

MINI-GRIDS IN NEPAL:

PACE OF IMPLEMENTATION



THE WORLD BANK

Treasury

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

Background

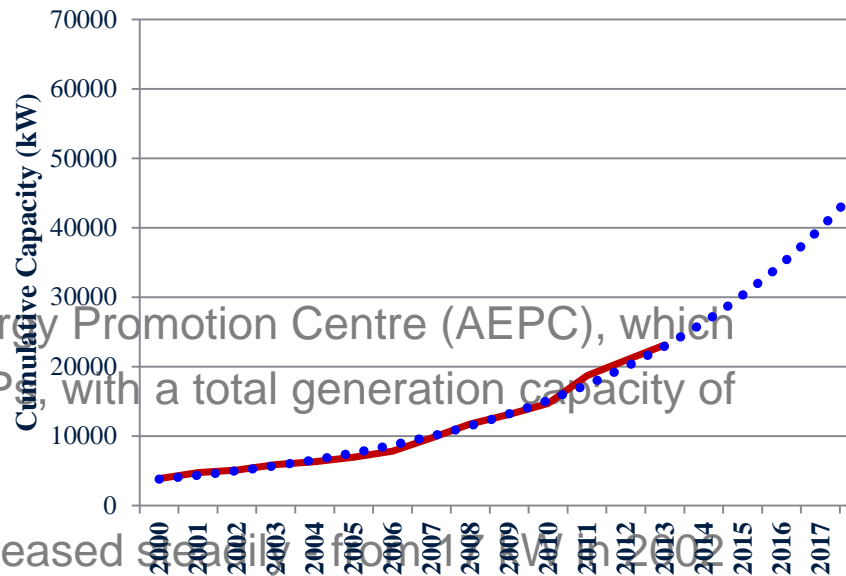
- Nepal is currently facing a crippling energy crisis.
- Despite the techno-economic potential to generate 43,000 MW of hydroelectric power in Nepal, approximately 710 MW of the potential has been developed by the state-owned, vertically integrated electricity utility, Nepal Electricity Authority (NEA), 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 km².

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

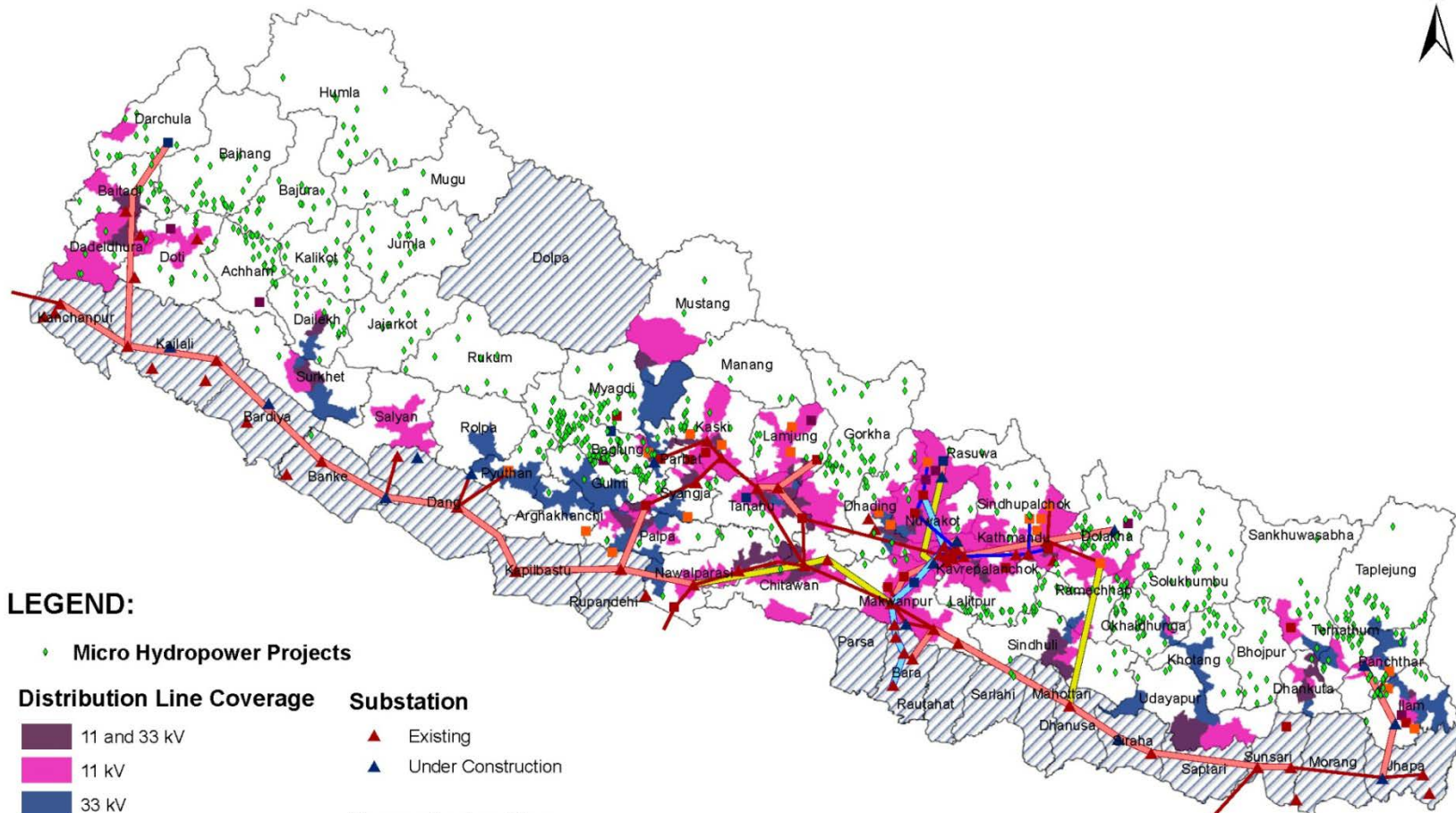
- By 2014, with support from the Alternative Energy Promotion Centre (AEPC), which was established in 1996, more than 1,000 MHPs, with a total generation capacity of 25MW (or 25,000 kW), had been developed.
- Over the years, the average MHP size has increased steadily from 1 kW in 2002 to 30 kW in 2013.



