2018

System design for sustainability for all: S.PSS design applied to distributed economies

Vezzoli, Carlo and Basbolat, Cenk

RSD7

CHALLENGING COMPLEXITY BY SYSTEMIC DESIGN TOWARDS SUSTAINABILITY

Politecnico di Torino

October 24-25, 2018

System Design for Sustainability for All

Sustainable Product-Service System (S.PSS) Design applied to Distributed Economies (DE)

carlo vezzoli

politecnico di milano . DESIGN dept. . LeNSlab Polimi / DIS . School of Design . Italy

LeNS - Learning Network on Sustainability

coordinator LeNSin - international Learning Network of networks on Sustainability (EU erasmus+)

With the support of the Erasmus+ Programme of the European Union

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1. THE RESEARCH CONTEXT: LeNSin EU ERASMUS+ PROJECT

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12.2015 – 6.2019

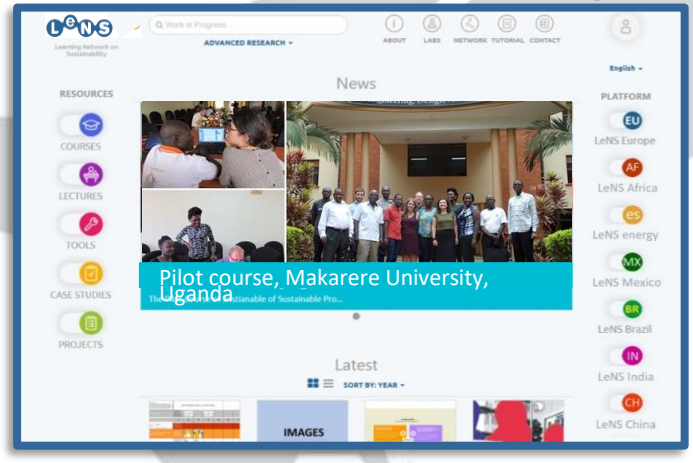
Erasmus+

This project is funded by the European Union.

the **in**ternational **Le**arning **N**etwork of networks on **S**ustainability

Multipolar and open network of network for curricula development on **Design for Sustainability**, focused on **Sustainable Product-Service Systems** (S.PSS) applied to **Distributed Economies** (DE).

www.lens-international.org



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the largest and most multiregional ever EU funded project!

36 universities partners:

14 partners + 22 associates partners

2. DISTRIBUTED ECONOMIES (DE)

… since ~ 2005 have been studied as a promising model for locally-based sustainability

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MANY PROCESSES OF CENTRALISATION RESULTED IN BEING ENVIRONMENTALLY, SOCIOETHICALLY (AND ECONOMICALLY) UNSUSTAINABLE

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DISTRIBUTED ECONOMIES (DE): A CLASSIFICATION

(LeNSin Erasmus+ project consortium, 2018)

HARDWARE/RESOURCE-BASED DE

Distributed energy **G**eneration (**DG**)

Distributed production of **F**ood (**DF**)

Distributed **W**ater management (**DW**)

Distributed **M**anufacturing (**DM**)

KNOWLEDGE/INFORMATION-BASED DE

Distributed **S**oftware development (**DS**)

Distributed **I**nformation/knowledge generation (**DI**)

Distributed **D**esign (**DD**)

