MINI-GRIDS IN NEPAL:
PACE OF IMPLEMENTATION

THE WORLD BANK
Treasury

Nairobi, Kenya
August 5, 2016

Table of Contents

- **Background**
- **Country context**
- **Status of mini-grids (Mini-grids projects, number and types of mini-grids, number of household served, CAPEX, tariffs etc.)**
- **Core challenges and barriers**
- **How the key issues were addressed?**
- **How long it took to resolve these issues?**
- **What were the results?**
- **What lessons can be drawn from the experience/results**
- **What is the replicability of this model?**
- **What needs to happen to scale up and sustain this effort?**

THE WORLD BANK
Treasury

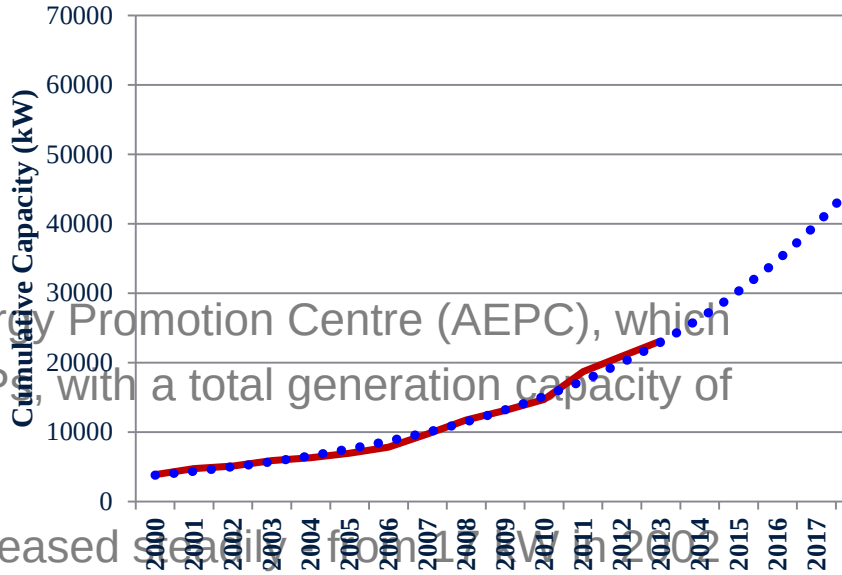
Background

- Nepal is currently facing a crippling energy crisis.
- Despite the techno-economic potential to generate 43,000 MW of hydroelectric power in Nepal, approximately 710 MW of the potential has been developed by the state-owned, vertically integrated electricity utility, Nepal Electricity Authority (NEA), and private independent power producers.
- The total domestic generation capacity is merely 760 MW for a population of 27.8 million and an area of 147,181 km^2.

Country context

- About 70 percent of the population in Nepal is estimated to have connections to on-grid (about 45 percent) and off-grid (about 25 percent) electricity.
- Of the 25 percent off-grid electrified households, MHPs supply approximately 20 percent and solar home systems supply the remaining 5 percent.
- Load shedding in the grid is up to 12 hours per day.
- The remaining 30 percent of the country's population, mostly in rural and remote areas, have access to neither on-grid nor off-grid electricity.

