.

Citizens and community level engagement will also be underpinned by an Asset Based Community Development (ABCD) lens. This supports community-driven development and aims to identify and recognise community level micro-assets and link these with the macro-environment. The assumption is that communities can drive local development, responding to challenges and create local social improvement and economic development.

An assets-based approach will make optimal opportunity to identify and empower existing civil society organisations - community networks, organisations and association. This supports a social practice approach to behaviour change within the Living Labs. From this perspective "How do we change individuals' behaviours?" is reframed as "How do we change social practices?".

Transnational – Mutual Learning and Impact By Design

A commonality of approach of local living labs will not alone suffice to ensure that the HYBES project team can best create and share knowledge and insights for generating trans-regional value and impact arising from the Living Labs (and wider project activities).

A structured methodology and framework is needed to ensure bi-directional local to transnational learning and knowledge development between partners and to ensure that:

- capitalisation opportunities across the Research and Innovation policy context and environment can be best leveraged and that;
- Key relevant insights for replicability or policy can be considered in the context of best practice for effective results or social impact measures - in effect to enable impact by design.

The wider Framework for HYBES Living Labs is therefore underpinned by Mutual Learning theory as a pedagogical model for learning from and with others. Mutual Learning Exercises (MLEs) will be developed to support trans-national knowledge exchange between and across Local Living Labs. This approach is aligned to European Policy, for example recent EC MLE's have taken a focus on EU Missions; Industrial decarbonisation and Citizen Science Initiatives – Policy and Practice (*Horizon Europe Policy Support Facility*). The development of trans-national MLEs will be informed by good practice for results and impacts frameworks, in particular the OECD TOOLKIT 'Impact by design - Effective Results Frameworks for Sustainable Development'.

3. The HYBES Living Lab Framework and Model

3.1. Core Principles

Informed by the Local Context (Section 4), and the methodological and theoretical underpinning the following **Core Principles** for HYBES Living Labs will enable local partners to develop a common approach whilst allowing for local specificity.

HYBES Living Labs (HBLL) Core Principles

1. HBLL embed place-based approach to develop local knowledge and open innovation management.
2. HBLL demonstrate enhanced citizen engagement and collaborative participatory practices through locally determined measures of change.
3. HBLL employ a partnership approach with quadruple helix stakeholders for steering and driving local-led change that generates local value for all stakeholders.
4. HBLL cultivate an assets based approach to community engagement and development and a challenge based approach to innovation.
5. HBLL create distinctive pilot actions and knowledge development for (i) building capacity for co-creation across citizen and community participation and engagement in synergy with pilot actions and knowledge development for (ii) energy efficiency modelling, analysis, management and monitoring and (iii) the development of new and alternative fossil fuel replacement technologies.
6. HBLL create mutual learning and share knowledge and insights for generating trans-regional value and impact.

3.2. Living Lab Framework

This **'HYBES Living Lab Framework - Enabling a Knowledge Based Ecosystem for Co-Creating Solutions'** provides an overall framework for systematically embedding and building capacity for stakeholder engagement, partnerships and co-operation as a means to deliver designated Decarbonisation Zones in the NPA region, informed and underpinned by:

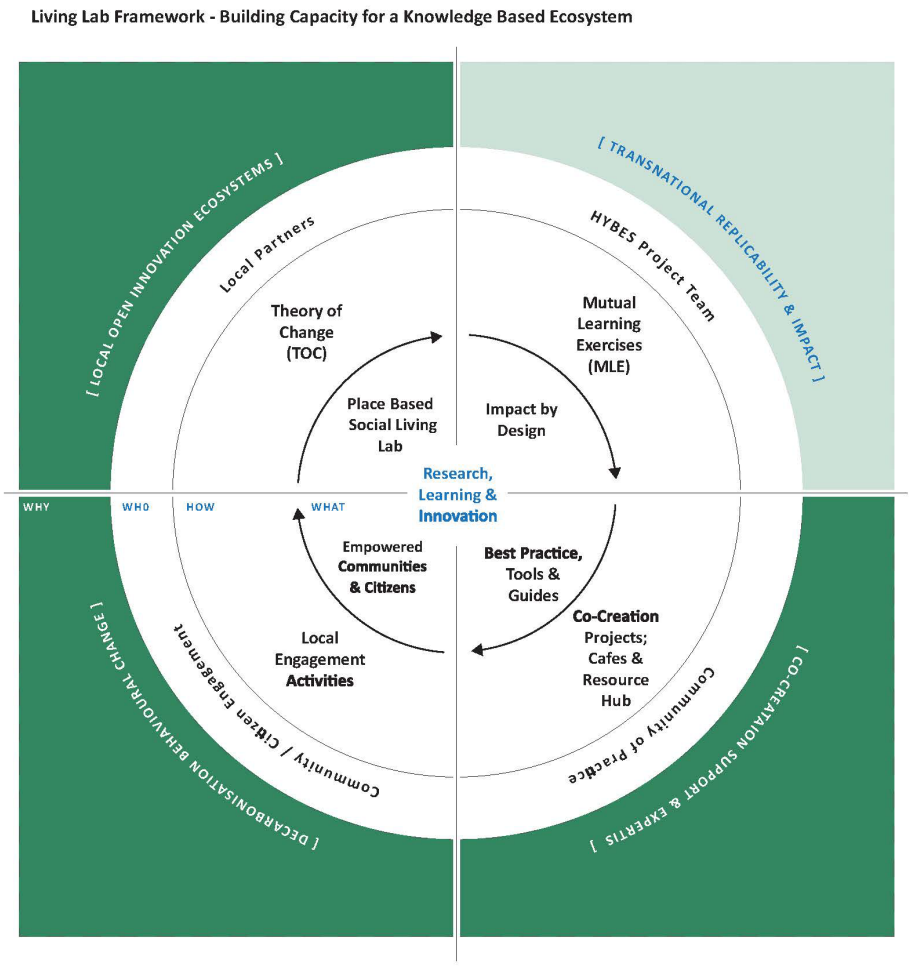
- Mutual Learning theory and Mutual Learning Exercises as model to facilitate transnational mutual learning through hands-on project-based exchange of good practice

- Key European Research and Innovation policy and platforms
- Key relevant policy and best practice for Effective Results Frameworks for Sustainable Development, Public Sector Innovation and Social Impact Measurement.

Working together with wider project deliverables, the living lab model and enabling framework for a knowledge based eco-system aims to allow project partners to harness co-creation practices, participatory design principles and partnership approaches for local and trans-national research, learning and innovation and:

- jointly created knowledge-based tools and activities,
- promote improved energy efficient solutions,
- promote decarbonisation opportunities,
- build capacity to engage citizens as positive actors in achieving carbon neutral goals.

Fig.1 Summary View of the Living Lab Framework for a Knowledge Based Eco-System in HYBES.



3.3. Local Living Lab Model

During Period 2 (M7-12) partner regions will initiate the Start-Up phase of a Local Living Lab based on the following Local Living Lab model.

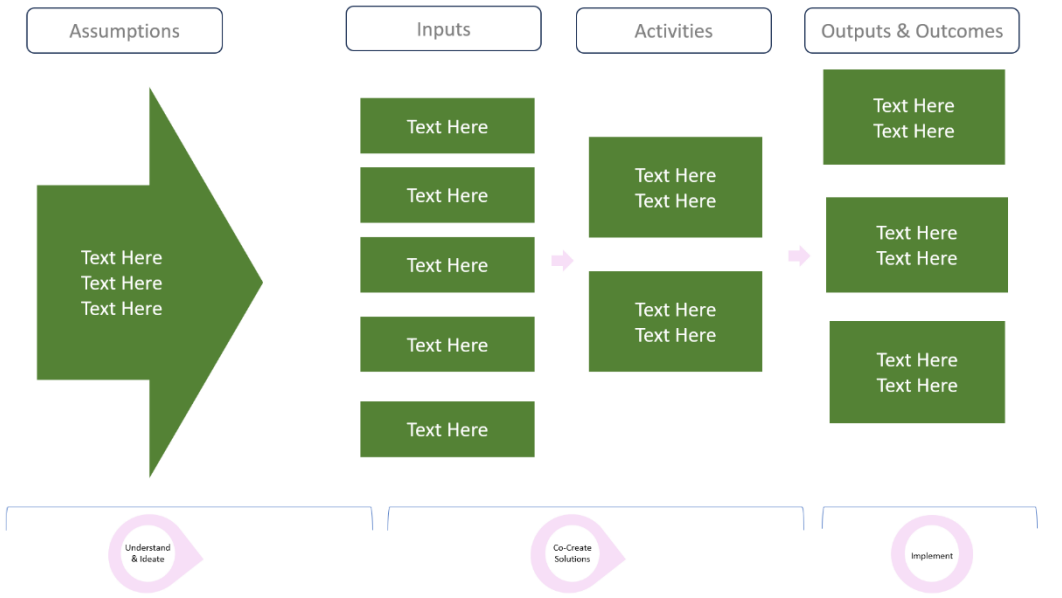
	Description/Core Elements	*Research, Learning & Innovation*
Macro	- **Local QH Partnership** Mobilise a small team of local Quadruple Helix Project Partners committed to long term engagement to support Local Living Lab and steer activities using Theory of Change	- Enabling a local Open Innovation Eco-System: Knowledge transfer between local organizations and leveraging existing networks and assets to create a locally relevant change model
Meso	- **Local Co-Creation Roundtable** with quadruple helix stakeholders to inform the co-design of local Theory of Change and social living lab activities	- Enabling multi-method and multi-stakeholder engagement and real life experimentation
Micro	- **Local Activities** Test and Pilot Community and Citizen Engagement Activities	- Supporting local activities to integrate good practice co-creation and contribute to citizen and community engagement in solutions to support decarbonisation transition

Local teams will be supported through Co-Creation consultation sessions, on a one to one and trans-national project team basis, to support and guide them through the start-up phase. Based on their own local contexts and as priority first steps partners will be invited to:

1. Identify a 'place' to orient an initial place-based approach and focus
2. Initiate detailed stakeholder mapping to inform the start-up phase
3. Identify key partners from the quadruple helix to engage with in a sustained way
4. A Co-Creation Consultation meeting to learn more about the HYBES Theory of Change template and how:

a. it will serve as a key 'orchestration' tool to manage the development of the local living lab and
b. it can be used for initial work with local partners and as a focal point for the local Co-Creation roundtable workshops.

