

Supporting SMEs in designing sustainable business models for energy access for the BoP

The Design Framework and Cards



Photo: R. S. Escudero CIWEM

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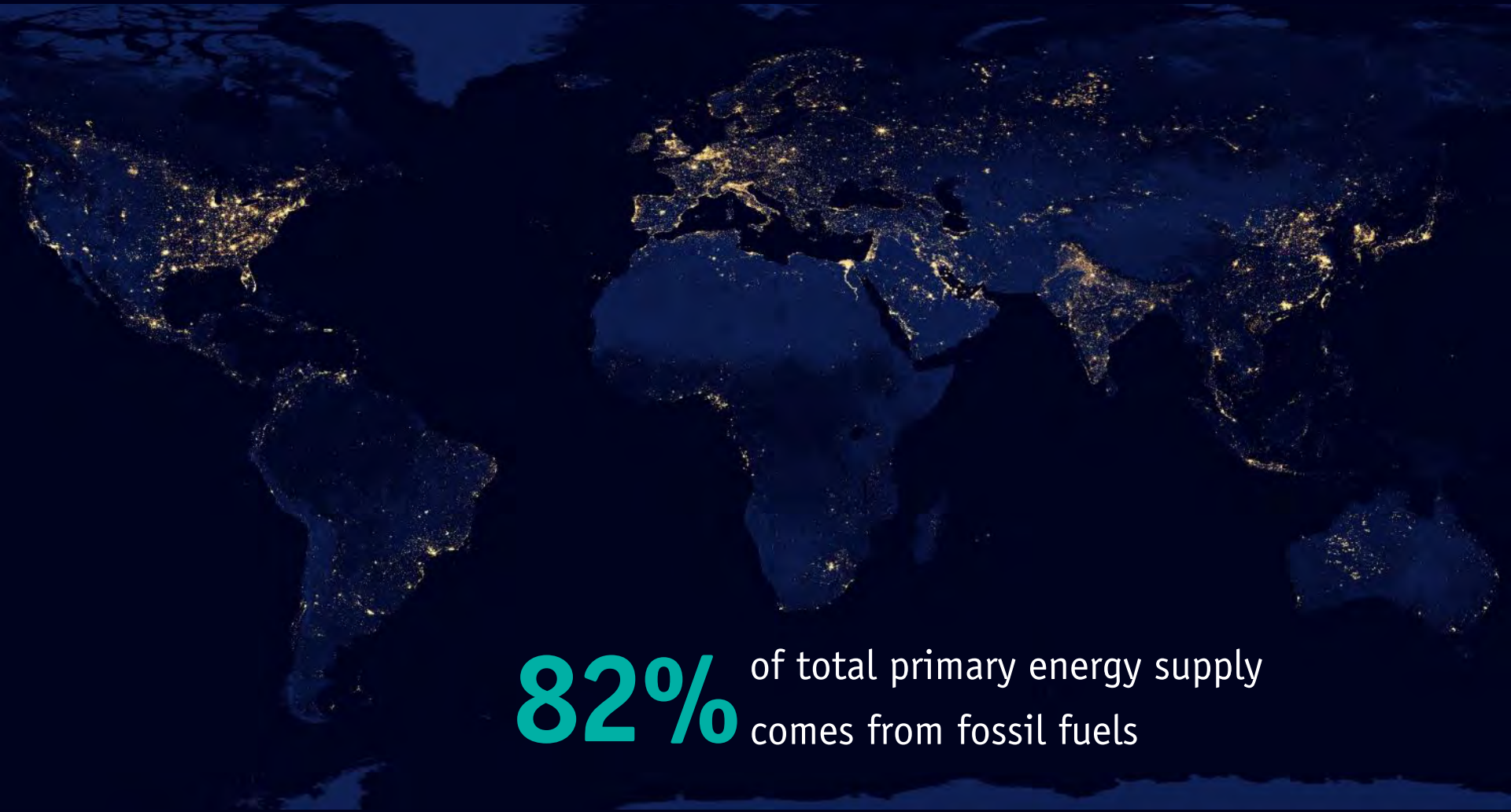
Brunel
University
London



Overview

- Energy access and sustainable development
- Distributed Renewable Energy (DRE)
- Product Service Systems (PSS)
- The PSS+DRE Design Framework and Cards
 - Development and evaluation of the tool
 - Further research activities

1.4 billion people
lacking modern energy access





UNITED NATIONS DECADE OF
SUSTAINABLE ENERGY FOR ALL
2014-2024

Ensuring universal **Energy Access** Doubling the share of **Renewable Energy** Doubling **Energy Efficiency**



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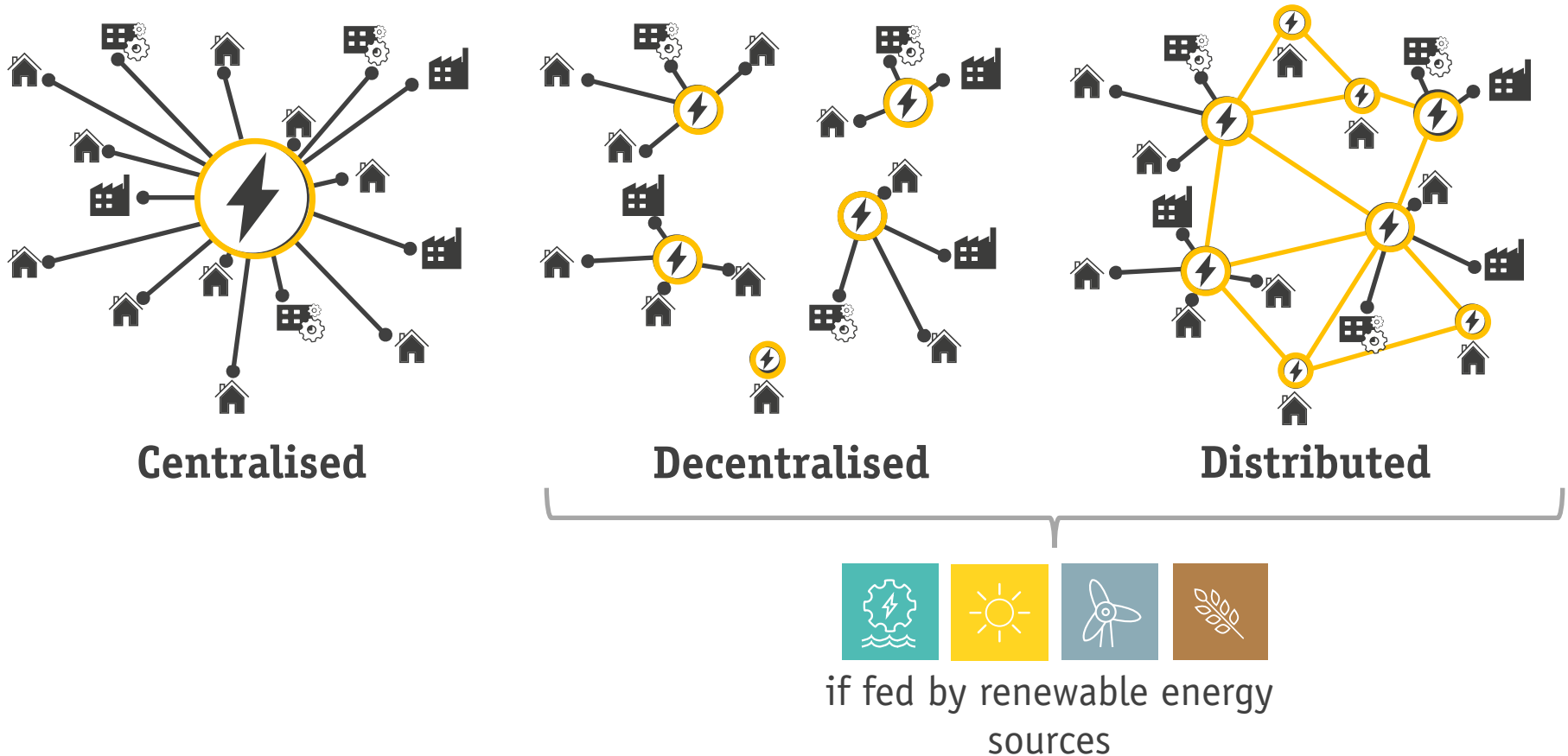
AFFORDABLE AND
CLEAN ENERGY



