



D2.3 Decarbonisation Toolkit of 5 Tools

29/02/2024

Shannon Macika, Melike Nur Ülsever, Emmanuel Appiah, Iasmin Kormann da Silva, Ankit Bid, Santosh Eashwar, Jordi Jené Jaume, Tang Jingyang, Yağmur Sönmez

Seyfferstraße 34, 70197 Stuttgart

Disclaimer

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Innovation Council and SMEs Executive Agency (EISMEA). Neither the European Union nor the granting authority can be held responsible for them.



Funded by the
European Union

Deliverable administration			
No & name	D2.3 Decarbonisation Toolkit of 5 Tools		
Status	Uploaded	Due M12	Date 2024-02-29
Author(s)	Shannon Macika, Melike Nur Ülsever, Emmanuel Appiah, Iasmin Kormann da Silva, Ankit Bid, Santosh Eashwar, Jordi Jené Jaume, Tang Jingyang, Yağmur Sönmez		
Description of the related task and the deliverable. Extract from DoA & GA	<p>T2.3 Decarbonisation Toolkit for SMCs (Leader: BAB, Duration: M7-M12, Contributors: UDNA, ODZ, SCC)</p> <p>The project will collect and digitalise a series of tools toward decarbonisation from existing projects (identified and prioritised as part of the WP1). These tools (at least 4) will be made available within the Digital Forum to further support SMCs in their efforts toward reaching net zero ambitions. Additionally, BAB will develop and implement a Funding Finder tool to further support SMCs in achieving financial support toward net zero implementations by increasing awareness for existing funding opportunities, drawing from databases and funding sources including e.g. EIT (co)fundings, the EU Mission: Climate-Neutral and Smart Cities and Interreg programmes, and other funding calls through the EU Funding and Tenders Portal.</p>		
Participants	All partners		
Comments			
V	Date	Authors	Description
1	27/02/2024	Shannon Macika & Melike Nur Ülsever	Working document ready for internal review
2	29/02/2024	All partners	Peer-review comments attended, finalisation
3	29/02/2024	PC	The coordinator submits the deliverable to the EU

Dissemination level

PU	Public	x
SEN	Sensitive	

Disclaimer

Funded by the European Union. Views and opinions expressed are however those of the author(s) only and do not necessarily reflect those of the European Union or European Innovation Council and SMEs Executive Agency (EISMEA). Neither the European Union nor the granting authority can be held responsible for them.

Copyright

© Copyright SMCNetZero Consortium consisting of:

- 1 BABLE GmbH
- 2 ODRAZ – Održivi razvoj zajednice
- 3 ASOCIACIÓN EMPRESARIAL MULTISECTORIAL INNOVADORA PARA LAS CIUDADES INTELIGENTES (SMART CITY CLUSTER)
- 4 Southern Regional Assembly
- 5 Foreningen BLOXHUB
- 6 WE BUILD DENMARK
- 7 UrbanDNA Solutions LLP

This document may not be copied, reproduced, or modified in whole or in part for any purpose without written permission from the **SMCNetZero** Consortium. In addition to such written permission to copy, reproduce, or modify this document in whole or part, an acknowledgement of the authors of the document and all applicable portions of the copyright notice must be clearly referenced. All rights reserved.

About SMCNetZero

SMCNetZero brings together six successful urban innovation initiatives in Europe with seven (7) regional and Pan European networks and their partners to create a **Satellite Network of innovation actors** to support public sector representatives from Small and Medium-sized cities (SMCs), SMEs, academia, NGOs, and investors across Europe to **facilitate decarbonisation in SMCs**.

The SMCNetZero consortium is composed of:

- BABLE Smart Cities**, Germany (BAB)
- ODRAZ - Održivi razvoj zajednice**, Croatia (ODZ)
- Smart City Cluster**, Spain (SCC)
- Southern Regional Assembly**, Ireland (SRA)
- BLOXHUB**, Denmark (BXH)
- WE BUILD DENMARK**, Denmark (WBD)
- UrbanDNA**, United Kingdom (UDNA)

This project is unique in that its diverse consortium partners and broad commitment from target stakeholders in the Satellite Network ensure **focus in regions with less innovation capacity**, with written confirmed commitment from nearly 100 innovation actors at the proposal stage, to participate in the activities- including an emphasis on largely underrepresented regions and stakeholders.

The project will leverage its diverse Satellite Network to:

- Gain an in-depth understanding of SMC needs and barriers towards achieving Net Zero emissions.
- Raise awareness and simplify access to existing successful initiatives supporting decarbonisation.
- Support matchmaking between supply and demand sides by linking SMEs, researchers, and investors with SMCs.
- Help identify and open access to funding for enabling innovation deployment in SMCs currently underrepresented in the European innovation ecosystem.

SMCNetZero's vision is to **create and strengthen local innovation ecosystems' interrelations in SMCNetZero regions** through brokerage and knowledge-building activities as well as digital resources to increase capacity **for planning, deploying, and**

scaling up of decarbonisation solutions, overall focusing on increasing the inclusivity of these innovation ecosystems and minimizing existing innovation divides.

To achieve this vision, SMCNetZero has the following primary strategic objectives:

- Open up opportunities and stimulate the dissemination of information and exchange of knowledge on best practices on decarbonization for SMCs (and as a result, SMEs).
- Increase implementation prospects between providers of zero-emission solutions and public authorities from SMCs by designing, developing and providing a digital space and accompanying toolkit for collaborating, learning and networking.
- Identify and engage innovation leaders from the public and private sectors from “strong” innovator regions and “moderate” to “modest” innovator regions within the project’s focus countries.
- Design and deploy engagement and knowledge-building activities for ensuring wide participation for SMCNetZero and maximum impact.
- Facilitate the understanding and implications of the implementation and scale-up of innovation projects in SMCs.

