Achieving Universal Electricity Access: Solar Home Lighting Systems for ISA Member Countries

IV BRICS Energy Ministers' Meeting
11 November 2019

INTERNATIONAL SOLAR ALLIANCE

Presentation Outline

- **International Solar Alliance - Overview and Key Achievements**
- **Problem Statement- Achieving Universal Electricity Access by 2030?**
- **Aggregation Model-Case Studies on Improving Electricity Access**
- **ISA’s proposal for Improving Electricity Access Through Solar Home Lighting Systems**

International Solar Alliance – A Unique Platform for Global Cooperation

Paris Declaration:

ISA launched at COP 21 as India's proposal for a common platform for cooperation among all the UN countries.

Objective of the ISA:

To mobilize USD 1000 billion of solar investments by 2030 in ISA member countries

Membership Status

- ❑ **83 Countries have signed the Framework Agreement of the ISA**
- ❑ **61** Countries have ratified the FA
- ❑ ISA Membership is now **open to all UN Member States**

ACHIEVEMENTS & PIPELINE

AGGREGATION

Solar Pumps
270829

Solar Mini Grids
73.1234 MW

Solar Rooftops
275.309 MW
509.3568 MW
256.9 MW

INCUBATOR

Solar E-mobility
& Storage

ENABLER

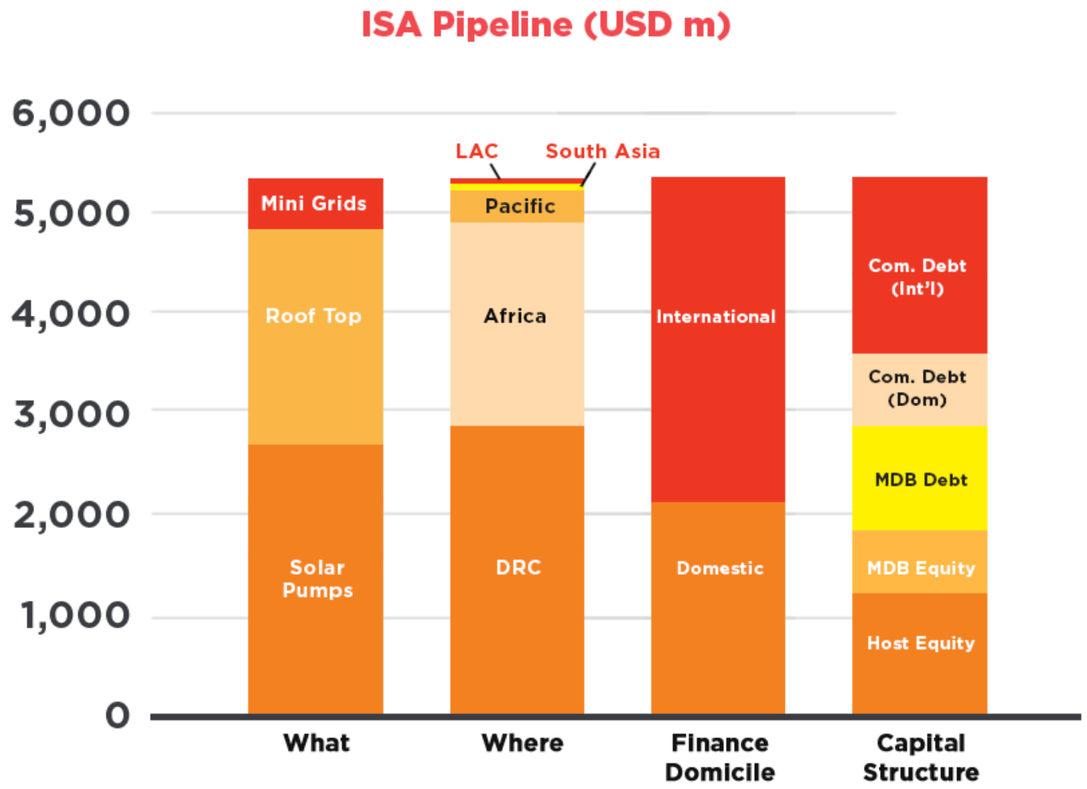
iSTAR-C

Infopedia

ACCELERATOR

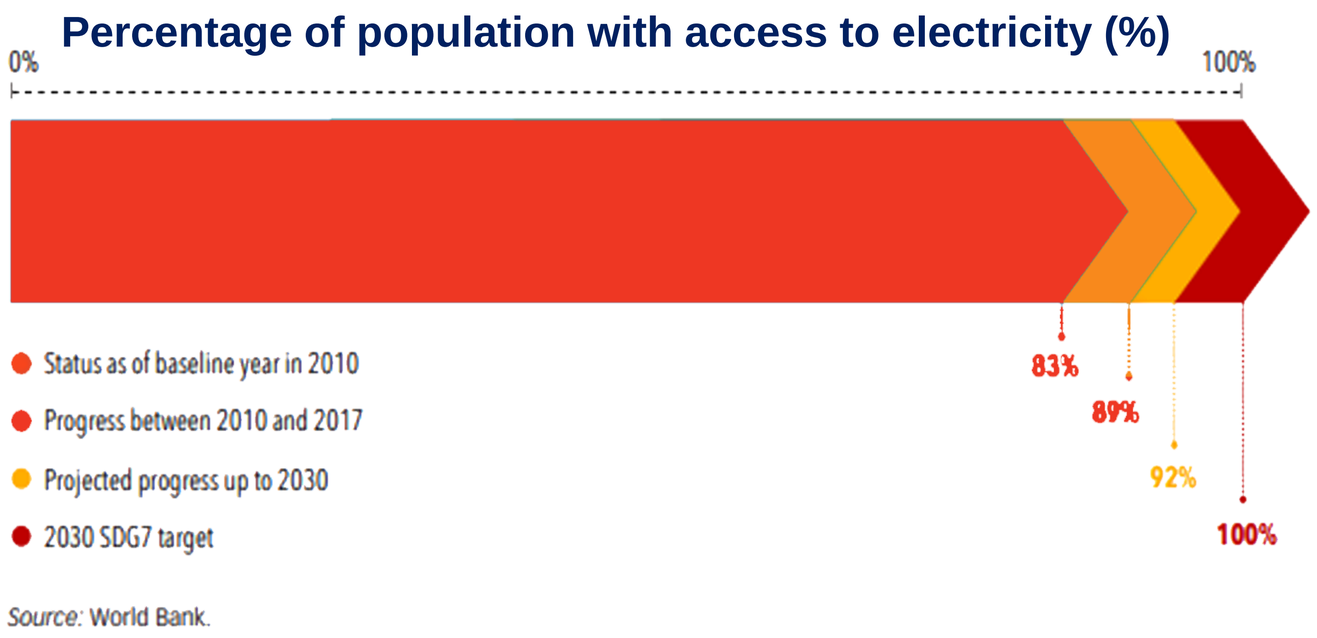
Solar Risk
Mitigation Initiative

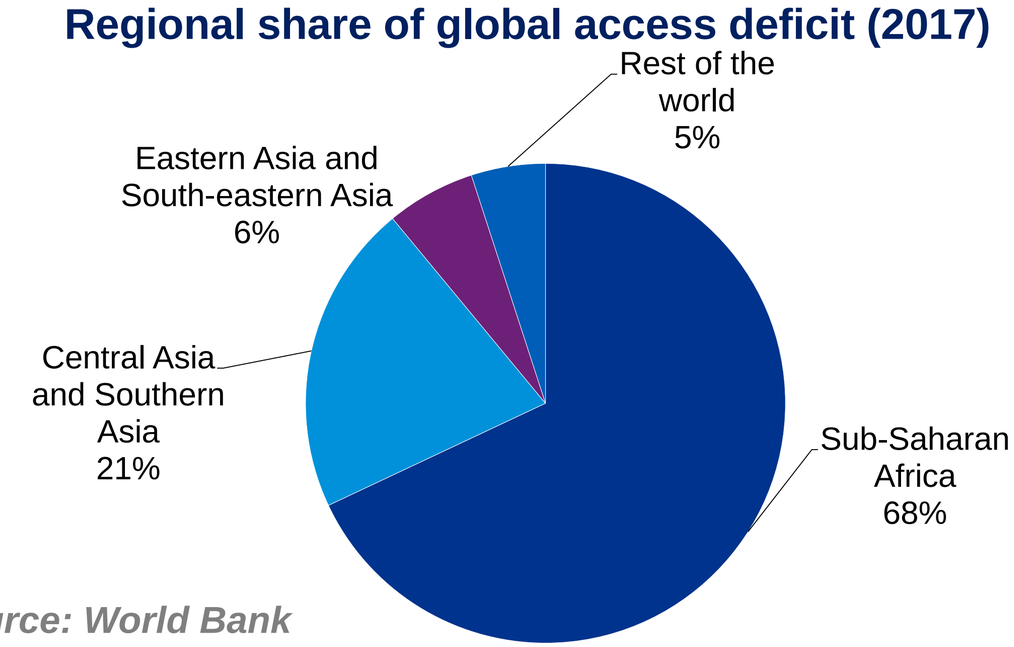
30- Fellowships
200- Training of Trainers



The Challenge - 650 million People Will be Without Access to Electricity Even in 2030

