Myanmar: Towards Universal Access to Electricity by 2030

WORLD BANK GROUP

ESMAP
Energy Sector Management Assistance Program

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Outline

- **Country and Sector Overview**
- **SE4ALL Engagement in Myanmar**
- **National electrification plan (NEP) toward universal access by 2030**
- **Implementation progress to date**

Country and Sector Overview

Country Overview

Land Area: 261,319 sq mile (678,500 sq km)

Population: **53.9 million**

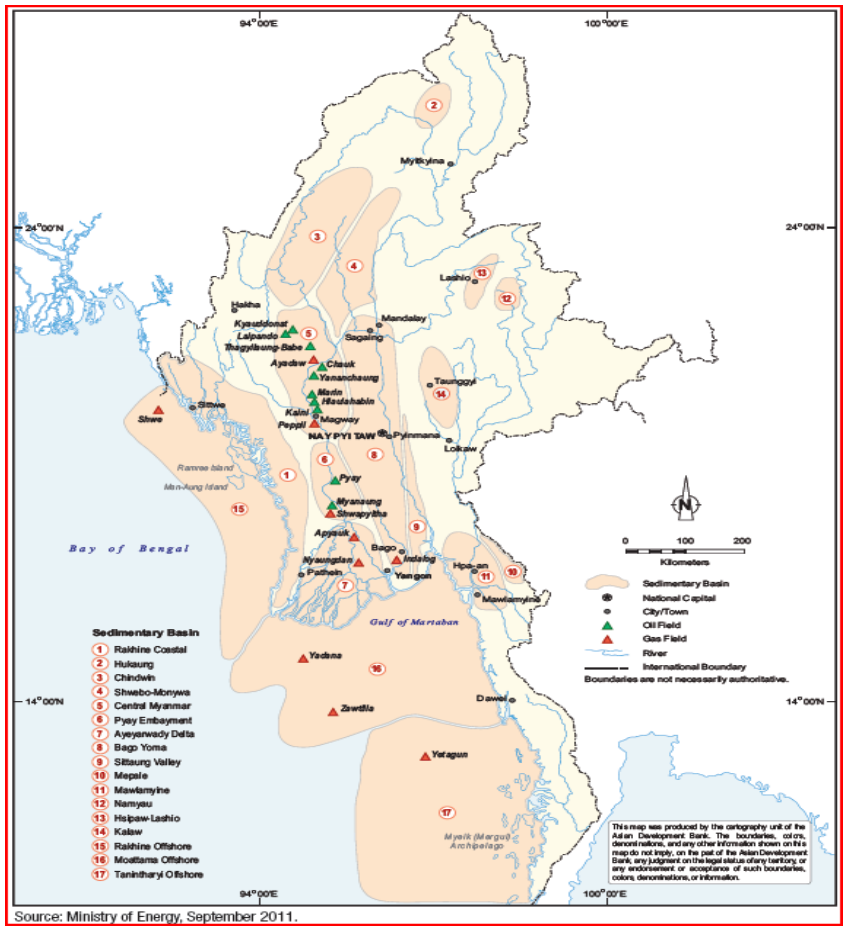
States/Regions: 15

GDP per capita: **US$1,190**

Triple transitions since 2011:

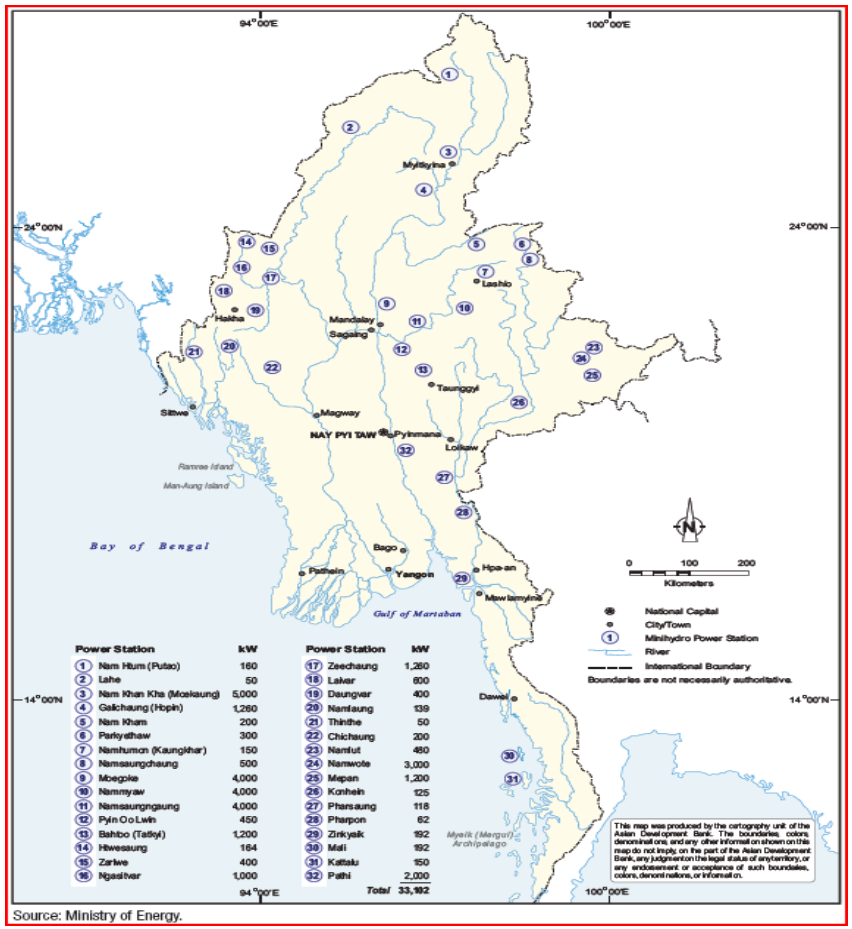
- from an authoritarian military system to democratic governance;
- from a centrally directed economy to market oriented reforms;
- from 60 years of conflict to peace in the border areas.
- First democratically elected government took office in April 2016

Very Rich Natural Energy Resources



Source: Ministry of Energy, September 2011.