Table of Contents

Disclaimer.....	3
Copyright	3
About SMCNetZero	4
Executive Summary	7
1. SMCNetZero Digital Forum Overview	8
1.1 Aim of the Digital Forum	8
1.2 Relation to the BABLE Smart Cities platform	8
1.3 Definition of the target users	9
1.4 Overview: Decarbonisation Toolbox of the Digital Forum	9
2. Description of tools in the SMCNetZero Toolbox.....	11
2.1 The SMCNetZero Funding Finder Tool	11
2.2 SPARCS Market Consultation Tool	12
2.3 EnPover Toolkit of local support schemes facilitating implementation of energy efficiency measures in vulnerable households	14
2.4 AI Chatbot: EnerGyPT (Beta)	15
2.5 Unlocking Public-Private Partnerships: A Toolkit for Local Governments.....	21
2.6 Climate Finance Decision-Making Tree	22
2.7 Regional Adaptation Support Tool (RAST)	24
3. Next steps for the Digital Forum.....	26

Executive Summary

The **SMCNetZero Digital Forum** is a dynamic online platform designed to address the unique challenges faced by Small and Medium-sized Cities (SMCs) and Small and Medium-sized Enterprises (SMEs) in their pursuit of decarbonisation. As part of the tasks and intended components of the Digital Forum, the SMCNetZero project has committed to collect and digitalise a series of tools toward decarbonisation from existing EU- and other publicly-funded projects, as well as develop new tools, focusing on a Funding Finder tool to further support SMCs in achieving financial support toward net zero emission implementations. Notably, the project has also received in-kind support from a group of students through the EIT InnoEnergy masters programme to develop an additional tool: an AI Chatbot on priority topics including addressing energy poverty. These tools are collectively now available within the Digital Forum Decarbonisation Toolbox to further support SMCs in their efforts toward reaching net zero ambitions.

This document specifically focuses on the Decarbonisation Toolbox, its fit into the overall SMCNetZero Digital Forum and specific details regarding each tool currently included in the Toolbox, including how and why the tools are relevant to the Digital Forum's intended users.

The document is organised as follows: Section 1 provides an overview of the entire SMCNetZero Digital Forum, including its aim, relation to the BABLE smart cities platform (where the Digital Forum is housed), an overview of the target users, an exploration of the various areas/features of the Digital Forum and an introduction to the SMCNetZero Digital Forum Toolbox. Section 2 provides a further description of each tool in the Toolbox as well as success stories, case studies and use cases demonstrating these tools in action. Finally, Section 3 provides a quick highlight of what's next for the Digital Forum related to its exploitation, dissemination and user engagement.

1. SMCNetZero Digital Forum Overview

1.1 Aim of the Digital Forum

The SMCNetZero Digital Forum is driven by an in-depth understanding of the specific challenges and needs faced by SMCs. Its primary goal is to establish a dynamic online platform where SMCs, SMEs and other relevant stakeholders can share knowledge, build connections and accelerate efforts towards decarbonisation. The SMCNetZero Digital Forum aims to simplify access to existing successful initiatives, raise awareness and offer tailored support, capacity building, workshops and tools. This collaborative endeavour is directed towards advancing sustainability within the SMC community by setting up a connected network of initiatives and organisations representing various involved innovation actors, which is also directly in alignment with the overall project goals.

1.2 Relation to the BABLE Smart Cities platform

The SMCNetZero Digital Forum operate as a virtual "one-stop shop" integrated as a sub-space within the existing BABLE Smart Cities platform, serving as an expansive resource hub. Therefore, users of the SMCNetZero Digital Forum can access both the niche resources that the Digital Forum offers tailored to SMC and SME needs while also taking advantage of the broader offering and opportunities offered through the BABLE platform.

In conjunction with the specific sections of the SMCNetZero Digital Forum, users can take advantage of the additional features offered by the overarching BABLE platform, which is a robust digital ecosystem designed to facilitate innovative urban initiatives. Noteworthy features on the BABLE platform to go beyond those available specifically within the SMCNetZero Digital Forum include, but are not limited to:

- **Neutral Solution blueprints:** provide a clear roadmap for implementing smart city initiatives based on proven practices and successful Use Cases.
- **Personalised User Dashboard:** offers a user-friendly interface for monitoring and overseeing information, tools, and related resources created by and of most interest to the user.
- **Networking:** offers the opportunity to connect not only with members of the SMCNetZero Digital Forum but also with a diverse community of experts, peers, and stakeholders engaged in innovation and sustainability initiatives in urban environments.

1.3 Definition of the target users

While the exact size may be defined slightly differently by various entities and projects, to ensure a standard of focus, the following definitions were agreed to be considered within the scope of the SMCNetZero project with regards to sizes and resources of SMCs and SMEs:

- **Small and Medium Sized Cities (SMCs):** Cities with a population between 5k and 100k inhabitants will be the targeted ones. Those towns/cities having independent governance structures (e.g. cities with Mayors, city councils) and motivation to be net zero will be preferred. However, if in any case, a partner identifies a city of interest that falls slightly outside these boundaries, it may also be considered.
- **Small and Medium Sized Enterprises (SMEs):** Companies with <250 employees that offer innovative solutions and services to support decarbonization in cities, preferably those with experience in the development of net zero initiatives for small and medium-sized local authorities.