	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



LEGEND:

◆ Micro Hydropower Projects

Distribution Line Coverage

- 11 and 33 kV
- 11 kV
- 33 kV

Substation

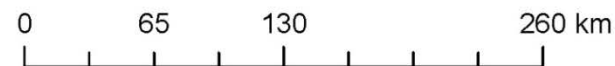
- ▲ Existing
- ▲ Under Construction

Hydro Power Projects

- NEA Existing
- NEA Under Construction
- IPP Existing
- IPP Under Construction

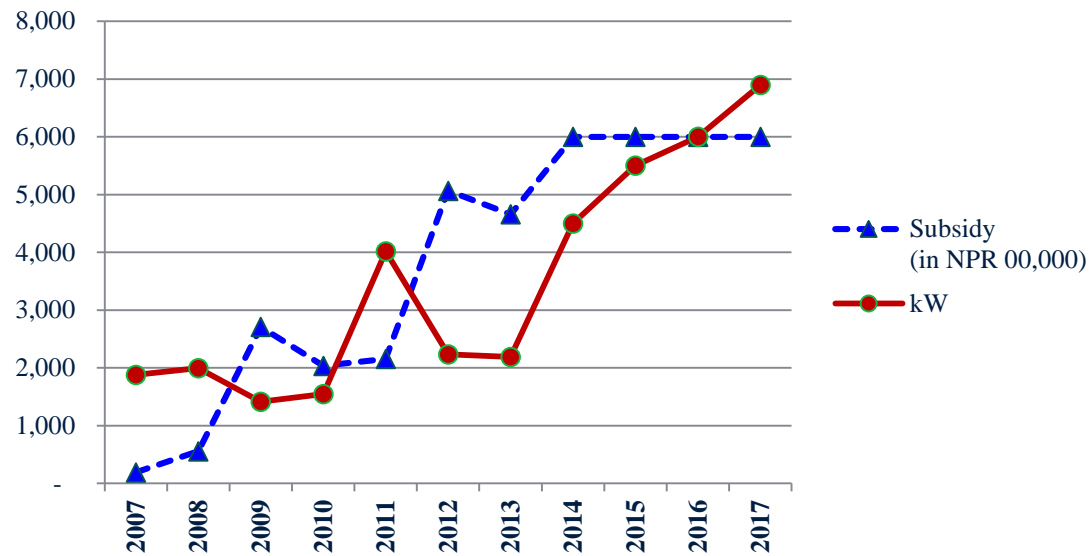
Transmission Line

- 66 kV Single Circuit Transmission Line
- 66 kV Double Circuit Transmission Line
- 132 kV Single Circuit Transmission Line
- 132 kV Double Circuit Transmission Line
- 220 kV Double Circuit Transmission Line