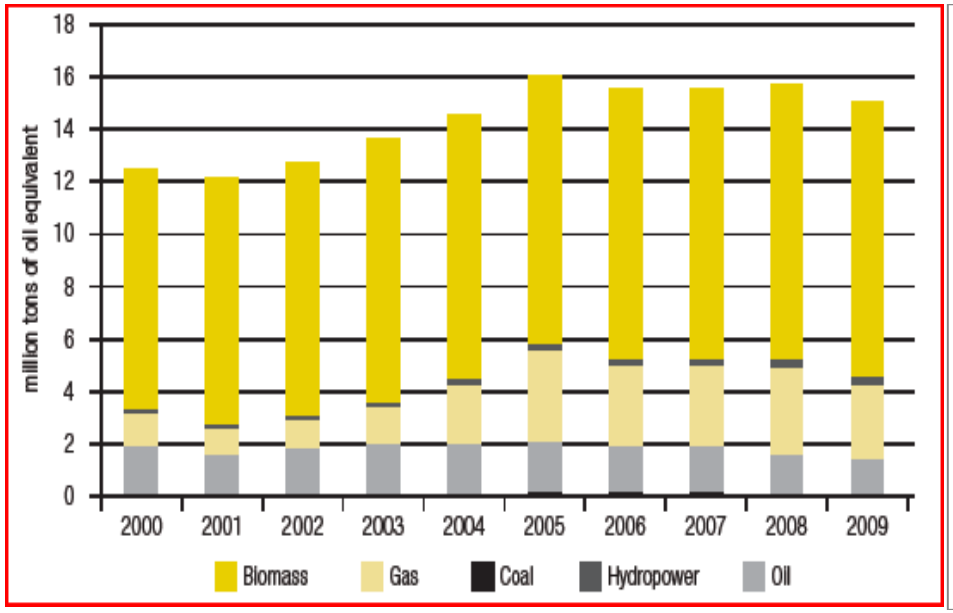
Oil and gas fields (11.8 tcf gas reserves)

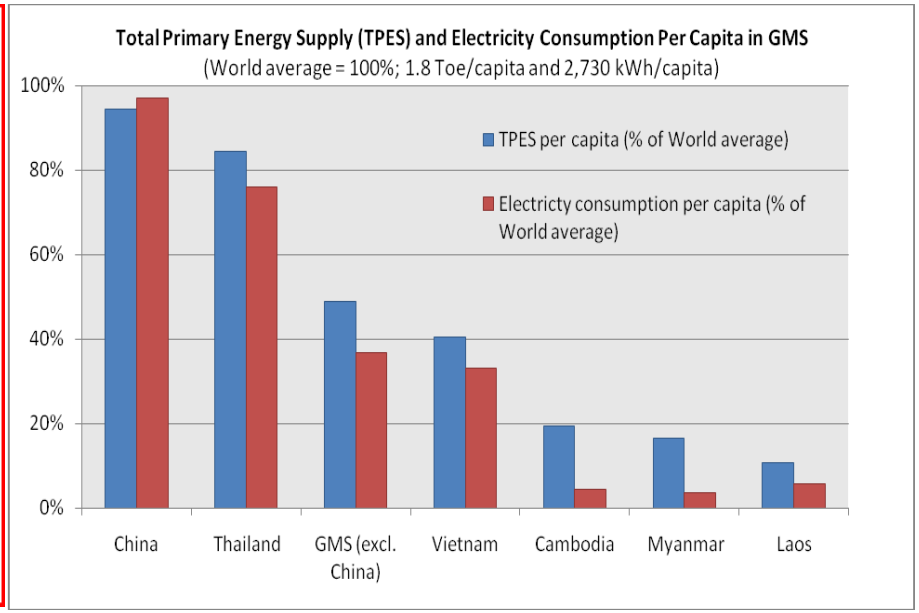


Source: Ministry of Energy.

Hydropower potential about 100 GW

Low Per Capita Energy Consumption and Electrification Rate





- Solid fuels (biomass) represent about two thirds of the total primary energy supply
- Electricity consumption per capita is one of the lowest in the world (263 kWh/year)

- Grid electrification ratio increased from 16% in 2006 to 34% in 2015
- Average electrification ratio in rural areas is about 16%

Rapidly Growing Electricity Demand (~10%/yr)

No.	Year	Total Consumption (kWh - million)	Electrified Household		Per Capital Consumption (kWh / yr)
			No of Household (Million)	Percentage	
1	2010-2011	6,467.30	2.22	25%	108
2	2011-2012	7,876.72	2.42	26%	131
3	2012-2013	8.441.04	2.63	28%	141
4	2013-2014	9,795.09	2.91	31%	163
5	2014-2015	11,406.76	3.26	29%	222
6	2015-2016	13,550.267	3.70	34%	263