Status of mini-grids

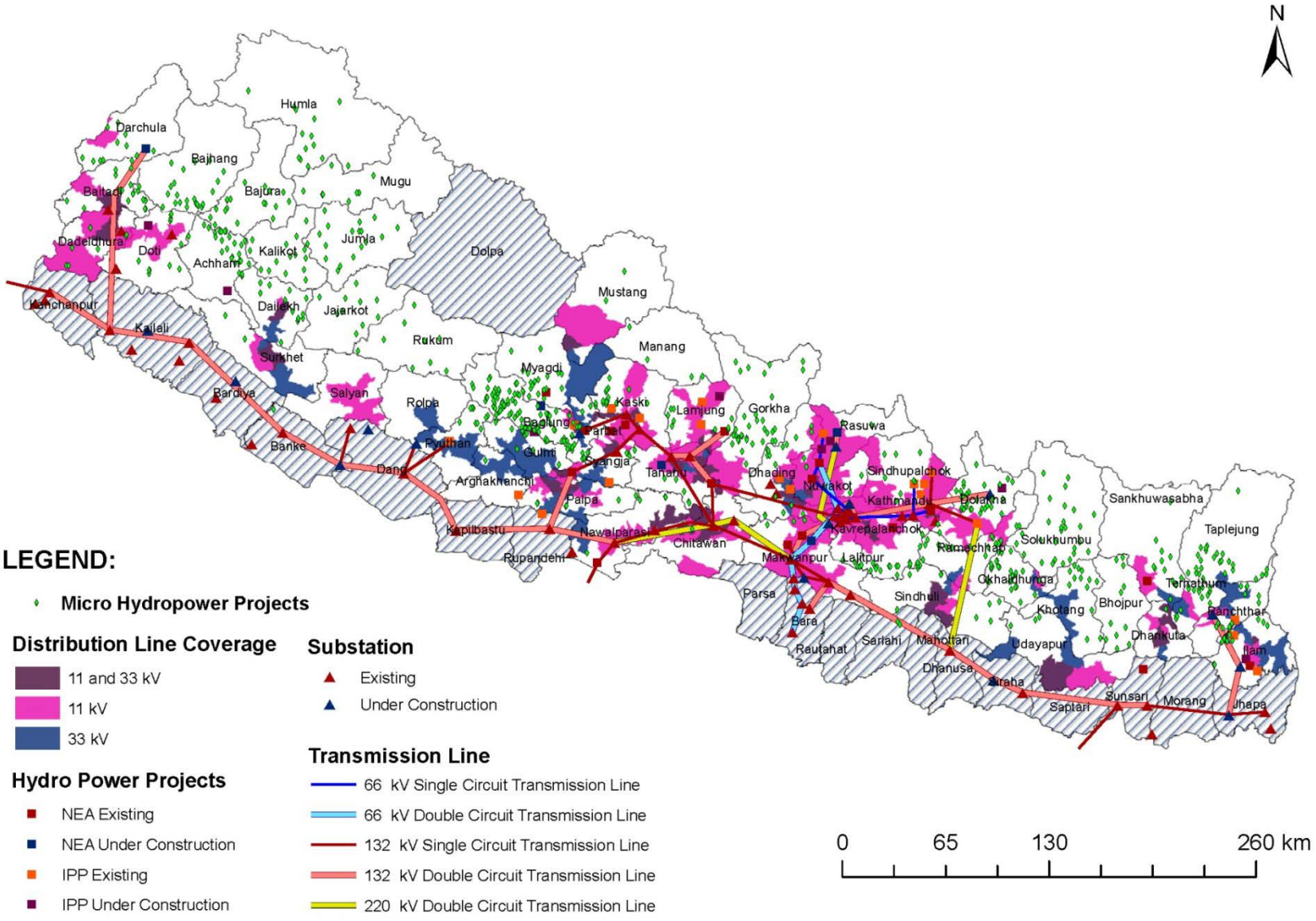


- By 2014, with support from the Alternative Energy Promotion Centre (AEPC), which was established in 1996, more than 1,000 MHPs, with a total generation capacity of 25MW (or 25,000 kW), had been developed.
- Over the years, the average MHP size has increased steadily from 17 kW in 2002 to 30 kW in 2013.

	Total	Grid encroached	Grid connected	Mini-grid
Number	1,400	90	None*	1
Capacity (kW)	25,000	2,700	NA	107
Number of HHs	400,000	27,000	NA	1,300

- The Government of Nepal aims to install an additional 25 MW of mini/micro hydropower, as part of the National Rural and Renewable Energy Programme (NRREP), currently being implemented by AEPC for five years (2012 - 2017), to provide electricity to an additional 150,000 rural households by 2017 (refer to Figure 2).