Fig. 2 Draft HYBES Theory of Change Template



1. Identifying a place

There are distinctive local social, cultural, natural and built environment and regulatory considerations for decarbonization across the partner regions. Similarly regional partners have already progressed diverse technologies, partnerships and community initiatives, with the 'current state' demonstrating different strengths to be built on, key opportunities to be harnessed or priority challenges to be addressed. Markedly different physical landscapes and local development contexts also inform the emergence of appropriate social, technical and policy challenges and solutions.

As an early action for the development of their Living Lab, each region will identify a 'place' as an articulated spatial area of focus to orient initial Living Lab activities. The spatial area of focus may be of diverse scale, be urban or rural, have diverse mix of uses and users and have diverse decarbonisation experiences, challenges and needs. For example in Cork, a town based approach is anticipated. In Bodo, there are opportunities around a new town district as well to build on an existing urban lab in scaling up solutions and engagement. Other partners have identified opportunities for new neighbourhoods. Umea has existing strengths

in engaging rural villages and may consider a village(s) focus or alternatively noted that with a lot of activity in the space a key challenge was keeping track of all events – a wider geographic area might suit for exploring where HYBES can add value, for example in building better integration or exchange between community engagement activities.

2. Initiating stakeholder mapping

The HYBES partners themselves have diverse levels of experience, modes and contexts in terms of accessing and leveraging existing established citizen engagement and collaborative participatory practices within the regions.

Whilst all have worked in collaborative and co-operative projects and environments with public and private sector actors, there is diverse capacity, reach and frequency of engagement with citizens and communities at an organisational and district/regional level. What activities might be appropriate for capacity building, and enhanced citizen engagement and collaborative participatory practices should therefore be locally determined and locally-led.

For example different partners may consider:

- *Building capacity for coherence and integration - across multiple but fragmented community engagement in this space*
- *Building capacity for decarbonisation literacy and action – where strong community assets are active but not focussed on decarbonisation*
- *Building capacity for community and civil society collaborations – where partners feel there are strong sectoral partnerships but weaker connections with community actors.*

Initial information on existing local citizen engagement and collaborative participatory practices has been captured in Appendix A. HYBES Living Labs will develop common templates, tools and guidance such that local partners can further map stakeholders and engagement locally to determine appropriate and meaningful activities and interventions that can demonstrate positive change locally for enhanced citizen engagement.

Equally, appropriate activities and interventions will have to take into consideration robust exploration of the diverse place-based socio-economic, cultural, demographic, municipal and regulatory contexts.

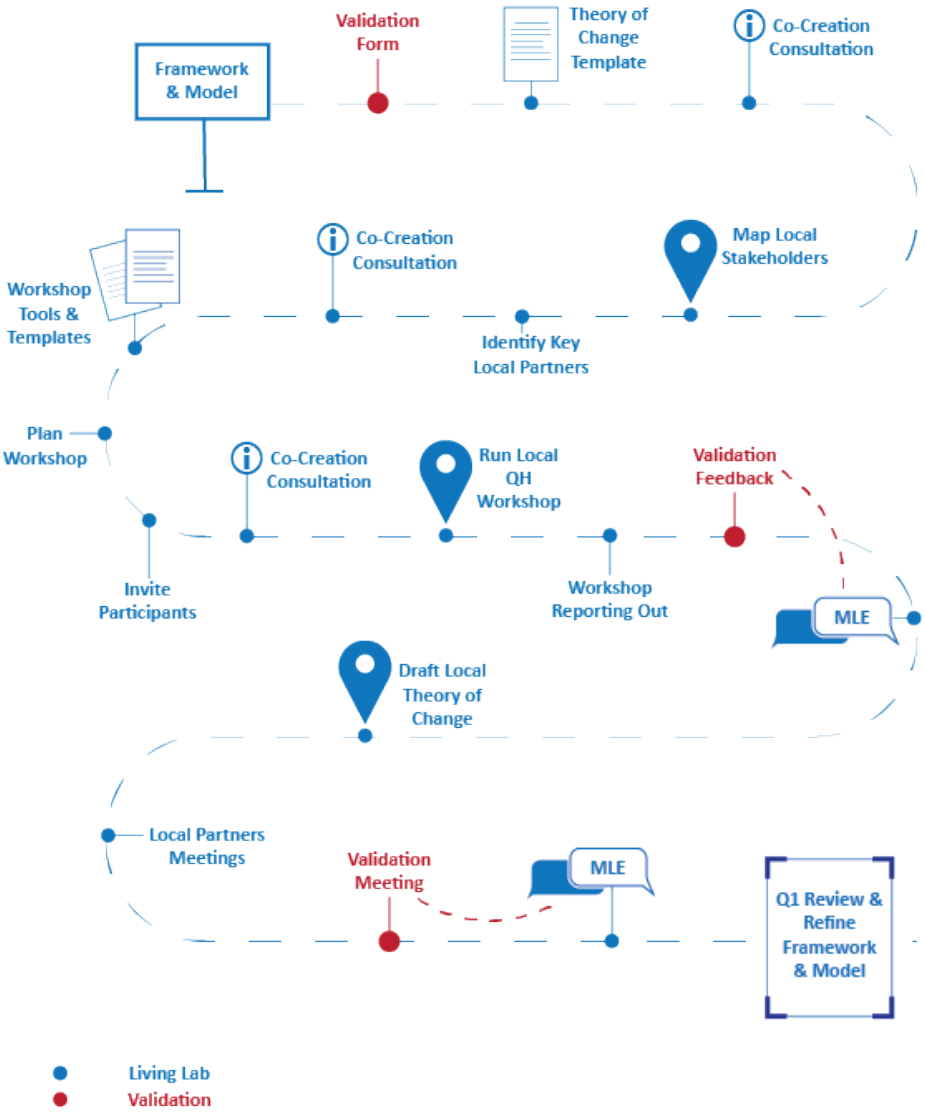
Local project teams will be supported to undertake a stakeholder mapping process, which will include consideration of marginalised or seldom heard voices as well a deeper review of exiting community engagement networks and assets in the regions.

3. Identify key local partners

Whilst the Co-Creation Roundtables will engage a wider pool of quadruple helix stakeholders, it is proposed that each Local Living Lab identify from the stakeholder mapping process, a

handful of key strategic partners from across the quadruple helix. The opportunity is to build local project supporters that would be willing to work with HYBES in a sustained way over the three years to support the ambitions of the project. They will be key to supporting reach into wider communities or networks, support delivery or joined up thinking for practical action or decision making and mobilising leadership to optimise the local and trans-national opportunities for capitalisation or replicability.

3.4. Roadmap to Initiate Local Living Labs



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Appendix A – Initial Scoping

Whilst across the partner regions there exists common challenges and areas of mutual interest and opportunity around decarbonisation, there are also locally specific contexts and conditions to be taken into consideration.

A fit-for-purpose framework and model for HYBES Living Labs must therefore provide adequate structure and consistency to facilitate transnational collaboration, whilst also providing regional partners with flexibility to work in an agile and responsive way within their own local environments. Developing the HYBES Living Lab Model and Framework therefore required an initial scoping and high level understanding of the current local context.

The report is therefore contextually informed by an initial exploration and understanding of the 'current state' arising from a series of project partner meetings, desktop research and the Policy Document produced to inform the Join Action Plan. This initial scoping of local contexts completed in Phase 1 are outlined in this appendix.

Deeper local contextualisation of living lab activities will progress through the project partners work to plan and deliver stakeholder workshops in their regions.

Akureyri, Iceland

Background	The city of Akureyri is located in Northern Iceland, just 100km from the Arctic Circle. Akureyri Municipality has a population of 19,893[1] people inhabiting an area of 133.6km^2. The town is home to some of Iceland's most beautiful natural wonders such as waterfalls, volcanic areas and canyons. The city is situated at the base of Eyjafjörður, the longest fjord in Iceland, surrounded by mountains that reach up to 1500m. The city, which is often referred to as the 'Capital of the North' is the country's second largest urban area after the Capital Region and fourth largest municipality with a population of around 20,000 people. Its municipal boundary includes two nearby island communities, one of which is partially located within the Arctic Circle. Akureyri is becoming an increasingly popular tourist destination as it boasts diversity in culture, education, economy, and nature. In recent decades, Akureyri has positioned itself at the forefront of Arctic issues with innovative institutions and initiatives supporting topics such as climate change, community well-being and gender equity in relation to the Arctic Region. The town of Akureyri has set the objective of becoming a carbon-neutral society.
Place: *Possible Decarbonisation Zone focus. Current Project Activity Sites, Social, Cultural and Economic Context.*	Akureyri is the main city for the wider northern Iceland regions and attracts large employment having developed from a trading town to a commercial centre. ➢ Large employment is further supported by the University of Akureyri which employs around 200 staff, and Akureyri Hospital which employs roughly 600 staff. Akureyri also boasts a graduate school for renewable-energy science, a marine biology research centre and a small international airport. ➢ The geographical location of Akureyri sheltered in the fjord presents ideal conditions for agricultural cultivation, a key feature of its historic socio-economic development and local identity. ➢ Today, Akureyri is home to the headquarters of two of Iceland´s five largest fishing companies and is among the largest fishing and fish processing centres in Iceland. Akureyri has successfully introduced many sustainable initiatives toward a green transition but there is a clear gap in sustainable solutions for traditional industry. ➢ 'The municipality of Akureyri has initiated an ambitious low carbon transition, that tackles the urban carbon flows, and arguably makes the city the country's leader in terms of climate change mitigation.'[3]