Sustainable development goal

ENSURE ACCESS TO AFFORDABLE, RELIABLE, SUSTAINABLE AND
MODERN ENERGY FOR ALL

Distributed Renewable Energy

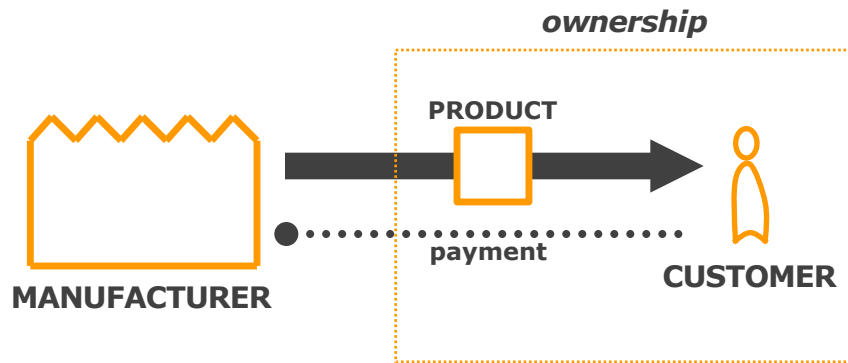


Distributed Renewable Energy (DRE) systems

Product-Service Systems

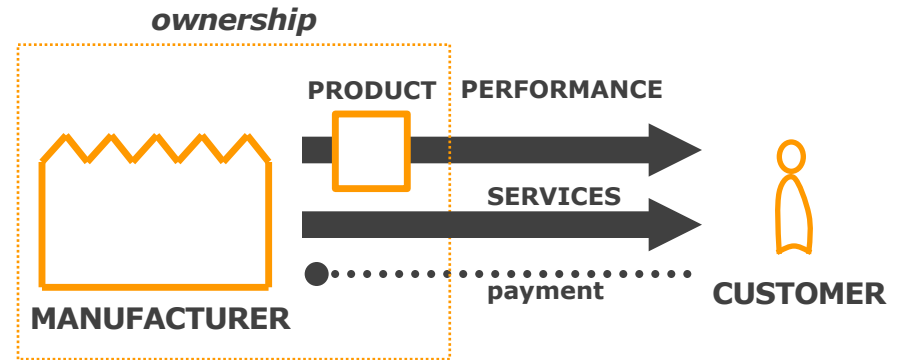
Traditional business model:

selling a product

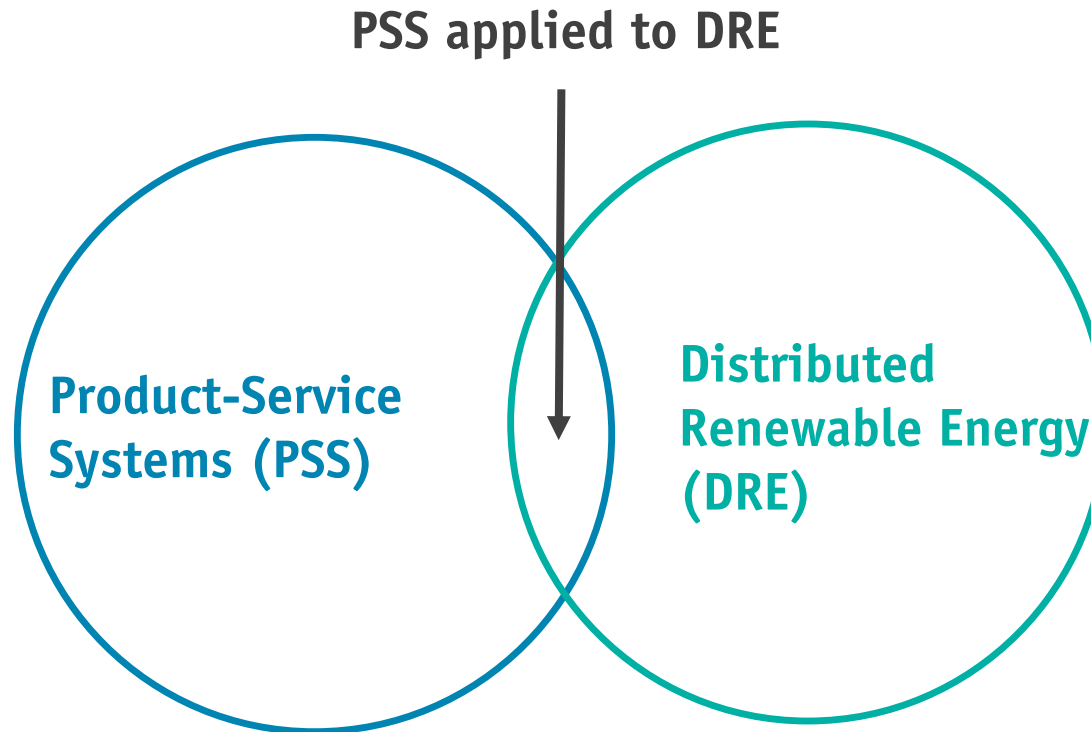


Product-Service System:

selling the use of a product, a result or performance

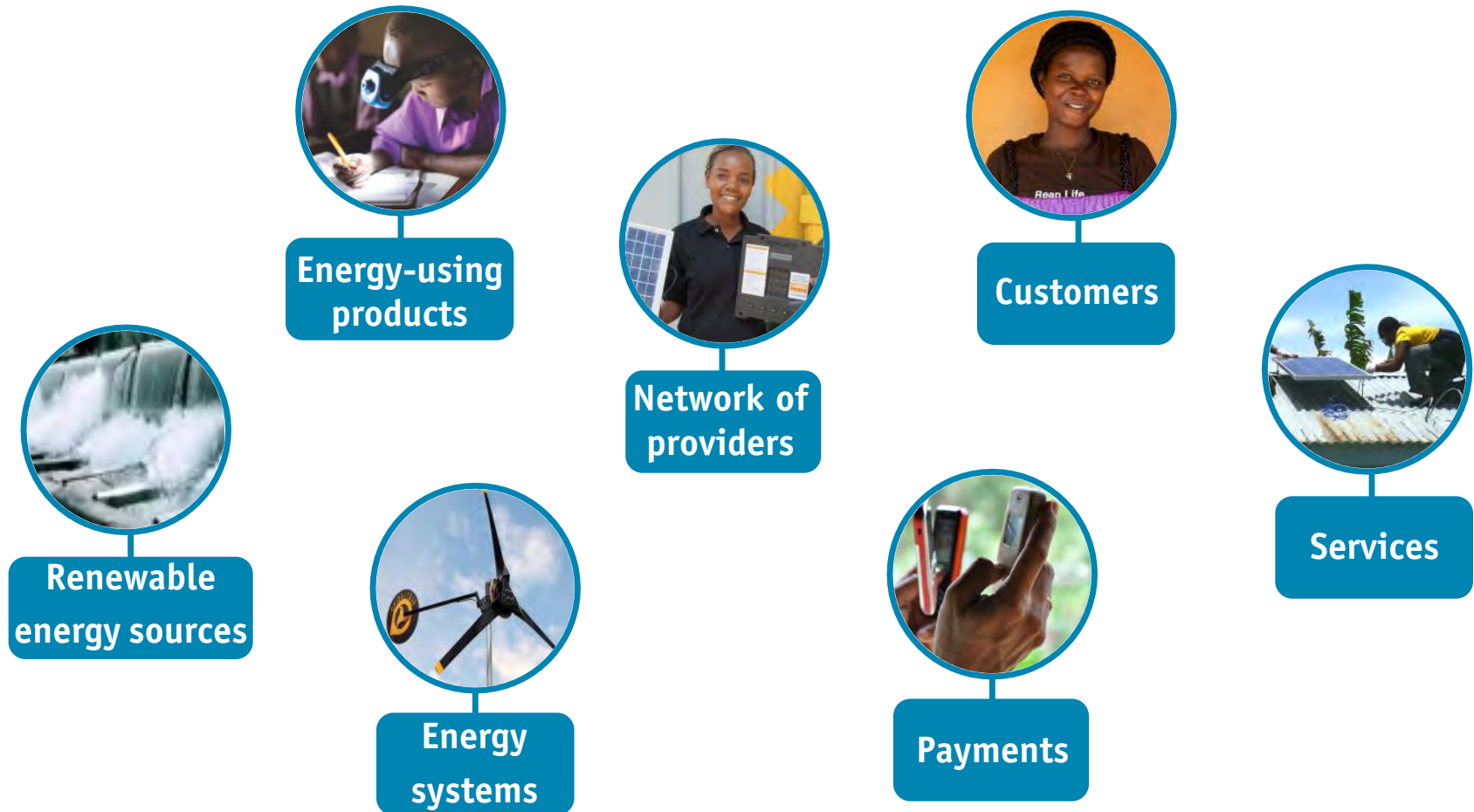


Research topic



PSS applied to DRE

Complex solutions that require a new design approach



PSS applied to DRE

The Design Framework and Cards

A tool to support the design of new sustainable Product-Service Systems applied to Distributed Renewable Energy