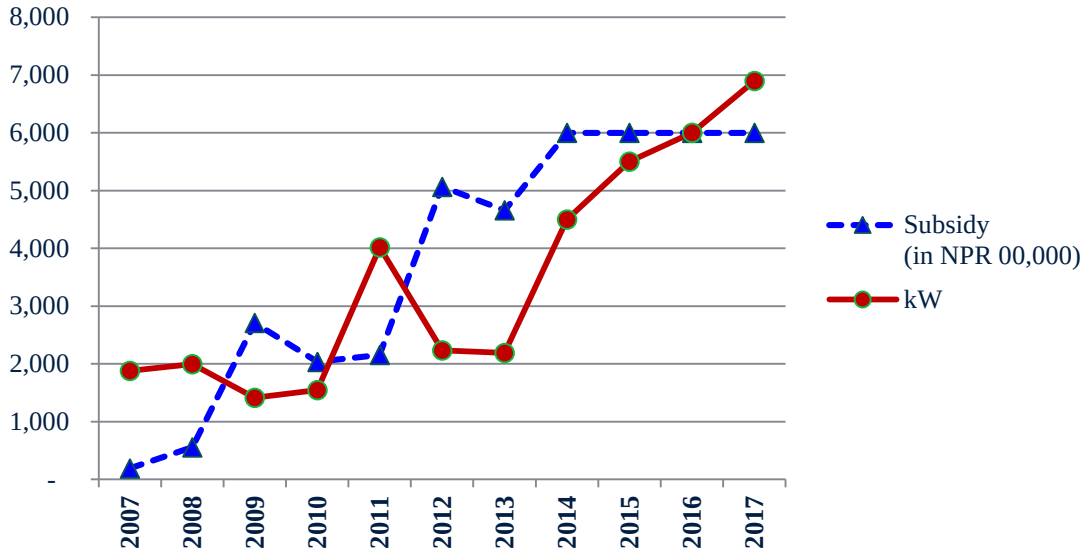
Status of mini-grids



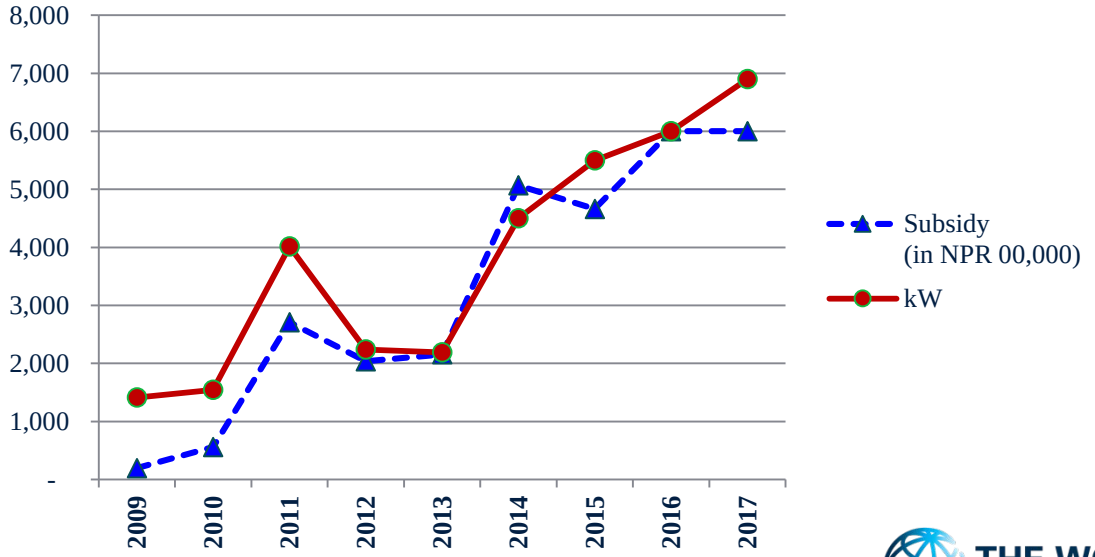
THE WORLD BANK
Treasury

Status of mini-grids

Impact of subsidy on installed capacity (when compared at same base year)