	➢ Akureyri's many sustainable actions toward a green transition include but are not limited to green waste management, green transport including free public transport; green energy including geothermal, and hydropower used in residential heating; and green parking and charging points allocated for vehicles using clean local energy. ➢ Additional sustainable strategies are required for traditional industries such as agriculture which continue to operate fossil fuel dependent machinery. Energy in Akureyri is largely distributed by the Norðurorka utility company which serves northern Iceland. ➢ Norðurorka, predominantly owned by Akureyri Municipality is a utility company which distributes electricity, heat, water and sewerage in Akureyri and elsewhere in the Eyjafjarður area. ➢ The company was established in 2000 with the merger of Akureyri Electricity Utility and Akureyri Heating and Water Utilities. ➢ Fallorka, an additional subsidiary of Norðurorka, has built hydropower plants in the near-by valley of Glerárdal, and erected wind turbines and solar cells in Grímsey. The company has in recent years also installed a number of charging stations for electric cars in the region. ➢ In 2015, Vistorka, a subsidiary of Norðurorka was established with the aim 'to promote the production of environmentally friendly fuels through the sustainable utilization of raw materials generated in the Eyjafjörður area.' Vistorka, a subsidiary of Norðurorka is working on sustainable energy solutions and has established strong links with stakeholders. ➢ The company also supports the investigation of energy related by-products and how their 'utilization and interaction can support the main goals of the area becoming carbon neutral.' ➢ Vistorka seeks to encourage and educate 'residents, institutions, and companies about energy exchange, sustainability, climate- and environmental issues in a broad context.'[4] ➢ Vistroka's current largest project is an energy exchange in transport and there are strong existing civic and community projects and initiatives across a number of decarbonisation issues. A key gap and current focus is on potential of solar technology solutions in the wider decarbonisation ambitions. Akureyri and its surroundings is currently one of the most popular tourist attractions in Iceland, with a strong creative and cultural sector. ➢ Akureyri & the North Guide 2023-2024 effectively communicates Akureyri's vast and diverse range of activities and attractions. Some of these attractions include the Akureyri Theatre Company, the

	North Iceland Symphonic Orchestra, the Hof Cultural Centre, and the world's most northerly botanic garden. The architecture of Akureyri clearly exhibits different periods of its development with the transition to a post-industrial town especially evident on Art Street (Kaupvangsstræti) in Akureyri. On Art Street, the closure or relocation of factories has created space for a series of small galleries, exhibition spaces and shops including the Akureyri Art Museum. The Summer Arts Festival is a local cultural / creative festival. The Port and cruise ships play a vital role in supporting the valuable tourist industry and economy in Akureryi. ➢ While Akureyri attracts many tourists via road and air travel, cruise ships make up the large portion of the vast influx of tourists in the summer months. ➢ The Port of Akureyri Tourism Policy states that tourism maintains 106 year-round jobs in Akureryi. In 2019 the Port of Akureryi welcomed 194 cruise ships to its ports followed by a decline due to Covid 19. In 2023, the port of Akureyri expects a successful recovery and is forecast to welcome the most cruise vessels to date with 286 in total. Akureyri Municipality includes the two Island communities of Hrísey, and Grímsey which experience huge fluctuations in population from summer to winter. ➢ Hrísey Island is located in Eyjafjörður and often referred to as the 'Pearl of Eyjafjörður'. Hrísey is the second largest island in Iceland with an area of around 7.7km^2 and a population of approximately 160 people. The island's attractions include birdwatching, hiking, and bathing in geothermal baths. The island joined Akureyri Municipality in 2005 followed by Grímsey Island in 2009. ➢ Grímsey Island is located about 40 km off the north coast of Iceland, with the Arctic Circle straddling the northernmost part of the island. Grímsey is approximately 5km^2 in area with a population of around 100 people and 1 million seabirds. From mid-April to the beginning of August, large Puffin colonies inhabit the island. Grímsey developed as a valuable trading post as it was a great resource of food, and today is owned by locals. ➢ As islands are often used as test sites for innovation, Grímsey and Hrísey could benefit from practices of sustainable innovation and experimentation which would further support their economies. ➢ It would also be beneficial to introduce clean energy ferries to and from the islands to replace existing vessels. As the islands do not currently produce enough revenue to justify this green transport transition, supporting the islands to build their economy around

	practices such as innovation and sustainable tourism could lead to support for this change.
People: *Existing Citizen Engagement / Collaborative Participatory Practices.*	A strong local collective identity in Akureryi, strong existing good practice and positive community engagement. ➢ Initiatives such as the heart shaped red traffic lights demonstrate a creative, high impact effective public engagement strategy. The installation was an attempt to boost citizens' morale following the financial crash in 2008. Sustainable solutions need to be created for Akureyri's challenging winter months. ➢ The climate in Akureyri ranges from about 15 degrees Celsius in Summer to -4 degrees Celsius during the winter months, boasting about 23.5 hours of light on the summer solstice with about 5 hours of sunlight on the winter solstice. The weather in Akureyri during the winter often requires the use of oversized vehicles and a lot of time is spent indoors during the darker months resulting in the demand for more regular electricity use. There is a strong existing relationship between the public and energy companies around behavioural changes in favour of a more sustainable Akureyri, including correct waste management and the use of electric vehicles. ➢ There are almost 10,000 households in Akureyri.[7] Up until 2010, all household waste in Akureyri was placed in a landfill in Glerárdalur. Since 2014, methane fuel produced from the landfill has been used to fuel the town's buses and process cars.[8] ➢ Significant progress has been made since with the addition of local sorting stations for recyclable waste such as newspapers/magazines, corrugated cardboard, plain cardboard, and in homes in Akureyri, and northern Iceland, about 80% of all organic waste is turned into compost.[9] ➢ 'The Green Funnel - Energy from the Kitchen' project provides residents of Akureyri with a free green funnel which is to be used to collect their waste cooking oil to be used later in biodiesel production. Cooking oil from commercial kitchens is collected directly from the premises while residents can return their waste oil to a waste management drop off point.[10] ➢ Akureyri also follows the Iceland wide 'Pant' system where plastic bottles and cans can be recycled for a pant value of 16ISK, with recycling of these objects being close to 90% ever since this system was implemented.[11] ➢ Based on the same development as in recent years in Akureyri, there will be a projected 24,000 inhabitants and 17,400 passenger cars by 2040.[12] In 2021, 1,000 pure electric cars and around 2,000 plug-in

	hybrid cars were registered in Akureyri, with electric car owners charging their vehicles about 90% of the time at home.[13] ➢ From 2016-2021, a transition occurred where around 60% of public transport in Akureyri ran on methane and 50% of Norðurorka's car fleet ran on either methane or electricity.[14] To further support sustainable travel, buses have been free to travel on since 2006. Vistorka has established multiple creative locally developed projects such as the Korter App and the Tangible emissions - CO2 challenge to promote sustainable travel in Akureyri. These could be beneficial when building capacity around further sustainable transport and general carbon literacy building. ➢ According to travel habit surveys in 2021 in Akureyri, 85% of university students go to school by car and 57% of secondary school students.[15] ➢ Akureyri has implemented a number of projects to build carbon literacy with a focus on travel emissions. KortEr, translating to a quarter or 15 minutes in English, is based on the idea that all citizens should be able to meet most of their needs in a short walk or bike ride from their home. The project has been established collaboratively with Vistorka, Orkusetur, the City of Reykjavík and the Ministry of the Environment and Natural Resources . ➢ An additional tool, The Magnet (Segullinn) was developed as a simple and effective tool to build carbon literacy around local travel. The project consists of a metal map and a portable magnetic ruler where users can calculate the time it takes to cycle or walk from within a certain distance with the assumption that it takes 4 minutes to cycle and 12 minutes to walk 1 km in Akureyri. ➢ The Tangible emissions - CO2 challenge is also another effective project by Vistorka which aims to build carbon literacy around travel. The project asks participants to lift a set of weights the equivalent to a week's worth of emissions from a petrol car and then multiply lifting that by 52 times to translate the emissions annually. Projects such as these have potential for mutual learning and development within the HYBES to create behavioural changes around transport. Akureyri as the Capital of the North and centre for education and research in Northern Iceland will be a valuable early engagement platform for Living Lab educational activities. ➢ There are 8 schools providing primary and lower secondary education in Akureyri Municipality, accommodating around 2700 students. In Iceland, education is compulsory between the ages of 6 and 16. Third level institutions in Akureyri include Akureyri Junior College, Akureyri Comprehensive College and the University of Akureyri (UNAK), the primary University for Northern Iceland founded in 1987.

	➢ The University of Akureyri (UNAK) currently has over 2,500 students across three schools enrolled. UNAK plays a key role in promoting university education, research, development and innovation in Iceland, and makes use of cross-disciplinary communication in learning and research in order to develop a creative learning environment in all fields of study.[16] ➢ The University was the first university in Iceland to achieve the Green Flag certification. UNAK collaborations include the new international, multidisciplinary Coastal Communities and Regional Development master's program, which addresses opportunities, challenges, and best practices of coastal communities along the North Atlantic, North Pacific and the Arctic. The course is taught in the University Centre of the Westfjords in Ísafjörður in collaboration with UNAK. UNAK is a long-standing member of the University of the Arctic (UArctic), a network of universities, colleges, research institutes, and other organizations concerned with education and research in and about the North.[17] Strong cross collaborations across the Arctic region supports the growth of Akureyri as a major hub of engagement and wider dissemination in NPA region. Education and research engagements will be useful resources in the Living Lab. ➢ Along with UNAK, several institutions and initiatives committed to the Arctic region which are permanently based in Akureyri conducting activities around research, education, innovation, and monitoring. Institutions responsible for these activities include Stefansson Arctic Institute; the Polar Law Institute; Secretariats of two Arctic Council Working Groups [18] and the University of Akureyri Research Centre (RHA), an independent research centre within UNAK. ➢ The Arctic Akureyri online platform is a useful collation of Arctic related institutions and companies located in Akureyri. The website could be utilised for capacity building and mutual learning around decarbonisation across the Arctic. ➢ Included on the platform are the Icelandic Arctic Cooperation Network and Arctic Portal. The goal of the Icelandic Arctic Cooperation Network (IACN) is to facilitate cooperation amongst Icelandic public and private organizations, institutions, businesses and bodies involved in Arctic issues, while the Arctic Portal provides a comprehensive gateway to Arctic information and data on the internet, increasing information sharing and co-operation among Arctic stakeholders. ➢ Other cross collaborations include the Arctic Circle, the largest network on the future of the Arctic and the Planet, with founders including former President of Iceland Ólafur Ragnar Grímsson.