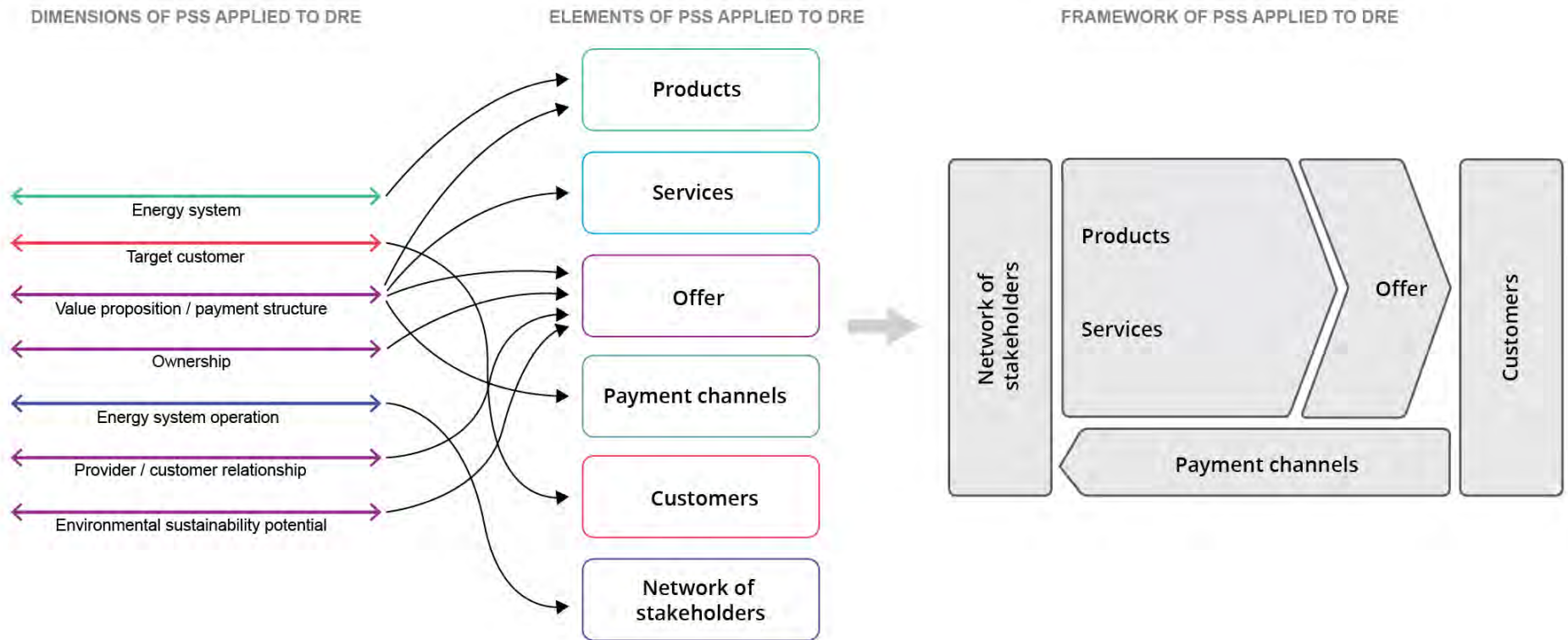
Design Framework and Cards



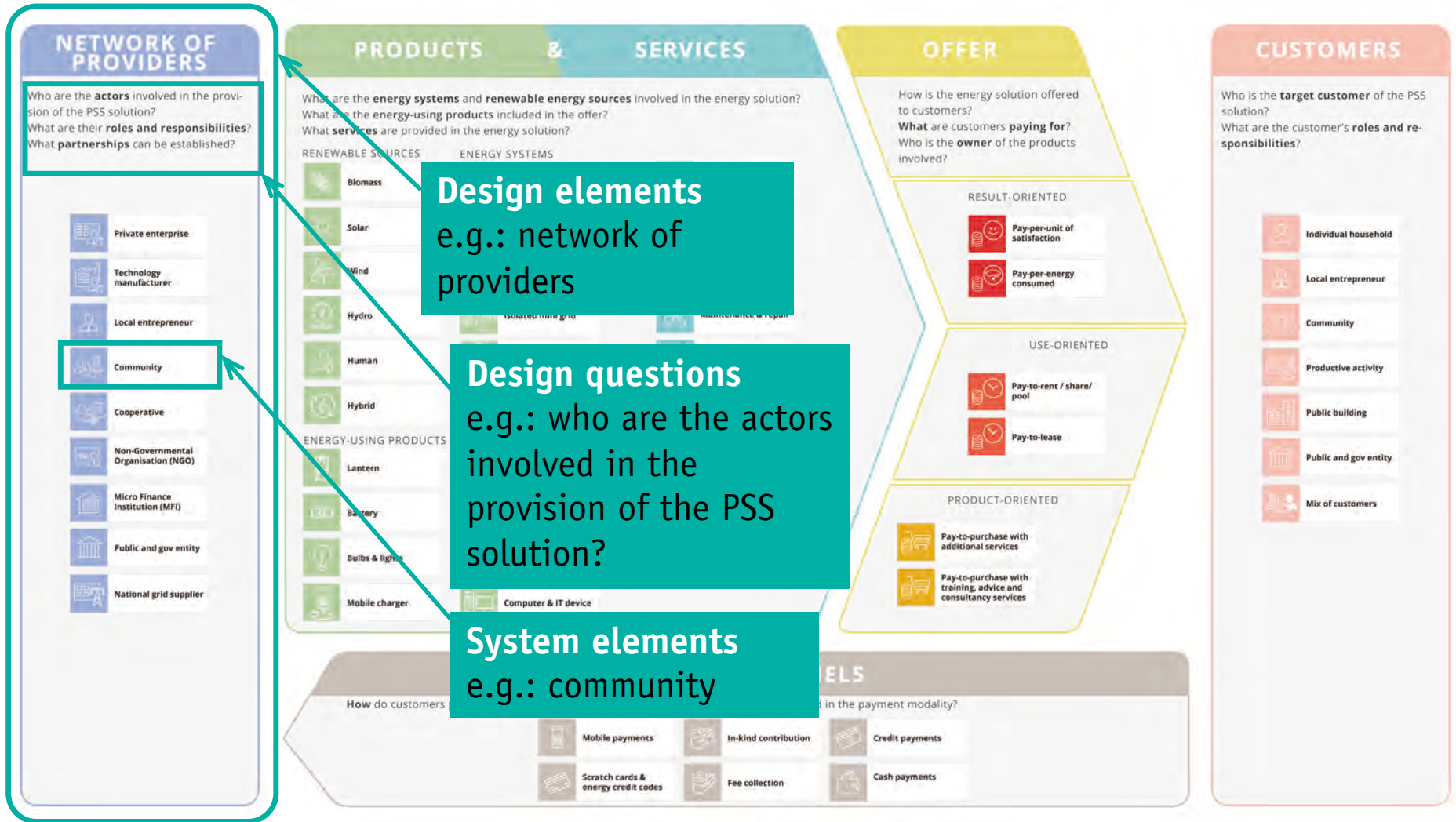
AIMS

- To visualise all the design elements that need to be considered
- To generate new ideas
- To support the refinement of concept ideas by browsing the guidelines and case studies

Development of the Design Framework



Design Framework



Cards

Cards are grouped according to system elements (customer, provider etc.)



Cards collect design guidelines, case studies, critical factors for each design element

Design questions:
use the cards to answer to the design questions

Guidelines development

Dimension: services	Critical factor	Reference	Guideline	Case study/example
Training services				
Offer training to end users	It is important that customers learn capabilities and limitations of systems. User training also creates a lasting relationship between provider and customer.	Gunaratne (2002)	Providing information on optimal use and limitations of the system is essential to build an enduring provider/customer relationship and educate end-users on sustainable behaviour.	<p>SELCO sells energy home systems and products with an inclusive service package. In order to prevent users from misuse or damage the solar systems, the company provides user training during installation of systems. Technicians, qualified by in-house training programs, explain clearly what the user should expect from the system and how to use it. A manual is provided</p>
	Training for technicians and users through manuals and guide books should be provided in their language and should be adapted to users' and technicians' prior belief structures and knowledge	Tillmans and Schweizer-Ries (2011)	Are you communicating in the right way? Training through manuals and guide books should be provided in the users' language and should be adapted to their prior knowledge and background. Use illustrations.	
	It is important that customers learn capabilities and limitations of systems. The technical education of consumers to help them to make the best out of their systems and to ensure the project sustainability is fundamental	Gunaratne (2002); Rolland and Glania (2011)	Can you educate or provide tools to end-users to enable them in reducing energy consumption? Wise consumption can prevent system blackouts and help end-users to save money.	
	Technical problems tend to be linked to overuse of systems and this happens because of a lack of understanding of the limits of the system. Regular visits of technicians would facilitate the learning process	Lemaire (2009)	Why not coupling installation with training services? You can provide end-user training about product use, limitations and care during the installation of the system. If a maintenance service is provided, technicians can also train end users during regular visits.	

SERVICES Training

Offer training to end users


Providing information on optimal use and limitations of the system is essential to build a enduring provider/customer relationship and and educate end-users on sustainable behaviour.

- **Why not coupling installation with training services?** You can provide end-user training about product use, limitations and care during the installation of the system. If a maintenance service is provided, technicians can also train end users during regular visits.
- **Are you communicating in the right way?** Training through manuals and guide books should be provided in the users' language and should be adapted to their prior knowledge and background. Use illustrations.
- **Can you educate or provide tools to end-users to enable them in reducing energy consumption?** Wise consumption can prevent system blackouts and help end-users to save money.

Southeast Asia

SELCO
Sri Lanka, India, Vietnam

SELCO sells energy home systems and products with an inclusive service package. In order to prevent users from misuse or damage the solar systems, the company provides user training during installation of systems. Technicians, qualified by in-house training programs, explain clearly what the user should expect from the system and how to use it. A manual is provided.



Cards

Card example: services

SERVICES • Financing

Offer microcredit to end users and entrepreneurs

Offering microcredit solutions can allow providers to reach clients with lower or irregular incomes and to target local entrepreneurs who want to set up energy businesses.

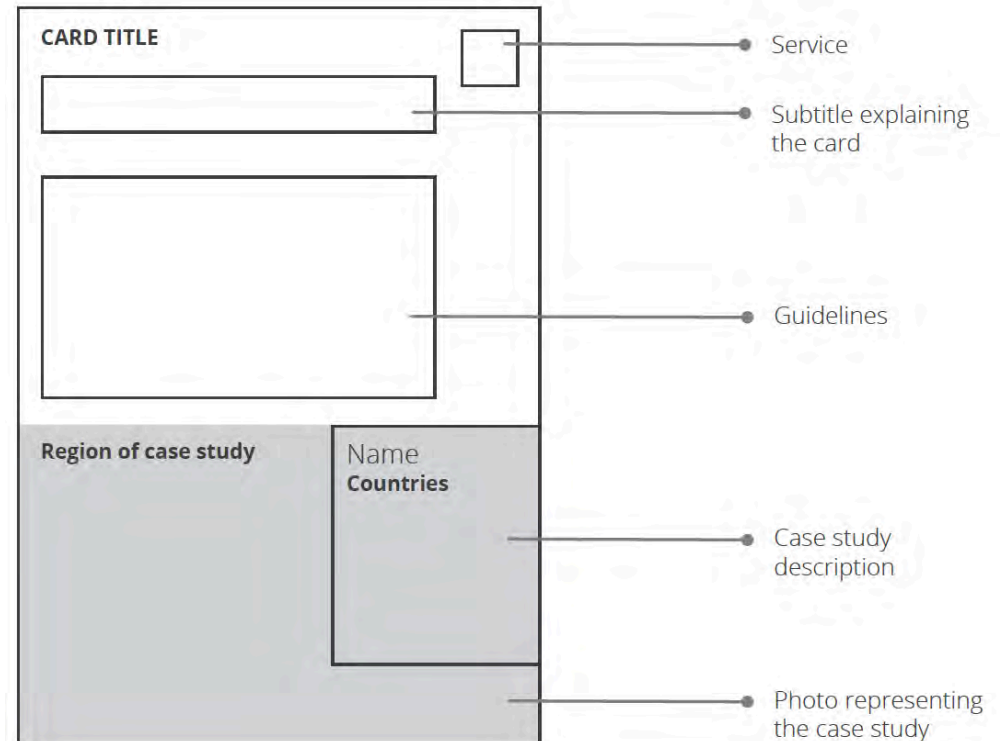
- ▶ **Can you develop strategic partnerships with Micro Finance Institutions or other credit facilities?** Offering microcredit can be challenging if you don't have an existing customer base and a good knowledge of your target users
- ▶ **Can you define willingness and ability to borrow?** Long term ability to pay, size of the down payment and monthly payments are influencing factors especially for customers with seasonal incomes (such as farmers). Pay attention to the their credit history and the financing environment of customers
- ▶ **Can you offer microcredit to entrepreneurs?** Helping them in covering capital costs to set up energy businesses (such as charging stations for renting of products).