Impact of subsidy on installed capacity with two years shift



THE WORLD BANK
Treasury

Status of mini-grids

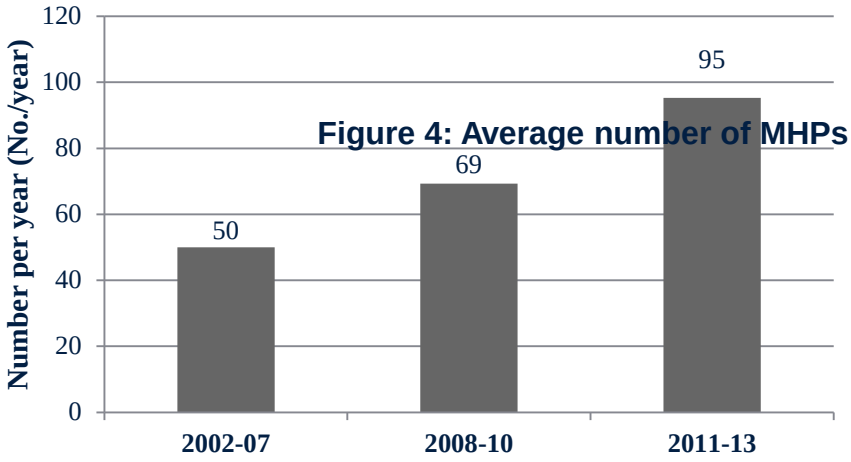


Figure 4: Average number of MHPs added each year during each subsidy period

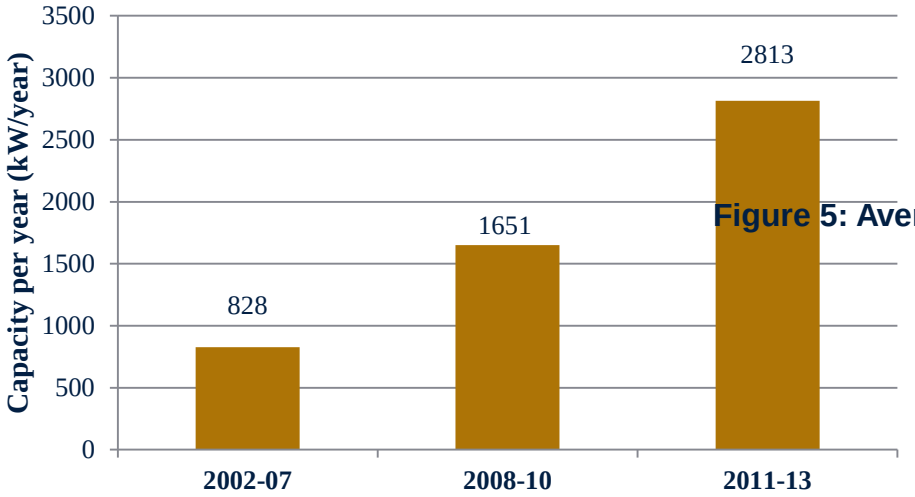
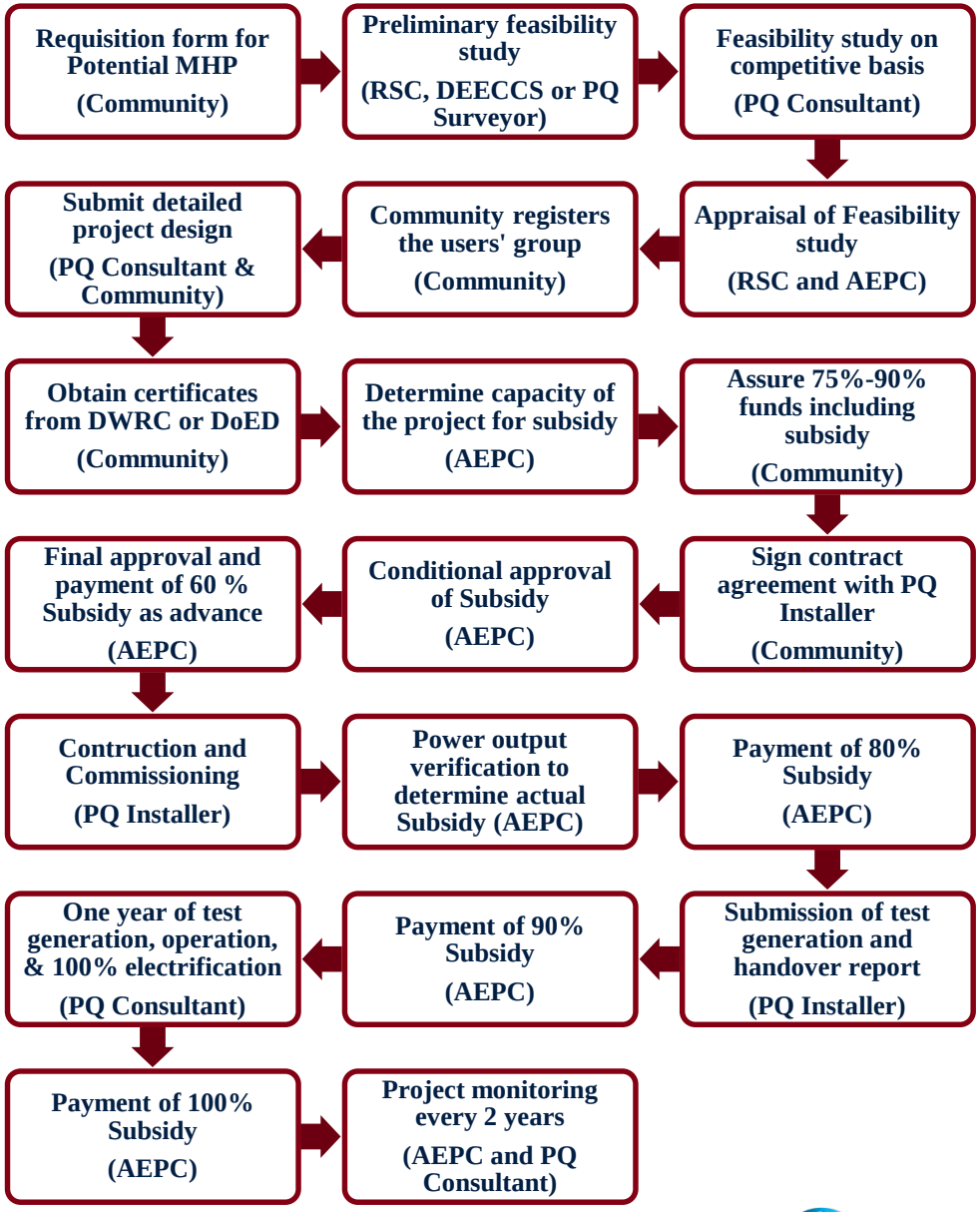


