The involvement in citizen science will leave participants more knowledgeable, skilled and better connected (social capital), fostering their sense of belonging and enhancing their understanding of how different actions – or inaction – affects them and the environment and what they can do to change the situation. Perhaps the biggest intangible benefit will come from the realisation that their actions matter, that their needs, data and recommendations are going to be used to inform policies to drive better outcomes for their communities. This is where policy impact comes into play.

Policy Relevance

Policy relevance requires an understanding of which policy priorities can be addressed with citizen science. In other words, what can cities use citizen science for? In Flanders, the Herzele municipality's decision to implement a school street required an evaluation mechanism to assess the measure's effectiveness. (Both the school and the neighbourhood have been involved in data collection, with results now integrated into the curriculum.) In Berlin, the new mobility plan has triggered massive land-use changes whose impact on air quality and traffic remains unknown [L3]. Athens adopted a climate change adaptation plan which lists citizen participation among the recommended resilience-boosting measures [4]. Sofia is about to launch a new school bus and wants to know if it will lead to a reduction in traffic and air pollution, while Plovdiv is eager to introduce and evaluate the effectiveness of the first-ever school street in a city

To all these needs, COMPAIR responded with the greatest asset cities have at their disposal – their citizens. The dual focus on inclusion and policy has turned citizen science into a vehicle for policy–society interface. It's this ability to merge top-down and bottom-up approaches in a unified framework that makes citizen science a powerful instrument for building climate-resilient communities and ensuring that local Green Deals are designed not only for but also with the people.

Links:

[L1] https://wecompair.eu/

[L2] https://tinyurl.com/2p8nu4m9

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LoCEL-H2 - Low-cost, Circular, Plug and Play, Off-grid Energy for Remote Locations including Hydrogen

by Athanasia-Maria Tompolidi (Consortium for Battery Innovation, CBI), Jonathan Wilson (Loughborough University) and Hassan A Khan (Lahore University of Management Sciences)

This short article introduces the EU funded project LoCEL-H2, which aims to provide low-cost, circular, plug and play, off-grid energy for remote locations along with a hydrogen solution for clean cooking. LoCEL-H2 addresses hot topics such as energy poverty in Africa, the adverse effects of climate change and female health degradation by indoor air pollution due to use of harmful cooking fuels. LoCEL-H2 introduces a unique low-cost, hydrogen-based energy solution (the battery-electrolyser) and a novel battery technology with high performance and excellent circularity, integrated through a decentralised peer-to-peer prosumer microgrid with renewable energy generation.

LoCEL-H2 project is a low-cost, circular, plug and play, off-grid electricity solution for remote locations with hydrogen provision for clean cooking [L1,L2]. The project kicked off in January 2023 and will be completed in December 2026.

The goal of LoCEL-H2 is to address and mitigate issues of energy poverty in remote communities in Africa, as well as provide a sustainable alternative source of energy for cooking. Currently, individuals in least-developed communities in Africa are exposed to harmful fuels when cooking indoors. The LoCEL-H2 will facilitate a) access to renewable, cost-effective, plug and play and sustainable electrical energy and b) access to clean fuels in two full-scale TRL-8 pilots in Africa (Côte d'Ivoire and Zambia). This will be achieved through a methodical evaluation of the critical socioeconomic factors for use in system development and future rollout led by experts from social sciences and humanities (SSH). The overall solution is a unique, low-cost, hydrogen-based energy solution, the battery-electrolyser [1], a novel battery technology [2] (high performance and excellent circularity) and a decentralized peer-to-peer prosumer microgrid [3]. Further post-project commercialization of LoCEL-H2 will take place through existing networks in Africa and Asia in order to boost European export potential in sustainable energy solutions.

LoCEL-H2 comprises three core technical innovations: flexible multi-vector energy storage via community-shared battery-electrolyser hydrogen technology (WP3), optimised battery energy storage for households, small businesses and community buildings (WP4), and a scalable, plug and play prosumer microgrid with 100% renewable energy production (WP5). Systems monitoring and optimisation through an EMS (WP6) will be critical to ensuring safe, reliable, and optimal operation. LoCEL-H2 will be qualified through two TRL-8 pilot de-

ployments (WP7) in Zambia and Côte d'Ivoire.