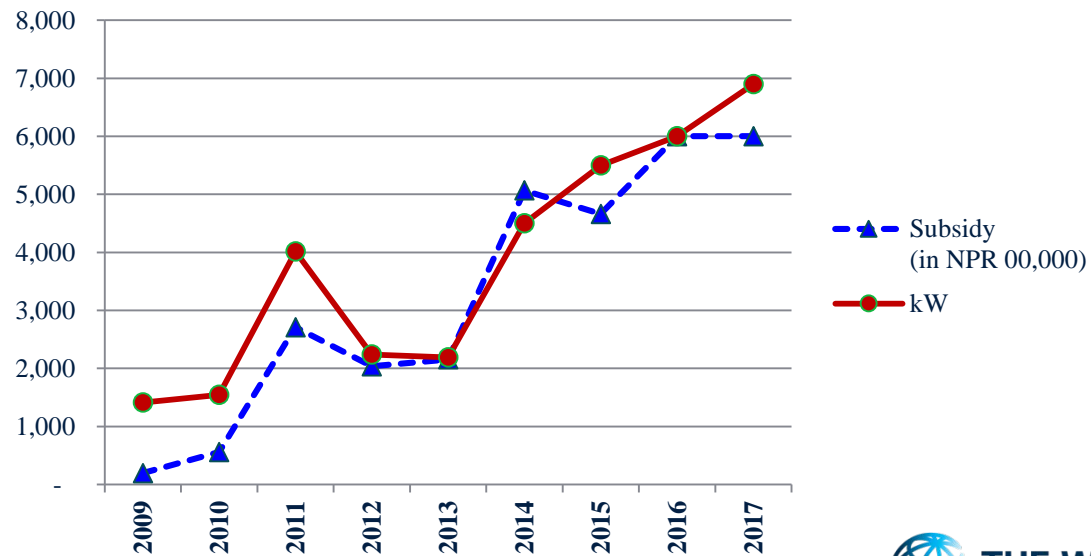


Status of mini-grids

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



Impact of subsidy on installed capacity with two years shift



Status of mini-grids