South Asia

SEWA and SELCO
India

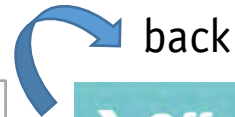
SEWA and SELCO: Self Employed Women's Association (SEWA) is an indian cooperative bank that provides credit, counseling and insurance and it established a partnership with SELCO in order to support women empowerment. Together they design solar products and deliver comprehensive energy solutions, enabling lower income customers to get access to microcredit and clean power generation.





Cards

Card example: services



back

SERVICES • Financing

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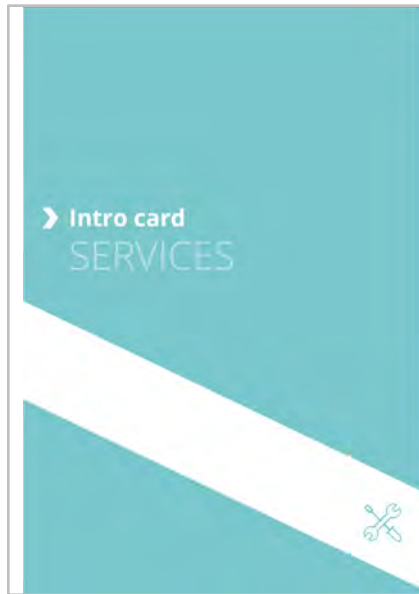
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▶ Offer training services