Figure 5: Average MHP capacity added (kW/year) during each subsidy pe

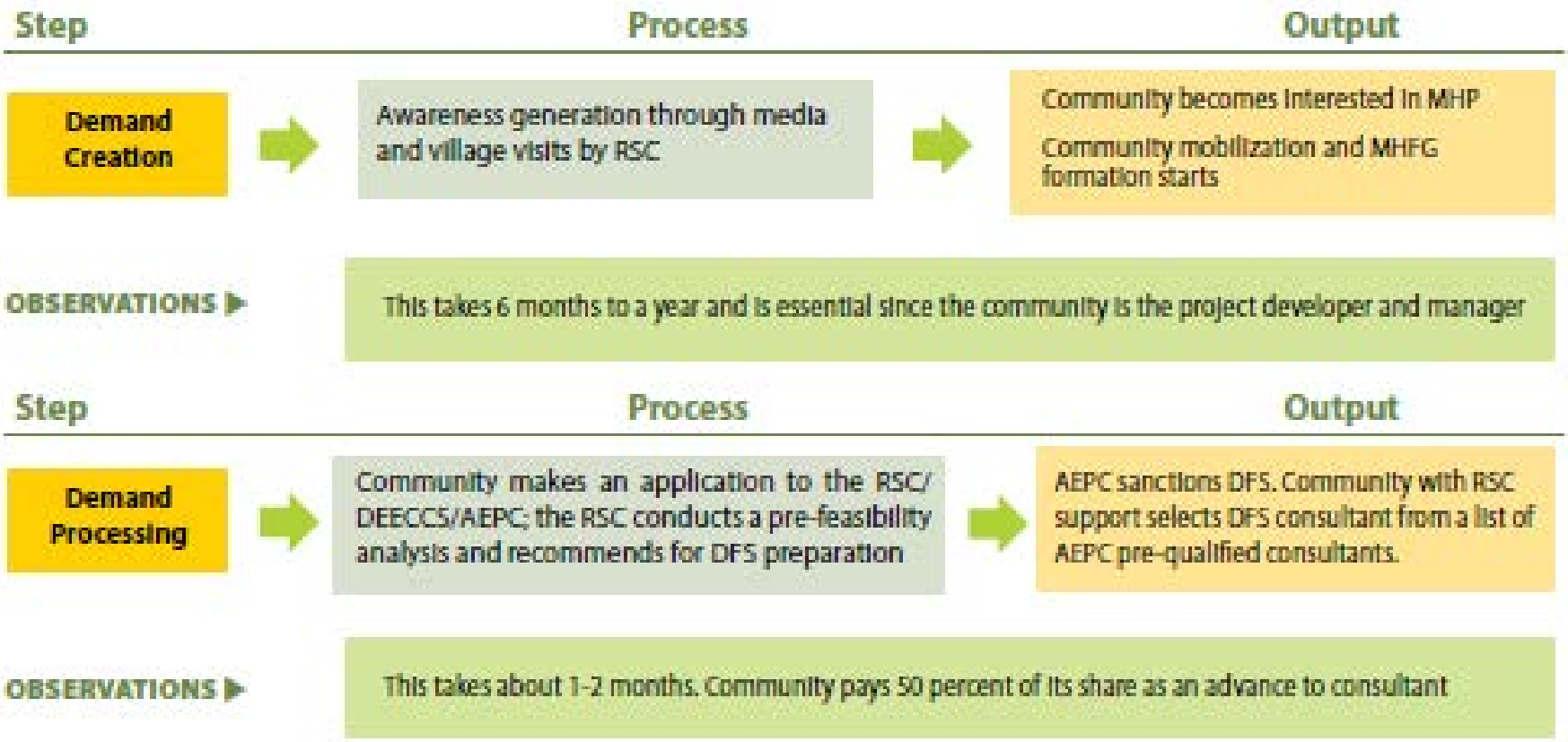
THE WORLD BANK
Treasury

MHP Project Cycle

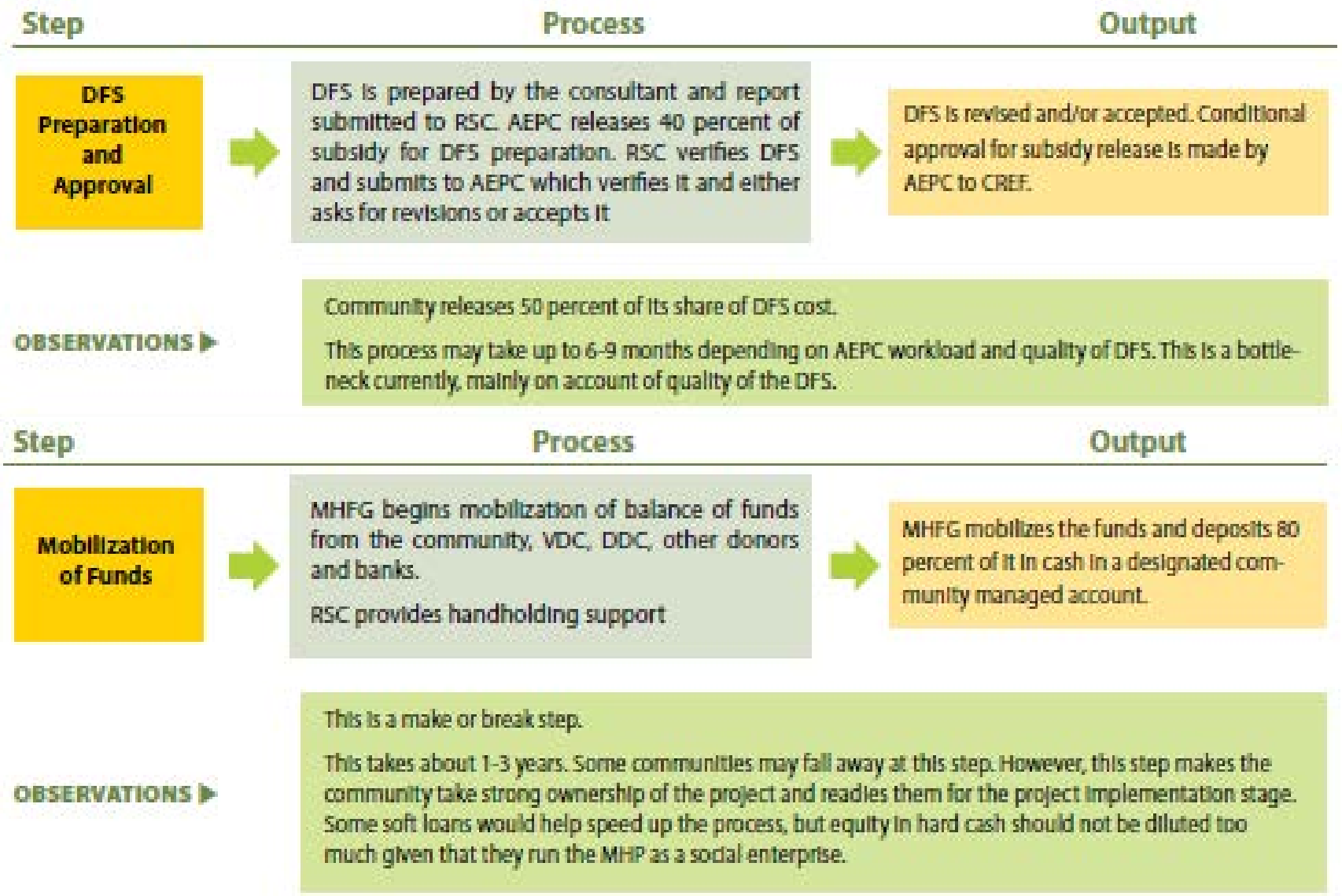


THE WORLD BANK
Treasury

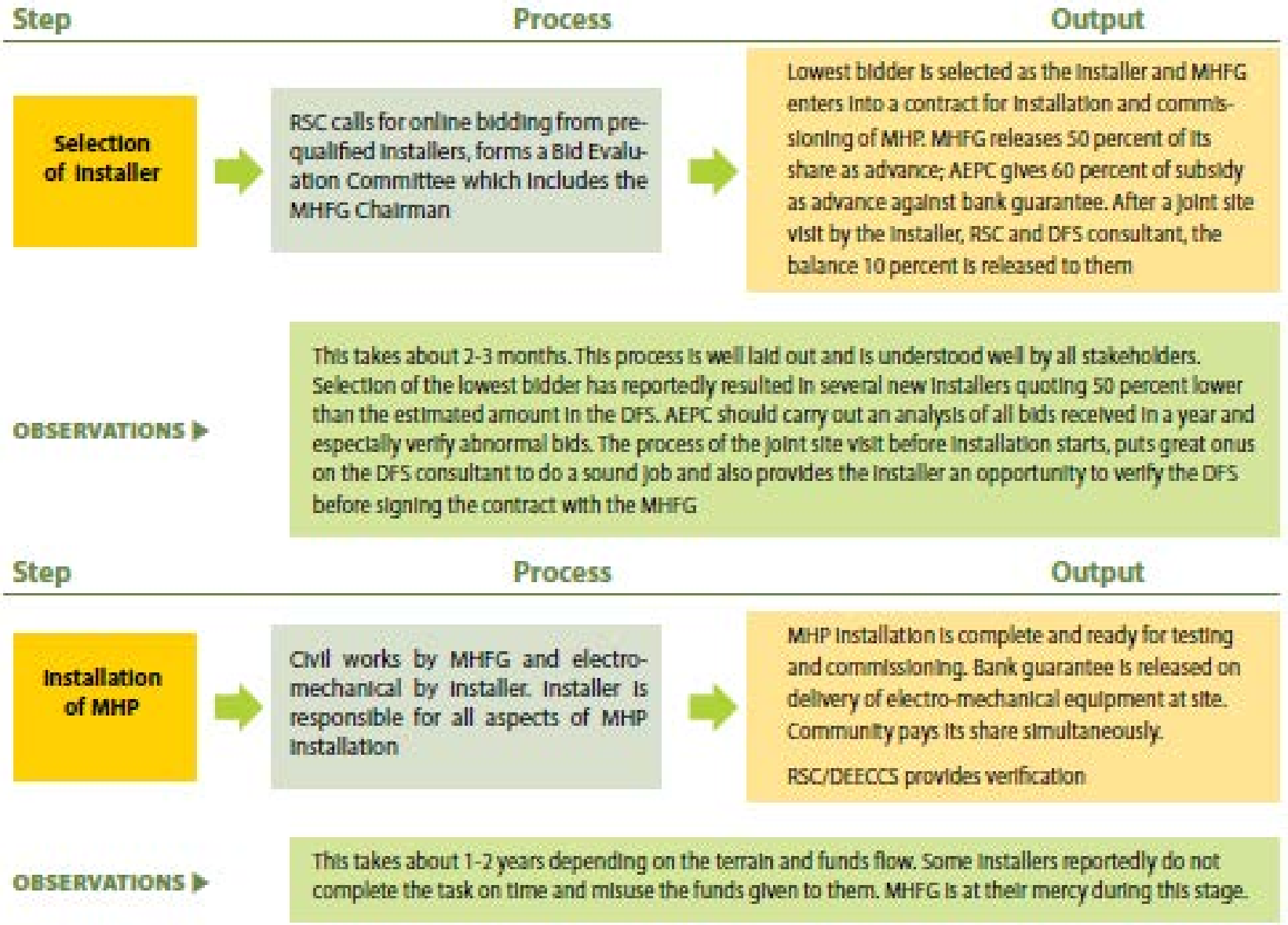
Core challenges and barriers



Core challenges and barriers



Core challenges and barriers



THE WORLD BANK
Treasury

Core challenges and barriers

Step	Process	Output
Power output test (POT) and verification	POT is done by RSC in the presence of MHFG, Installer and AEPC, and the plant is commissioned. Power output verification (POV) is conducted by a 3rd party inspector usually during November-May (lean flow season)	Successful POT results in a commissioning report and release of 20 percent to Installer. After POV, another 10 percent is released. Quantum of final subsidy amount is determined after POT and POV. If generation is less, subsidy is reduced and excess payment recovered from Installer. At the end of 1 year another check is conducted. If satisfactory, balance 10 percent subsidy is released to Installer
OBSERVATIONS	POT takes 2-3 months. POV is done usually within the year of commissioning. Largely, the QA only verifies the power output and is at the end of commissioning. There is no material and in-process verification of electromechanical components that attract 50-60 percent