SE4ALL Engagement in Myanmar

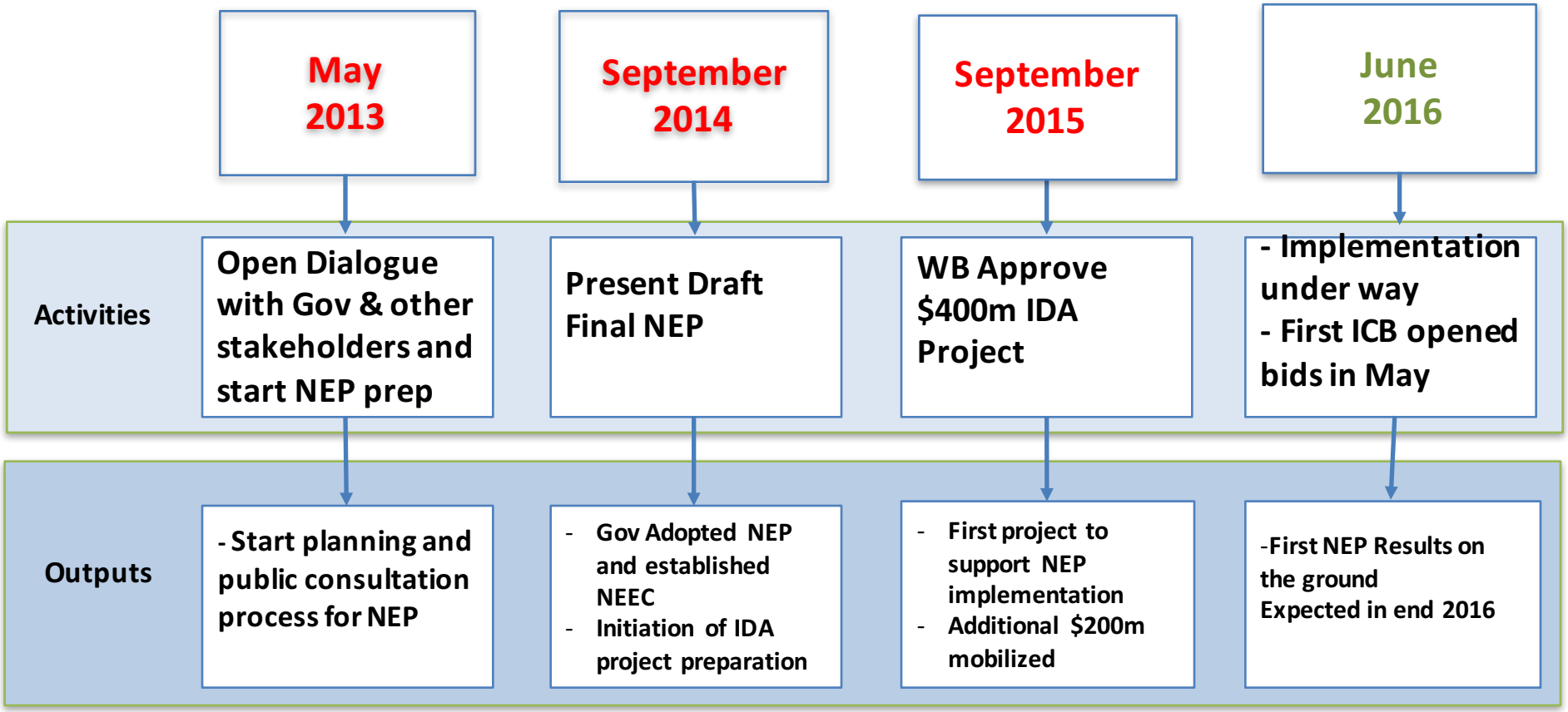
Government Commitment to Universal Access Aligns with UN Sustainable Energy for ALL (SE4ALL) Objectives

- **Myanmar** was an early endorser of the UN SE4ALL Initiative
- **Myanmar an high impact country** - Myanmar is identified as one of the high impact countries that offer the most potential to make rapid progress by SE4ALL.
- **Myanmar was one of the first 10 countries** which received approximately $2 million grant support from the World Bank/ESMAP SE4ALL Technical Assistance Program in 2013 to develop a national electrification plan (NEP) and investment prospectus.

Government Ownership and Coordination

- MOEE (formerly MOEP) and MOALI (formerly MLFRD) jointly lead the NEP preparation with participation from other government agencies and assistance from the World Bank.
- MOEP and MLFRD co-manage consultants together with World Bank. This includes strategic guidance, data collection, review of key deliverables, and dissemination of the results.
- Consultants work closely with the government teams throughout the NEP preparation process
- Close coordination with ADB, JICA and other DPs, private sector and CSOs.

Processes and Milestones



Objectives of Myanmar National Electrification Plan (NEP) 2015-30

- To serve as **comprehensive action plan** for developing, financing, and implementing electricity access scale-up program nationwide, with the target of achieving universal access by 2030.

- **To align support from different stakeholders** to implement national access targets, leverage concessional financing and mobilize other sources of financing on a timely, ongoing and programmatic basis.

NEP Adopts a Programmatic, Sector-wide Approach

Key Features:

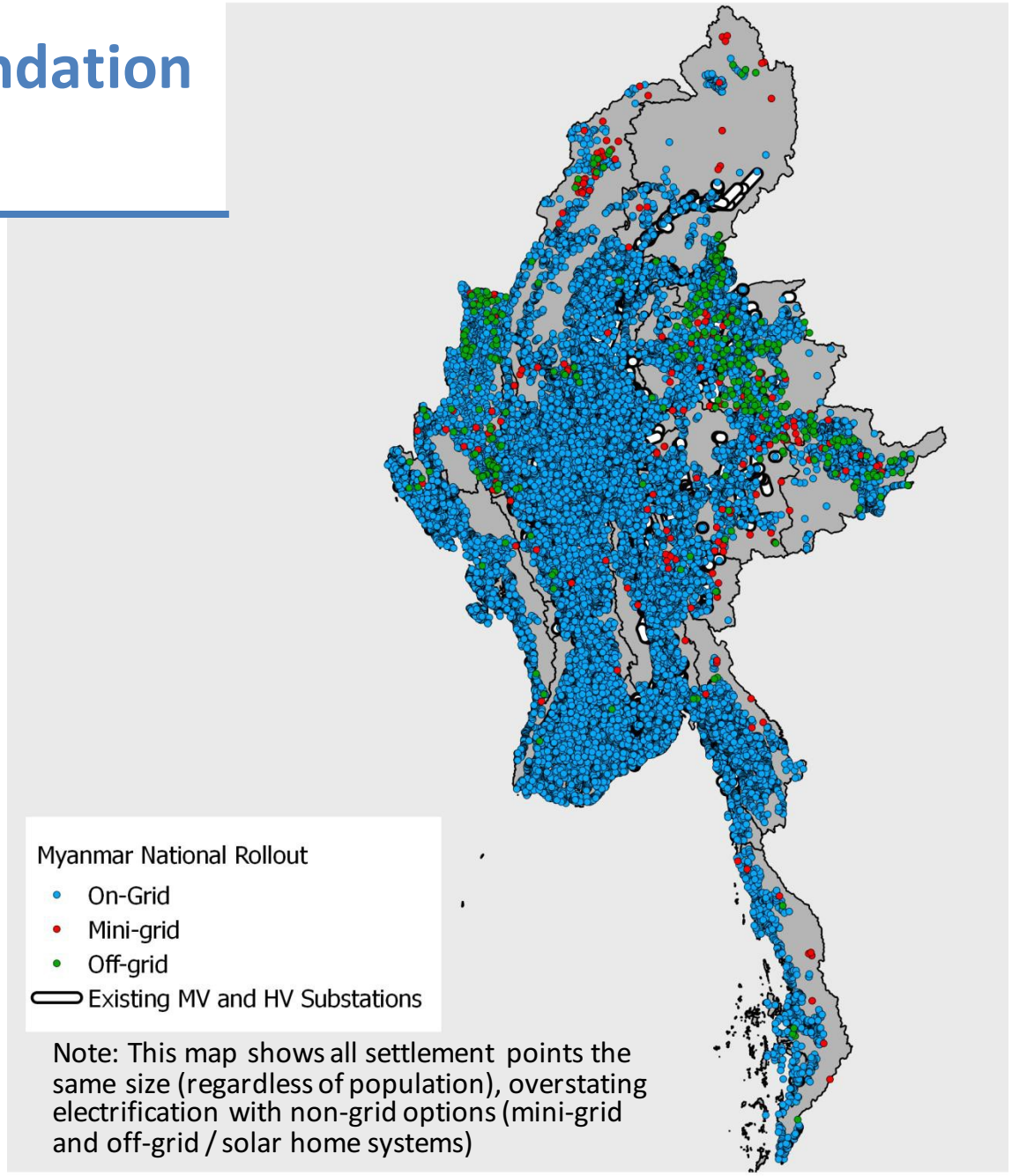
- Coordinated least-cost technical and investment planning
- Sustainable financing policy
- Stable flow of funds
- Results focused

Myanmar National Electrification Plan toward universal access by 2030

- Key Messages

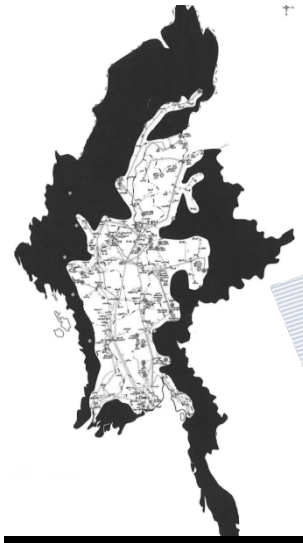
Least-cost recommendation for 2030

- By 2030, the majority are **grid connections**
- This represents **7.2 million households**
- Total cost is estimated at **US $6.0 billion** (US$800 per connection, average)
- Additional investments needed for generation & transmission



Note: This map shows all settlement points the same size (regardless of population), overstating electrification with non-grid options (mini-grid and off-grid / solar home systems)