1.4 Overview: Decarbonisation Toolbox of the Digital Forum

In the "[TOOLS](#)" section of the SMCNetZero Digital Forum, users will find the Decarbonisation Toolbox dedicated to supporting SMCs in their decarbonisation efforts. These tools, including a Funding Finder, an AI Chatbot and also tools developed under other EU co-funded projects, provide knowledge and resources that support SMCs and SMEs in making informed decisions and driving meaningful environmental impact.

Aligning with the priority need and challenge areas identified within the project's WP1 and D1.1 Market Analysis report, the project team committed to a process of detailed desk research and development, ultimately **identifying and developing the following tools for preliminary inclusion in the Digital Forum's Decarbonisation Toolbox** (note: while the project requirements have only stipulated a minimum of 4 tools, the Toolbox is being planned currently with 7 tools, including two newly developed under SMCNetZero). The SMCNetZero project team has liaised with each of the external tool owners, as well, to collaborate on the inclusion of their tools into the Toolbox:

- 1 **SMCNetZero Funding Finder Tool** – *developed new within SMCNetZero project*
- 2 **Market Consultation Tool** – *developed under the SPARCS EU H2020 project*
- 3 **EnPover Toolkit of local support schemes facilitating implementation of energy efficiency measures in vulnerable households** – *developed under the*

- EnPoverty project supported by the European Climate Initiative (EUKI) of the German Federal Ministry of Environment, Nature Conservation and Nuclear Safety (BMU)*
- 4 **AI ChatBot EnerGyPT** – developed new within the SMCNetZero project, through in-kind support of students in the EIT InnoEnergy masters programme Project of the Year (PoY) course
 - 5 **Unlocking Public-Private Partnerships: A Toolkit for Local Governments** – part of the Benin Energy Plus (BEP) project, which is supported by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ)
 - a. NOTE: This tool will be added into the Toolbox in March 2024.
 - 6 **Climate Finance Decision-Making Tree** – supported by the EU-funded Urban-LEDS project, with additional support from the Global Environment Facility (GEF)
 - 7 **Regional Adaptations Support Tool (RAST)** – offered through the European Climate Adaptation Platform Climate-ADAPT, a partnership between the European Commission and the European Environment Agency.

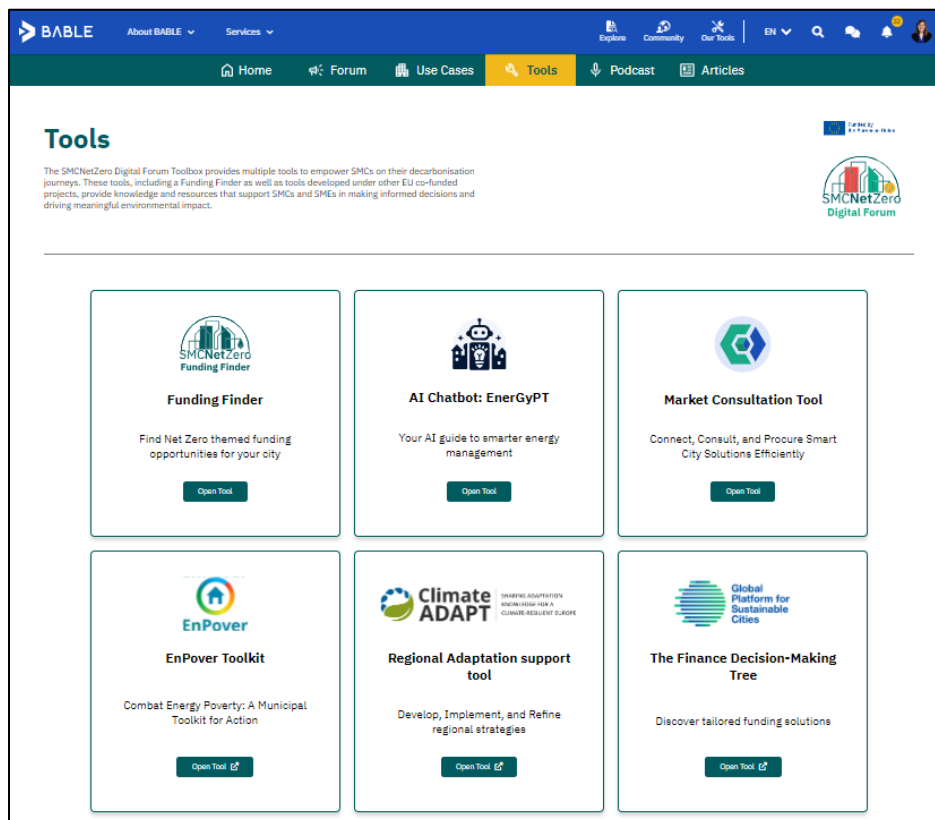


Figure 1: Decarbonisation Toolbox area of the SMCNetZero Digital Forum (NOTE: the toolbox is continuing to evolve and therefore this frontend will continue to be adapted to fit user needs and requirements)

2. Description of tools in the SMCNetZero Toolbox

2.1 The SMCNetZero Funding Finder Tool

The SMCNetZero Funding Finder is a specialised version of the BABLE Funding Matcher tailored specifically for net zero initiatives. Its primary function is to sift through an extensive, constantly updated database to unearth funding opportunities for cities and companies aiming to achieve net zero objectives. Users can leverage this tool to navigate through a curated selection of net zero-themed funding opportunities, using keywords, filters and sorting mechanisms to pinpoint the most apt funding options.

