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SOLARISE living lab at KU Leuven an academic living-lab as sociotechnical imaginary to facilitate the uptake of solar technologies in the 2Seas region

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Living lab as socio-technical imaginary

A socio-technical imaginary

- a set of ideas, beliefs, and visions about the future of solar energy
- a **place to experiment**, 'play' with future concepts, technologies and to interact with others and to co-produce
- mostly used in the context of smart cities



S. Jasanoff "[co-production] is not about ideas alone; it is equally about concrete, physical things. It is not only about how people organize or express themselves, but also about what they value and how they assume responsibility for their inventions"

NATUREIVol 45011 November 2007

Technologies of humility

Researchers and policy-makers need ways for accommodating the partiality of scientific knowledge and for acting under the inevitable uncertainty it holds.

Sheila Jasanoff The great mystery of modernity is that we think of certainty as an attainable state. Uncertainty has become the threat to collective action, the disease that knowledge must cure. It is the condition that poses cruel dilemmas for decision-makers; that must be reduced at any cost; that is tamed with scenarios and assessments; and that feeds the frenzy for new know-

ledge, much of it scientific. For a long time we accepted lack of certainty as humankind's natural lot. What has happened to reverse that presumption? Perhaps it is the spread of binary thinking that frames the future in terms of determinate choices between knowable options. Boolean algebra and digital logics are not only built into our computers, mobile phones and other information and communication technologies, they dominate the framing of social problems and the options for dealing with them. Thus, statistics offers a choice

between Type 1 and Type 2 errors. The first lead to false positives that promote too much risk avoidance, the second to false negatives that keep us from acting whet Terrell at

infinitely complex, and for any given problem, science offers only part of the icture. Climate scientists can tell us with high certainty that human activities are raising Earth's mean surface temperature, that extreme weather events will occur, and that melting ice caps will cause abrupt



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Policies based on humility might: redress ----- liter h - C---- C-- Jim -- --- t h



Living-labs – worldwide concept



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Why another living-lab?

- To create awareness and knowledge for various target groups on energy challenges and various 'exotic/novel' types of solar harvesting technologies (hybrid PV/T, BIPV, transparent/bifacial/colored, ...) and associated storage, smart monitoring and control of the harvested electric/thermal energy
- To provide small scale showcases for novel combinations/applications of solar technologies
- To motivate the stakeholders to experiment and apply the new technologies in own (local) context and to co-produce
- To create **local visibility and enhance low-threshold contact/interaction** with and among various **stakeholders**





Who are the stakeholders?

Stakeholders	MSc/PhD	Municipalities	Politicians	Installers	Citizens
	Students				cooperatives
Affiliation	Universities	Local authorities	Policy makers	SMEs	None
Objective (stakeholder needs)	Knowledge	Solve problems	Societal relevant	Solve problems Commercial	Knowledge
How (what to offer)	Novelty	Usefulness	Impact	Econ. yield	Usefulness Econ. yield
Stakeholder expertise	Multi- disciplinary	Non-technical Mono- disciplinary	Non-technical Mono- disciplinary	Technical Mono- disciplinary	Non-technical







WP4 Investment 5: KU Leuven – Living-lab solar energy





A living-lab as residential tiny house (in living-units) with embedded sustainable energy facilities



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A living-lab as **residential tiny house** (in living-units of sea containers sizes)

with sustainable energy facilities (PV and PV/T-systems, rainwater management system with tank as thermal energy storage, household loads,...)



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5 kWp installation (PV, **PV/T**, various exotic types of solar energy harvesters)



Flexible and various combinations of the solar energy harvesters with

- CHP, heat pump, battery packs, inverters, ...
- rain-water collection and usage as thermal storage
- waste heat recovery with thermoelectric materials (on solar harvesters of from waste water/exhausted air)
- PV&bamboo, PVground-bouded green (ivy, vines), microalgae







5 kWp installation (PV, **PV/T**, various exotic types of solar energy harvesters)

Flexible and various combination of solar energy harvesters with other components/technologies

Integration of high performance/cost and lower cost/performance (own design) sensors





→ I-V meas. → PLC

Batteries



Batteries



5 kWp installation (PV, **PV/T**, various exotic types of solar energy harvesters)

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Integration of high performance/cost and lower cost/performance (own design) sensors

Hands-on and virtual learning opportunities based on commercial and open-source platforms/software tools



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+ I-V meas. -> PLC

Batteries



5 kWp installation (PV, **PV/T**, various exotic types of solar energy harvesters)

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How is the living-lab now?











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Inaugurated on the 13-th of November 2019 during a workshop related to sustainable energy in the Global South





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Future plans SOLARISE living-lab









- Finalize installation of the flexible/modular systems
- Install monitoring system

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- Develop lab material and hands-on training material
- Organize training sessions for stakeholders

Energy







Remarks and future work

- The low threshold living lab embedded in local context is useful as longterm sociotechnical imaginary and it serves many stakeholders
- Education and hands-on training together with co-production is still needed for many stakeholders
- **Course modules and hands-on trainings** are in development to fit the needs of stakeholders and 'match' the existent living-lab equipment
- The concept of solar/sustainable energy mobile labs/showrooms in containers can be expanded to other regions/countries



Thank you for your attention!



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For more information

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