of total costs. In effect, the quality of the work under the direct control of the Installer is verified only after commissioning. Oversight of civil works is not stringent as Installer deputes a technical person only for providing marking and level. RSC cannot physically serve many installation sites with their manpower. Thus, QA is a weak link in the MHP installation and commissioning process; especially the quality of electromechanical equipment.	

How the key issues were addressed?

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec commodo nulla tortor, sit amet blandit turpis ultricies eget. Integer malesuada quam posuere sem sollicitudin pellentesque. Interdum et malesuada fames ac ante ipsum primis in faucibus. Morbi massa lacus, iaculis quis aliquet eu, vulputate a velit. Sed blandit sapien turpis, quis bibendum orci accumsan non. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Nunc lacinia congue elit, facilisis feugiat lorem dictum ac.

How long it took to resolve these issues?

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec commodo nulla tortor, sit amet blandit turpis ultricies eget. Integer malesuada quam posuere sem sollicitudin pellentesque. Interdum et malesuada fames ac ante ipsum primis in faucibus. Morbi massa lacus, iaculis quis aliquet eu, vulputate a velit. Sed blandit sapien turpis, quis bibendum orci accumsan non. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Nunc lacinia congue elit, facilisis feugiat lorem dictum ac.

What were the results?

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec commodo nulla tortor, sit amet blandit turpis ultricies eget. Integer malesuada quam posuere sem sollicitudin pellentesque. Interdum et malesuada fames ac ante ipsum primis in faucibus. Morbi massa lacus, iaculis quis aliquet eu, vulputate a velit. Sed blandit sapien turpis, quis bibendum orci accumsan non. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Nunc lacinia congue elit, facilisis feugiat lorem dictum ac.

What lessons can be drawn from the experience/results

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec commodo nulla tortor, sit amet blandit turpis ultricies eget. Integer malesuada quam posuere sem sollicitudin pellentesque. Interdum et malesuada fames ac ante ipsum primis in faucibus. Morbi massa lacus, iaculis quis aliquet eu, vulputate a velit. Sed blandit sapien turpis, quis bibendum orci accumsan non. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Nunc lacinia congue elit, facilisis feugiat lorem dictum ac.

What is the replicability of this model?

