

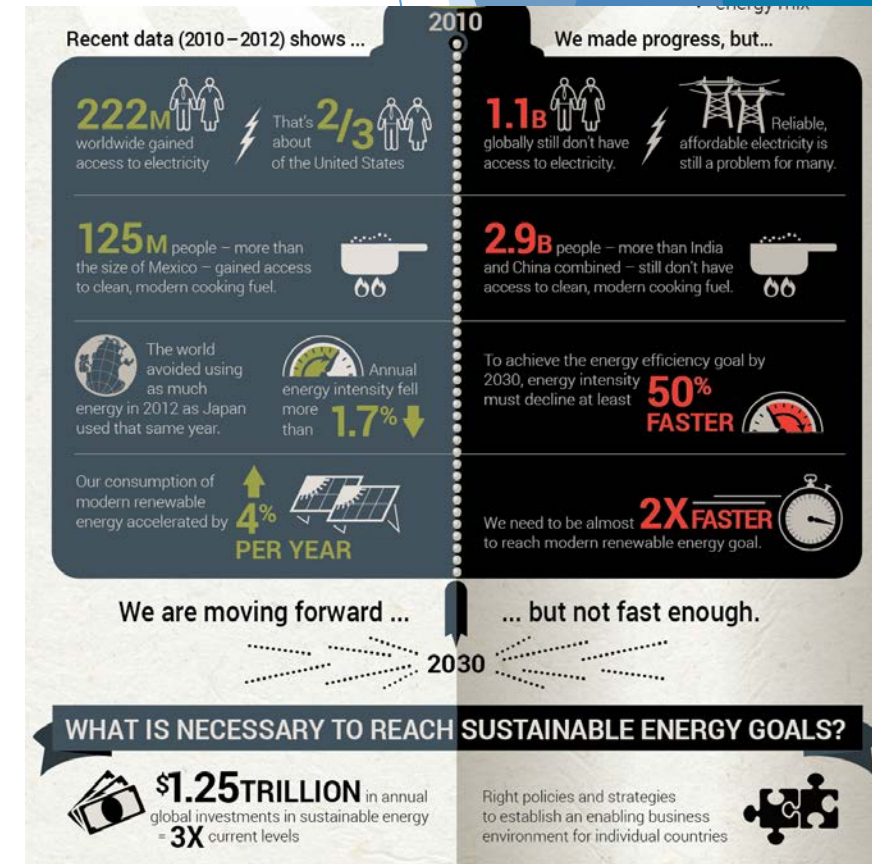
Distributed Renewable Energy for Energy Access