	Examples of participatory bodies include government, universities and think tanks, indigenous communities and concerned citizens. ➢ The Arctic Circle Assembly is held every October in Harpa Concert Hall and Conference Center, Reykjavík hosting over 2000 participants from over 60 countries, making it the largest annual international gathering on the Arctic.
Policy: *Local regional cultural, societal, environmental, and regulatory contexts impacting decarbonisation.*	Akureyri's commitment to the transition to sustainable transport measures is emphasised through the partnership with the Accelerating to Zero Coalition (A2Z). ➢ Akureyri, along with Iceland's Capital city Reykjavík is one of the signatories of the Zero Emissions Vehicle Declaration, a global pledge to ensure that all new car and van sales be zero emission by 2040 globally, and by 2035 in leading markets. This will help to reduce air pollution and oil dependency and deliver new jobs through the transition to zero emission vehicles (ZEVs). Coordination and cross collaboration is achieved through the Accelerating to Zero Coalition, a platform for signatories of the ZEV Declaration including Akureyri. The Northeast Iceland development strategy 2020-2024, including 'Business development and innovation' tactic of the development strategy in which Akureyri is specifically mentioned. ➢ The Northeast Iceland development strategy 2020-2024 outlines a framework for business development and innovation, culture and environment in Northeast Iceland. Of particular interest in the context of living labs is the 'Business development and innovation' tactic of the development strategy in which Akureyri is specifically mentioned. This includes the tactic to 'strength the infrastructure of the region by defining Akureyri as an urban city', and to 'promote a diverse economy and promote innovation by establishing Akureyri as the center for Arctic activities in the country. Special emphasis is placed on food tech, welfare technology, primary industries, tourism and the Artic.' ➢ The tactic of Environment as laid out in the development strategy of 'increasing local awareness about environmental and consumption issues', and 'establishing future and overall vision of the region in environmental matters' is also relevant. ➢ A series of maps is available outlining Akureyri's master plan 2018-2030 while Iceland's Climate Action Plan for 2018-2030 and Iceland's Strategy on Adaptation to Climate Change provide a comprehensive overview of Iceland's sustainability goals.
Generating Value and Impacts:	Akureyri serves as a successful example of Iceland's identity as a clean energy nation, having implemented many positive sustainable strategies. Opportunities to enhance this remains in the areas of solar solution, local energy consumption, the built environment, tourism, transport, and food production and consumption.

Early thoughts - what change could we affect within the scope of this project.	➢ Clear site-specific opportunities exist in which to test and embed new sustainable strategies in Akureyri. A new district which is currently under development, will be followed by a second future development, both of which can act as test beds for decarbonisation. The sequential timelines of these new developments present an opportunity to test various new sustainable strategies including circular economy strategies in real time in the first district followed by further refinement and implementation in the second district. ➢ One strategy which can be readily tested is the Danish sharing economy strategy. This strategy encourages the sharing of resources including the sharing of vehicles and domestic appliances, serving as a successful example of behavioural change. ➢ Ongoing improvement in the production and consumption of food could be made complementing significant improvements already made in areas such as energy use and waste management, food production and consumption - strengthening sustainable practices in Akureyri's prominent agricultural sector. Improved carbon literacy could highlight the environmental and economic benefits of responsible agricultural practices such as regenerative farming supporting a green shift which could be celebrated locally and within the tourism industry. ➢ Solar has been identified as a key area requiring further development and exploration in contributing to the specific local needs and challenges. ➢ Potential opportunity to engage small number of particularly remote and rural residents. Other possible vulnerable or seldom heard voices to be identified. ➢ Potential to explore creative, arts, cultural collaborations.
	At the time of submitting this report, it is noted that Iceland's current volcanic activity significantly impacts on the local context.

Bodø, Norway

Background	Bodø is a coastal town located just north of the Arctic Circle in the Salten Region in Nordland County, Northern Norway. Bodø is part of Sápmi, the cultural region inhabited by the Sámi people and the capital of Nordland County with a population of over 50,000 residents. The 12th largest city in Norway, Bodø developed to accommodate a population growth from 519 inhabitants in 1865 to 3,656 inhabitants by 1890 supported by new connections with other Norwegian cities along the coast through the introduction of the first coastal steamer service, the Norwegian Coastal Express. In May 1940, the city was devastated by German bombers, with approximately 400 out of the city's 600 buildings laid to ruins. Bodø was rebuilt in the in the post war years and today, Bodø aims to be a pioneering municipality in relation to climate and energy work supporting a smart, green, and sustainable society. Bodø has become a popular tourist destination acting as both a gateway to the Lofoten islands nearby and a connection between north and south Norway connecting rail and bus services. Bodø has been chosen as a European Capital of Culture for 2024 which seeks to spotlight the indigenous Sami people.
Place: Possible *Decarbonisation Zone focus. Current Project Activity Sites, Social, Cultural and Economic Context.*	Bodø boasts a population of 53,522 residents (Q1 2023), with an expected increase to 55,566 residents by 2050. ➢ Bodø experienced a sudden and rapid population increase in the post war years that has since been replaced by a steady predictable growth. ➢ The 1,395km^2 city had a population density of 40 inhabitants per km in 2022[2], with 91% of citizens living in urban areas in 2021. The demographic of Bodø is generally middle class with the mean age of citizens ranging from 25-34 years of age. ➢ Bodø has shown extensive city-wide efforts towards a green transition that is human-centric, green, and economically focused. Some of the city's districts include Kjerringøy; North Asia; Rønvik; and Downtown. Bodø is twinned with Vyborg in Russia; Kuopio in Finland; Jonkoping in Sweden; and Svendborg in Denmark. ➢ A key opportunity exists around a new district development. Bodø has a generally middle-class demographic, with relatively high house prices and very little social housing. With the city expanding, there is opportunity for capacity building around successful sustainable and circular renovation practices which meet the needs of all households.

	➢ Bodø's demographic is predominantly middle-class with its economy supported by industries such as trade, tourism, defence, traffic, health/social sector, education, and public administration. ➢ Bodø is transitioning towards becoming a circular city. Along with the development of newly constructed upcoming circular neighbourhoods, building renovations could include circular principles to meet sustainable criteria. The rapid expansion of the city since 1950 has led to the development of new methods by Bodø Municipality partnered with Nordland Research Institute to make buildings more energy efficient and environmentally friendly understanding which solutions can be implemented to achieve the goal of a zero-emission neighbourhood.[2] There is an existing City Lab operating in Bodø since 2019 via the Horizon CityLoops Project that has established strong stakeholder engagements that can be utilised for Living Lab activities. ➢ City Loops is a City Lab that brings together the seven European Cities of Apeldoorn, Bodø, Mikkeli, Porto, Seville, Høje-Taastrup and Roskilde to address construction and demolition waste, and bio-waste. These cities aim to become circular driving the transition to a circular economy.[3] Bodø's demonstration actions for CityLoops are focused on the major urban development project 'New Airport New City'. ➢ Bodø's demolition actions include the demolition of the military airport with circular material management, involving stakeholders and citizens in city development using innovative tools and embedding circular strategies into the planning of a new city district. CityLoops has facilitated the creation of an existing platform and stakeholder network that can be a valuable resource for Living Lab activities. ➢ CityLoop's 3D GIS-based Visualisation Tool for Monitoring and Planning aids the visualisation of all city structures, materials, emissions and flows such as energy use in real time. The current users are local government and businesses but there could be potential to develop this further within the Living Lab to also engage with civilians. Bodø's transition toward a circular city is clearly evident in upcoming redevelopment projects. Communication of these projects to the public are useful tools for further developing carbon literacy. ➢ Bodø is a rapidly expanding city with an increase of more than three times its population within its current municipal boundaries during the period of 1946-2015.[4] To accommodate for this increase and improve the city environment, Bodø has plans to redevelop large prominent city sites including the airport and port area.

	➢ The relocation of the existing airport will create a new sustainable district in its place, and the Harbour District will be further developed into a green and smart port. ➢ Bodø is part of the Urban Transitions Mission as one of 50 cities worldwide that will demonstrate integrated pathways towards holistic, people-centred urban transitions built around clean energy and innovative net-zero carbon solutions[5] along with the Southwestern city of Bergen. Further information can be found in the Urban Transitions Mission's Innovation Roadmap. Included in these redevelopments is one of Norway's largest projects 'New City New Airport', which shows great potential as a test site for innovative and sustainable solutions which can be supported by the Living Lab. ➢ Bodø has a historic identity as a defence and aviation city, representing a hub of connectivity for the north and south of Norway. To address the threat of Soviet attacks on northern Europe during the Cold War Period, a combat aircraft base was established in Bodø in 1950 leading to the city's rapid expansion. In 1952, along with military traffic, the airport also began to facilitate civil traffic, making the airport one of the city's biggest employers. Today, the relocation of the Norwegian Air Force from Bodø to Evenes and Ørland creates a unique opportunity to develop the city free from wartime pressures. 'New City New Airport' (NBNF) is a major redevelopment plan, relocating Bodø's existing Airport 900m to the south of its current location in order to construct a new town district in its place. ➢ The 'New City New Airport' project will be facilitated through the City Loops initiative, creating 3,000 new jobs. The existing airport is set to be demolished using circular economy principles and a new airport with a serving capacity of 2.3 million passengers per annum will be constructed using similar circular principles. ➢ The relocation of the city's airport will free up valuable land for a new zero-emission neighbourhood to be established in its place. 350 companies will be involved in the construction period, and the new airport is scheduled to be open and be operational in 2029/2030. Through this redevelopment, the Municipality projects a creation of 10,000 new jobs by 2050 through the investment areas of green aviation, tourism and seafood. The Port of Bodø is still an early stage but aims to be a green port with lower greenhouse gas emissions and green technology. ➢ The Port of Bodø at a district level is in the early stages of development as a green and smart port who's day-to-day work is based on four of the UN Sustainable Development Goals 9, 11, 14 and 17.