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec commodo nulla tortor, sit amet blandit turpis ultricies eget. Integer malesuada quam posuere sem sollicitudin pellentesque. Interdum et malesuada fames ac ante ipsum primis in faucibus. Morbi massa lacus, iaculis quis aliquet eu, vulputate a velit. Sed blandit sapien turpis, quis bibendum orci accumsan non. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Nunc lacinia congue elit, facilisis feugiat lorem dictum ac.

What needs to happen to scale up and sustain this effort?

Lorem ipsum dolor sit amet, consectetur adipiscing elit. Donec commodo nulla tortor, sit amet blandit turpis ultricies eget. Integer malesuada quam posuere sem sollicitudin pellentesque. Interdum et malesuada fames ac ante ipsum primis in faucibus. Morbi massa lacus, iaculis quis aliquet eu, vulputate a velit. Sed blandit sapien turpis, quis bibendum orci accumsan non. Pellentesque habitant morbi tristique senectus et netus et malesuada fames ac turpis egestas. Nunc lacinia congue elit, facilisis feugiat lorem dictum ac.

Main Title

Subtitle

Insert Section Title

Insert Section Subtitle

THE WORLD BANK
Treasury

CONTACTS

SECTION TITLE

Jane Smith	Title	Location	Phone Number	Email@site.com

SECTION TITLE

Jane Smith	Title	Location	Phone Number	Email@site.com

SECTION TITLE

Jane Smith	Title	Location	Phone Number	Email@site.com

SECTION TITLE

Jane Smith	Title	Location	Phone Number	Email@site.com

SECTION TITLE

Jane Smith	Title	Location	Phone Number	Email@site.com

THE WORLD BANK
Treasury