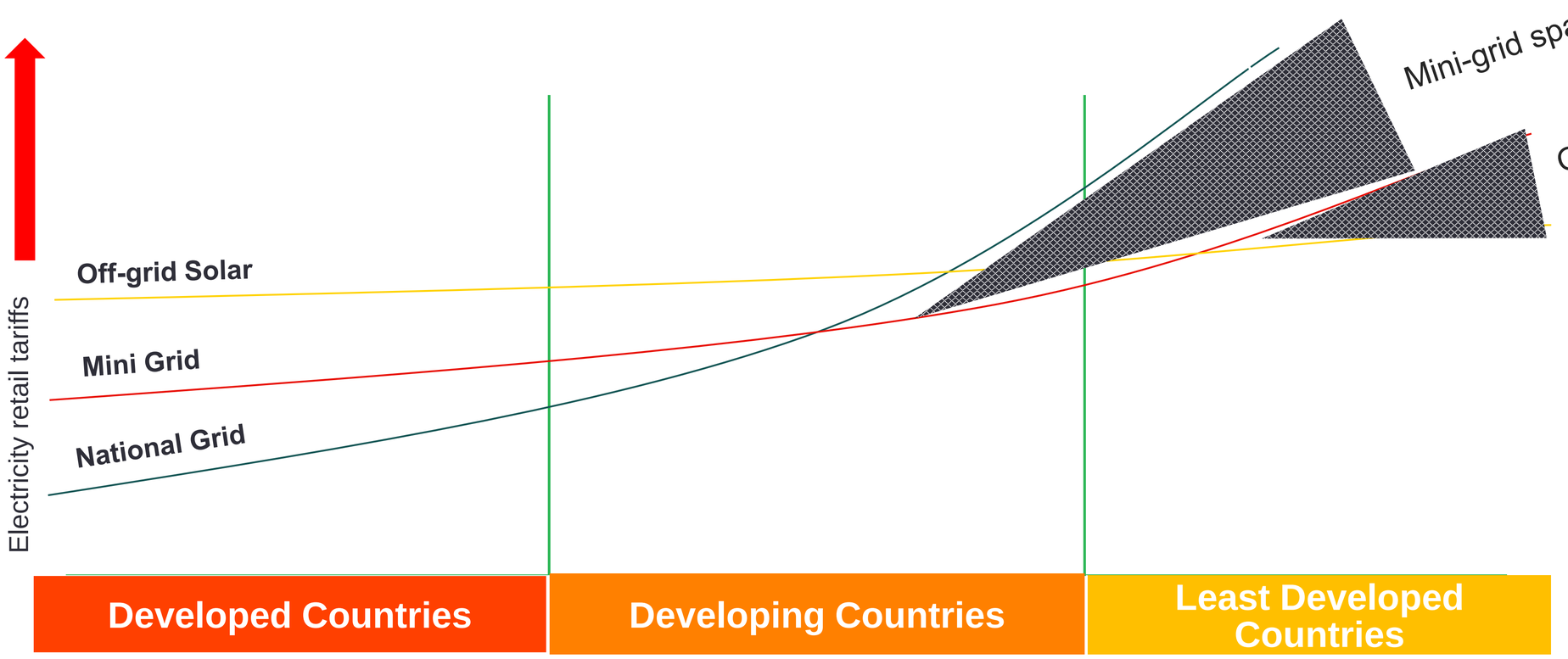
Despite concerted efforts by different stakeholders, the world will not be able to achieve SDG 7 of providing sustainable and affordable energy for all by 2030





- Despite significant progress, **840 million people live without electricity today** and without more sustained action, **650 million people will not have access to electricity even in 2030**
- **500 Million people in Sub-Saharan Africa** will be left without electricity by 2030 (77% of the total)
- ISA countries have some of the **biggest challenges with off-grid access**. **Fifteen of the twenty slowest rates of increase in energy access are ISA countries.**