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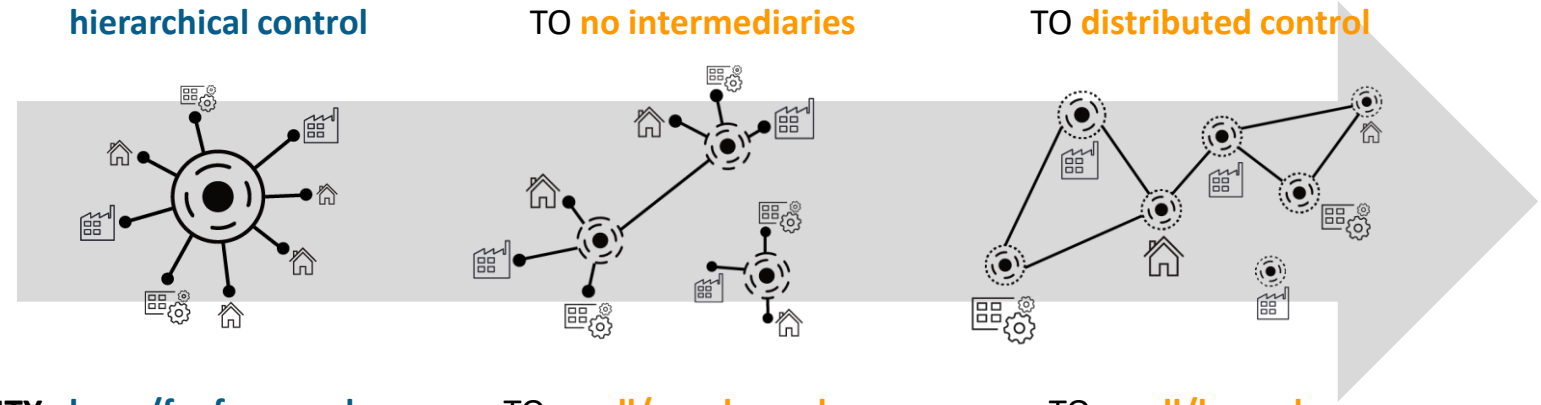
DISTRIBUTED ECONOMIES (DE):

a paradigm shift from **centralized large** production unit and distribution system to …

	CENTRALISED	TO DECENTRALISED	TO DISTRIBUTED
STRUCTURE	hierarchical control	TO no intermediaries	TO distributed control
SIZE/PROXIMITY	large/far form end-user	TO small/nearby end-user	TO small/by end-user



… **small** scale **locally-based** production **units empowering end-user** control on essential activities

+ (eventually) peer-to-peer **network-structured** to optimise production and consumption by sharing resources and/or goods and/or information/knowledge + to improve system resilience

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DISTRIBUTED ECONOMIES: LOCALLY-BASED SUSTAINABILITY BENEFITS

(LeNSin Erasmus+ project consortium, 2018)

ENVIRONMENTAL POTENTIAL BENEFITS

. **DE** engage **local** users directly interested to **safeguard** the **environment** and the **resources availability** of the context in which they leave/work

. **DE reduce** overall goods **distribution**

SOCIOETHICAL POTENTIAL BENEFITS

. **DE** gives to **local** users **direct access** to resources + increasing their **participation** in the **extraction**, **production, use** and **disposal**

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3. S.PSS APPLIED TO DE: SUSTAINABLE OPPORTUNITY FOR ALL

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SUSTAINABLE PRODUCT-SERVICE SYSTEM (S.PSS)

A DEFINITION

"an offer model providing an integrated mix of products and services that are together able to fulfil a particular customer demand (to deliver a "unit of satisfaction"), based on innovative interactions between the stakeholders of the value production system, where the provider/s retain the ownership of the product/s and/or offer all inclusive life cycle services, so that the economic interest of the provider/s continuously seeks environmentally and/or socioethically beneficial new solutions"

[LeNSin, 2018]