Tracking Shadows

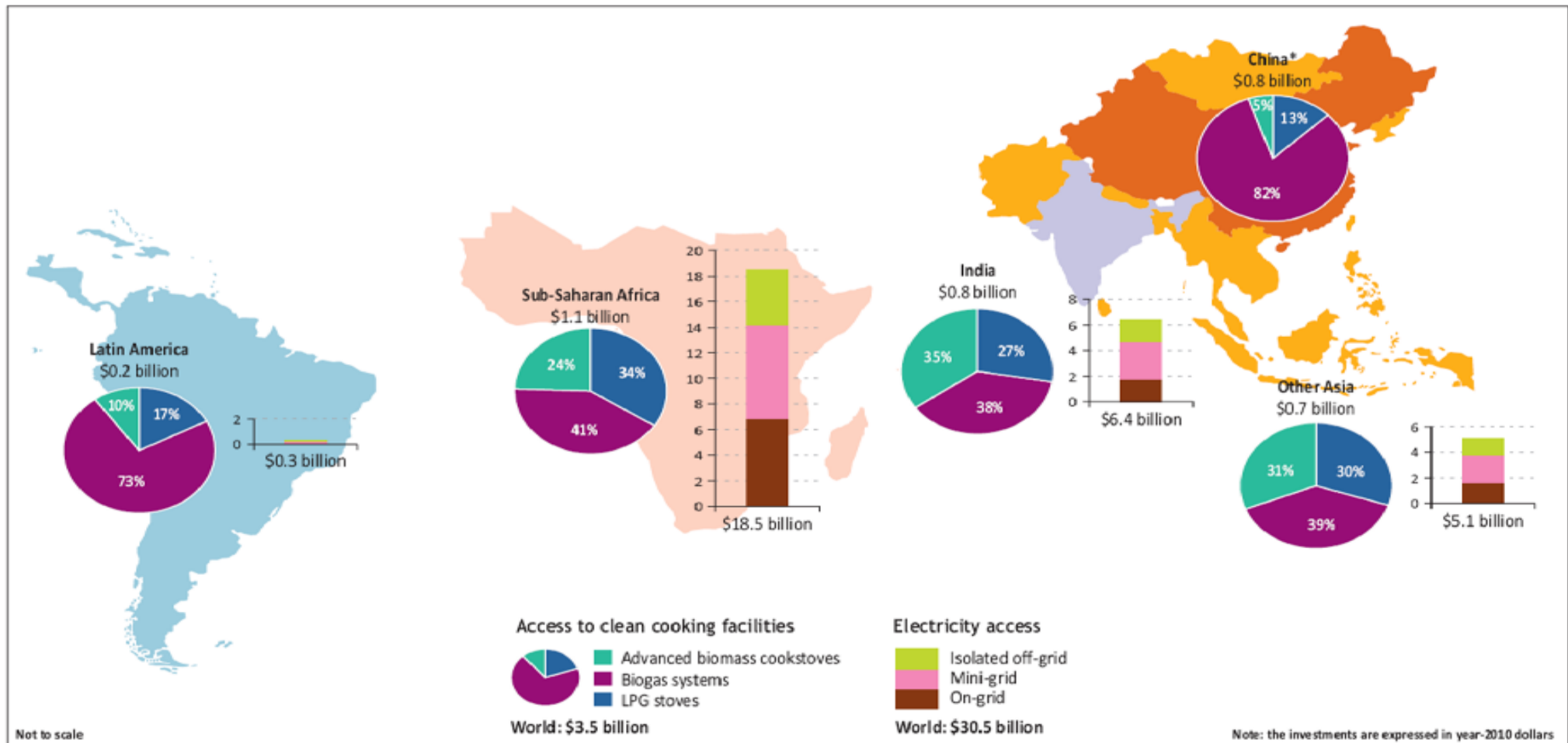
Fabiani Appavou
REN21
10 September 2015

Distributed Renewable Energy (DRE): The way forward for energy access

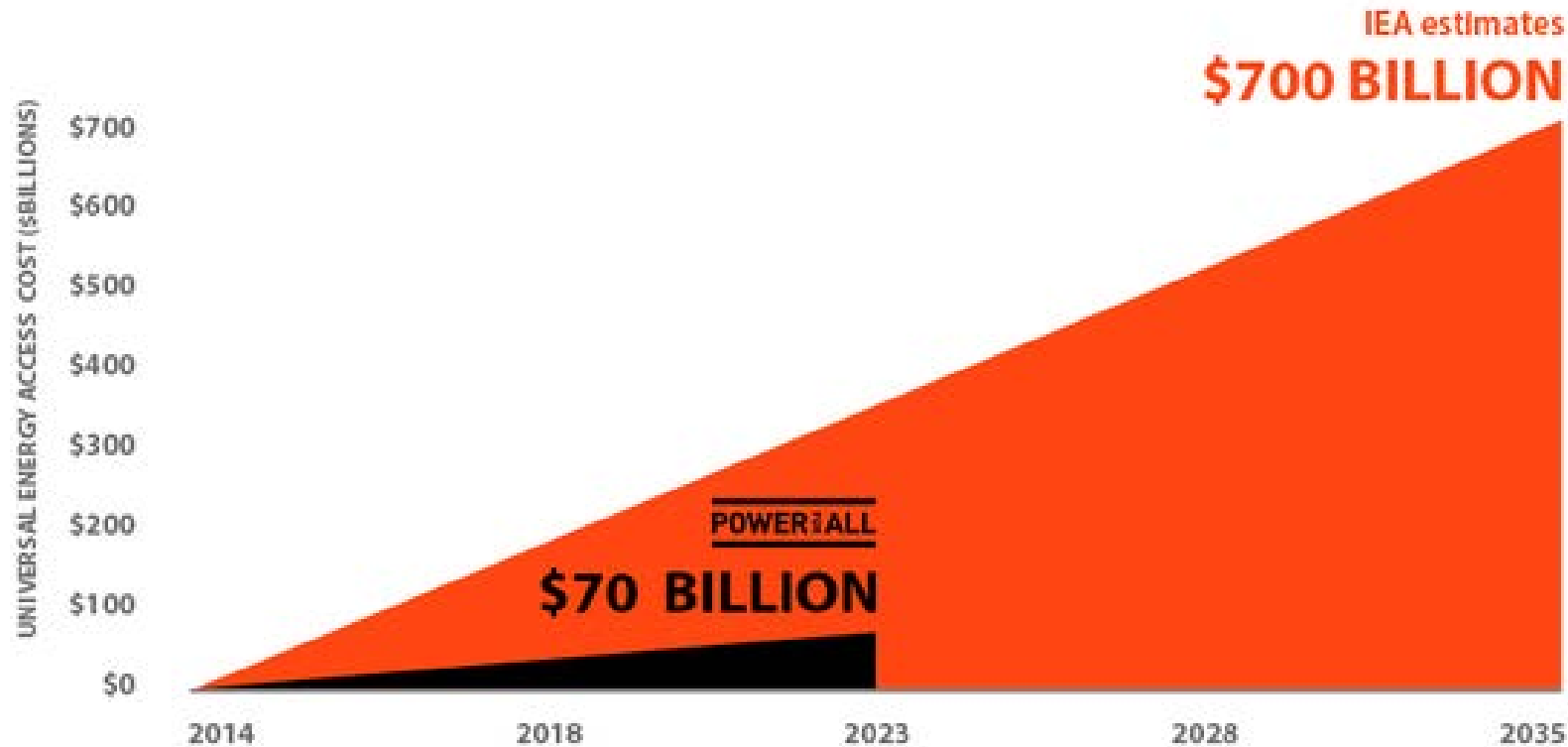
- ▶ According to the IEA,
 - ▶ By 2030, **70%** of the current population lacking access to electricity and clean forms of cooking will be served through decentralized energy.
 - ▶ For universal access, **55%** of all new power till 2030 must come from decentralized energy sources, **90%** of it being from renewables
 - ▶ Of the total investments needed to achieve universal energy access by 2030, **64%** will be off-grid and mini-grid technologies