The overall objective of storage is the development of multi-vector green energy generation (hydrogen) and storage (battery) solutions. A critical innovation will be the development of a low-cost battery-electrolyser and components thereof to enable the generation of hydrogen (for cooking) when an excess of solar energy is available. The battery-electrolyser will be developed using off-the-shelf components with additional low-cost, easily manufactured parts. The effective uptake of the battery-electrolyser by rural communities would reduce the use of firewood and potentially positively impact deforestation, indoor pollution, and GHG emission levels. Energy generation will be based on 100% renewable generation through the prosumer microgrid and high performance batteries that are optimised for use in microgrid applications in developing-economy communities, not only in terms of performance but also in terms of cost.

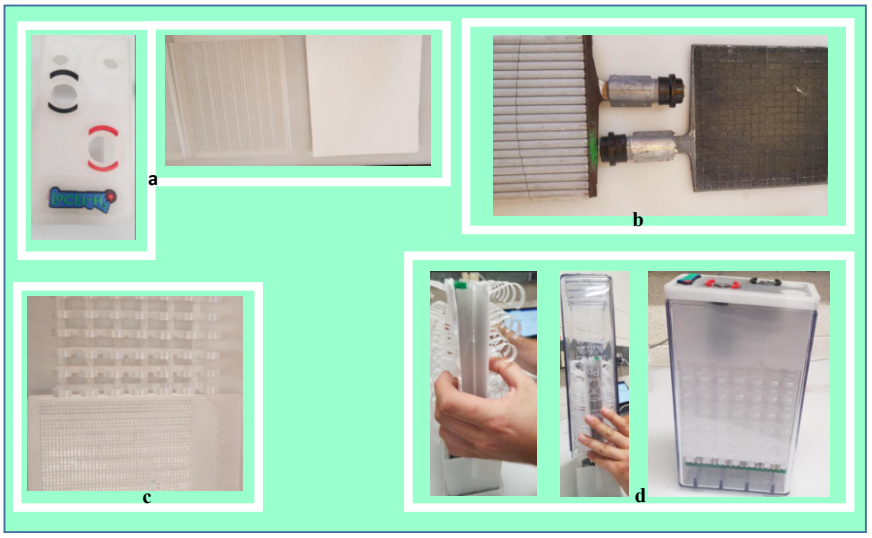

Figure 1: a) A new 3D-printed lid and separator frame with gas flow channels. b) Plates provided by Hoppecke and soldered to terminal blocks. c) An H&V separator was located within the new separator frame and H&V AGM and printed spring clips were used to provide pressure to the plates. d) Manufacture is straightforward – connect the terminals, assemble and slide the battery box on. Bubbles of hydrogen (H_2) and oxygen (O_2) appear at the output ports under electrolysis.

Target communities in Africa and developing Asia are the lowest contributors to global greenhouse gas emissions but are affected disproportionately by climate change due to their lack of access to technologies and services. On the other hand, poverty is one of the pressing issues for these countries. At a local level, the climate adaptation tools proposed by LoCEL-H2 will provide valuable inputs for implementing the nationally determined contributions (NDCs) and the goals set in national adaptation plans (NAPs) of the countries. Appropriate policy guidelines will also be proposed across various sectors, including agriculture, irrigation, economy and land usage in collaboration with knowledge-centred policy facilitation bodies such as the African Climate Policy Centre that primarily acts to reduce poverty through mitigation and climate change. The sustainable business model of LoCEL-H2 will enhance investment and drive effective implementation of NDCs and meeting of the goals of NAPs. LoCEL-H2 will also address policy interventions regarding livelihood creation, microfinancing, land and water usage, citizen awareness through the regulated use of ICTs, merchandise selling and women empowerment, all of which will help to combat poverty and increase the resilience of communities against climate change-induced disasters.

LoCEL-H2 project is scheduling to participate in several future events in order to disseminate its actions.

LoCEL-H2 will ensure sustainability and achieve its wide long-term impacts through the design of training material for locals, who will be trained through targeted focus groups and workshops.

To disseminate project results, partners will actively involve their academic and professional network, for example, P2-UNINA will be involved in the dissemination and engagement the University Coordination for Development Cooperation (CUCS), active from 2007 with the international development cooperation, the AURORA network whose mission is to tackle global societal challenges in areas like the Sustainable Development Goals of the United Nations. Further, LoCEL-H2 will engage in knowledge-sharing arrangements and actively contribute to Horizon Magazine and CORDIS periodically. In conclusion, LoCEL-H2 as a newly started project, expresses its interest to expand its network through the connection with ERCIM members and contribute regularly on issues related to climate adaptation and mitigation energy solutions.

Link:

[L1] https://locelh2.org/

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