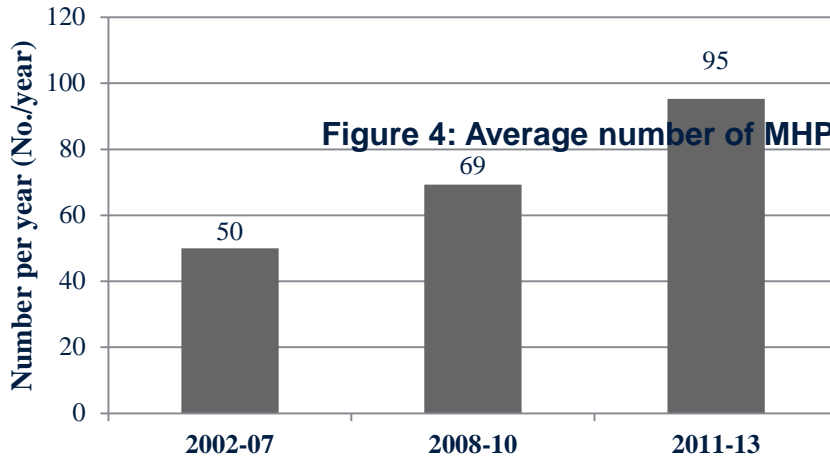


Figure 4: Average number of MHPs added each year during each subsidy period

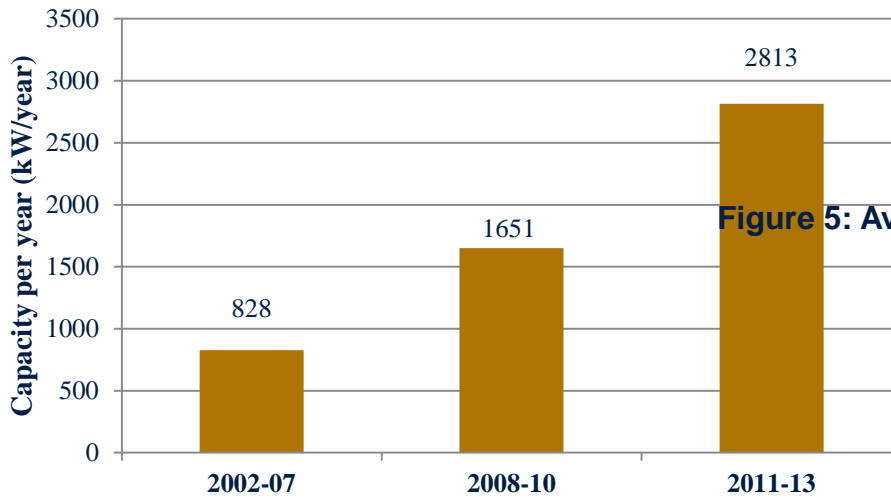
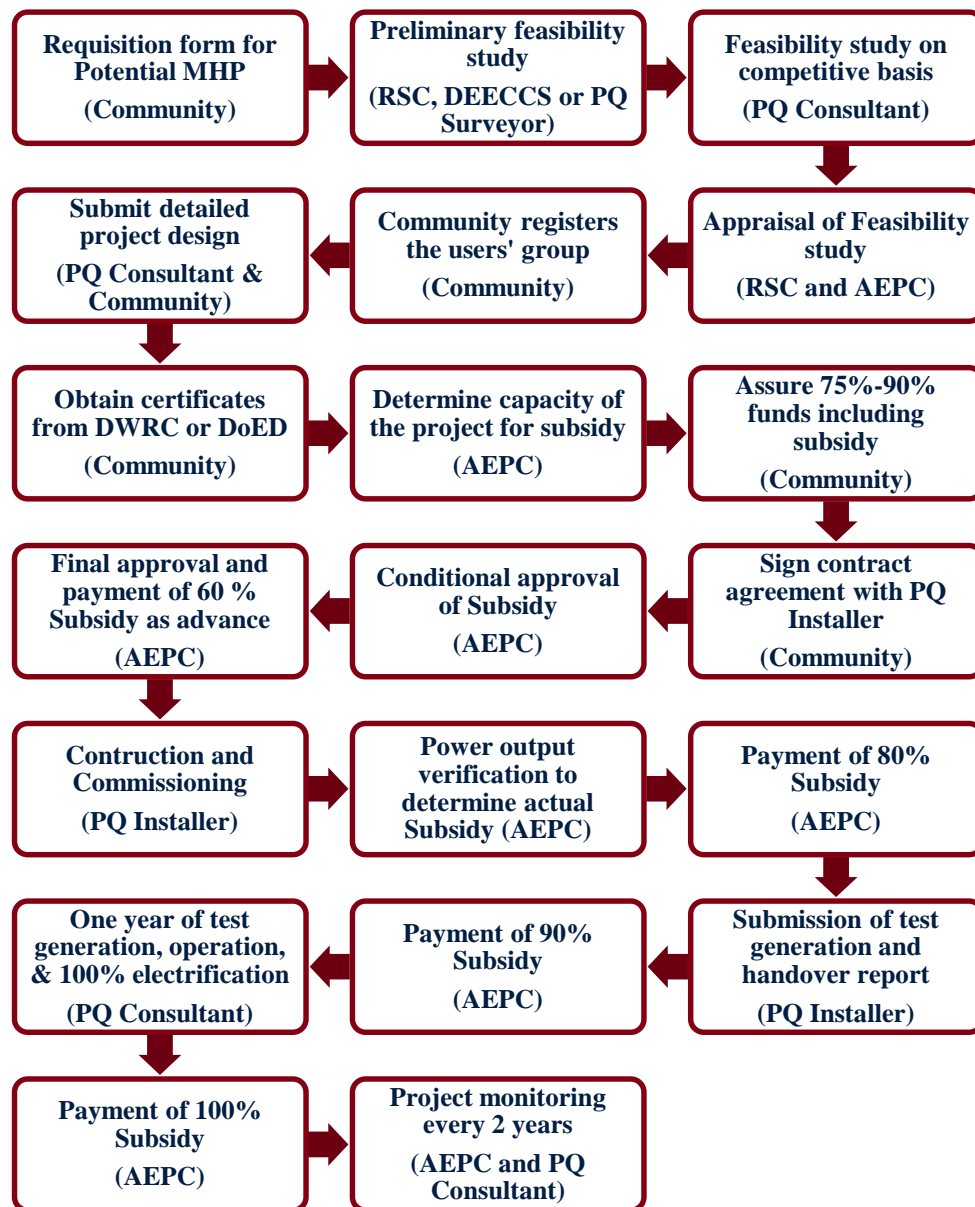