Distributed Renewable Energy (DRE): The way forward for energy access



Distributed Renewable Energy (DRE): The way forward for energy access



2010

Recent data (2010–2012) shows ...

- 222M** worldwide gained access to electricity. That's **2/3** about of the United States.
- 125M** people – more than the size of Mexico – gained access to clean, modern cooking fuel.
- The world avoided using as much energy in 2012 as Japan used that same year. Annual energy intensity fell more than **1.7%**.
- Our consumption of modern renewable energy accelerated by **4% PER YEAR**.

We made progress, but...

- 1.1B** globally still don't have access to electricity. Reliable, affordable electricity is still a problem for many.
- 2.9B** people – more than India and China combined – still don't have access to clean, modern cooking fuel.
- To achieve the energy efficiency goal by 2030, energy intensity must decline at least **50% FASTER**.
- We need to be almost **2X FASTER** to reach modern renewable energy goal.

We are moving forward ... **... but not fast enough.**

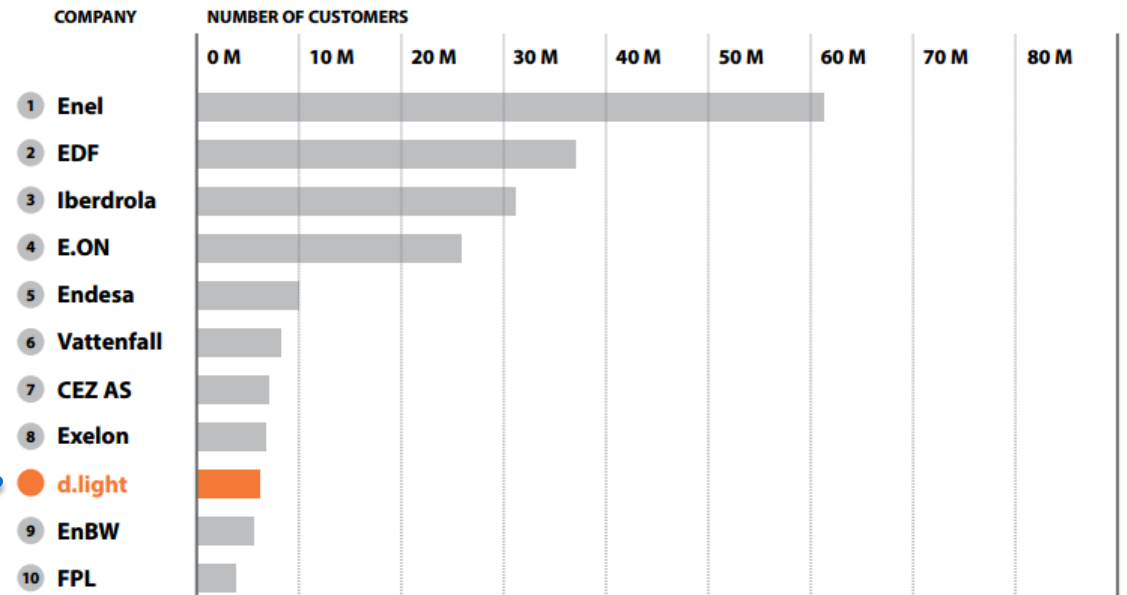
2030

WHAT IS NECESSARY TO REACH SUSTAINABLE ENERGY GOALS?