	➢ The port seeks to be sustainable and future-oriented, as well as develop Bodø Harbor's advantages and opportunities to create growth and value. ➢ Environmental goals of Bodø Harbour include cutting greenhouse gas emissions, implementing sustainable port operations, reducing waste and discharges to the sea, and contributing to sustainable development where sea meets land. ➢ Commercial areas for offices, warehouses, outdoor areas and other commercial activities along the harbour area are rented out by the Port of Bodø and could implement more sustainable practices. Hydrogen-powered ferries are in development which will operate between Bodø and the Lofoten Archipelago. ➢ Bodø is a valuable point of connection between the North and South of Norway and a gateway to the popular Lofoten Islands and therefore an attractive region for summer residents. ➢ The Norwegian ferry line Torghatten Nord is developing two hydrogen-powered ferries which will use a minimum of 85% 'green hydrogen' based fuel, helping to reduce CO2 emissions on the route by an estimated 26,500 tons each year.The project aims to replace similar-sized, fossil-fuel powered ferries in the company's fleet to comply with the Norwegian government's requirement for all vessels on the Vestfjorden crossing to be emission free. There are opportunities for capacity building across several cultural events with primary focus on Bodø as the European Capital of Culture 2024. ➢ Bodø's successful growth as a prominant cultural hub is clearly reflected through the past titles awarded such as Norway's most attractive city in 2016 and Norway's cultural city in 2017. ➢ In 2024, Bodø, along with Bad Ischl in Austria and Tartu in Estonia will become a European Capital of Culture. Partnered with Nordland County, Bodø will become the first ever city north of the Arctic Circle to hold the title. ➢ Bodø 2024 which proposed the 'ARTICulation' programme, 'a play on their Arctic location and 'artig,' a northern Norwegian word for 'fun' was chosen to host the event as the programme leans in hard to Arctic culture including a focus on Sámi. ➢ Bodø2024 will be a valuable resource for local, national and transnational engagements around decarbonisation. A wide range of cultural institutions facilitating the events of Bodø2024 with the concert hall and library Stormen appointed as the main venue. ➢ A main event of Bodø2024, the Bodø Biennale, an interdisciplinary festival of visual art and dance art established in 2015, will be held in September 2024. Molobyen, a new sustainable city district which is employing participation and co-creation as a driving force in its development, will also host a variety of projects and events both

	before and during Bodø 2024. More information on Bodø2024 events are available at https://www.bodo2024.no/salten.
People: *Existing Citizen Engagement / Collaborative Participatory Practices.*	The living lab has been in operation in Bodø since 2019 and has established connections with stakeholders across the Quadruple Helix. ➢ Building Contractors, Energy Companies, and University Faculty are all engaged through the Living Lab (ByLab in Norwegian) with Citizens as the focal point. The Stakeholder Engagement Platform is a useful tool providing a physical and virtual platform for stakeholder engagement on Bodø's city development. As the construction sector can be difficult to engage, this might be vital when building on existing stakeholder connections. Bodø's appointment as the European Capital of Culture 2024 creates an invaluable opportunity for cultural events related activities. ➢ Bodø Municipality has partnered with Nordland County under the banner of ARCTICulation, to create Bodø 2024. In Autumn 2023, a meeting will occur to discuss Bodø 2024 defining concrete opportunities that can engage with Living Lab activities. Bodø2024 intends to build on the research done by Nord University and become an arena to test ways promoting ecological economy.[12] Bodø Municipality supports city-wide sustainability initiatives with a strong emphasis on engaging students from kindergarten to university. ➢ The municipality's new kindergartens and schools are built in a green perspective and with high energy efficiency requirements. Large investments have also been made in new and existing nursery and school buildings. ➢ City-wide engagement relating to local policy across Bodø is encouraged, which includes student participation in discussions on new student housing in the city centre and a new district development emphasising circular economy principles. ➢ Participatory incentives executed through the municipality include The Environmental Prize 2023, awarded during Bodø Recycling Week in the first half of September, while financial incentives exist to support the transition to electrical vehicles. Bodø as a university city presents opportunities for engagement within higher level education utilising existing links to stakeholders in the quadruple helix. ➢ Nord University is the principle University of Nordland County. The University's main campus is located in Bodø and consists of five faculties. The University also acts as co-owner in some companies and several professional centres including the Nordland Research Centre.

	➢ Nord University Strategy 2030 reinforces the University as a pioneer of sustainability championing blue and green growth, Nord University has introduced new degrees around sustainability such as Bachelor of Circumpolar Studies provides in-depth knowledge about environment and sustainability in the High North and advocates for innovative approaches and solutions where global challenges related to food, climate, and energy can be explored in the context of the Arctic regions.
Policy: *Local regional cultural, societal, environmental, and regulatory contexts impacting decarbonisation.*	Bodø's New City New Airport project will be crucial in communicating the city's carbon ambitions. ➢ By 2025, Bodø aims to achieve emission-free municipal construction activities with emission-free construction activities throughout the city of Bodø achieved by 2030. ➢ By the same year, Bodø municipality aims to reduce direct greenhouse gas emissions by 70% compared to 2009 levels and achieve a 70% material recycling rate for household waste and commercial waste. ➢ By 2050, Bodø aims to be a low-emission society, in accordance with the Paris Agreement. New City New Airport will effectively communicate these ambitions through its processes, while also supporting the city's decade long policy to make the centre more residential. Bodø is encouraging changes in travel habits including through its dedicated transport strategy which is supported by the Municipality's commitment to the exclusive use of electrical vehicles. ➢ The Smart Bodø initiative includes research projects such as Smarter transport, Use of sensors and IoT, Car sharing and bicycle scheme, and Eu Projects City Loops and B-Watersmart. Smarter Transport Bodø, Bodø's dedicated transport strategy is a collaboration between Nordland County municipality, Bodø municipality, airport operating company Avinor and telecommunications company Telenor. ➢ The project seeks to reduce climate emissions by changing travel habits. Smarter Transport Bodø offers open data which supports the project's aims of reducing climate emissions; making it easier to get information and to choose between different transport solutions; increasing the use of walkways, bicycle and public transport for traveling; and contributing to increasing local and regional innovation. ➢ There are 10 sub projects of Smarter Transport Bodø including «Mobility as a Service» (MaaS) a future method for mobility services; Stimulating innovation in local industry, Self-going buses, and Pasient (Patient) mobility. This strategy is further supported by Bodø's transition toward a concentrated use of electrical vehicles (EV)

	supported by the municipality's commitment to the exclusive use of EV's in its fleet. More innovation would further integrate transport solutions where enough energy is produced to support the rise of EV's. Norway is a leading country of sustainable energy with an impressive amount produced from hydro- and windpower sources. However, these sources of energy are generally too expensive for systems such as residential heating. Therefore, innovative solutions need to be created to address economic challenges relating to renewable energy sources. ➢ Norway has the most extensive hydro- and wind power development in Europe and is in the top ten globally with 98% of total energy production resulting from hydro- and wind power. ➢ Northern Norway is the home base for one of the oldest energy companies in the country, Troms Kraft, with over 120 years of history. Bodø Energi founded in Bodø in 1909 is a group consisting of five complementary companies and is 100% owned by Bodø Municipality. Bodø Energi produces Bodø's district heating in Bodø to housing associations, public buildings and commercial buildings. Engagement with Bodø Energi would be beneficial in creating innovative solutions that could address the costs of operating domestic appliances such as heat pumps.
Generating Value and Impacts: *Early thoughts - What change could we affect within the scope of this project. Desired / intended impacts.*	The Living Lab could be used to prepare tools and possible solutions in existing city districts that could inform new city districts, predominantly within the New City New Airport project. These tools and solutions could consequently build capacity around decarbonisation supporting behavioural change. ➢ Support needs to be built and ownership needs to be established where future scenarios can be effectively imagined around sustainability. ➢ A focus on early engagement within Bodø's large educational sector can be utilised to create potential early engagement in schools and universities around decarbonisation strategies and innovations. ➢ Coupled with the transnational resources of the Living Lab, information and benefits including economic benefits of decarbonisation could be effectively disseminated across a large audience. ➢ Capacity built through local and transnational sources could therefore support continued research and innovation to inform sustainable strategies and practices in Bodø's existing districts and the new town district. ➢ Integrated solutions, infrastructure and a total energy system at district level could also benefit from developed engagement with the construction sector including the creation of transport solutions that

	together with the built environment provide enough energy to support the rise of electrical vehicles. ➢ Benefits of the Living Lab can include the scaling up of solutions and engagement with citizens and construction to address the concerns of frequent difficulty when engaging the construction sector.

Macroom, Count Cork, Ireland

Background	Macroom is an established market town in the southern county of Cork, Ireland, and the largest town in the Macroom Municipal District. The town began as a settlement on the banks of the river Sullane and exhibits archaeological monuments dating to the Iron Age. The town was established as a centre for trade, burial, and religious worship during the middle-ages, and was one of the earliest Irish milling centres. Macroom has developed as a valuable commuter town located between the main cities of Cork and Killarney. Macroom has been designated as the Decarbonization Zone for Cork County Council as a Decarbonisation Zone as part of the Local Authority Climate Action Plan and aligned to the national Government Climate Action Plan and Policy.
Place: *Possible Decarbonisation Zone focus. Current Project Activity Sites, Social, Cultural and Economic Context.*	Macroom has been designated a Decarbonisation Zone (DZ) by Cork County Council. ➢ Ireland's Climate Action and Low Carbon Development (Amendment) Act (2021) required all local authorities to prepare a Local Authority Climate Action Plan (LACAP) declaring a chosen Decarbonisaton Zone. ➢ A Decarbonisation Zone (DZ) is a spatial area, identified by each local authority in Ireland, in which a range of climate change mitigation, adaptation and biodiversity measures are identified to address local low carbon energy, greenhouse gas emissions and climate needs to contribute to national climate action targets. ➢ Macroom, which covers a region of 530,000 hectares[2] was chosen as Cork County Council's DZ as the town met the criteria for the national emission reduction targets of 51% by 2030 and net zero by end of 2050. ➢ Macroom has a population of 3,961 according to the 2016 census, with a population density of 1,200 people per km2, which is significantly higher than the national average of 72 people per km2. ➢ A Baseline Emissions Inventory (BEI) shows that the residential sector is accountable for 32% of carbon emissions within the Macroom DZ area, the commercial and public sector accounts for 34% of the DZ's carbon emissions. The Local Authority Climate Action Plan Baseline Evidence Report published in 2023 identifies areas of focus for emissions reduction in the area informed by the BEI. Successful exercises around decarbonisation elsewhere in Cork offer valuable insight into the success of localised high impact exercises that promote carbon literacy which could be communicated to the citizens of Macroom through the Living Lab.