Development and Background

The SMCNetZero Funding Finder tool is an offshoot of the BABLE Funding Matcher, developed by BABLE Digital. This adaptation was designed to cater specifically to the needs surrounding net zero projects, simplifying the search for relevant funding. The development underscores BABLE's commitment to fostering innovative solutions in urban areas and companies by easing the financial sourcing process.

Key Features and Functionality

The tool boasts a host of features aimed at streamlining the funding search process:

- **Comprehensive Database:** Access to a broad spectrum of funding sources across multiple portals, updated in real-time.
- **Bespoken Program Connections:** Direct links to tailored funding programs that match specific project needs.
- **Time-Saving Platform:** Consolidation of diverse funding data onto a single, user-friendly platform.
- **Advanced filtering options include:**
 - Relevance-based search with additional filters for open/closed funding statuses, countries, and sectors.
 - Sorting capabilities by relevance, deadline, and popularity.

Benefits for Cities

Cities pursuing net zero emissions goals stand to gain significantly from the SMCNetZero Funding Finder tool. It offers a streamlined pathway to financial resources necessary for implementing sustainable, energy-efficient and carbon-reducing initiatives. By simplifying the funding search process, the tool enables cities to more effectively allocate resources towards impactful environmental projects, thereby accelerating their journey to net zero.

Case Studies and Success Stories

As this is a brand-new tool specifically developed in the framework of the SMCNetZero project, there are no examples of implementation yet; however, the tool's integration in cities would likely reflect success stories of enhanced project funding efficiency, accelerated net zero-focused initiatives and bolstered sustainability projects, drawing from the comprehensive and user-friendly nature of the tool.

Challenges and Limitations

Potential challenges might include the tool's current language limitations (English only) and the geographical scope of detailed filters. The reliance on digital literacy and access to technology could also pose barriers to some users. However, ongoing updates and expansions, such as the inclusion of new funding opportunities and broader regional filters, indicate a commitment to overcoming these limitations.

2.2 SPARCS Market Consultation Tool

The [Market Consultation Tool](#) was developed by BABLE Smart Cities under the EU H2020-funded Sustainable energy Positive & zero cARbon CommunitieS (SPARCS) project. The tool serves as a platform for city officials to learn about smart city innovations they want to acquire and a way to alert relevant suppliers about their plans to purchase those innovations. As the tool is hosted on the BABLE Smart Cities open platform with a large community of relevant professionals from across Europe, this also enables potential cross-border market involvement. The principal aim of this initiative is to optimise the market consultation procedure, facilitating the evaluation of supplier skills, fostering inter-city knowledge sharing and laying the groundwork for cooperative procurement by detecting potential participants early in the procedure.

Through increased adoption and streamlined innovation procurement procedures, the Market Consultation Tool transforms how cities accept innovative solutions. Cities can use the tool to engage with forward-thinking companies and obtain state-of-the-art solutions by gaining access to an ever-expanding network of European suppliers. This makes it easier for cities to share knowledge and learn from each other's experiences as they work towards common net zero goals.

Additionally, the tool acts as a forum for market consultations, giving cities a chance to express their requirements, interact with creative suppliers and determine whether the market is ready for solutions. It signifies a significant change in the way that cities acquire innovation, enabling cooperative procurement using expedited assessments of innovation requirements and international viability analyses. It facilitates cooperative

procurement activities and expedites the identification of possible collaborators by fostering standardisation and information exchange. In the end, this game-changing tool can save cities a great deal of time by enabling them to look for solutions in the market while utilising peer experiences. It provides important features for system installation, setup and hardware and software commissioning.

The Market Consultation tool was tested and improved in partnership with the city of Maia, Portugal, and its partners, directly addressing the issues of poor knowledge sharing across cities, ineffective procurement procedures and low market engagement. The city of Maia, along with its local partners Porto Energy Agency (AdEPorto) and EDP's Group Research and Development Centre (NEW), directly tested the market consultation tool, providing meaningful feedback for its improvement.

Success Story

Within the scope of the SPARCS project, the city of Maia (population ca. 134.000 as of 2021) intended to implement a Building Integrated Photovoltaics (BIPV) technology in existing buildings, creating the possibility to replicate the solution on a large scale. Thus, the objective of this project was to install PV film in existing windows, without having to replace any elements in its facade structure.

Maia embarked on its Market Consultation phase by initially identifying potential technology providers and reaching out to them individually. However, this approach proved to be time-consuming and yielded subpar results, as many companies did not offer the exact solution Maia was seeking. Recognising the inefficiencies of this method, Maia turned to the Market Consultation tool, which streamlined the process significantly.

With the Market Consultation tool, Maia was able to describe its requirements for Building Integrated Photovoltaics (BIPV) technology in existing buildings upfront. This allowed interested organisations to register and participate in a single event, saving considerable time and effort compared to the previous approach of individually contacting companies. Additionally, BABLE's large open platform community enabled Maia to expand further and identify different companies from the ones originally targeted.

Through the Market Consultation Tool, Maia gained invaluable insights into the current market conditions during the consultation event. This process highlighted a significant gap between available solutions and the specific needs of the city regarding Building Integrated Photovoltaics (BIPV) technology in existing buildings. This awareness was

crucial as it helped Maia avoid allocating resources towards solutions that wouldn't meet its requirements, ultimately ensuring a more efficient and effective procurement process. By assessing its requirements, available budget and implementation timeline through the tool, Maia gained a comprehensive understanding of the market conditions before proceeding with procurement. This proactive approach enabled Maia to make informed decisions aligned with its goals and maximize the impact of its investments in sustainability and energy efficiency.