- \$1.25 TRILLION** in annual global investments in sustainable energy – **3X** current levels.
- Right policies and strategies to establish an enabling business environment for individual countries.

DRE for Energy Access: A Growing market

- ▶ Investments in off-grid solar in 2014: **USD 82 million** (est)
- ▶ Investment in off-grid solar for Jan 2015: **USD 42 million**
- ▶ The market for off-grid lighting products in Africa has acknowledged a **300% growth** in sales i.e. topping 5.7 million in 2014 and this represents only **5%** of the potential market.



DRE for Energy Access: A Growing market

- ▶ Some **26 million households** around the world are currently served by **off-grid renewable energy**
- ▶ **28 million people** provided access to solar lighting in Africa through the Lighting Programme of the IFC/World Bank
- ▶ In **Bangladesh**, more than **60,000 Solar Home Systems** are currently being **deployed every month**

DRE for Energy Access: A Growing market

Tanzania announces One Million Solar Homes initiative

18. FEBRUARY 2015 | [MARKETS & TRENDS](#). [GLOBAL PV MARKETS](#). [INDUSTRY & SUPPLIERS](#). [TOP NEWS](#). [OFF-GRID](#) | BY: EDGAR MEZA

Commitments by the IFC, USAID, OPIC, Sunfunder, SNV and Off Grid Electric are expected to put Tanzania at the forefront of the U.S. Power Africa program.

USAID To Invest \$41 Million In Off-Grid Renewable Energy Projects In India

August 20th, 2015 by [Smiti Mittal](#)

MINISTER LAUNCHES SOLAR LANTERN DISTRIBUTION PROGRAMME

February 22, 2013 | [Communications Unit](#)


The government, through the Ministry of Energy and Petroleum, has begun distributing solar lanterns to rural off-grid communities to replace kerosene lanterns, as part of measures to mitigate any effect the partial removal of subsidies on fuel will have on the rural poor. The programme aims at providing 200,000 solar lanterns in off-grid rural homes over a period of five years. Launching the programme at Alorkpem, Off Big Ada in the Greater Accra Region on Thursday, the Minister of Energy and Petroleum, Hon. Emmanuel Armah-Kofi Buah, said the quantum of government sub-

JANUARY 18, 2015

PERU PROVIDES FREE SOLAR POWER BY GIVING 2 MILLION OF ITS POOREST RESIDENTS SOLAR PANELS



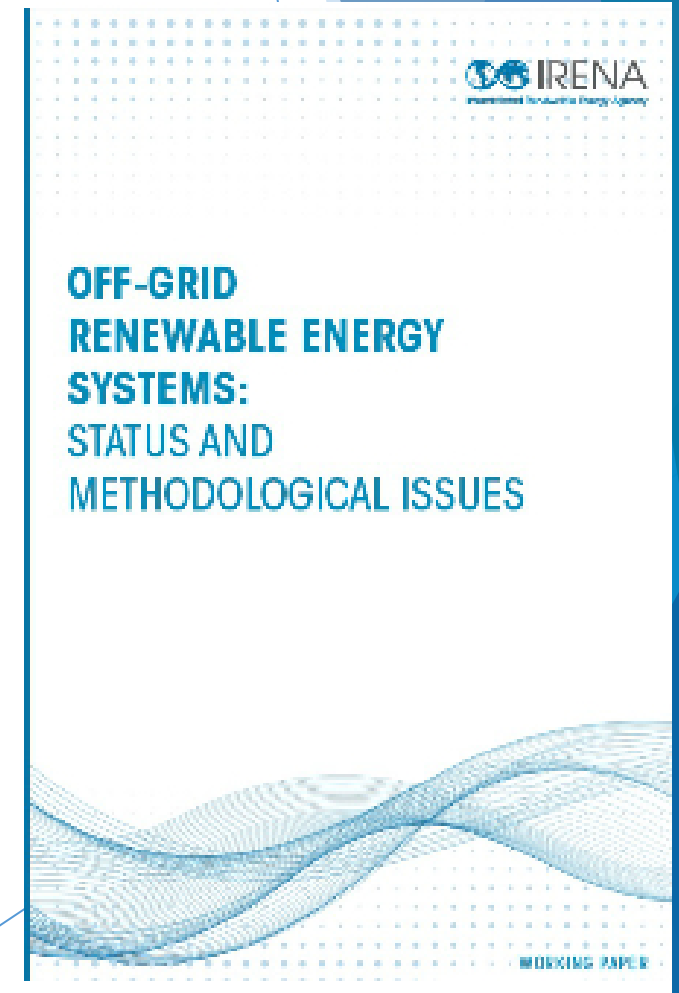
- Some 6 millions SHS have been installed worldwide
- In Kenya, it is estimated that solar lanterns have provided lighting to 12% of the population compared to 2% in 2009
- 10% of the population of Bangladesh benefits from solar energy

A close-up photograph of a lit oil lamp. The lamp is a dark, shallow bowl with a small flame. The flame is bright yellow and orange, with a blue base. The lamp is resting on a dark, textured surface, possibly a piece of wood or stone. The background is dark and out of focus.