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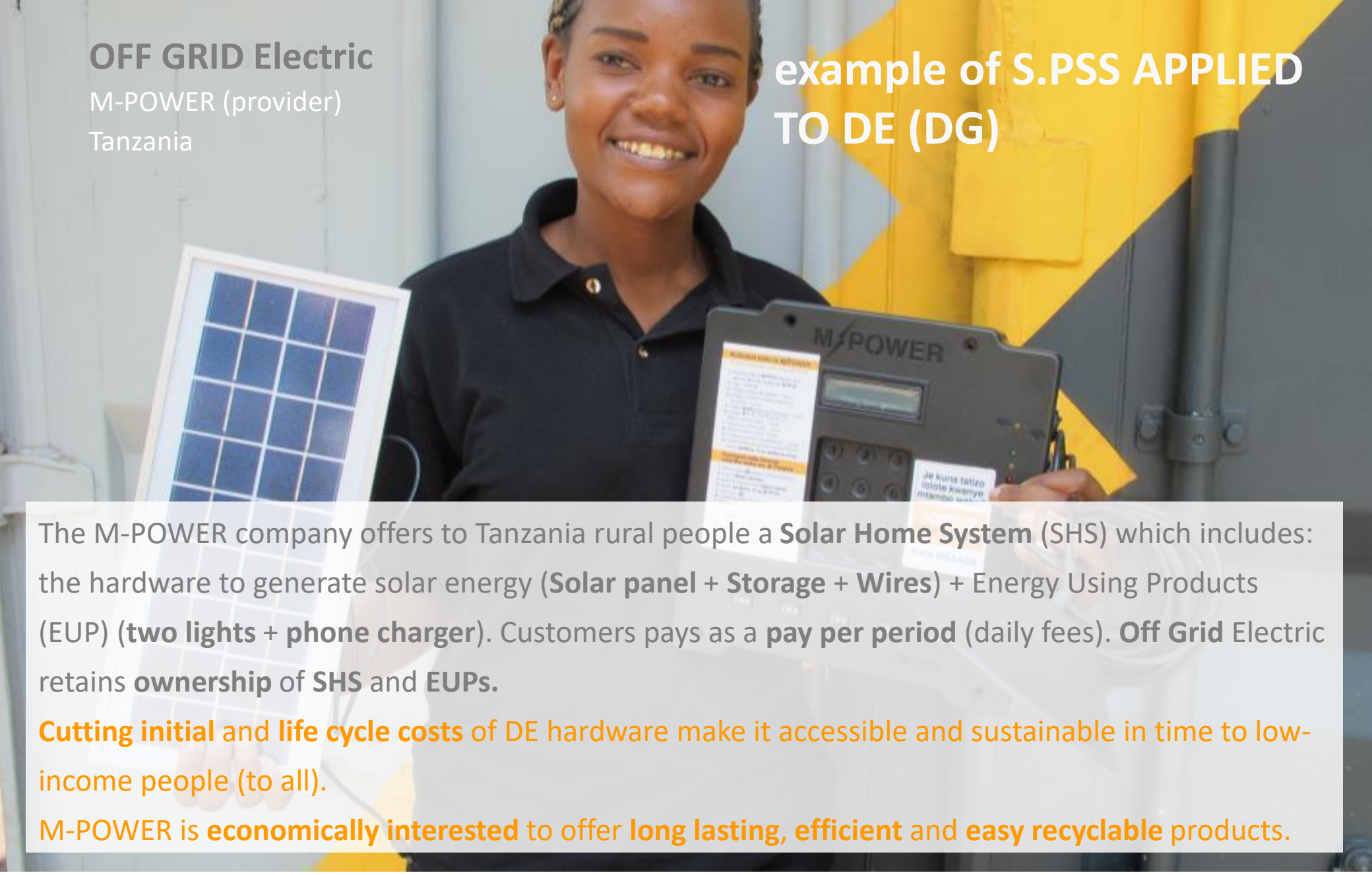
OFF GRID Electric

M-POWER (provider)

Tanzania

example of S.PSS APPLIED TO DE (DG)



The M-POWER company offers to Tanzania rural people a **Solar Home System** (SHS) which includes: the hardware to generate solar energy (**Solar panel** + **Storage** + **Wires**) + Energy Using Products (EUP) (**two lights** + **phone charger**). Customers pays as a **pay per period** (daily fees). **Off Grid** Electric retains **ownership** of **SHS** and **EUPs.**

Cutting initial and **life cycle costs** of DE hardware make it accessible and sustainable in time to low-income people (to all).

M-POWER is **economically interested** to offer **long lasting**, **efficient** and **easy recyclable** products.

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S.PSS APPLIED TO DE: WIN-WIN OPPORTUNITY FOR ALL

SELLING **PRODUCT** TO **"UNIT OF SATISFACTION"**

Product-oriented
Result-oriented
Use-oriented

INNOVATION TECHNOLOGICAL TO STAKEHOLDER/SOCIAL S.PSS

CUSTOM VALUE INDIVIDUAL OWNERSHIP TO ACCESS

cut initial + life cycle costs of DE hardware > extending DE **access** + sustainable **use** to **low-income** (all) end-users and entrepreneurs

STRUCTURE CENTRALISED TO DECENTRALISED AND DISTRIBUTED

increase **market opportunities (BoP)** > increase **local entrepreneurship,** hence **employment** and **skills**