	➢ Decarbonisation exercises previously executed elsewhere in Cork County include Cork City and Skibbereen. An example identified was a carbon study conducted during by University College Cork academics at the Ballydehob Jazz Festival in 2022. ➢ The study effectively built carbon literacy by communicating festival goers personal carbon footprint when travelling to the festival. Festivals such as the Macroom Roots Festival and Culture Night held every September could be useful events to conduct similar exercises which build carbon literacy. Events such as these could also communicate the power of communities to generate own CO2 savings through developed carbon literacy. ➢ The Energy Pathfinder Project demonstrates improving energy efficiency in historic buildings to achieve or approach modern Near Zero Energy Standards and shows that historic buildings can be sustainable from an energy and CO2 perspective, economically viable and socially and culturally relevant. Macroom is largely industrial town. The rural context of Macroom town is reflected in enterprise base of SME's, Agriculture and Inland fisheries and with low levels of large industry, ➢ Since the 1960's Macroom has been a largely industrial town. Factories such as Cake Decorations, The Carpet Factory, Wessman Toys, and the Tape Factory, and Paper Snacks were large employers but have since ceased operations. ➢ The Danone Plant is a large employer which remains in operation. The plant expresses commitments to renewable energies and community engagement in Macroom. ➢ Inland Fisheries Ireland also has a local advisory office near Macroom town, as does Teagasc, the Agriculture and Food Development Authority, which also provides teaching through the Teagasc Training Centre. These bodies could potentially be used to engage with agricultural and fishing industries in Macroom. There are examples of local initiatives largely engaging with climate related projects. Examples such as these successfully communicate the benefits of a green business transition which would help to address distinct sectoral employment and perception on climate change and small businesses. ➢ Macroom E, a joint initiative of Cork County Council, Local Enterprise Office South Cork, Lee Valley Enterprise Board and Enterprise Ireland, is a community enterprise centre in Macroom. In 2015, Macroom E was chosen as the only Irish partner to participate in the 'Circular Ocean' project due to its successful involvement in the SMILE Exchange programme which was funded by the Environmental Protection Agency (EPA), Cork city and county councils and local enterprise offices. Macroom E is a successful example of the benefits of small business engagement with climate related problems and

	solutions. Initiatives in other partner regions in the HYBES project would help to further communicate the benefits of a green business transition. There is a clear emphasis on the importance of skills development, and links to education and training in Macroom. Strong engagement with education services has been established acting as a valuable resource for young and adult education around decarbonisation. ➢ Around 27% of the population of Macroom are 18 years old and under, slightly higher than the national average of 23.6%.[3] This is reflected in the abundant presence of schools and youth groups/services based in Macroom. ➢ There are two primary schools and three secondary schools located in Macroom Town, with several of the schools planning to relocate and/or expand facilities over the period 2022-2028. ➢ Youth service groups include Cork College of FET Macroom Youthreach Centre and Foróige, along with adult education services including the Adult Learning Centre and the Teagasc Training Centre. The expansion of Macroom is supported by extensive upgrades to its infrastructure with more planned in the near future. Activities of the Living Lab could support these future upgrades by embedding sustainable solutions. ➢ Upgrades have been made to Macroom's infrastructure including the national road - the N22 Baile Bhuirne-Macroom Bypass completed in October 2022, along with new flood defence schemes. ➢ There are also current regeneration plans for a number of areas in the town; The Mart Area: The Bus Depot, and the Council Yard; North of Market Square and South of Market Square; and the existing Fire Station. There is a strong emphasis on culture in the town with cultural spaces such the Briery Gap Theatre undergoing redevelopment. These spaces would potentially be useful locations for capacity building workshops etc. ➢ The Briery Gap Theatre and Cultural Centre is also currently undergoing an extensive refurbishment with its estimated completion date due mid 2024. ➢ Macroom Library which was previously located in the Briery Gap Theatre and Cultural Centre has temporarily relocated to Railway View during this period of refurbishment. ➢ The Chapel Hill School of Art is a leading example of a successful repurposing of an existing building. The school was repurposed in 2020 from the former Mercy Convent and is the town's first School of Art. There are also plans to redevelop the former Church of Ireland church at the Market Square, which is currently under

	ownership of the Cork County Council, with the intent for the site to play a key role in cultural life in Macroom. There are strong links and instructure established at county level between Public Participatory Network and civil society and community organisations. These links will be valuable in building capacity around decarbonisation. ➢ Cork County Public Participatory Network (PPN) is a network of community, voluntary, social inclusion, and environmental organisations, working to build better communities across the county. The PPN is a countrywide initiative to build a network of community, social inclusion and environmental groups who work within a local authority area. The focus of the PPN is to empower and assist groups to participate in local decision making. ➢ The PPN infrastructure links with national policy and network and with, Cork County Council. It coordinates Linkage Groups - groups formed around specific interests that provide information and feedback to PPN Representatives. With more than 400 members including community-based groups, organisations, associations, clubs, societies, and charities, the PPN serves an invaluable network for the Living Lab. ➢ The PPN has an existing relationships with several potential stakeholders in Macroom which can be further developed.
People: *Existing Citizen Engagement / Collaborative Participatory Practices.*	During a Cork PPN consultation in 2022, Macroom proved to be one of the most difficult groups of people to engage with. However, the citizens of Macroom have shown a strong sense of self organized community coordination elsewhere. ➢ In November 2022, Cork PPN conducted a 4-week workshop to develop a vision for community wellbeing across Cork County. Macroom was one of the most difficult areas to secure engagement in that process. However, that same year, the town was awarded with a silver medal the Supervalu TidyTowns competition showing a clear sense of self organized communal cooperation. ➢ The competition was first organized as a single competition running for 37 years, changing its status to a national competition in the 1950's. The competition is currently run by the Department of Rural and Community Development, serving as a great example of a small but high impact community focused event gaining national importance. There are several suitable venues to host workshops and meetings that would reach a wide audience in Macroom. ➢ The re-opening of the newly refurbished Briery Gap along with Chapel Hill Arts Centre and various educational buildings could provide potentially viable venues for holding larger workshops and meetings that engage across the broad demographic of students, teachers, parents, business owners and farmers. It would also be

	beneficial to engage with the Department of Education to coordinate some events promoting early engagement around decarbonisation.
Policy: *Local regional cultural, societal, environmental, and regulatory contexts impacting decarbonisation.*	There are a number of important current policies being implemented by Cork County Council that effect climate and community. ➢ These include the Cork County Development Plan which came into effect 6th June 2022, the Local Authority Climate Action Plan (LACAP) which is currently under development and the Local Economic and Community Plan (LECP) which is also currently under development for the period 2023-2029. ➢ Supporting a coherent and integrated approach will be critical for engagement activities between municipality and external stakeholders in this space. ➢ The designation and progression of Macroom as DZ sits withing a local and national statutory policy context. There is a need to communicate an understanding of decarbonisation, decarbonisation zones and their guidelines. ➢ Carbon emissions within Macroom DZ are almost evenly split between the residential, transport, and commercial and public sector, with the waste sector responsible for 2% of total carbon emissions. ➢ There are currently 1,836 houses present in Macroom town of which 857 are owned according to the 2016 census. The residential sector is accountable for 32% of carbon emissions within the Macroom DZ area. ➢ Oil is the most prominent fuel source, used by 71% of households. Coal, electricity, and wood are used by 24% of households, with 4% of households using Natural Gas, LPG, and Peat. ➢ An effective strategy to engage importance of decarbonisation, decarbonisation zones and their guidelines to the public and stakeholders will be required. An individual focus on each of the sectors outlined could be an effective first step in building carbon literacy. This can then further be communicated through EU policies, Irish policies, and local policies, creating a clear understanding of Cork County Council's emission targets and information.
Generating Value and Impacts: *Early thoughts - What change could we affect within the scope*	There is a need to build capacity for community engagement and working with key stakeholder networks. ➢ The group identified several different groups and stakeholders such as the PPN and LEO's that are potentially suitable to support capacity building and build strong engagement. ➢ There is potential to develop a brokering of community and business with support from enterprises such as the PPN and LEO's in

of this project. Desired / intended impacts.	Macroom who have already established lines of community engagement. ➢ This cohesion could also address two concerns identified by the group: the risk of engagement fatigue amongst the community, and the need for support around implementation for community actions and interventions going forward. ➢ There has diverse engagement and consultation processes driven by the local policy context. Living lab activities will need to be cognizant of diverse strands and work closely and collaboratively with these processes to ensure it adds meaningful value to the DZ ambitions. What does decarbonisation mean to the community? ➢ Some of the largest challenges faced in Macroom is the challenge of public perception and the risk of community fatigue. Activities that supports community understanding and capacity building would be beneficial. ➢ Citizens should be positioned at the centre encouraging citizen generated solutions while providing support for community led actions and interventions. ➢ Demonstration champions and experts in decarbonisation could help with community understanding and capacity building, communicating the power of communities to generate their own financial savings through more efficient energy consumption. ➢ There are several successful examples of community dashboard and competitions across the partner regions which could support the understanding of community based decarbonization. These include the Carbon project conducted by NCE which aims to communicate carbon literacy in schools. Green construction and retrofit programmes can help to communicate the success of decarbonization strategies within the built environment. Community dashboards and competition to develop citizen agency around decarbonisation ➢ Workshops by the PPN, including a community wellbeing workshop held in Macroom over the course of 4 weeks in 2022 are useful examples of community engagement events. The workshop structure which encourages agency within the community could easily be adapted to be climate focused. ➢ Successful participatory events include Climate Heroes Climate Competition – a competition to digitally record climate friendly actions with other groups across Ireland. Workshops and challenges such as these are useful in developing an overall understanding of capacity building and cohesion in the community. These could also provide the community with the understanding and mechanisms to create citizen generated solutions to decarbonisation.