No quantification of the role of DRE *in terms of MW installed or MWh generated*

Data gaps on the DRE Market

- ▶ Given the growing market size of off-grid systems, effort in developing an accurate DRE datasets is warranted and there is actually an urgent need to improve the statistical basis for off-grid systems.
- ▶ There is a definite need to improve country statistics on off-grid renewable energy and this will require the engagement of local development agencies, utilities, end users and technology providers.



Data gaps on the DRE market

▶ Reasons:

- ▶ Lack of country reporting and consolidation mechanism to track DRE systems
- ▶ Country statistics do usually not take into account systems < 1MW
- ▶ Lack for reporting from donors, private sector, NGO's and industry on their activities and projects
- ▶ Focus on the “end” rather than on the “means”
- ▶ Lack of good, timely and reliable data source

▶ Implication:

- ▶ No proper understanding of the market dynamics => prohibits sound decision making to put in place enabling policy frameworks to attract and scale up investment in DRE and renewables at large



The other side of the moon



REN21 Initiatives



RENEWABLES 2015 GLOBAL STATUS REPORT



05 DISTRIBUTED RENEWABLE ENERGY FOR ENERGY ACCESS

COUNTRY	TECHNOLOGY/ SYSTEM	CAPACITY ADDED IN 2014	CUMULATIVE AT END-2014	ADDITIONAL INFORMATION (including programme, financing partner and project developer)
AFRICA				
Mali (continued)	Hybrid mini-grid (PV / diesel)		2.1 MW	- 21 hybrid mini-grids installed - Consolidated at country level
	Improved cookstoves	17,529 units	25,459 units	- Domestic and productive stoves - Implemented under the SNV-funded EPGAP project
	Improved cookstoves		3,100 units	Implemented under a Plan International project
Mauritania	Solar water pumping systems		16 kW _p	- Eight solar water pumping systems for community water supply and irrigation installed - Installed by ARE members
	Hybrid mini-grid (PV / diesel)		6 units	PV / diesel power plants (three systems of 15–20 kW _p and three systems of 25 kW _p)
Morocco	Solar home systems		51,599 units (2013)	Implemented under the Governmental Rural Electrification Programme
Mozambique	Solar PV (pico)		6,600 units	Implemented under the EnDev Programme ²
	Solar outdoor micro-station		6 kW _p	- 1,800 residents electrified - Installed by ARE members
	Mini-grid (solar)		9 kW _p	- Three compact mini-grids installed - Installed by ARE members
	Improved cookstoves	4,500 units	4,700 units	Implemented under the EnDev Programme ²
Niger	Solar PV		4 MW	Consolidated at country level
	Solar lamps	7,600 units		Implemented under an SNV-funded project
	Mini-grid (solar)		27.5 kW _p	- 105 households electrified and electricity for productive use - Implemented by Plan International under the ECREEE EREF II

The other side of the moon of the DRE market

▶ Bangladesh:

- 3 millions SHS installed
- 15 million people provided with electricity through solar systems => 10 % of the population
- According to IDCOL, this represents a capacity of 135MW
- Installed capacity of Bangladesh: about 11,000 MW ~ 1% of the country installed capacity from SHS.
- Aim: universal access to electricity by 2021
- Total expected installed capacity: 24 GW out which 10% from renewables

The other side of the moon of the DRE market

► India

Sl. No.	State/UT	Biogas Plants (Nos. in Lakh)	Biomass Gasifiers (Rural+ Industrial) (KW)	Biomass (non-bagasse) (MW)	Water Pumping/ Wind Mills [#] (Nos.)	SPV Pumps (Nos.)	Solar Photovoltaic			
							SLS (Nos. in Lakh)	HLS (Nos. in Lakh)	SL (Nos. in Lakh)	PP (KWP)
1	2	3	4	5	6	7	8	9	10	11
1	Andhra Pradesh	5.2	22914	75.4	6	613	0.1	0.2	0.4	1263.6
2	Arunachal Pradesh	0.0	750	0.0	0	18	0.0	0.2	0.1	217.1
3	Assam	1.1	2933	0.0	3	45	0.0	0.1	0.0	910.0
4	Bihar	1.3	10924	8.2	46	139	0.0	0.1	0.5	775.6
5	Chhattisgarh	0.5	1210	2.5	1	240	0.0	0.1	0.0	14616.7
6	Goa	0.0	0	0.0	0	15	0.0	0.0	0.0	1.7
7	Gujarat	4.3	21530	0.0	945	85	0.0	0.1	0.3	9452.6