MINI-GRID AND OFF-GRID SOLAR ARE AMONGST THE MOST ECONOMICAL SOLUTIONS FOR A LARGE UN-ELECTRIFIED POPULATION GLOBALLY

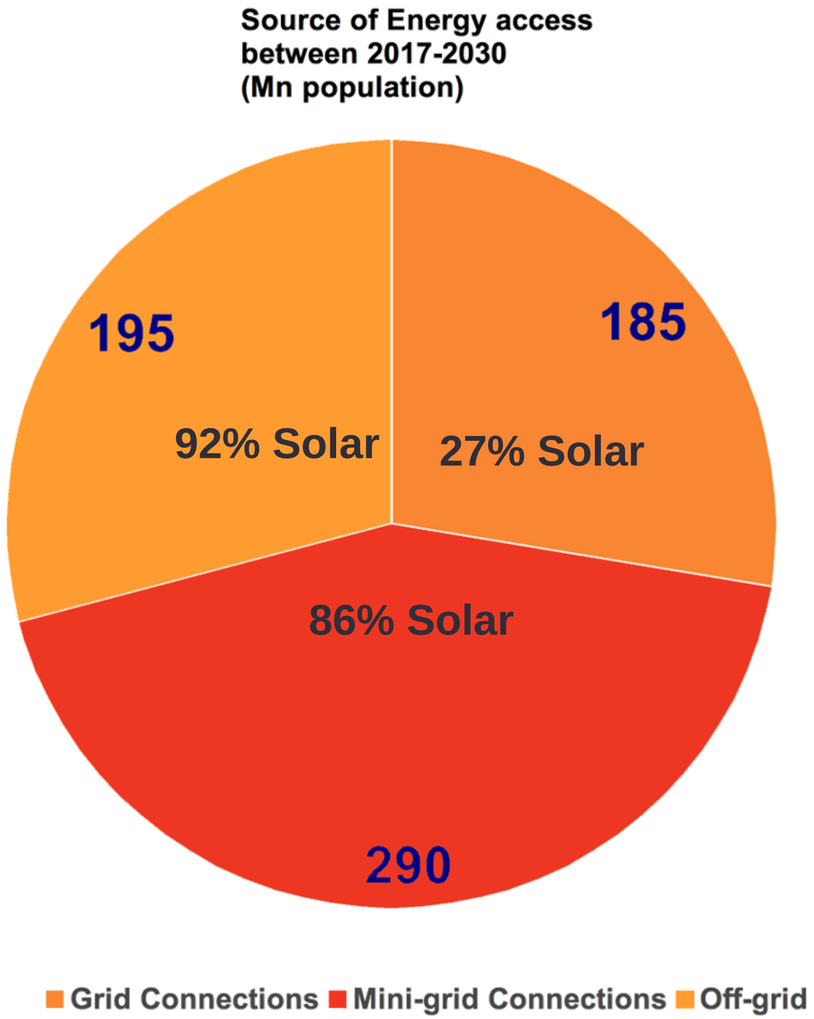


“Decentralised Solutions offer most economical solution for energy access”

Developed Countries	Developing Countries	Least Developed Countries
Large buildings	Densely populated regions	Scattered population
Developed national grid	Mediocre Grid infrastructure	Absence of national grid
High Income	Medium Income	Low Income
High per capita Energy Consumption	Easy terrains	Complex terrains
		Negligible per capita energy consumption

Source: Mini Grids For Half A Billion People (ESMAP), REN 21, Providing Energy Access through Off-Grid Solar: Guidance for Governments (GOGLA), EY Analysis

DECENTRALIZED SYSTEMS ARE THE MOST COST-EFFECTIVE SOLUTIONS FOR TO IMPROVE ELECTRICITY ACCESS BY 2030

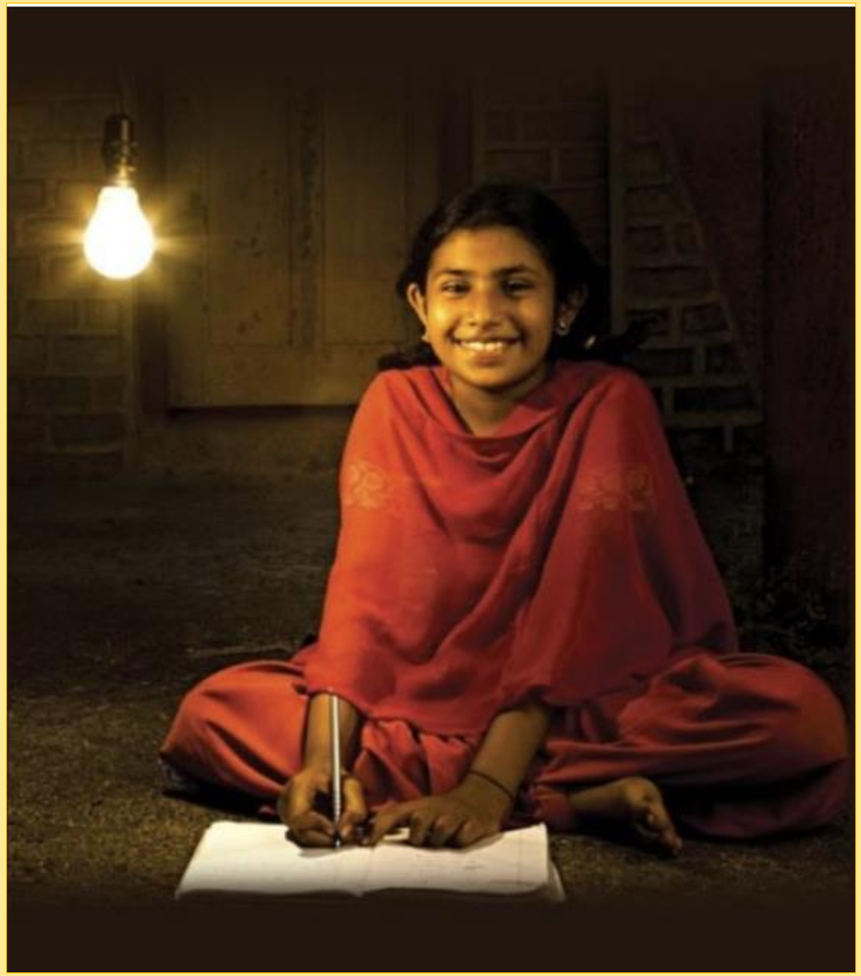


70% of those who gain access by 2030 could have decentralized systems as the most cost-effective solutions