Tórshavn, Faroe Islands

Background	The Faroe Islands (Føroyar) is an archipelago of 18 mountainous islands, of which 17 are inhabited, located halfway between Iceland and Scotland in the North Atlantic Ocean. The name Faroe Islands is derived from old Norse meaning Sheep Islands, given by Norse Vikings who settled on the islands in the ninth century. The Faroe Islands have been a self-governing nation under the sovereignty of the Kingdom of Denmark since 1948. Tórshavn, located on the central island of Streymoy, is the capital and largest town in the Faroe Islands. In 1866, Tórshavn became an independent municipality, and in 1909, Tórshavn was granted provincial town status. As of May 2023, Tórshavn accounts for more than 40% of the total population of the Faroe Islands (54,362) with a population of 23,113 people and a total land area of 1,393 km2. A green transition has begun on the islands, with focus on renewable energy, sustainable fisheries and agriculture, waste management, eco-tourism, biodiversity conservation, and education and research. Addition capacity building in communities is required as there is still some scepticism around the urgency and benefits of making a full transition to renewable energy.
Place: *Possible Decarbonisation Zone focus. Current Project Activity Sites, Social, Cultural and Economic Context.*	Focus will be placed on Tórshavn with potential connections across the municipalities or kommunur of the islands. There are six regions: Streymoy; Eysturoy; Norðoyggjar; Vágar and Mykines; Sandoy, Skúvoy and Stóra Dímun; and Suðuroy and Lítla Dímun. Focus will be on the capital Tórshavn located on the island of Streymoy, where the most activity occurs, but as the furthest point from Tórshavn is just 100km there is potential for communication across the 29 municipal offices covering about 120 towns and villages. The Faroe Islands have a thriving cultural heritage, historically rooted in Nordic culture. ➢ The Faroese society is founded on the Scandinavian welfare model. The living standard in the Faroe Islands is ranked amongst the highest based on GDP per capita. ➢ Several cultural institutions exist in Tórshavn including the Nordic House, the National Art Gallery, the National Theatre, the Playhouse Theatre, the National Museum, and the cultural venue Reinsaríið. ➢ St Olaf's Wake brings together people from all over the islands to celebrate in Tórshavn, along with Culture Night every June, and festivals Summartónar, and Voxbotn in June and July. These institutions and events aid in the integration policies of the island. ➢ By January 2023, there were 2,660 people living in the Faroes, who came from countries outside of Northern Norway.

	➢ Hesi represents 110 different communities and is 4.9% of the total population in the Faroes. The Philippines, Poland, Romania, Thailand, Ukraine, and Serbia are the six countries that are best represented in the Faroes. Strong connections exist between Tórshavn Municipality and the schools in the capital, extending across the islands from school to third level university education ➢ There are 54 schools across the Faroe Islands that provide either primary or lower secondary education, with 13 of these located in Tórshavn. ➢ Glasir– Tórshavn College houses three schools – The Faroe Islands Gymnasium, Tórshavn Technical College, and the Business College of Faroe Islands for over 1750 students, teachers, and staff. ➢ The University of the Faroe Islands, located in Tórshavn, offers 24 degrees to 1000 students facilitated by 144 faculty and staff, and is the only university on the island. ➢ There is a focus on early engagement and presentations from the energy sector have been made frequently to students and teachers promoting information on renewable energy and information on the current energy transition on the islands. Sustainable transport is encouraged across the islands with free bus transportation in Tórshavn ➢ The 17 inhabited islands are efficiently connected with paved roads, sub-sea tunnels, bridges, and ferry lines. Buses and ferries are the main source of public transportation with buses free of charge in Tórshavn and ferries across the islands are subsidised by the government. The southern island of Suðuroy which accounts for around 10% population of the islands, is connected to Tórshavn via ferry. The Faroe Islands have some of the world's best conditions for capturing wind energy at a 10m/s capture rate. ➢ Two separate tasks exist across the islands: (a) the production of renewable energy and (b) the use of renewable energy. ➢ The high production rate of wind energy has led to a reduction in price of wind energy but has also created concerns on how to use and store this excess energy. There is one energy company that serves the islands ➢ SEV named after the islands Streymoy, Eysturoy and Vágoy, is an inter-municipal community, owned by all the municipalities in the Faroe Islands, and therefore owned by the people of the Faroe Islands. SEV was established in Tórshavn in 1946 after there were

	various attempts to create energy across the islands in the first half of the 20th Century. ➢ The establishment of this jointly owned company shows a great cooperative capacity across the islands. ➢ There are currently six hydro power plants, three thermal power plants, three wind farms and one solar power plant operated by SEV with one wind farm and one biomass plant operated by external suppliers. 52% of the energy expended on the islands in 2022 was renewable. Citizen transition to renewable energy ➢ There is a willingness to participate in sustainable practices and experimentation around renewable energy. There has been public interest expressed for data collection of heat pumps installed in around 10-20 houses for capacity building but the selection process for these houses has not yet begun. ➢ Waste disposal and recycling services are currently implemented in residences. These schemes differ slightly across the country but are regulated by the same legislation IRF (Interkommunali Renovatiónsfelagsskapurin) which is jointly owned by several municipalities. The Municipality of Tórshavn has its own waste collect service and recycling centre. Fishing has been the main industry of the Faroe Islands since the late 19th Century with a recent transition to 50% farmed fish ➢ Fishing is deeply embedded in Faroese culture. Fish is the main export of the Faroe Islands with farmed salmon accounting for 50% of the fish exported with the remaining 50% as a result of sea fishing. ➢ Faroe fish products constitute 90-95 per cent of the islands export income and around 20 per cent of GDP. Information on responsible fisheries are available at https://www.faroeislands.fo/economy-business/fisheries/.
People: *Existing Citizen Engagement / Collaborative Participatory Practices.*	There is Political will and common ground that renewables are the way forward however there are still some points of contention between support and opposition ➢ Local champions have established some smaller grass roots groups of expressing an interest in energy. ➢ Frequent village meetings facilitate discussions around sustainable efforts such as the construction of wind turbines which has rendered little opposition. Yet, traditional mindsets and the circulation of misinformation is encouraging resistance in some areas. ➢ The primary scepticism or a lack of belief is around the need to make a 100% transition from fossil fuels especially when replacing residential oil burners to heat pumps. Three main concerns have been identified regarding the relevance of these: longevity; efficiency; and price in comparison to oil burners.

	Tórshavn Municipality seeks to support local and international initiatives with the intent to create lasting impact on the local community ➢ The Municipality of Tórshavn will provide funding opportunities for conferences or events with over 50 international delegates, with extra funding for initiatives or lectures that invite private citizens to take part in the events. ➢ Additional support in organising events is provided by the Sustainable Events Toolbox. Tórshavn has also hosted the 7th International Hybrid Power Plants & Systems Workshop in May 2023.
Policy: *Local regional cultural, societal, environmental, and regulatory contexts impacting decarbonisation.*	The Faroe Islands have strong international trade links both with and outside of the EU ➢ The Faroe Islands did not follow Denmark in joining the European Union in 1973, instead maintaining a strong trading partnership. ➢ The EU is the Faroe Islands' largest trading partner accounting for 39% of the country's total global trade in goods in 2022, followed by Russia, the UK, China and Norway. ➢ The EU's Arctic Policy, supports the Faroe Islands with a commitment to investing in the future of people living in the Arctic, stimulating better education, sustainable growth and jobs. The Faroe Islands Sustainability Policy centres on sustainable tourism, implementing a development strategy towards 2030 ➢ The Faroe Islands Sustainability Policy aims to align with numbers 8, 11, 12, 13 & 15 of the United Nation's Sustainability Goals; sets targets to fulfill by 2030; and sets out a framework for the role of the tourism body Visit Faroe Islands, the role of the (tourism) industry and the role of the tourist. ➢ Strategies such as 'Preservolution' (preserve and evolve as a solution), a development strategy for the Faroe Islands towards 2025 brings together the Faroe Islands consideration of people, environment and economy. Preservolution highlights three marks of success for 2025, which are outlined as a DKK 1.5+ billion in socio-economic revenue, 90% of visitors agreeing with brand promise of the islands as 'unspoiled, unexplored and unbelievable', and 80% of citizens seeing tourism as a net positive. ➢ The Visit Faroe Islands framework outlined in the Sustainability Policy includes the monitoring of impacts of increased visitor numbers, promoting and distributing visitors around the islands, ensuring community-based products are in harmony with locals, facilitating networking opportunities, working with municipalities and government towards a common legislative framework of the destination, and inspiring and informing guests of a sustainable visit. The latter is supported by a sustainable guide for travellers and the Official Tourist Guide 2023.

	Local incentives have been created to champion sustainable energy choices ➢ The transition to electrical vehicles is accepted due to a decrease in European production of petrol and diesel fuelled vehicles in the near future. This transition is supported through various VAT refund schemes, and the Faroese Government has plans to ban all oil burners in new houses from 2024. ➢ There will be an increase in Electric Vehicle's on the islands with Vat reduction incentives already in operation, however 100% use of EV's may prove problematic if EV's are not designed correctly for rural topographies and needs such as trailer attachments etc. ➢ There is a general agreement amongst political parties around energy transition but there are still concerns about the best solutions and appropriate timelines for the implementation of these solutions.
Generating Value and Impacts: *Early thoughts - What change could we affect within the scope of this project. Desired / intended impacts.*	Building common understanding for best pathways forward ➢ While there is a strong willingness to transition to greener solutions such as Electric Vehicles, there remains a clear scepticism around the need to fully transition to renewable energy sources. The scale of the islands would allow for HYBES activities to provide potential room to marry something with scope large enough to be island wide but with a focus on the capital. ➢ As there is a reluctance to replace residential oil burners with heat pumps and transition from fossil fuels to renewable energy, a key focus could be to build capacity around renewable energy, creating opportunities to communicate electrical energy use to the Faroese public. ➢ The increasing volatility of fossil fuels, especially oil, emphasises the need to make the transition to renewable energy sources, however more data needs to be collected and communicated to the public to effectively address some existing scepticism. Clear communication between potential stakeholders such as SEV and others across the quadruple helix could be beneficial to address this existing scepticism. Opportunity on strong focus of social inclusion, integration and engaging existing grass roots groups. ➢ Existing grassroots interest could be built on and nurtured. ➢ Opportunity to ensure migrant engagement. ➢ There is potential for future engagement with the fishing industry, but there are currently no clear solutions to creating greener marine energy. The living lab focus will therefore initially be on land energy and how to successfully disseminate the benefits of a green transition to the public, including on the transition to heat pumps. Overall strategies to successfully engage public and communities in the transition to renewable energy on the islands can add value.