2.3 EnPover Toolkit of local support schemes facilitating implementation of energy efficiency measures in vulnerable households

The [EnPover Toolkit](#), developed under the EnPover project supported by the European Climate Initiative (EUKI) of the German Federal Ministry of the Environment, Nature Conservation and Nuclear Safety (BMU), was aimed at alleviating energy poverty of vulnerable households by engaging municipal actors in the process. In doing so, the project aimed to empower municipal actors to fight energy poverty on their territories and equip them with a set of universal and ready-to-use tools boosting implementation of low-cost energy efficiency measures in households most prone to energy poverty.

The toolkit serves as a practical resource to aid cities in combating energy poverty. It offers comprehensive guidance on assessing the extent of energy poverty within their jurisdictions, identifying households most in need, and devising tangible strategies for implementing cost-effective energy efficiency improvements.

The EnPover toolkit not only equips local governments with ready-to-use tools for addressing energy poverty at the grassroots level but also includes references to relevant best practices and supplementary materials for inspiration. It is specifically tailored for local governments seeking to tackle the issue of energy poverty within their communities. Comprising a series of customised and easily implementable actions, the toolkit facilitates the adoption of low-cost energy efficiency upgrades, whether through behavioural changes, minor interventions or investments, targeting vulnerable families.



Case Study

As part of the EnPover Municipalities initiative, the EnPover tool has been successfully applied in seven municipalities in Poland, Hungary and Germany, with the main goal

being to reduce energy poverty among households. This project aims to support community-driven projects and activities in addition to affordable energy efficiency solutions.

One notable outcome of the EnPover tool implementation is the launch of awareness-raising campaigns by the involved municipalities. These campaigns were strategically designed to enhance the energy awareness of vulnerable citizens and educate them about practical, no-cost and low-cost energy efficiency measures that could be implemented within their households. Through diverse channels such as social media, podcasts, articles, leaflets, posters and dedicated websites, the municipalities effectively reached their target audience, providing them with valuable information and actionable tips.

Additionally, municipal support programmes were developed and executed as part of the project. These programmes offered tailored advice and assistance to households facing energy poverty. Services included energy audits, distribution of energy-saving kits, online and offline counselling sessions and dedicated office hours to address the specific energy needs and challenges of households. Collaborating with key municipal partners such as social workers, energy advisors, housing associations and local NGOs ensured a comprehensive and impactful approach.

Furthermore, meticulous evaluation and feedback mechanisms were put in place by the municipalities to monitor the implementation of the EnPover tool and the effectiveness of their campaigns and programmes. Data on energy consumption, energy bills, energy behaviours and participant satisfaction were collected and analysed. This evaluation process facilitated the identification of costs and benefits associated with the measures implemented, providing valuable insights for future initiatives. Additionally, the municipalities shared their experiences and lessons learned, offering feedback and recommendations to project partners and other interested municipalities, thus fostering a culture of knowledge exchange and continuous improvement.

2.4 AI Chatbot: EnerGyPT (Beta)

The AI ChatBot: EnerGyPT has been developed new within the SMCNetZero project as a collaboration between BABLE and students in the EIT InnoEnergy masters programme Project of the Year (PoY) course. Inspired by the EnPover Toolkit (also linked in the Decarbonisation Toolbox), the aim has been to develop a digital tool addressing energy poverty and related topics within SMCs.

Development and Background

The tool originated from the collaborative efforts of EIT InnoEnergy master students, as part of their commitment to sustainability, in collaboration with BABLE, to develop this innovative solution addressing one of the challenge areas identified within the SMCNetZero project. The students, acting as key contributors, played a pivotal role in the development process. While not directly funded by the SMCNetZero EU project, government agency or specific research institution, this tool emerged from a partnership between academia and the private sector, demonstrating synergy between education and industry in driving sustainable urban solutions.

Tool Name and Purpose

The AI ChatBot: EnerGyPT is an advanced LLM-powered tool that provides policymakers with a single platform for accessing and synthesising relevant, up-to-date information on sustainable city planning. The ChatBot helps policymakers make informed decisions for a greener future by providing specific guidance and insights.

Key Features and Functionality

This LLM-Powered Chatbot for policymakers is an evolving tool that aims to centralise access to comprehensive knowledge on sustainable city planning. It recognizes policymakers' requirements, makes individualized suggestions, and interfaces with municipal planning systems using Large Language Models (LLMs). The development technique includes crucial phases such as package installation, API key generation and index construction mostly using Microsoft OpenAI Azure. The challenges addressed include data privacy, bias, data quality and natural language comprehension. The tool intends to overcome restricted information availability, ease decision-making, bridge language barriers and improve user experience, making it a useful resource for policymakers working on sustainable city development.

Benefits for Cities

The LLM-Powered Chatbot provides significant benefits to communities pursuing net zero targets, including:

- Improving municipal planning efficiency by providing targeted advice and simplifying data flows
- Supporting and promoting diversity and inclusion through multilingual support
- Ongoing learning as an LLM, guaranteeing that cities keep current with the newest sustainable practices

- Incorporating ESG (environment, social and governance) criteria, through the tool's focus on environmental concerns, increasing resilience and conforming to ethical guidelines

In essence, the ChatBot serves as an invaluable companion for communities working toward NetZero goals.

Challenges and Limitations

The challenges for the ChatBot may include concerns with data quality and bias, as the tool's success is strongly dependent on the quality of the training data. If the data utilised for training is biased or lacks diversity, it may unconsciously include biases in the ChatBot's answers, impacting decision-making.