Figure 5: Average MHP capacity added (kW/year) during each subsidy period



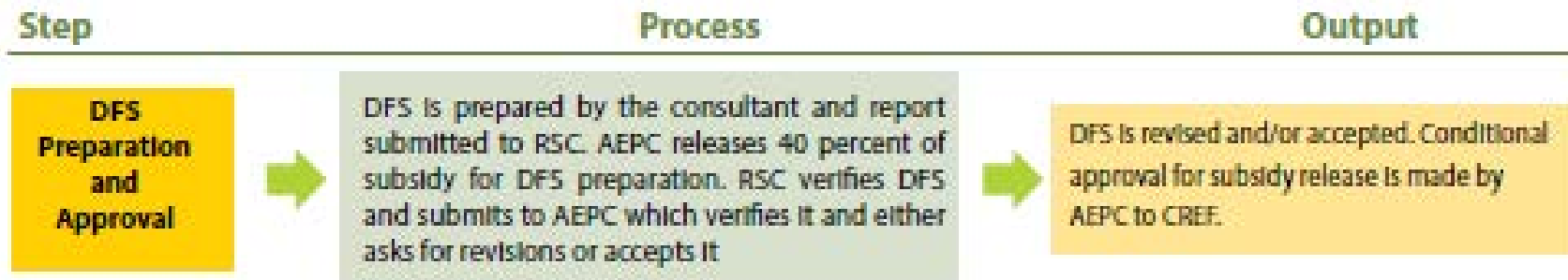
MHP Project Cycle



Core challenges and barriers

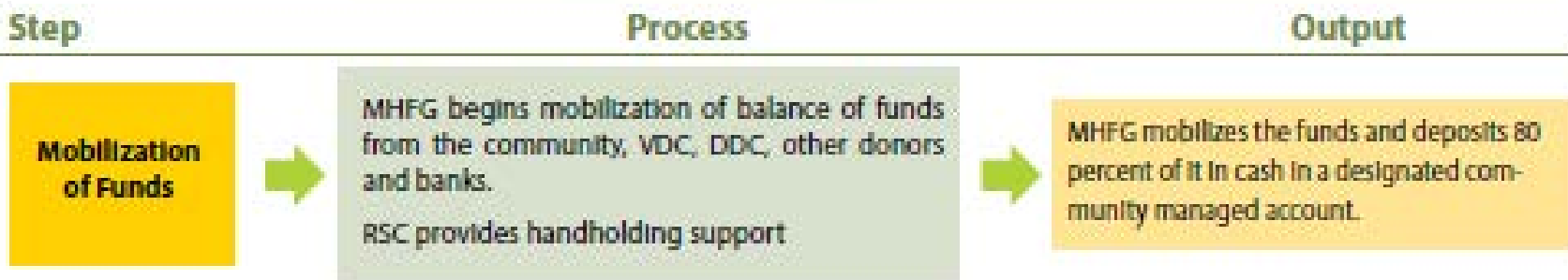


Core challenges and barriers



OBSERVATIONS ►

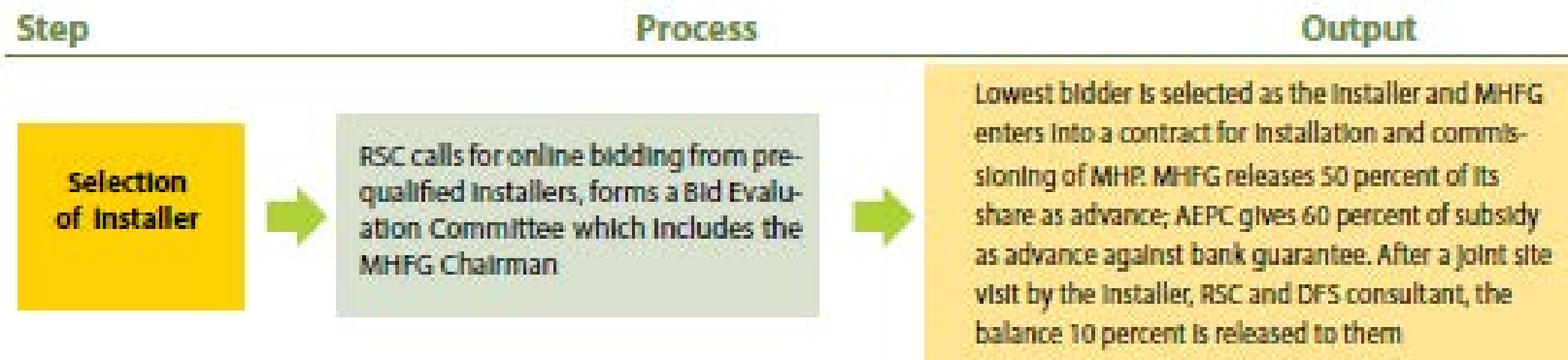
Community releases 50 percent of its share of DFS cost.
 This process may take up to 6-9 months depending on AEPC workload and quality of DFS. This is a bottleneck currently, mainly on account of quality of the DFS.