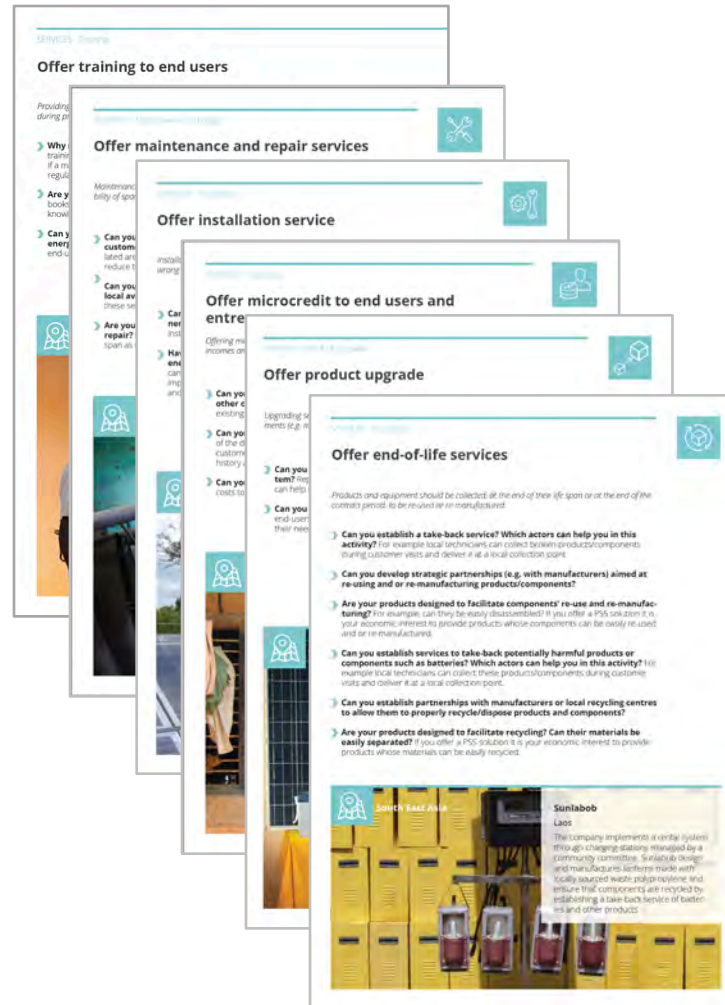
SERVICES

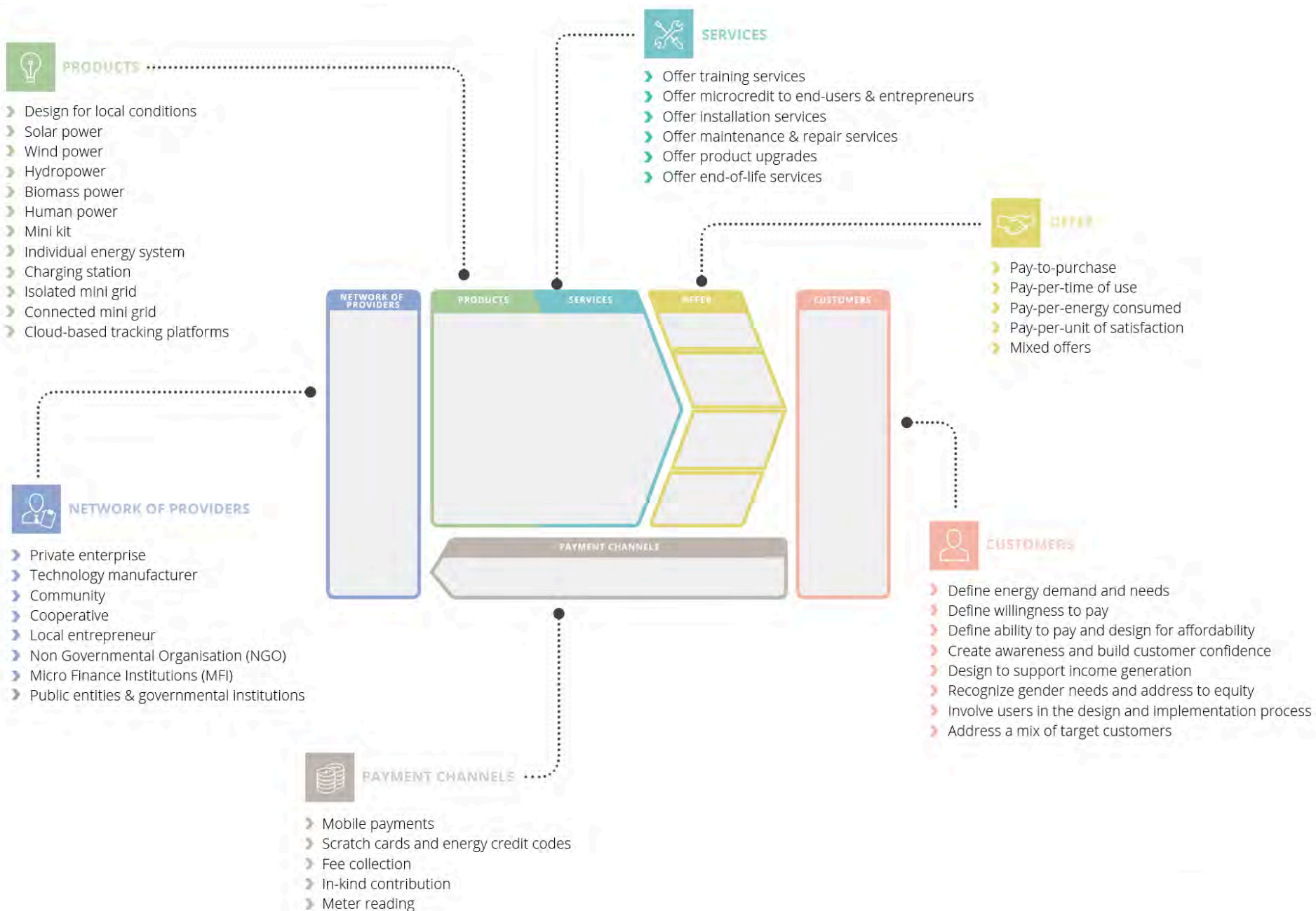
Cards



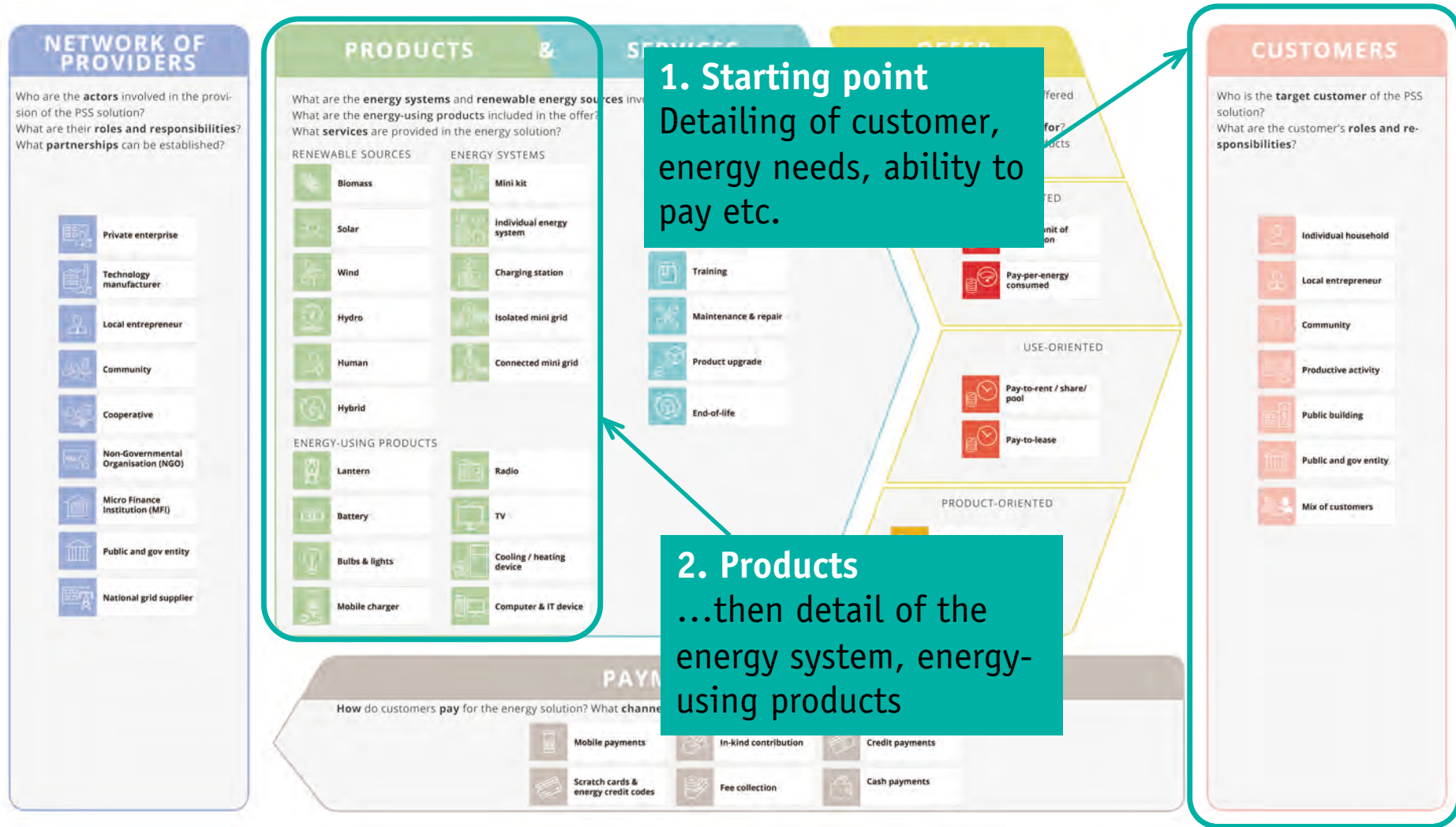
SERVICES

- Offer training services
- Offer microcredit to end-users & entrepreneurs
- Offer installation services
- Offer maintenance & repair services
- Offer product upgrades
- Offer end-of-life services