DE

Energy
DProduct
DSoftware
DInformation
DDesign

SCALE LARGE TO SMALL

ownerless DE and/or all-inclusive **life cycle services** > foster **low environmental impact DE** design

SUSTAINABLE OPPORTUNITIES

IN LOW/MIDDLE-INCOME (ALL) CONTEXTS

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4. DESIGN OF S.PSS APPLIED TO DE: A NEW SYSTEM DESIGN ROLE

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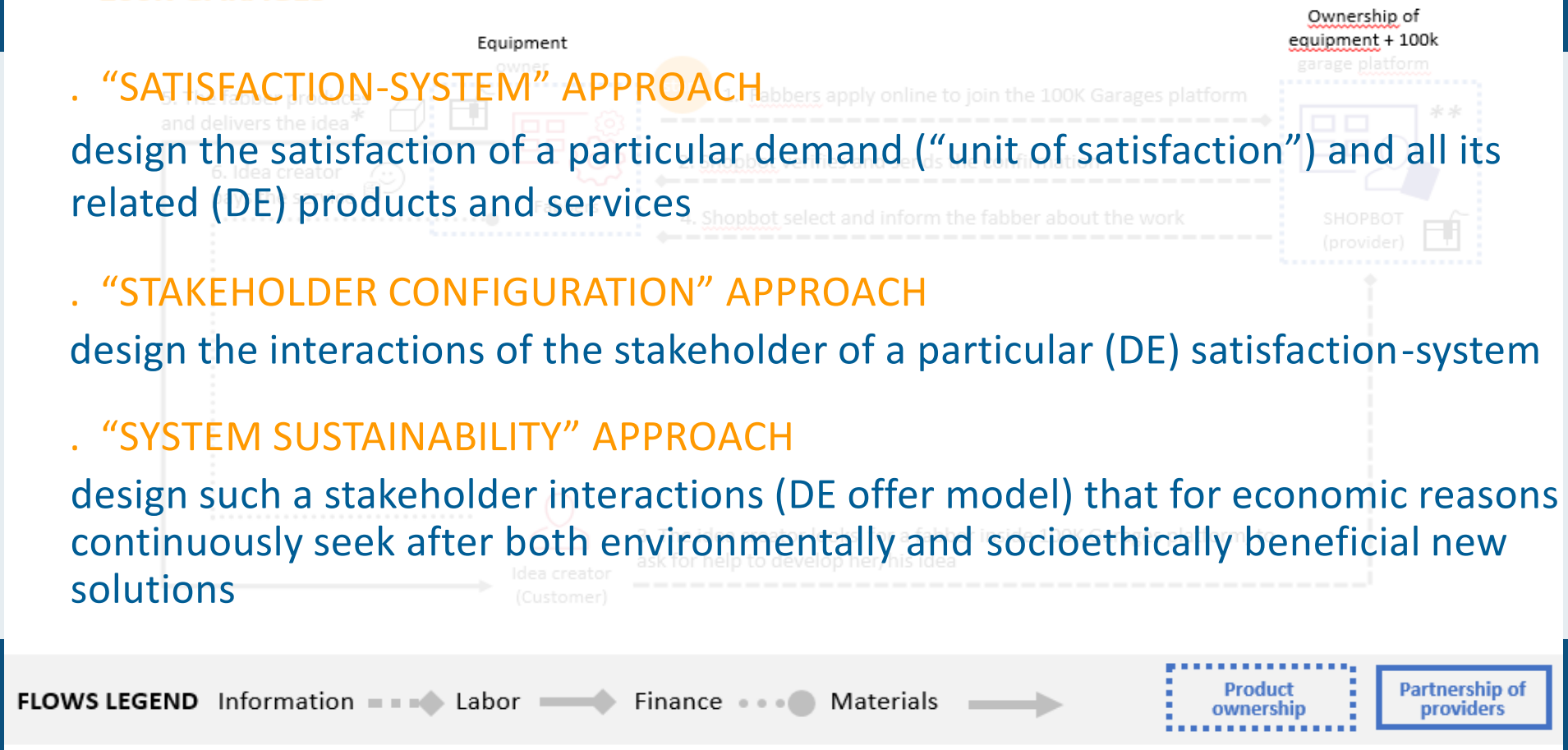
SYSTEM DESIGN FOR SUSTAINABILITY FOR ALL: APPROACHES AND SKILLS