Roadmap to Achieve Universal Access by 2030



Today

2015

34%

2020

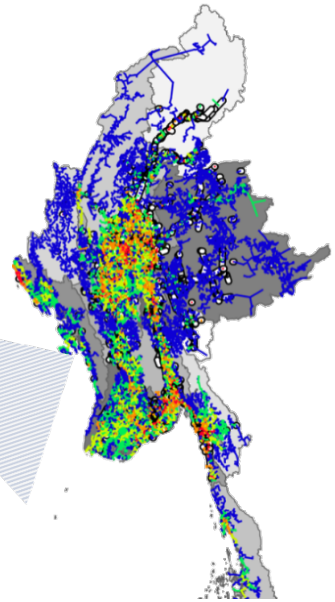
50%

2025

75%

2030

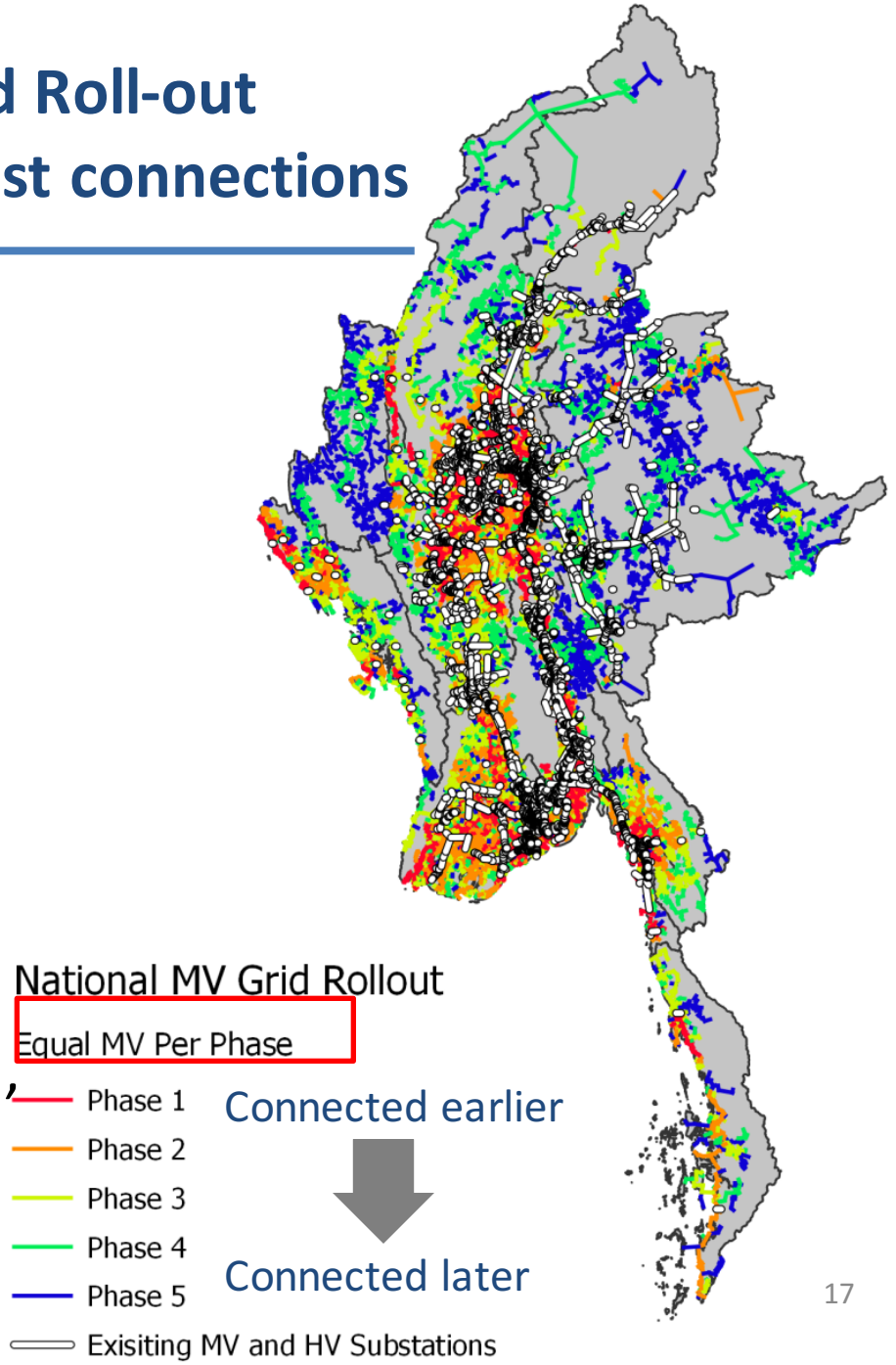
100%



2030 Planned

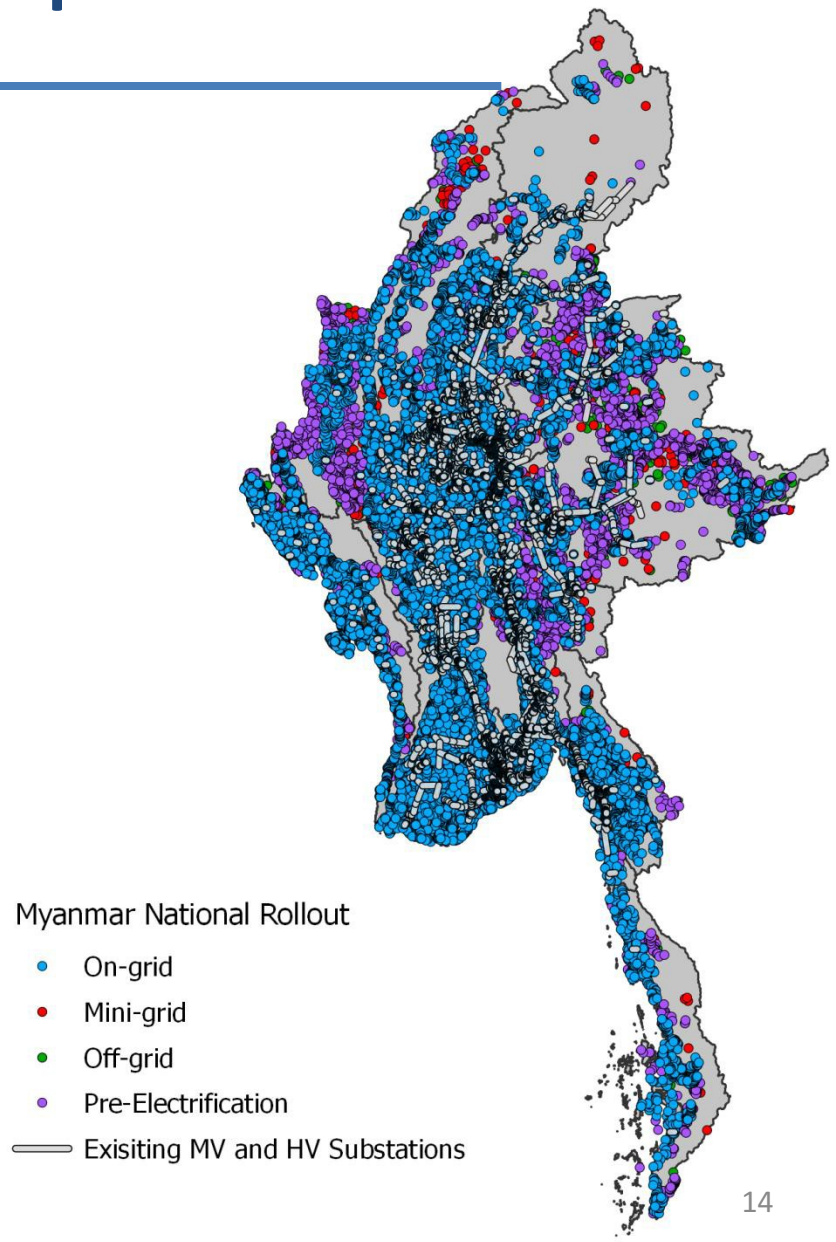
Recommended Sequencing of Grid Roll-out proceeds from low-cost to high-cost connections