Another major difficulty is that AI models, particularly big language models, demand significant computational resources. This may provide issues in terms of infrastructure expenditures and accessibility, particularly for smaller communities with limited resources. Furthermore, while continual learning is desirable, maintaining the ChatBot's development to new input while avoiding errors or biases requires particular focus.

Natural language processing remains a challenging task, and the ChatBot may struggle to effectively read confusing or poorly written user inquiries, reducing the quality of answers. The tool's success is also dependent on user participation and acceptance by policymakers, and opposition to AI technology or a lack of faith in the tool's skills may impede its usefulness.

Privacy issues may develop as a result of the tool's scanning and analysis of documents, especially when sensitive or confidential information is included in the training data. Addressing these problems requires strong data security processes. Furthermore, while multi-language support is described as a benefit, effective communication across languages and cultural differences in policymaking may provide obstacles.

Policy and Regulatory Alignment

The tool is thoroughly designed to align gradually with existing policies, regulations and international agreements about climate change and sustainability. By adhering to these established frameworks, the tool ensures responsible and compliant practices, contributing positively to global environmental goals.

Additionally, the ChatBot tool is specifically engineered to assist policymakers in aligning with the latest EU climate objectives for energy efficiency in buildings by 2030. It offers a comprehensive suite of analytics and guidance to help achieve the ambitious

targets of reducing EU final energy consumption by 11.7%, ensuring all new buildings are zero-emission by 2030, and requiring Member States to make annual savings of an average of 1.49% from 2024 to 2030.

Through detailed data analysis, predictive modelling and scenario planning, our tool empowers policymakers to make informed decisions, tailor strategies to national and regional specifics and monitor progress towards these critical milestones. This proactive approach not only supports the transition towards a more sustainable and energy-efficient building sector but also aligns with the broader objective of achieving climate neutrality by 2050, marking a significant step forward in the global fight against climate change.

User-Friendly Interface and Accessibility

The tool's interface design should be analysed for clarity, simplicity and easy navigation. Clear images, menus and features help to provide a great user experience. A user-friendly product relies heavily on its onboarding process and training materials. Guides and tutorials should be simple to follow, allowing city officials and stakeholders to rapidly learn how to utilize the chatbot efficiently. Another key factor to consider is the efficacy of multilingual support, which ensures that consumers may engage with the chatbot in their preferred language. However, these are considerations and implementations that will take place later in the development process.

The tool's feedback systems contribute to its usability. A great user experience is further improved by simple and instructive replies to user concerns, as well as help or clarification as needed. The tool's responsiveness to diverse devices and screen sizes is critical. A user-friendly interface should be adaptable to several platforms, such as computers, tablets, and mobile devices.

Another aspect to consider when evaluating user-friendliness is the availability of user assistance services, such as a help centre or customer service channels. Adequate help for consumers who face difficulties or want further information improves the overall user experience; this service could be added to the ChatBot in the future to improve its perceptions and utility.

User testing and getting input from local authorities and other relevant stakeholders will be critical for a thorough review of the tool's effectiveness and areas for improvement. This feedback can indicate particular usability difficulties or areas for future

development, allowing the tool's usability to be modified to meet the needs and preferences of its intended users.

Security and Privacy Measures

Strong security and privacy features are incorporated into the tool to protect data and guarantee responsible use. Content filters are used to stop incorrect or objectionable content from being created. To identify content, Azure OpenAI uses a variety of models. It actively filters out dangerous content from both prompts and completions. To have even more control over the outputs that are produced, customers of the service can also apply personalised content filters.

The tool also has a stateless interface, which means that whenever it exits, it loses any user-entered data. By preventing user data from being stored inside the tool, this design helps to safeguard users' privacy. Additionally, users have more control over data security since Azure Cognitive Search, a crucial part of the tool's architecture, supports a variety of data sources and allows users to customise access rights.

Feedback and User Engagement

In the development and refinement of this tool, the EIT InnoEnergy student team has planned for lasting mechanisms for user feedback and engagement, fostering continuous improvement and responsiveness to user needs. The following strategies have been or will be implemented:

- **Pilot Phase:** Before full-scale deployment, pilot use of the Beta tool was initiated among the team and relevant stakeholders. This has allowed for real-world testing and invaluable feedback before the launch in the Decarbonisation Toolbox.
- **Stakeholder Workshops:** Engaging directly with stakeholders through workshops ensures a deeper understanding of their needs and challenges. It also provides a platform for stakeholders to contribute ideas for tool enhancement. The project intends to include stakeholder engagement and testing for the tool as part of upcoming training opportunities offered for SMCs within the scope of the project.
- **User Feedback Surveys:** Regular surveys should be conducted to gather insights from city officials, residents and stakeholders. These surveys would be designed to elicit feedback on user experience, feature effectiveness and areas of improvement.

- **User Support Channels:** Dedicated support channels, including helpdesk services and user assistance features within the tool, should ideally be implemented. This ensures that users can seek assistance promptly and have their queries addressed.
- **Swift Development:** The team adheres to a swift development approach, facilitating iterative releases and rapid adjustments based on user feedback. This ensures that the tool can evolve promptly in response to the dynamic needs of the users.
- **Educational Initiatives:** A comprehensive education programme should be considered, including tutorials, webinars and documentation such as this methodological explanation. This helps users better understand the tool's capabilities and encourages them to explore its features effectively.

By using these strategies, the team hopes to develop a user-centred tool that will adapt to the changing demands and difficulties of municipalities and stakeholders while also addressing their requirements.