Umeå, Sweden

Background	Umeå, located in the Västerbotten region in Norrland near the northeast coast of Sweden. It is Sweden's 11th largest city and is one of Sweden's and Europe's fasted growing cities. The city, established in the Umeälven River Valley was officially founded in 1622 by Swedish King Gustav II Adolf with rock carvings showing settlement in the valley dating back to 3000BC. Umeå's place name is suspected to derive from the Old Norse word 'úma' referring to the roaring sound of the Umeälven River, and often referred to as the "City of Birches" due to its wide avenues with birch trees which were planted as fire prevention after much of the city was destroyed in a fire in 1888. The population of Umeå is 132,235 as of December 2022 which has almost doubled since the establishment of Umeå University in 1965. The Comprehensive Plan for Umeå Municipality seeks to establish Umeå as a sustainable, attractive city, sufficiently farsighted for future expansion needs, to increase attractiveness by creating opportunities and underlying conditions, and to boost Umeå's role as a regional centre and powerhouse in northern Sweden. These strategies proposed for the sustainable growth of a green, socially inclusive city seeks to successfully encourage a population growth to 200,000 residents by 2050. Through initiatives such as Cities100, Umeå is being used as a testing ground for behavioural change towards reducing the cities emissions.
Place: *Possible Decarbonisation Zone focus. Current Project Activity Sites, Social, Cultural and Economic Context.*	Umeå is developing as a European climate city with a substantial growth ambition. ➢ Umeå seeks to be carbon neutral by 2030. ➢ Umeå Municipality's vision is to reach 200,000 inhabitants by 2050 achieving this growth through social, economic, environmental, and cultural sustainability. ➢ Umeå's growth strategies include plans for a Five-kilometre City; new high-density districts; growth to main public transport; focus on public spaces and parks; and to create an inclusive city. ➢ Since 2015, Umeå Municipality has committed to becoming a leader in circular economy executed through actions such as joining the OECD program on Circular Cities and Regions, signing the EU Circular Cities declaration, appointing a Project Manager for Circular economy and developing a Municipal strategy for circular economy. ➢ Umeå has committed to becoming a Net Zero City as part of the Horizon Europe research and innovation programme for 2021-2027. Norrland's biggest low-energy building project 'Hållbara Ålidhem' (Sustainable Ålidhem), completed in 2015 is a useful case study for sustainable strategies achieved through cross collaboration.

	➢ Ålidhem, a town of approximately 8,000 residents is located about 4km from central Umeå. The town experienced extenisve redevelopment after a serious fire on Christmas Day in 2008. Existing buildings were retrofitted with sustainable innovative solutions with the addition of brand-new energy-efficient buildings. The project comprises of just over 500 apartments, 140 of which are new low-energy apartments, and has resulted in a decrease in energy consumption of around 40%. Among other things, washing machines were connected to the district heating system, new heating systems, new ventilation and new LED lighting were installed, and apartments were given supplementary insulation. 2,700m^2 of solar panels were also installed that produce 320,000 kw-hours per year. ➢ The project is an example of successful collaboration between Bostaden, Umeå Energi and Umeå University and many municipal housing companies and other actors still make study visits. Umeå is a university town with over 30% of its population made up of students. Since the university's inception, Umeå's population has doubled attracting both national and international students with immigrants accounting for up to 54% of Umeå's population. ➢ Umeå University was founded in 1965. Today the university has approximately 37,000 students enrolled accounting for around 36 percent of the overall city's population. The gravity of the university is further reflected in Umeå's demographic as the average age of 39 for residents is comparatively younger than the national average of 41.4 years. ➢ Umeå University is located in the centre of the city, coupled with the Swedish University of Agriculture. The Strategic plan for Umeå University 2023–2025 outlines several visions and paths for the university including strengthening the competitiveness of the University's research into achieving SDGs; and to promote increased interdisciplinary collaboration. ➢ As Umeå is a university city, there is a high concentration of rental properties in the popular student neighbourhoods of Berghem, Carlshem, Mariehem, Nydalahöjd, Tunnelbacken, and Ålidhöjd, with privately owned houses predominantly to the north and south of the city. There is potential to embed Living Lab activities in newly developing residential areas in Umeå, which could also help to support the challenges in changing existing neighbourhoods. ➢ Umeå is constantly expanding with plans for a number of new developments. One residential area which is to be built to the northeast of the city where there is currently forest is of particular

	interest. There is potential to invite the three or four developers who are currently engaged with the project to the Living Lab workshops to explore potential for collaborative opportunities. Umeå is a district heated city. ➢ Umeå Energi, an energy company based in Umeå, is able to deliver pure forms of energy including hydropower by tapping into the power of the Umeälven river at the rapids of Stornorrfos. As early as the 1960's Umeå started investing in district heating, which today warms 70% of indoors areas of the city, replacing traditional oil burners. ➢ Umeå's own heat production is also used to produce district cooling via absorption refrigerators, creating a sustainable and cyclical production system. At the Dåva plant to the northeast of the city, waste and biofuel are converted into energy and electricity in an environmentally acceptable manner. Almost 30% of Umeå's residents live outside of the city. The development of rural Umeå is therefore vital to achieving the population strategy of 200,000 inhabitants by 2050. These rural areas could potentially align with the Irish rural context. ➢ The Umeå countryside offers some of the most attractive living environments in the municipality with some towns becoming increasingly urbanised with the inclusion of amenities such as large shops and regional shopping centres. ➢ The strategy of a five-kilometre high-density city is balanced with the demand and development of low-density, single-family dwellings in Umeå's rural areas. Several radial village corridors with concentrations of high-density development will further compliment the low-density rural areas. ➢ Links will be created between these areas via increased public transport such as the bus services and the Botniabanan and future Norrbotniabanan rail lines enabling sustainable travel and population growth. ➢ Infrastructure such as the construction of new apartment blocks will facilitate the intended 3,000 new inhabitants in radial village corridors as outlined in the Comprehensive Plan for Umeå Municipality. The overall aim is to create infrastructure for an additional 30,000 people to live in the countryside in villages and population centres by 2050. The Comprehensive Plan states that the attitude to development in rural communities is positive.

	➢ Opportunities could be created to engage with citizens in these rural communities to determine possible engagement around decarbonisation. Coompanion is a vital resource for engaging with village level activity through the Municipality. ➢ Coompanion Sweden is an is an economic association that works to promote entrepreneurship and develop companies and organizations that want to work sustainably and make a positive difference in society. It promotes egalitarian and democratic social development. This is facilitated through free advice, collaboration with civil society, the public sector and the private sector in various types of projects, through educational efforts and through collaboration/networking. ➢ Coompanion is financed by various organisations and funds such as the EU and the State Agency for Growth. Coompanion is structured into regional divisions, with Coompanion Västerbotten serving the city of Umeå. ➢ Coompanion's reach is evidently vast with a recorded meeting number of 7,500 people per annum and the aided establishment of 1,139 social enterprises through advice provided. Energy councillors from Coompanion are frequently asked to consult on cooperative working with different villages to make energy communities in their areas. Coompanion is one of many affiliated organisations that works closely with Umeå Municipality to support the Umeå Climate roadmap. Umecom, is a key example of transnational collaboration facilitating participatory community engagements through citizen workshops for solving societal issues in Umeå. ➢ Umecom, which was founded on a Japanese model of Kamacon created in the city of Kamakura, is a collaborative group which actively facilitates monthly participatory community engagements. Umecom was a result of Umeå's participation in the EU lead International Urban Cooperation programme (IUC) in Japan whereby a mutual interest in participatory social innovation was discovered between Umeå and Kamakura. ➢ Umecom's network includes actors, projects, initiatives and enthusiasts such as Umeå Municipality, RISE (Research Institute of Sweden) and Coompanion. ➢ Umecom Festival 2024 will be held in August 2024 in the Umeå town centre which can be used a potential key opportunity for large scale community engagement efforts around decarbonisation.

People: *Existing Citizen Engagement / Collaborative Participatory Practices.*	Coherence within Umeå Municipality is necessary to avoid any overlap of projects and initiatives or duplication of community engagement processes and infrastructure. ➢ Umeå municipality has approximately 12,000 employees and is northern Sweden's largest employer. ➢ Actions need to be well considered to ensure municipal wide coherence to avoid any overlaps between actions or ideas and to ensure living lab activities add value to the existing local context. Open Data is an open democratic data platform which supports increased agency of resident and encourages initiatives around climate change. Open Data will be a valuable resource for stakeholder engagement in the Living Lab. ➢ Open Data is Open data creates an open dialogue with the residents of Umeå facilitating easy to access open-source data gathering and simulation studies. Open data provides a precedent for smaller scale projects or additional projects that require platforms and is partnered with RUGGEDISED, Umea Energi, Umea Kommun, and Vakin. ➢ Initiatives by Open Data such as the Umeå Open Data Climate Challenge encourages innovative thinking to drive and support climate action around the sectors of mobility and transport, energy and the built environment, consumption and circular economy, and food and agriculture. The hope is that the challenge will lead to an increase in access to open data and an increase in collaboration between different stakeholders. The challenge is supported by supported by Balticgruppen, INAB, Tyréns, HYBES and Umeå University with six finalists will have the opportunity to share a total prize pool of 130,000 Swedish kronor. Some rural villages have established energy communities, but workshops would create additional support to achieve larger community engagement. ➢ Workshops in rural areas around rural centric topics such as agriculture may lead to better community engagement. Voting capacity exists in Umeå, however closer consideration of how companies and decision makers support and facilitate successful engagements with larger communities could be explored. ➢ Engagement with smaller communities such as home-owners and small business owners in the city can mobilise citizens and supporting communal agency around aspects such as local policy. Umecom could potentially be suggested as a successful example of

	participatory community engagements that can be applied elsewhere to larger communities.
Policy: *Local regional cultural, societal, environmental, and regulatory contexts impacting decarbonisation.*	Umeå is one of the 100 Climate-Neutral and Smart Cities by 2030. ➢ Under the EU Missions in Horizon Europe, which are a new way to bring concrete solutions to some of our greatest challenges[9], along with Cork, Umeå has been selected to be one of the 100 Climate-Neutral and Smart Cities by 2030. The aims of the Cities Mission's include to deliver 100 climate-neutral and smart cities by 2030 and to ensure that these cities act as experimentation and innovation hubs to enable all European cities to follow suit by 2050.
Generating Value and Impacts: *Early thoughts - What change could we affect within the scope of this project. Desired / intended impacts.*	There is a wide range of opportunities to implement Living Lab activities in Umeå. ➢ It will be critical that the local living lab activities support coherency both within the Municipality and between the Municipality and the public given the extensive local and city-wide initiatives and structures in this space. ➢ Potential to include urban, peri-urban and rural areas as the city expands. ➢ Resources such as Coompanion could assist in building on and harnessing existing momentum to create new community engagements and support existing ones. ➢ Umecom festival could be used as a key event in building capacity in decarbonisation while existing community actions or challenges such as the Open data Climate Challenge could further inspire climate focused initiatives. ➢ Existing behaviour/user insights surveys such as the Travel Habits Survey conducted by Umeå Kommun could also link to and inform the living lab activities.