- Dense areas require shorter distribution lines and lower cost per connection and will be connected first
- Remote communities require longer lines and higher cost and will be connected later
- Chin, Shan, Kachin and Kayah have highest cost per connection, thus to be connected in the final phases



Recommendations for off-grid pre-electrification

- **3-4% of the villages in the last phases of grid rollout are recommended for pre-electrification**
- **Shan, Chin, Kayah, Kachin and Tanintharyi** represent major areas for pre-electrification



NEP Flow of Funds

Tariff from electricity sales

Union budget

Donor funding/ financing

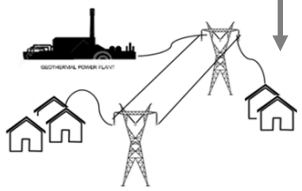
Coordination and allocation of funding on sector-wide basis, based on plan

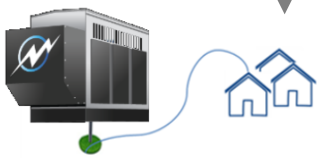
Funds flow to entities responsible for:

National grid expansion

Temporary and Permanent mini grid expansion

Household-level expansion (SHS)





Strong Institutions will ensure…

There are sufficient funds and predictable financing flowing through the entire electrification program

Project are being planned and prioritized in a least cost manner

Projects are being built efficiently and achieving social objectives

Institutional Reforms

Independent Regulator

- Advise on tariffs, standards and subsidies needed for grids
- Advise on mini-grid permits+interconnection

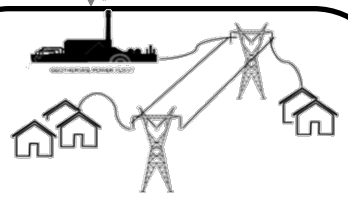
National Electrification Executive Secretariat reporting to VP Office

- Overall management and coordination of NEP planning
- Performance reporting
- Point source for donors

Donors

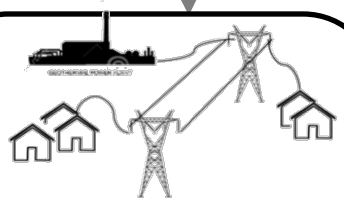
- TA to establish and train new entities
- Concessional finance
- Establish loan program with banks

Under MOEE leadership



YESC

- Develop investment program
- Corporatize YESC



ESE/MESC

- Follow YESC path
- Set up sub-franchise concessions

Mini-grid connections

- **DRD manage & monitor**
- Decentralized, private sector-led approach
- Develop regulatory framework

Off grid connections

- **DRD manage & monitor**
- Re-focus financial incentives
- Support private sector provision

Private Sector

Invest in utility corporations + Participate in sub franchise concessions + Provide solar home systems

First 5-year Investment Prospectus, FY2016-20

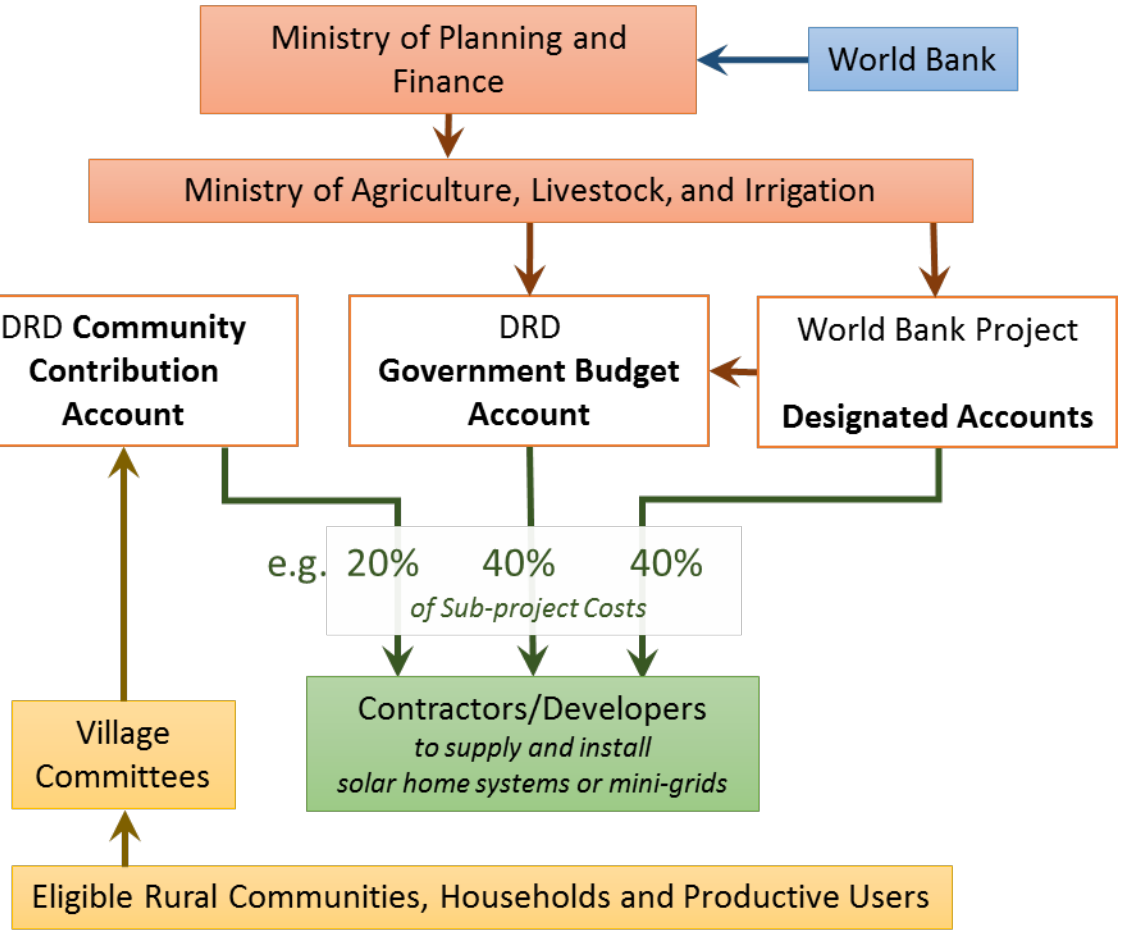
~ To implement about **1.7 million** additional grid connections

~ US$ 700 million from FY 2015-19 with national least-cost roll-out, including:

- **US$670 million** of capital investments and
- **US$30 million** of TA will be needed.