User Base and Adoption

In pursuit of developing a tool for sustainable city development, the tool's development team has engaged stakeholders and policymakers as the primary user base. At this juncture, the tool is strategically geared towards addressing the specific needs of cities in Europe.

There is a deliberate approach to align the tool with regional sustainability objectives. Although detailed information about widespread adoption is not available yet, the tool's design intends to cater to the decision-making processes of policymakers and other stakeholders involved in sustainable urban development.

As the team continues refining and developing the tool, it is anticipated that its adoption will grow organically. For the latest updates and more nuanced insights into user adoption, stakeholder involvement, and potential accolades, official communications from EIT InnoEnergy, BABLE, and the SMCNetZero project will be forthcoming.

Technology Stack

The tool is constructed on a robust technological foundation, primarily centred around AI, specifically leveraging Azure Cloud AI and GPT-3.5 to empower the ChatBot functionalities. This AI-driven approach enables the tool to comprehend and respond effectively to a wide array of queries related to sustainable urban practices.

In addition to artificial intelligence, the tool uses complex search algorithms to analyse big datasets and derive insightful information for municipal management and planning. The analytics component is essential for spotting trends, patterns, and important metrics that improve the cities' sustainable attributes.

Although the entire technology stack's specifics are still confidential, the combination of artificial intelligence and data analytics serves as the foundation, demonstrating the team's dedication to developing a full and cutting-edge tool for sustainable urban development in alignment with SMCs' net zero ambitions and goals.

2.5 Unlocking Public-Private Partnerships: A Toolkit for Local Governments

The [Unlocking Public-Private Partnerships Toolkit](#) is a part of the Benin Energy Plus (BEP) project, which is supported by Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH on behalf of the German Federal Ministry for Economic Cooperation and Development (BMZ).

The Toolkit is designed as a comprehensive resource for local and regional governments (LRGs) to facilitate the development and execution of renewable energy projects within a public-private partnership (PPP) framework. By offering a structured compilation of tools and materials, it aims to assist LRGs in engaging with the private sector throughout the entire project lifecycle – from initial identification and design to eventual implementation, operation and maintenance. With a primary goal of enhancing access to sustainable energy, the Toolkit also includes resources and tools for evaluating carbon credits to enhance project financing.

Although initially tailored for the Beninese context, specifically focusing on solar photovoltaics (PV), the Toolkit offers a generic content and approach to ensure its relevance and applicability to LRGs globally, therefore also making it relevant to the SMCNetZero project and its target audience.

Organised into five distinct 'building blocks', the Toolkit provides LRGs with practical guidance on several key aspects, including:

- the decision-making process leading to the establishment of a PPP,
- the allocation of tasks, objectives and risk management among the involved partners, along with recommended financial models for PPPs, with a specific emphasis on carbon markets; and
- the essential steps required for the effective implementation of such a model in climate and energy projects.

Use Case: Batesville School District

The 'Solar on Schools in Batesville' initiative was a strategic response to Batesville School District's (USA) annual utility costs exceeding USD 600,000. With a focus on curbing expenses while avoiding school closures or layoffs, the district partnered with Entegry to implement the largest solar energy installation among Arkansas school districts, totalling 759 kW. This public-private partnership is aimed at enhancing student achievement, staff retention and operational efficiency. The project, incorporating 1,483 solar panels and upgrades in lighting, energy efficiency and water conservation across two campuses, yields nearly USD 100,000 in annual savings. Anchored by an energy service performance contract, it ensures ongoing savings cover project costs, with a projected USD 4,000,000 in savings over 20 years. This turnaround from a budget deficit to a USD 1,800,000 surplus in three years enabled significant teacher salary increases. The initiative also serves as a model for neighbouring districts, showcasing the potential impact of public-private partnerships in education and sustainability.



2.6 Climate Finance Decision-Making Tree

The [Climate Finance Decision-Making Tree and Guidance document](#) was made possible through the support of the Urban-LEDS project, funded by the European Union, and with the additional support of the Global Environment Facility (GEF). The Decision-Making Tree is a full-service product for a local and regional government willing to explore available options to finance the projects that help in the fight against the change in climate and environment. At its core, this document describes, in a structured manner by way of a decision tree, a process of guiding users through a series of tailored questions, which given the characteristics, requirements and preferences of the given projects, will direct them toward the best choices.

The decision tree guides the user towards the tools of financing that best suit the demands of the project. The tools are, therefore, grouped into three main groups: **Own-Source Financing**, **External Financing** and **Financing Tools** which enable Private

Sector Participation. This classification assures a diversified variety of designs which would benefit the specific contexts for the users to choose from. The in-depth description defines each type of financing tool, noting its advantages and disadvantages, and provides example cases where the tool has been used. Only through deeper analysis can each tool's utility and applicability for your projects become clear.

The decision tree and its descriptions are very handy guidance for decision-makers who must make the right choices in financing climate and environment-related projects. This document frames a structured framework and details many financing options. It provides tools for regional and local governments to answer effectively to the pressing challenges put in front by climate change and environmental sustainability.



Case Study: Enerpower's Green Energy Transformation for Grantstown Nurseries

One of the Financing tools featured is the Energy Performance Contract (EPC). An EPC is a contract under which an array of services is agreed upon and the provider of the services can guarantee that a minimum of energy savings and/or sustainability value will be achieved. An Energy Service Company (ESCO) develops a tailored energy service package, which may include planning, building, operation & maintenance, optimisation, fuel procurement, (co-) financing and user behaviour.¹

As a specific example that utilised an EPC, Grantstown Nurseries, a well-known Irish tomato supplier, received support from Enerpower as they made the transition to adopting renewable energy sources. A 550-kW biomass boiler and a 30-kW solar panel system were installed as part of this project, which was a major step towards environmental responsibility and sustainability.