90% of these decentralized systems could be solar powered

~460 Mn population to could get energy access through **Solar** by 2030

Source: IEA - Energy Access Outlook 2017, EY Analysis



CASE STUDIES

1. SHLS in West Africa
2. SAUBHAGYA Scheme- Electrification of India
3. UJALA scheme- Distribution of LED lamps in India
4. ISA’s experience in aggregating demand of solar water pumps

SOLAR HOME LIGHTING SYSTEMS IN WEST AFRICA

Small SHLS for Liberia

Sl.No.	Parameter	Value
1.	SHLS for **MFT Tier II Access**	50 W
2.	Cost of SHLS excluding taxes	USD 495
3.	Taxes	30%
4.	Cost of SHLS including taxes	**USD 644**
5.	Life of SHLS considered for IRR computations	5 years
6.	Avoided monthly Energy spending	USD 18.55
7.	**Financial IRR**	**22%**
8.	**Economic IRR**	**35%**

Source: World Bank report on Western Africa Regional Off-Grid Electrification Project

Key Assumptions:

- FIRR is based on cost of SHLS excluding taxes;
- Monthly consumption includes five battery light points requiring dry cell replacement on a weekly basis; two phone charges 16 times per week; radio dry cells replaced twice per month; and TV powered by small generator recharged once per week
- Conservative estimate of savings to the tune of 66% of total monthly energy spending

- Need to harmonize tax regimes (import duties and VAT) and alleviate the tax burden for Off-Grid Solar products to improve returns
- DC appliance efficiency is improving rapidly and contributing to further improvement in economics and service capacity of SHLS
- Economics of the three key components of SHLS viz. PV panels, LED lights, and batteries (Li-ion) has improved by 70%-80% from 2010 to 2016

SAUBHAGYA SCHEME IN INDIA

Total households- 214 Million

The Saubhagya Scheme is a Government of India project to **provide electricity to all households, which was** launched in September 2017

99.99%

Electrified

0.01%

To be electrified

Households electrified in last 2 years- **26 Million**

Key features

- DISCOMs organized camps in villages for on-the-spot release of electricity connections
- Innovative mechanisms like dedicated web-portal/Mobile App for collection/consolidation of application form
- Connections included provision of service line cable, energy meter, single point wiring, LED lamps and other accessories
- In case of remote and inaccessible areas, **solar home lighting systems of 200- 300 Wp (with battery bank), up to 5 LED lights, 1 DC Fan and 1 DC power plug were provided**

Funding

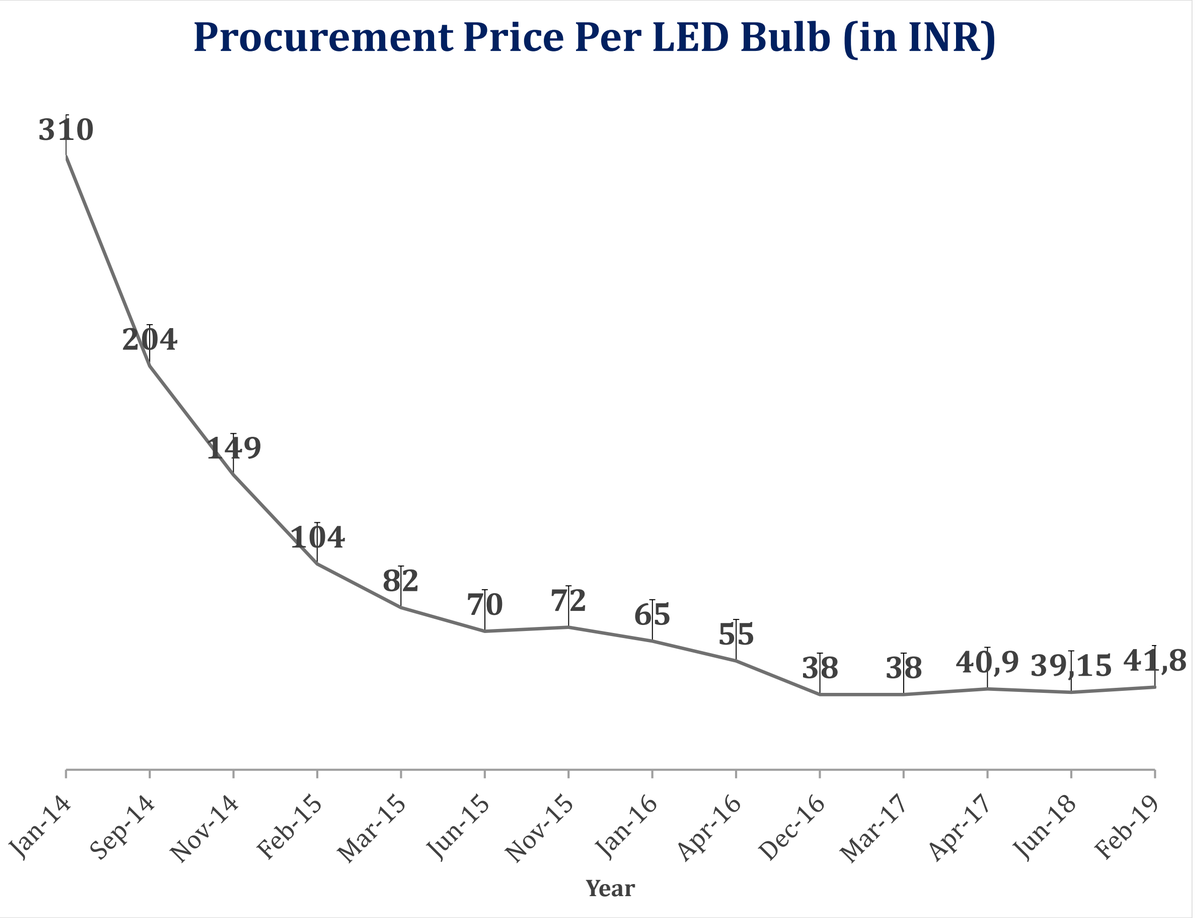
Agency	Nature of support	Quantum of support (%)
Govt of India	Grant	60
Utility/State Contribution	Own Fund	10
Loan (FIs/ Banks)	Loan	30
Additional Grant from GOI*	Grant	15%