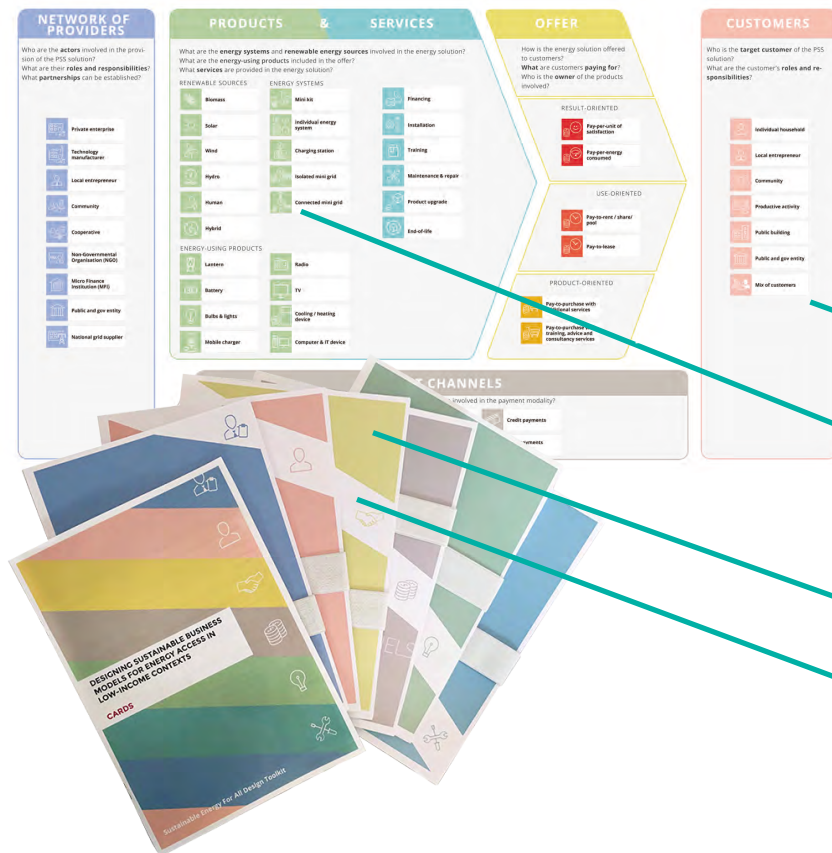




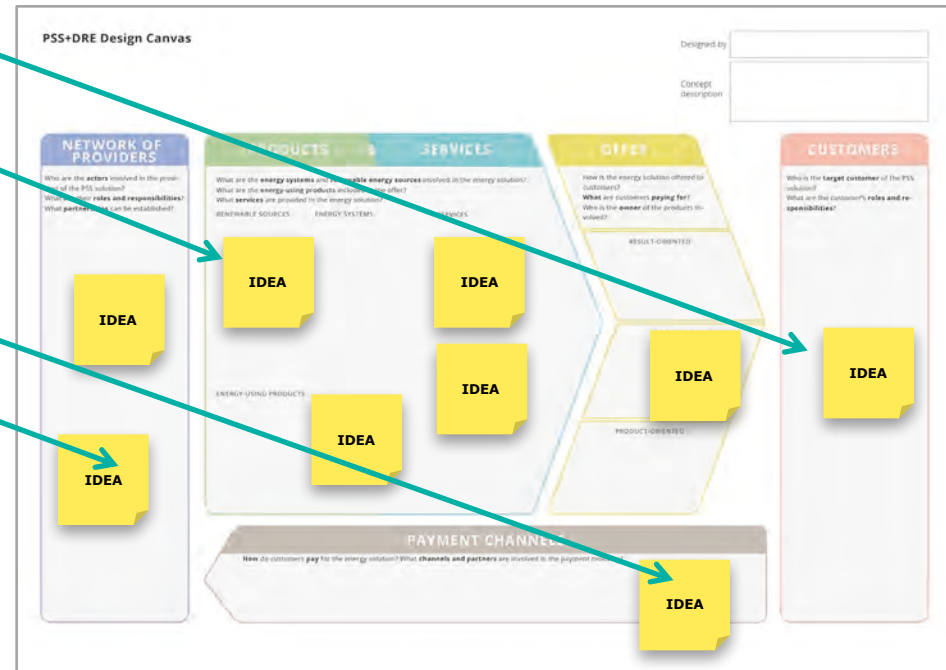
Design process



Idea generation



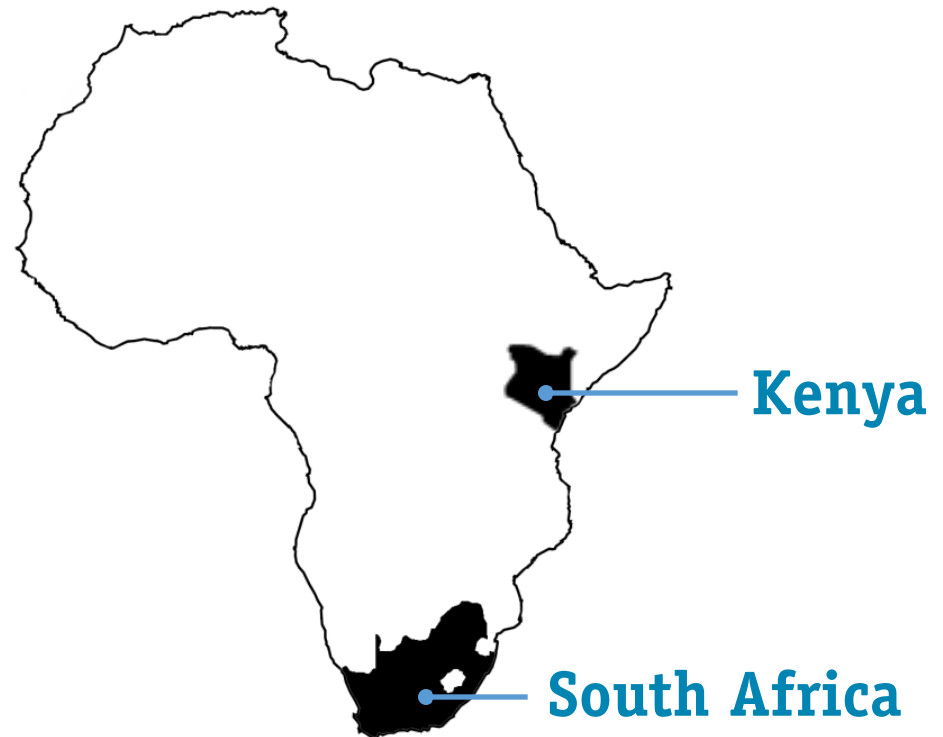
The Design Canvas is filled with details about the energy solution