32	Daman & Diu	0.0	0	0.0	0	0	0.0	0.0	0.0	0.0
33	Delhi	0.0	0	0.0	0	90	0.0	0.0	0.0	332.0
34	Lakshadweep	0.0	250	0.0	0	0	0.0	0.0	0.1	1090.0
35	Puducherry	0.0	0	0.0	0	21	0.0	0.0	0.0	0.0
36	Others*	0.1	0	0.0	0	0	0.1	0.2	1.3	23885.0
Total		47.5	163235	531.8	1418	11626	2.7	11.0	9.6	85138.4

The other side of the moon of the DRE market

- ▶ Ghana
 - Under the SE4ALL, Country Action Agenda and Rapid Assessment and Gap Analysis

Table 3.4: Solar PV Installations in Ghana (kW)

SOLAR PV SYSTEMS	INSTALLED CAPACITY	GENERATION
Rural home system	450	0.70 – 0.90
Urban home system	20	0.05 – 0.06
School system	15	0.01 – 0.02
System for lighting health centres	6	0.01 -0.10
Vaccine refrigeration	42	0.08 – 0.09
Water pumping	120	0.24 – 0.25
Telecommunication	100	0.10 – 0.20
Battery charging system	10	0.01 – 0.02
Grid connected system	60	0.10 – 0.12
Solar streetlights	10	0.04 – 0.06
TOTAL	853	1.34 – 1.82

Source: Energy Commission, 2011

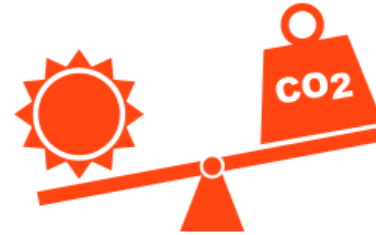
The other side of the moon of the DRE market



51 MILLION
lives empowered



\$1.8 BILLION
saved in energy-related
expenses



4 MILLION
tons of CO₂ offset



13 MILLION
school-aged children reached
with solar lighting



21 BILLION
productive hours created for
working & studying



81 GWH
generated from a renewable energy
source



The other side of the moon of the DRE market

The impact of our work in Africa



10 million people with access to safe, clean solar light.



£230 million saved by families *



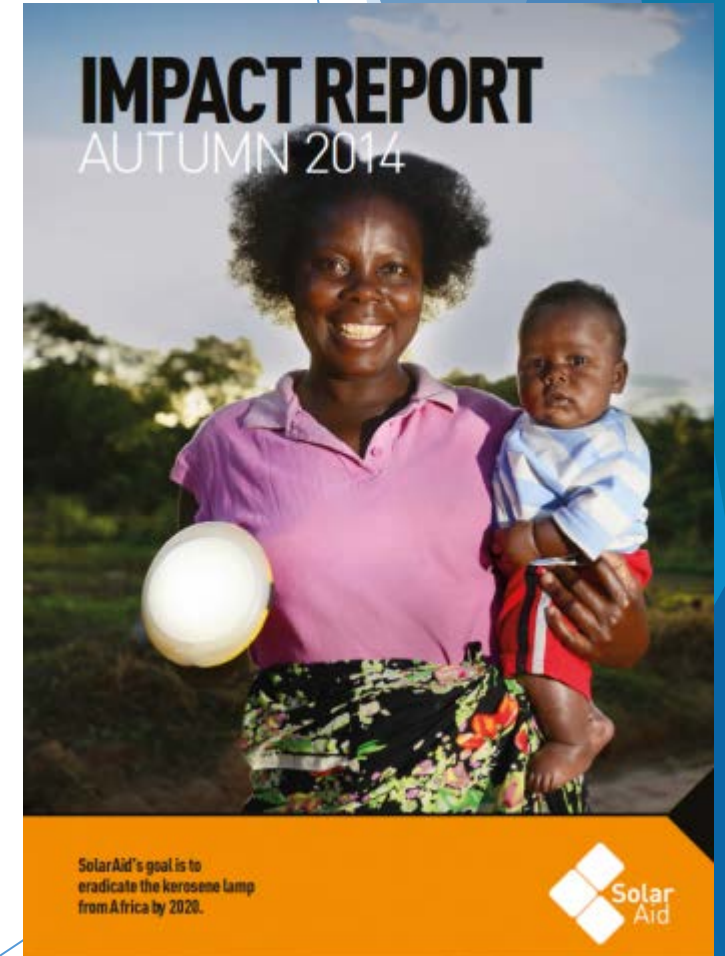
6 million people noticing better health.