*Achievement of prescribed milestones

Source: Ministry of Power, GoI

UNNAT JYOTI BY AFFORDABLE LEDs FOR ALL (UJALA) IN INDIA

- The Indian government launched the National UJALA Program in 2015 to provide LED bulbs to domestic consumers
- It is **largest non-subsidy based LED lighting program in the world**
- Indian utilities distributed over **7 Million** LED tube lights
- Estimated energy savings of **525 million kWh** per year



Source: EESL

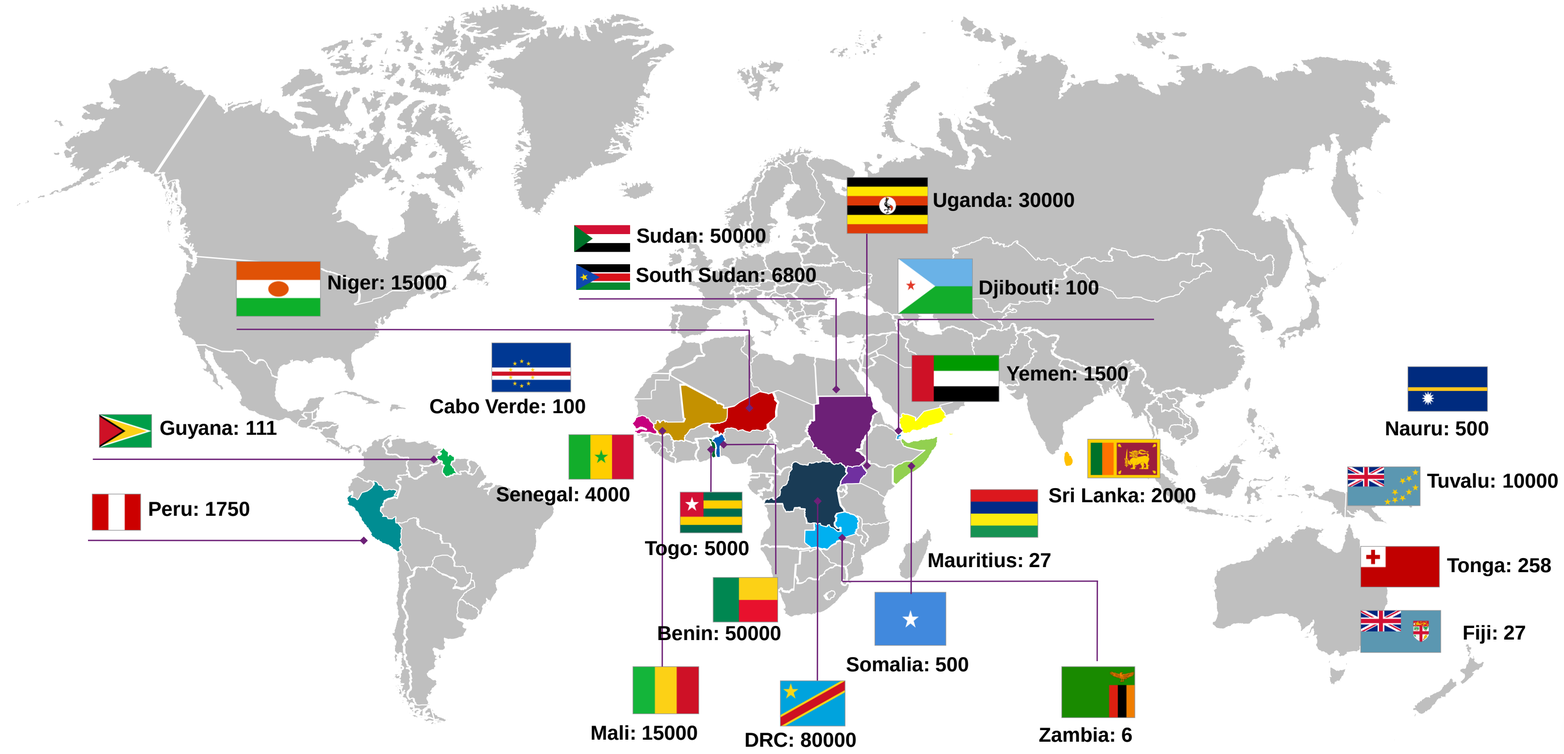
Demand Aggregation and Economies of Scale resulted in decrease in LED prices by 87%