100K GARAGES



. "SATISFACTION-SYSTEM" APPROACH

design the satisfaction of a particular demand ("unit of satisfaction") and all its related (DE) products and services

. "STAKEHOLDER CONFIGURATION" APPROACH

design the interactions of the stakeholder of a particular (DE) satisfaction-system

. "SYSTEM SUSTAINABILITY" APPROACH

design such a stakeholder interactions (DE offer model) that for economic reasons continuously seek after both environmentally and socioethically beneficial new solutions

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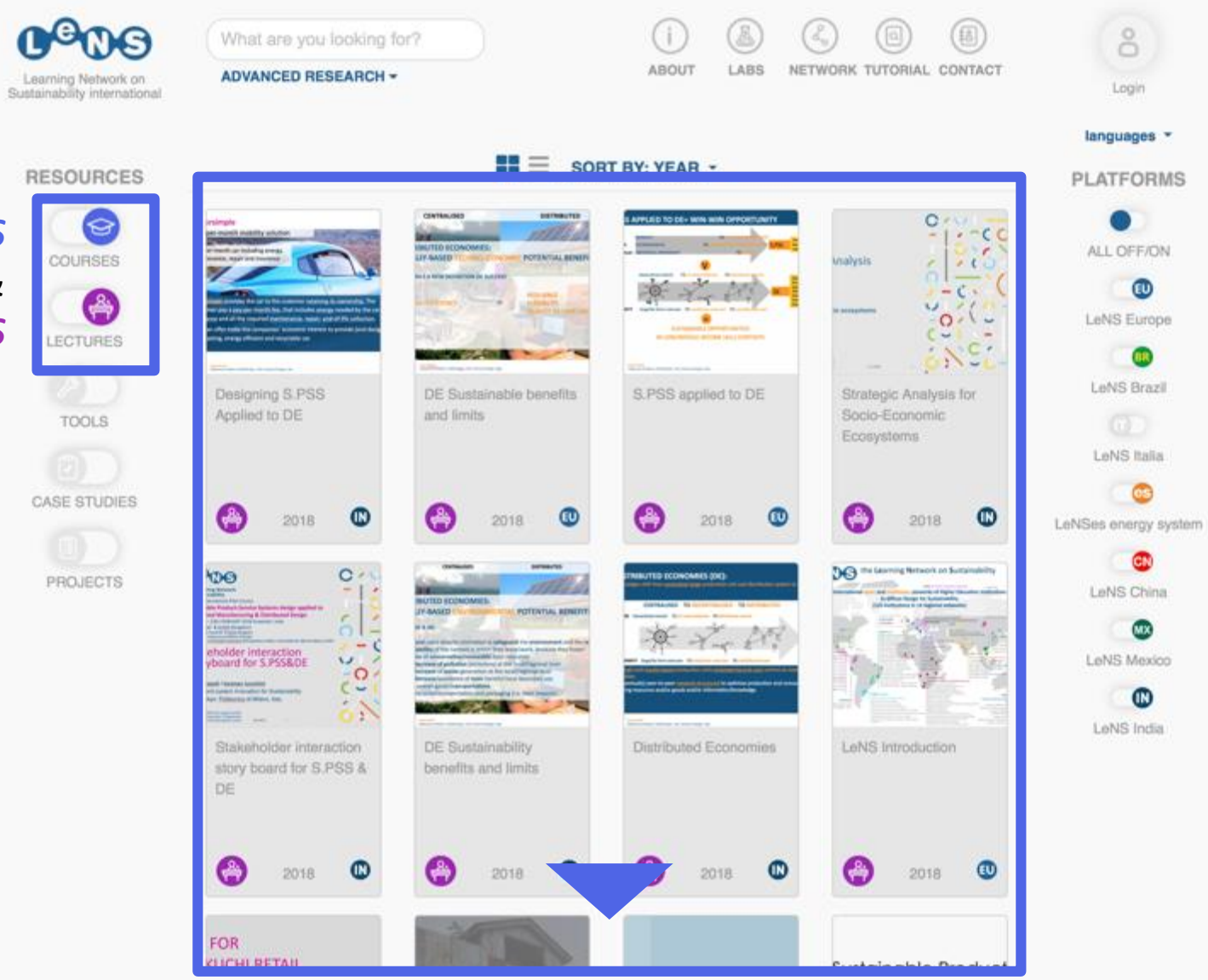
&
125 LECTURES