The project's main goals were to:

- significantly lower the carbon emissions that Grantstown Nurseries' operations are responsible for.

¹ Standard EPC documents , European Energy Service Initiative, 2010

- achieve real cost savings in energy costs by switching to renewable energy sources to produce both heating and electricity.

This initiative produced nothing less than extraordinary results. Grantstown Nurseries has effectively achieved a significant reduction in carbon emissions, with an approximate annual reduction of 1,200 metric tonnes. This decrease highlights Grantstown Nurseries' dedication to environmental stewardship while also helping to lessen the negative effects of climate change.

Moreover, Grantstown Nurseries saw a large reduction in costs as a result of implementing renewable energy solutions. The installation of the solar panel system and biomass boiler marked a noteworthy 40% decrease in heating costs and an impressive 30% reduction in electricity expenses. These cost reductions show the viability and financial advantages of adopting renewable energy technologies, in addition to improving Grantstown Nurseries' financial sustainability.

By utilising renewable energy sources, Grantstown Nurseries became a leader in sustainable agriculture. In addition to helping to decarbonise the energy industry, Grantstown Nurseries creates new revenue streams by feeding excess electricity produced by the solar panel system back into the grid. This novel strategy highlights the potential for cooperation between sustainable farming methods and renewable energy solutions.

2.7 Regional Adaptation Support Tool (RAST)

The [Regional Adaptation Support Tool \(RAST\)](#) is offered through the European Climate Adaptation Platform Climate-ADAPT, a partnership between the European Commission and the European Environment Agency. It serves as a practical guidance resource tailored for regional or local authorities in developing, implementing, and assessing climate change adaptation plans. Drawing inspiration from the Adaptation Support Tool and the Urban Adaptation Support Tool, RAST offers comprehensive guidance throughout the six key stages of the adaptation planning process. This tool not only outlines these steps but also introduces pertinent data sources, additional guidance and various tools that can aid authorities in their adaptation efforts.

Furthermore, RAST undergoes periodic updates to incorporate new research findings, feedback from regional and local authorities, as well as the latest developments and information available in the field of climate change adaptation. Through its dynamic and evolving nature, RAST strives to provide relevant and up-to-date support to regional and

local authorities as they navigate the complexities of climate change adaptation planning.

The tool addresses several key challenges in the adaptation planning process, including:

- **Establishing a Strong Foundation:** It assists regional and local authorities in securing high-level support, gathering relevant climate impact data, establishing coordination mechanisms, identifying funding sources and involving stakeholders. This foundational step ensures a well-coordinated and inclusive approach to adaptation planning.
- **Assessing Climate Risks:** The tool facilitates the assessment of current and future climate-related hazards, vulnerabilities and adaptive capacities of exposed systems. This comprehensive analysis helps authorities understand the specific climate risks their region faces, enabling targeted adaptation strategies.
- **Identifying Adaptation Options:** By involving experts and stakeholders, the tool aids in identifying a range of adaptation options that address vulnerabilities and exposure to climate-related hazards. This ensures that adaptation measures are tailored to the unique needs of each region and do not hinder neighbouring areas' adaptation efforts.
- **Prioritizing Adaptation Options:** Through collaboration with stakeholders, the tool supports the assessment and prioritization of adaptation options based on various criteria such as effectiveness, efficiency, co-benefits and costs. This prioritization process ensures that limited resources are allocated to the most impactful and cost-effective measures.
- **Designing Adaptation Strategy and Action Plan:** The tool assists authorities in designing a comprehensive adaptation strategy and action plan, integrating preferred options and aligning with sectoral policies. This strategy serves as a roadmap for effective adaptation implementation, emphasizing objectives, rationale, timelines and provisions for monitoring and evaluation.

Case study: Adaptation to Climate Change (Upper Austria)

Following the devastating floods in Upper Austria in 2002, collaborative efforts led to recommendations for flood control improvements, marking the introduction of climate change considerations at the provincial parliament level. Subsequently, participation in the AMICA program from 2005 to 2007 bolstered adaptation efforts, resulting in the establishment of a state network dedicated to climate change adaptation. This

momentum aligned with Upper Austria's government program, prompting the development of a comprehensive climate change adaptation strategy approved in 2013.

The Regional Adaptation tool further aided Upper Austria by guiding the strategic examination of climate change consequences, offering tailored adaptation methods, and facilitating decision-making processes. It played a pivotal role in developing and evaluating the Upper Austrian Climate Change Adaptation Strategy, adopted in 2013.

Overall, Upper Austria's journey underscores the importance of proactive climate action and collaborative efforts in addressing climate change impacts. The establishment of dedicated networks, adoption of comprehensive strategies, and utilisation of the adaptation tool exemplified the region's commitment to resilience-building and sustainable adaptation. Through the initiatives, Upper Austria serves as a model for effective climate governance and proactive adaptation planning, paving the way for sustainable development amidst environmental challenges.

3. Next steps for the Digital Forum

The SMCNetZero Digital Forum will continue to be improved throughout the remainder of the project, including improvements based on feedback collected both from the projects' partners and from the user testing. In addition, further assets will be curated and added from the project partners' networks, capitalising on the overall envisaged "network of networks" approach that the project takes.