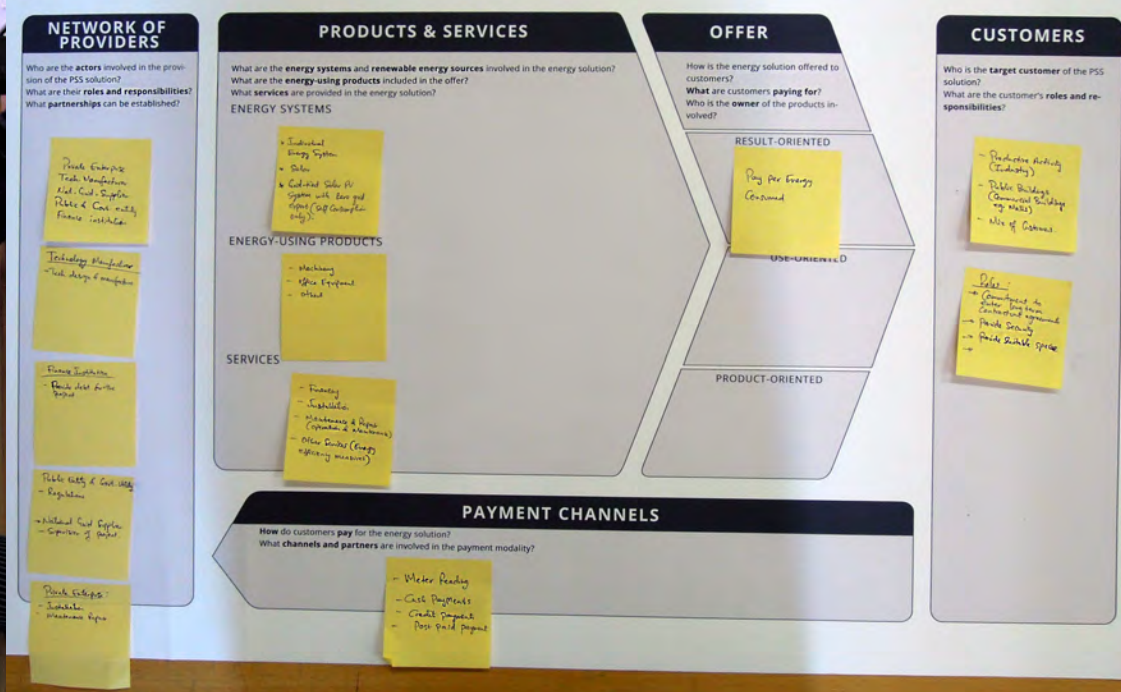


Testing activities

Workshops + questionnaires

8 companies
10 consultants & energy
experts



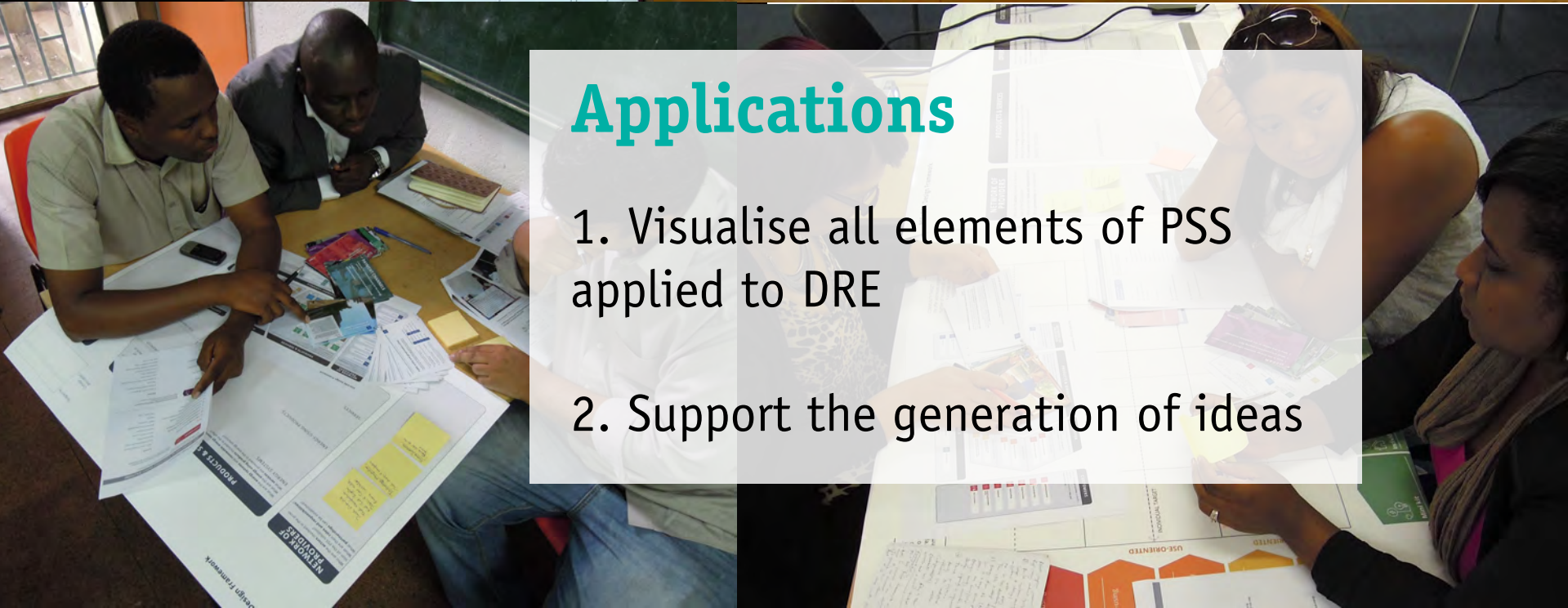


Clearness and usability

Design Framework and Cards: their content is clear, the tool is easy to be understood and used

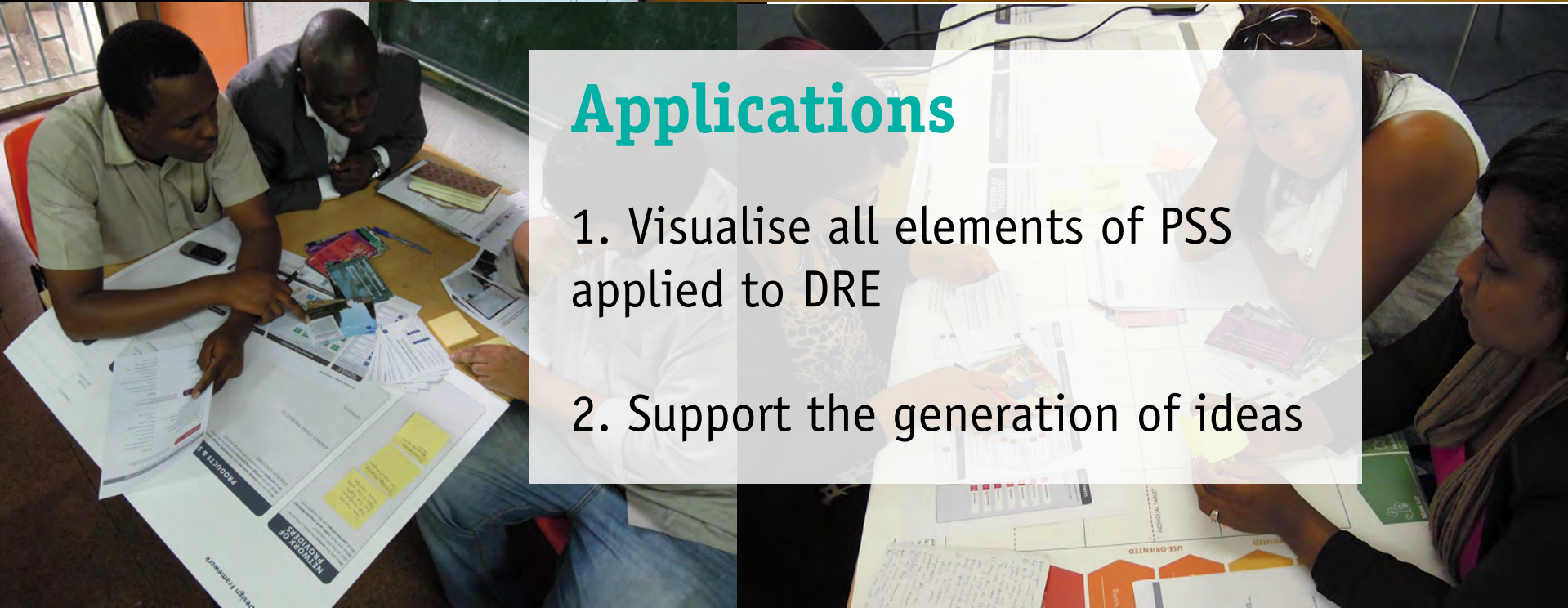
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Applications

1. Visualise all elements of PSS applied to DRE
2. Support the generation of ideas

- 
- # Applications
1. Visualise all elements of PSS applied to DRE
 2. Support the generation of ideas

Results from testing activities

Design Framework

Rating 1 to 5,
1=very poor, 5=very good

Ease of use

Average rating

1. Clearness: the elements are clear and their relation easy to understand
2. The design questions are clear

4.3

4.4

Cards

Ease of use

3. Clearness: the content of the cards is easy to understand
4. Easy to be used
5. Appropriate layout

4.5

4.5

4.6

Usefulness

6. The guidelines support the generation of ideas
7. Case studies inspire the generation of ideas

4.5

4.5

Next steps

- The Design Framework and Cards will be applied in further testing activities in Nairobi and Gaborone.
- Local SMES, NGOs, and experts from business, policy, design and technologies are involved in the evaluation process
- A refined version will be digitally available