OBSERVATIONS ►

This is a make or break step.
 This takes about 1-3 years. Some communities may fall away at this step. However, this step makes the community take strong ownership of the project and readies them for the project implementation stage. Some soft loans would help speed up the process, but equity in hard cash should not be diluted too much given that they run the MHP as a social enterprise.

Core challenges and barriers



OBSERVATIONS ►

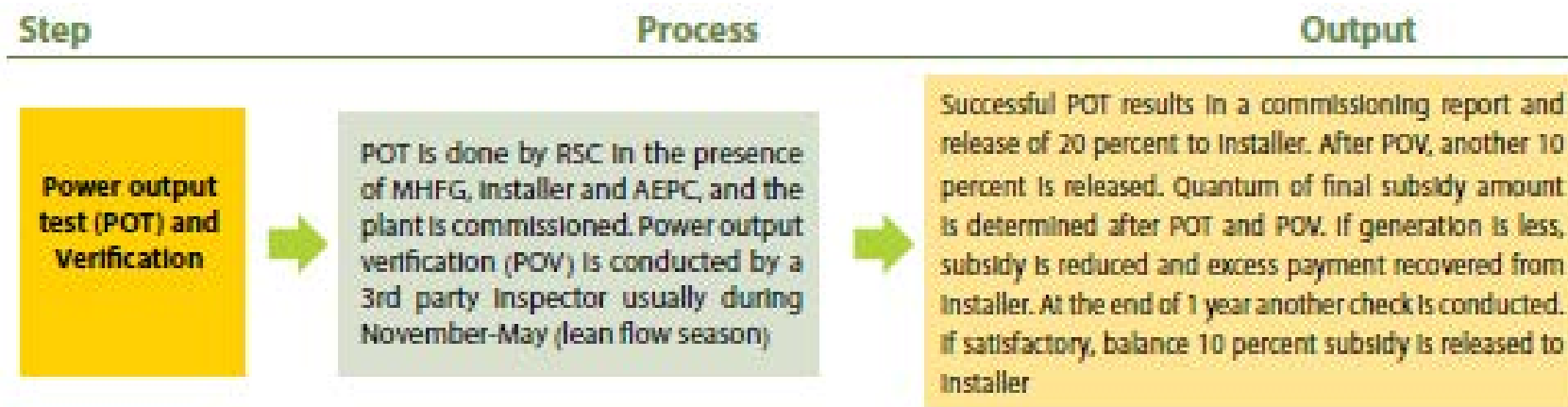
This takes about 2-3 months. This process is well laid out and is understood well by all stakeholders. Selection of the lowest bidder has reportedly resulted in several new installers quoting 50 percent lower than the estimated amount in the DFS. AEPC should carry out an analysis of all bids received in a year and especially verify abnormal bids. The process of the joint site visit before installation starts, puts great onus on the DFS consultant to do a sound job and also provides the installer an opportunity to verify the DFS before signing the contract with the MHFG.



OBSERVATIONS ►

This takes about 1-2 years depending on the terrain and funds flow. Some installers reportedly do not complete the task on time and misuse the funds given to them. MHFG is at their mercy during this stage.

Core challenges and barriers



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?

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How long it took to resolve these issues?

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What were the results?

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What lessons can be drawn from the experience/results

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What is the replicability of this model?

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Main Title

Subtitle

Insert Section Title

Insert Section Subtitle

CONTACTS

SECTION TITLE

Jane Smith	Title	Location	Phone Number	Email@site.com
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SECTION TITLE

Jane Smith	Title	Location	Phone Number	Email@site.com
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