~ Potential sources of funding include Government, DPs, private sector and users' contribution

Shared Responsibilities between Union and Local Governments, Communities/Households, and Private Sector



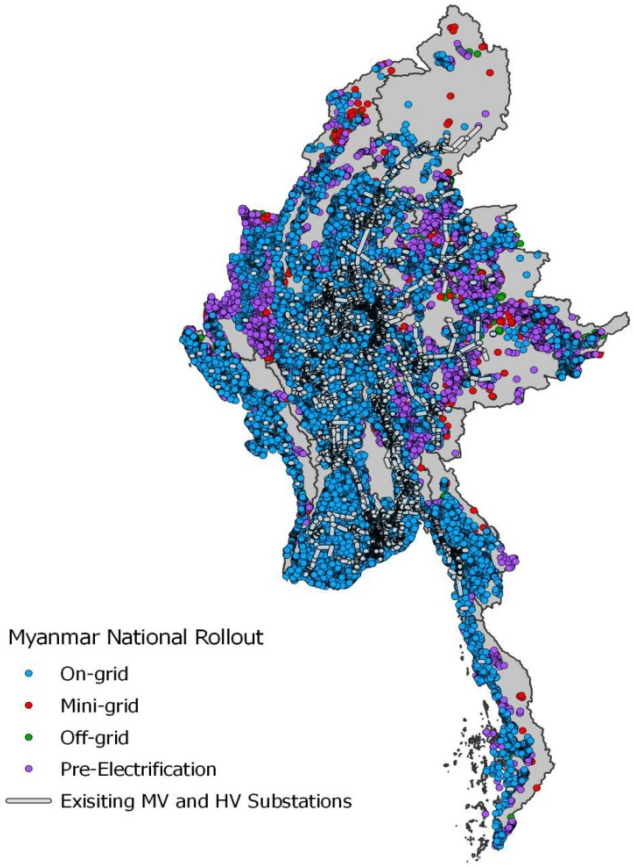
Goods and materials for MV networks	MOEE, local gov
MV Installation	MOEE, local gov
LV networks	VECs/HHs, MOEE (?), local gov (?)
Connection charges	HHs

1) NEP offgrid model

2) NEP grid extension model

Implementation Progress to Date

NEP Implementation: Initial Results



- Informed **WBG/IDA operation of $400 million** (approved Sept 2015 and expected to benefit 6 million people)
- Mobilized additional **$260 million concessional financing**
- Informed development of the market-based **IFC Lighting Myanmar Program**
- Partnered with **ADB, JICA, KfW, GIZ, Italy, and Norway** who use NEP as common platform for their support to electrification

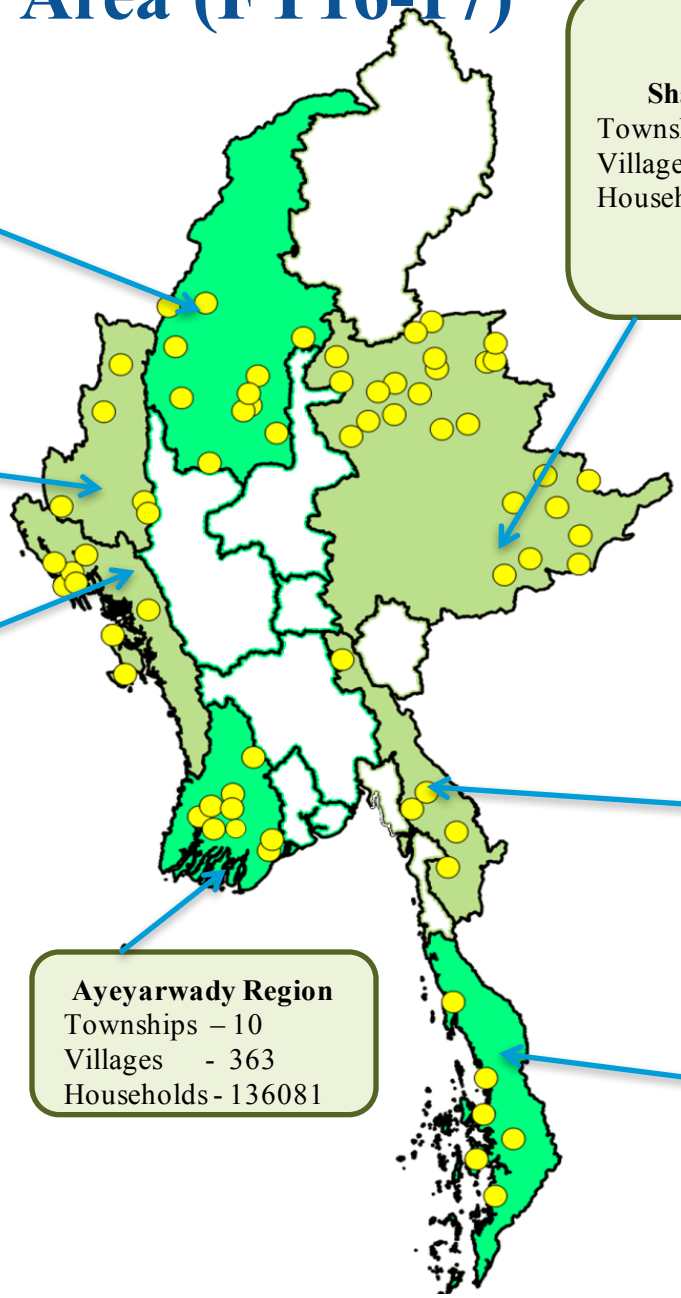
Off-grid Electrification for 2016-2017 Fiscal Year