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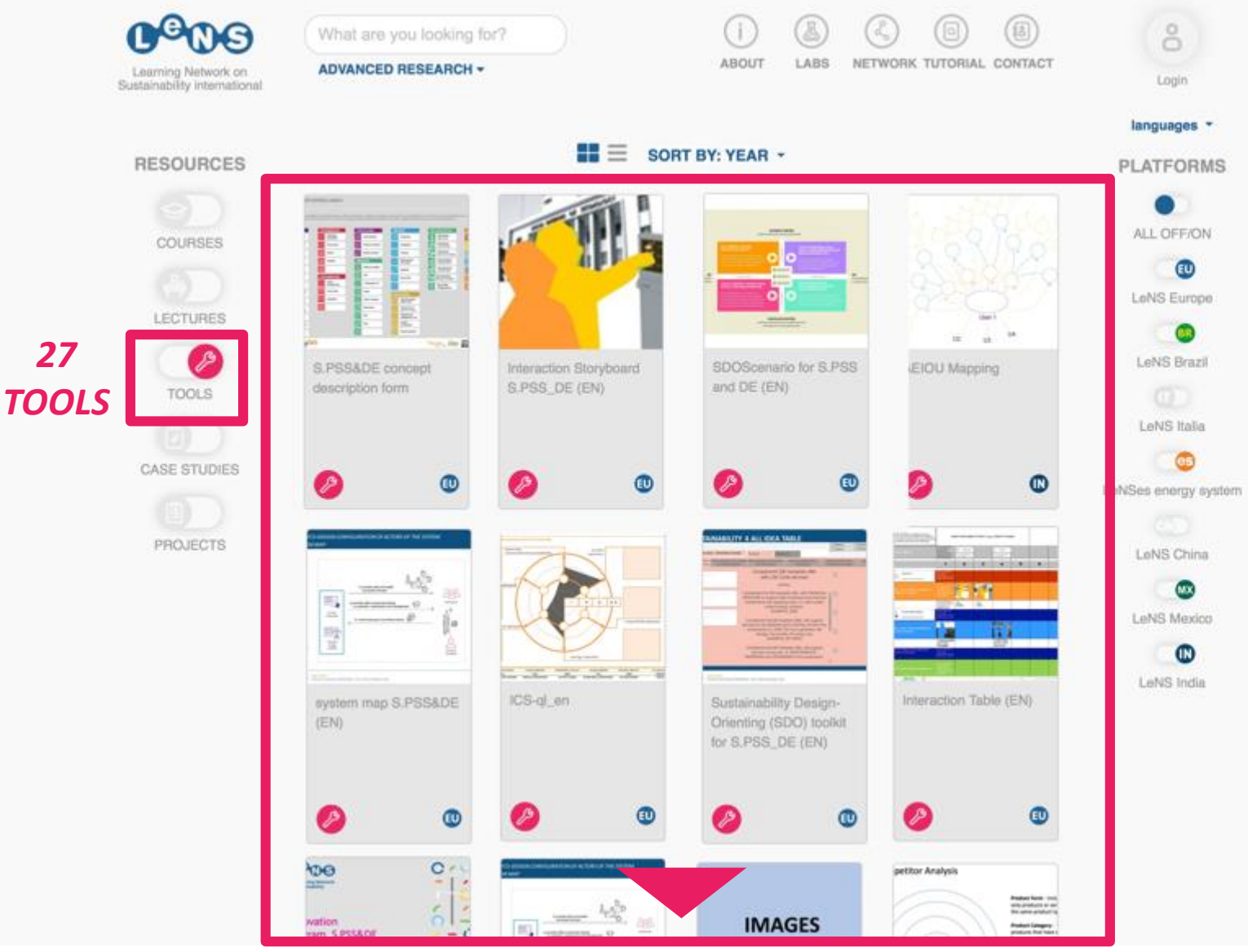
SYSTEM DESIGN FOR SUSTAINABILITY FOR ALL