2 billion extra study hours for children *

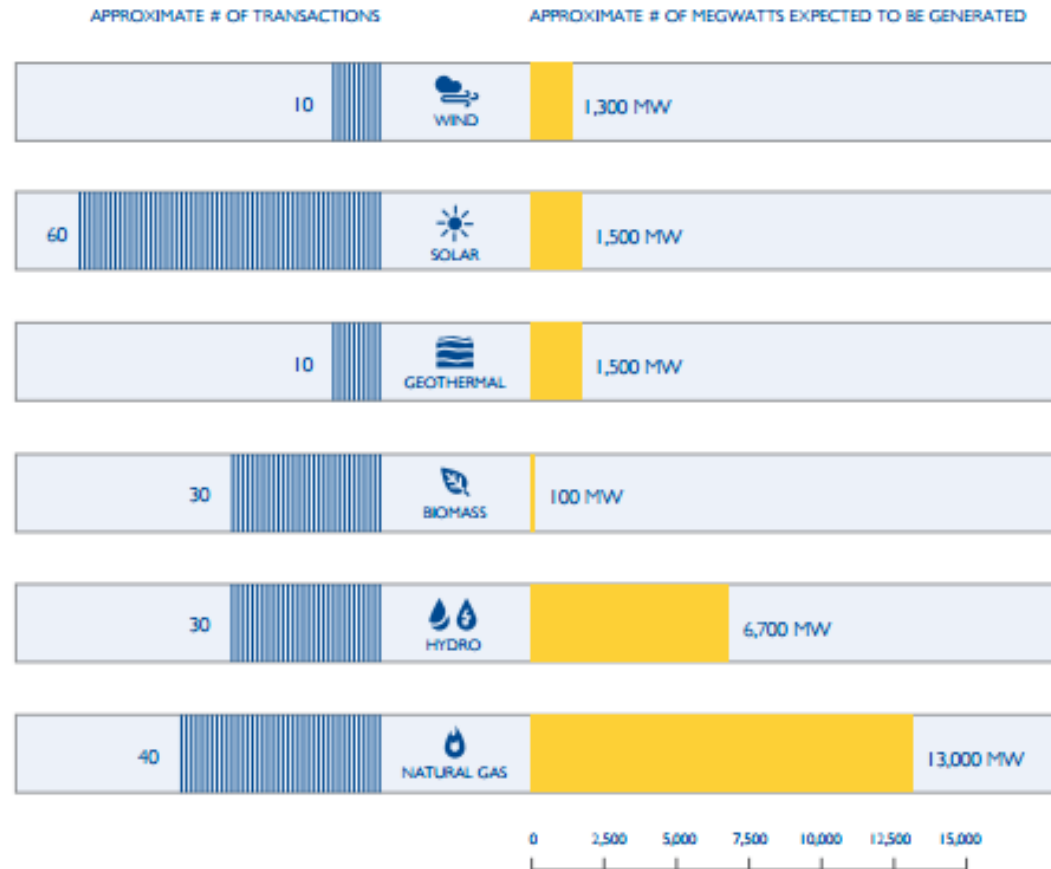


890,000 tonnes of CO₂ averted *



The other side of the moon of the DRE market

BY TECHNOLOGY

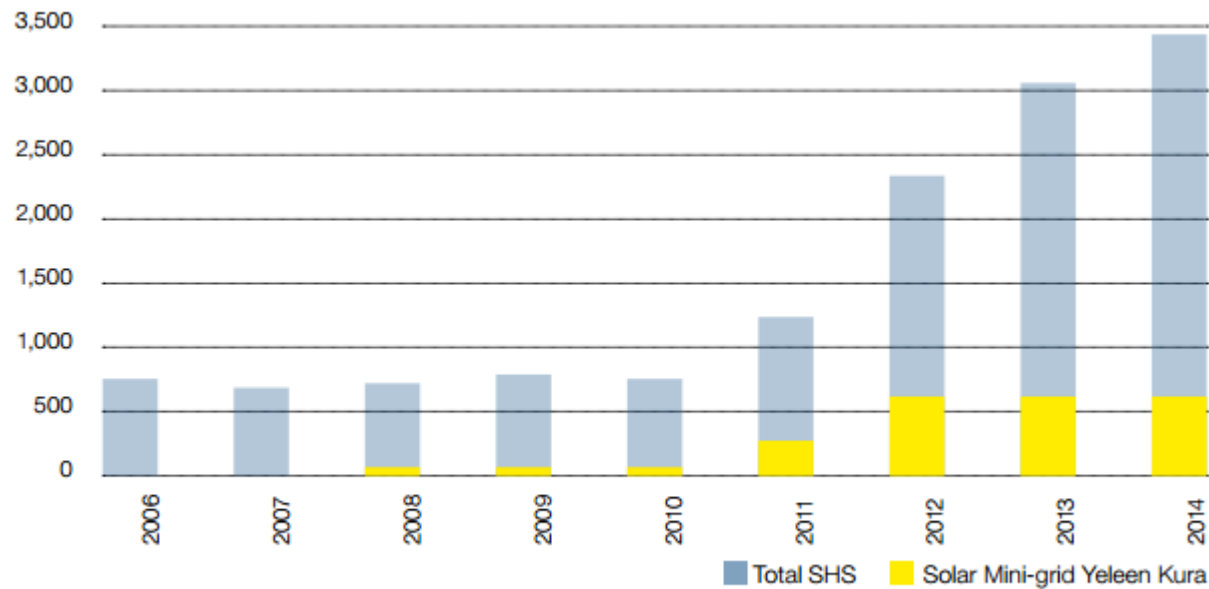


The other side of the moon of the DRE market

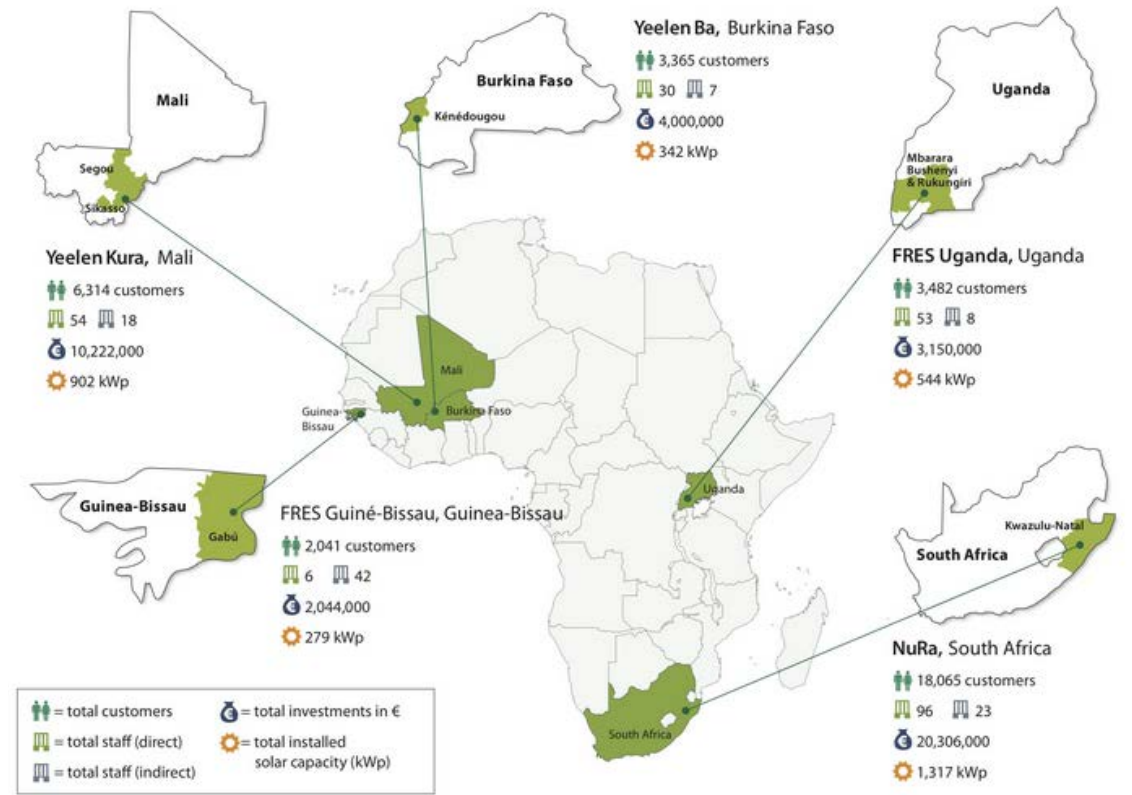


foundation **RURAL ENERGY SERVICES**

Total installed solar capacity in kWp



Customers, staff, investments and installed solar capacity 2014



	Total customers*	Total staff (direct)	Total staff (indirect)	Total investments in €	Total installed solar capacity (kWp)
FRESTotal	33,267	239	98	€ 39,965,000	3,384

Key constraints

- ▶ Inadequate process for up-to date data
- ▶ Frequency of reporting of the data
- ▶ Data on DRE systems less than the MW unit that might not be captured in country statistics.
- ▶ Data collection and reporting in energy metrics only.

But the benefit to countries, the private sector and the stakeholders are enormous.

Questions?

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www.ren21.net