EXPERIENCE OF ISA IN DEMAND AGGREGATION OF SOLAR WATER PUMPS

22
Number of countries

4
Number of continents

2,72,000
Total Demand of Solar Pumps

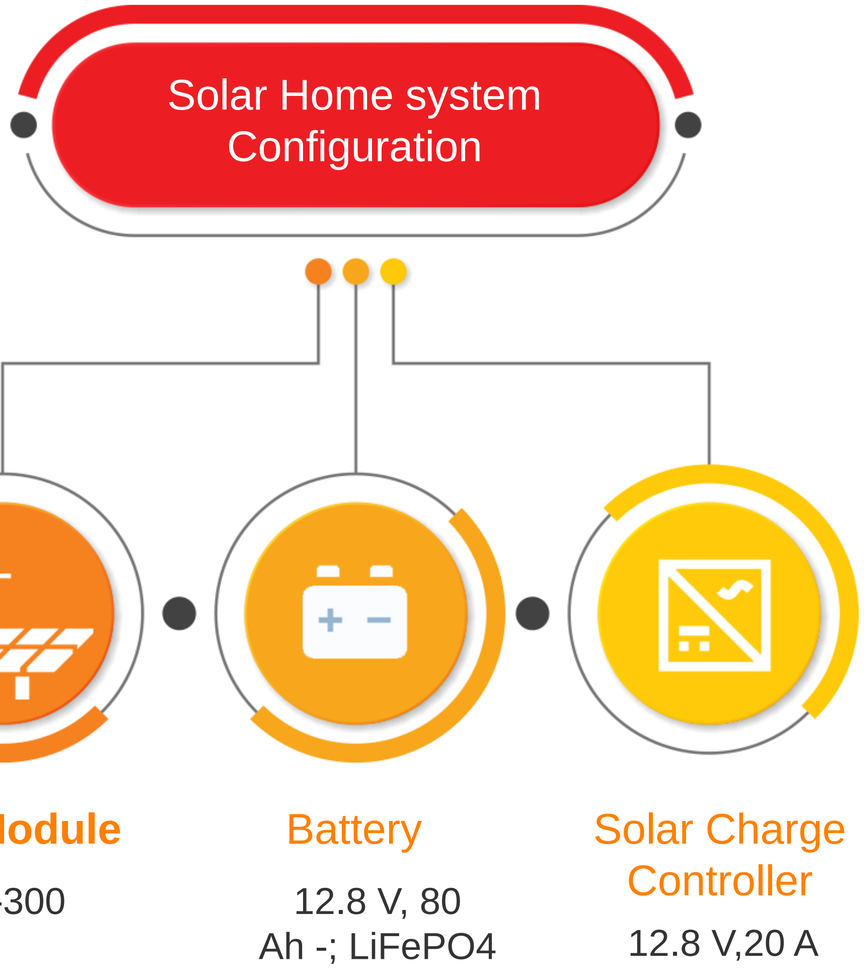


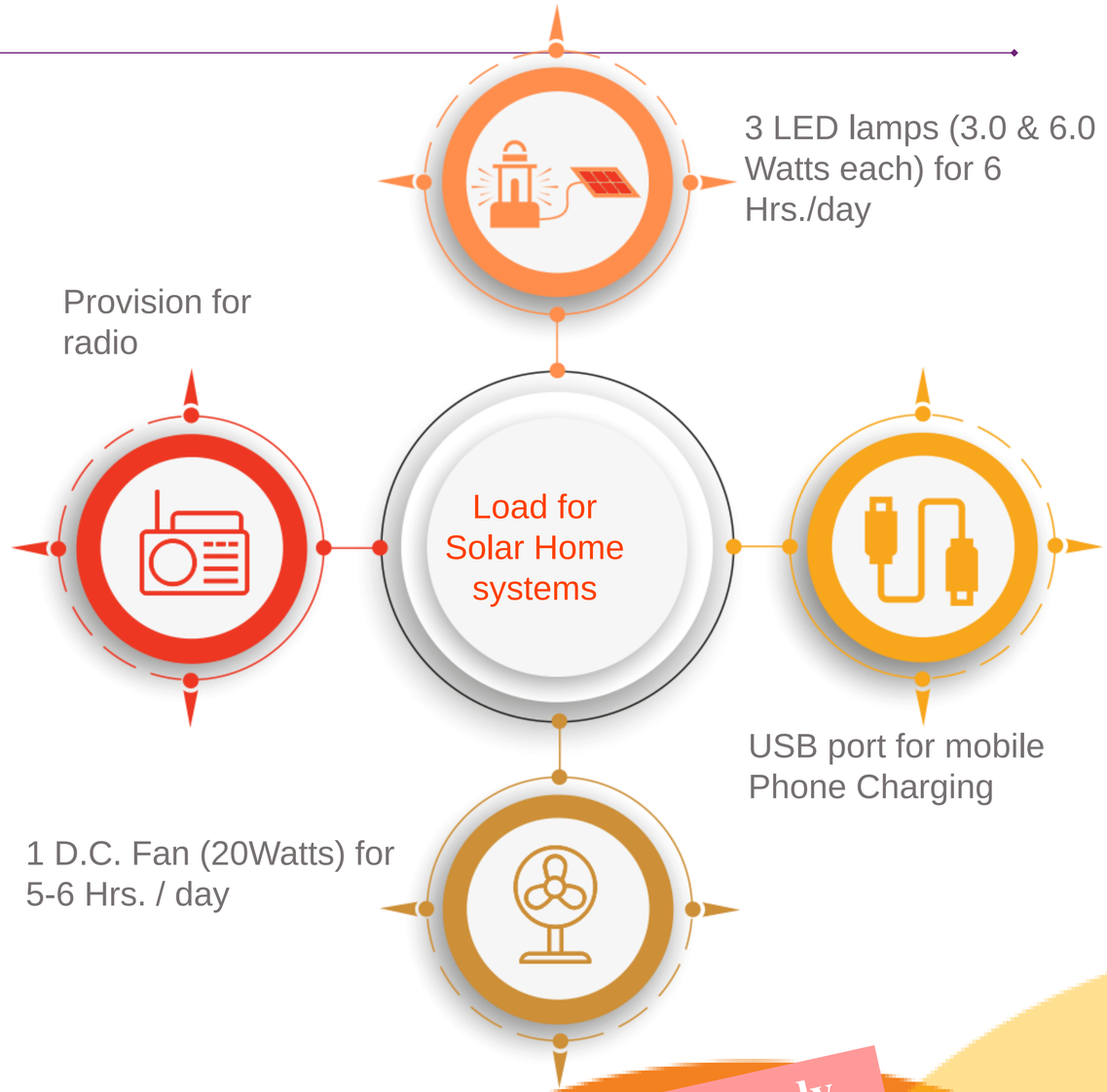
Timeline for SWPS tender

- **16th May:** Upload Bid document on website, UNDB, CPC, NFP
- **7th June :** Pre-bid meeting at ISA HQ
- **28th June to 27th Aug :** Clarifications/Amendments after deliberation with ISA
- **12th Sep :** Bid Submission by bidders
- **25th Sep:** Technical Bid Evaluation
- **27th Sep:** Price Bid Opening

ROLE OF ISA IN PROMOTING SOLAR HOME LIGHTING SYSTEMS

PROPOSED SHLS CONFIGURATION





For Illustration only

ISA PLAN FOR SOLAR HOME LIGHTING SYSTEMS

- Inviting interest from Member Countries for SHLS programme and Demand aggregation of SHLS
- International Competitive Bidding to leverage economies of scale and reduce SHLS prices
- Design innovative financial and business models in partnership with MDBs and DFIs
- Training of local technicians, knowledge exchange programs including capacity building of government institutions and banks through i-STARC and Infopedia
- Developing a local entrepreneurship base of system integrators in partnership with local and regional Renewable Energy Centers
- Implementation support including rolling out of pilot projected in participating member countries

FUNDING OF USD 10-42 BILLION COULD PROVIDE UNIVERSAL ELECTRICITY ACCESS THROUGH SOLAR HOME LIGHTING SYSTEMS

Scenario 1

Paratmeter	Value
Population without electricity access by 2030	650 Million
Average size of household	5
No. of households without electricity access by 2030	130 Million
Cost of SHLS including taxes	USD 644
Reduced cost due to demand aggregation (considering 50% cost reduction)	USD 322
Total investment required for achieving universal energy access	~ USD 42 Billion

Scenario 2

Parameter	Value
Population without electricity access by 2030	650 Million
Average size of household	5
No. of households without electricity access by 2030	130 Million
Cost of SHLS including taxes	USD 644
Reduced cost due to demand aggregation (considering 87% cost reduction)	USD 80
Total investment required for achieving universal energy access	~ USD 10 Billion

Source: World Bank report on Western Africa Regional Off-Grid Electrification Project

THANK YOU

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