27 TOOLS

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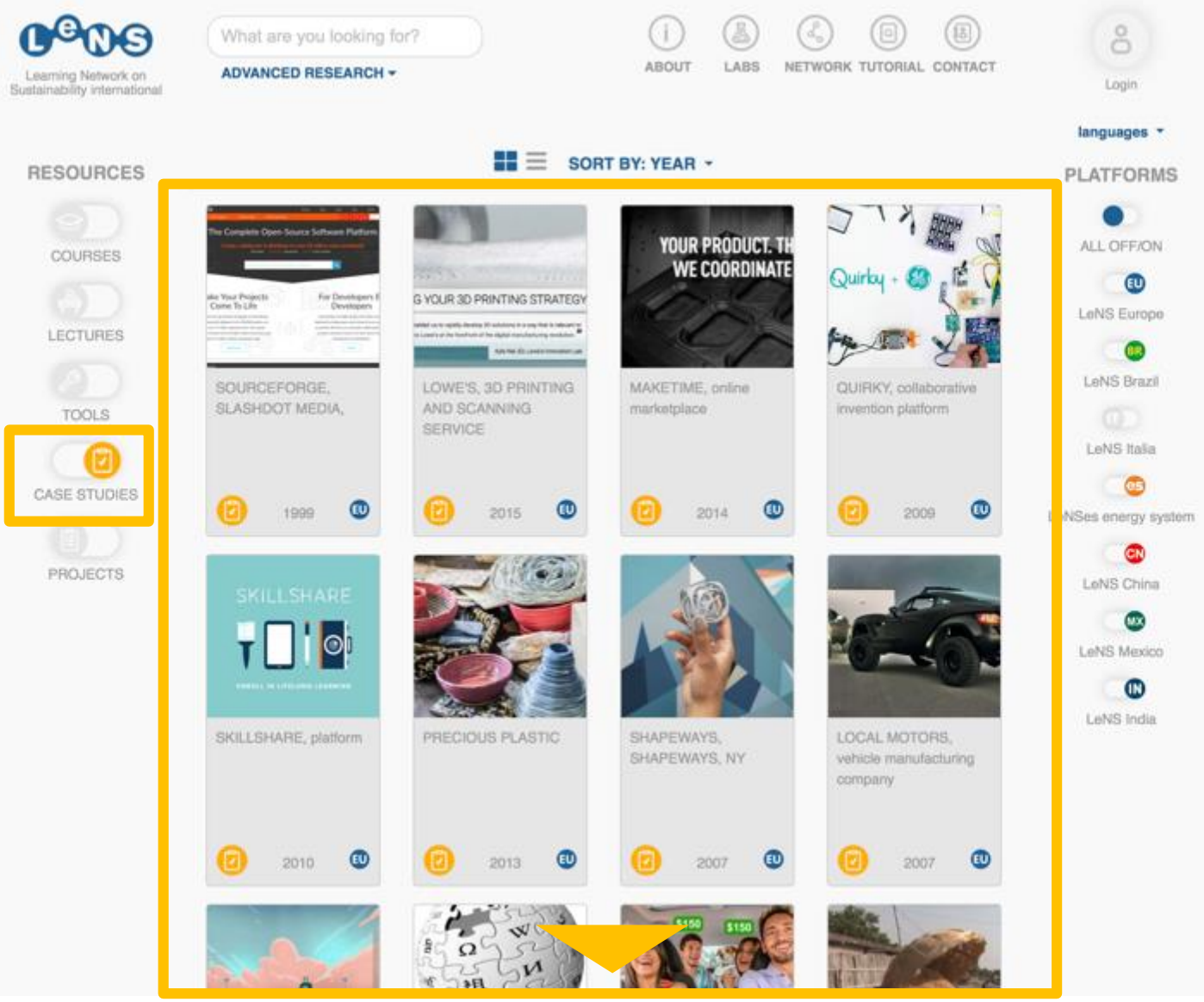
SYSTEM DESIGN FOR SUSTAINABILITY FOR ALL

MORE THAN 150 CASES



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