- **Electrification System**
  - Solar Home System
  - Mini-Grid System

  (Solar, Hydro, Bio-mass and Bio-gas System)
- **Electrification Item (9 items)**
  - House-hold Electrification

    (small, medium ,Large)
  - Rural Health Centre
  - School (Primary, Middle, High)
  - Religious Building
  - Street Light

Off grid project Area (FY16-17)



Sagaing Region
Townships - 11
Villages - 91
Households - 7756

Shan State
Townships - 25
Villages - 730
Households - 26606

Chin State
Townships - 5
Villages - 274
Households - 11379

Rakhaing State
Townships - 9
Villages - 350
Households - 30384

Kayin State
Townships - 5
Villages - 110
Households - 7896

Ayeyarwady Region
Townships – 10
Villages - 363
Households - 136081

Tanintharyi Region
Townships - 6
Villages - 164
Households - 16666

Remote communities areas located far beyond 11 miles from national grid and unlikely to receive electricity in next 10 years are targeted to pre-electrify.

First ICB for Solar PV Systems Launched in March 2016

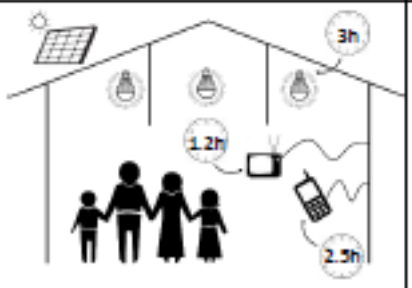
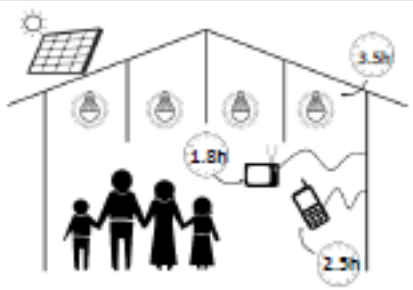
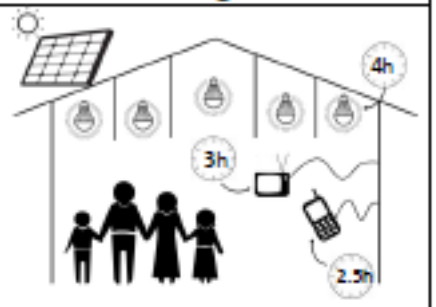
Total: 151,166 solar PV systems, in 12 lots, estimated costs of $67 m

- SHS - 136,768 Nos
  (30Wp, 45Wp, 60Wp)
- School - 1,564 Nos
  (120Wp,375Wp,475Wp)
- Health Center - 328 Nos
  (180Wp)
- Religious Building - 2,096 Nos
  (120Wp)
- Street Light - 10,410 Nos
  (70Wp)

Bid evaluation is under way. A total of 354 bids for all 12 lots received

Targeting subsidies for the Poorer of the Poor

- DRD offers SHS of three different sizes, the smallest with highest % of subsidies, targeting the poor, to meet the basic needs for lighting and ICT.

	Small	Medium	Large
= LED light ≥ 240 lumens 4h = 4 hours per day = TV or other 15 watt appliance			
Service level	3 h lights, 1.2 hr TV, 2.5 h phone charging	3.5 h lights, 1.8 hr TV, 2.5 h phone charging	4 h lights, 3 hr TV, 2.5 h phone charging
System cost (kyat)	300000	380,000	420,000
Subsidy (kyat)	270,000	330,000	340,000
Cost to user (kyat)	30,000	50,000	80,000

Community Organization and Mobilization

- Each village participating in the Off-Grid program must form a Village Electrification Committee (VEC)
- DRD will develop guidelines for VEC formation.
  - ❖ To organize at least 9 persons in the committee
  - ❖ To involve at least 3 women in the committee
  - ❖ To involve 50% of middle age persons
  - ❖ To be a collaborator for the development of the village

VEC

- Explain the systems to villagers
- Count the number of each system type
- Collect down payments
- Fill out SHS Form, keep one copy for records
- Transfer the down payment to NEP account.

Training

Sr.	Type of Training	Place	Date	No.of Trainee	Remark
1	Training for Verification the Component of **Solar Home System and Design Calculation**	Department of Rural Development (Head Quarter)	19.1.2016 – 22.1.2016	45 Union -35 S&D -10	Pro-Engineering
2	Training for **Solar Mini-grid Installation and Verification**	Department of Rural Development (Head Quarter)	4.2.2016	39 Union -23 S&D -16	ADB (Technical Assistance)
3	Capacity Building for **Biomass, Biogas Hydro Mini-grid**	Department of Rural Development (Head Quarter)	10.3.2016-11.3.2016	25 Union -23 S&D - 2	ADB (Technical Assistance)

Challenges and Barriers

- Lack of communities institutional capacity due to people contribution at the beginning of the project
- Most of the users don't want to pay the cost of system without seeing the product
- Poor access to finance by some users
- Lack of knowledge for the use of good qualified product, operation and maintenance of the system
- Lack of private sector participation in remote areas
- Guidelines of the mini-grid system, operation and maintenance, collection of tariff (1% of household target in first year of NEP Project)
- Time is limited to complete target installation for FY16-17
- Feasible data for mini-grid and budget allotment for feasible study

Lesson Learned and Conclusions

- **Vision and sustained high-level government commitment to** achieving universal electrification have been crucial to the preparation and implementation of NEP.

- Programmatic, sector-wide approach helped align and sustain engagement from different stakeholders for implementing rapid scale-up of electrification.

- Once over the financing hurdle, institutional capacity in the public and private sector becomes a major constraint to implementation and delivery of results.