

INTRODUCING IFC AND THE ITALY-IFC ENERGY ACCESS PARTNERSHIP

MARKET TRENDS WORKSHOP: EXPLORING
OPPORTUNITIES FOR ITALIAN COMPANIES



Russell Sturm
Marco Indelicato
Stratos Tavoulareas

IFC: A MEMBER OF THE WORLD BANK GROUP

IBRD

International
Bank for
Reconstruction
and
Development

Loans to
middle-income
and credit-
worthy low-
income country
governments

IFC

International
Finance
Corporation

Solutions
in
private
sector
development

MIGA

Multilateral
Investment
Guarantee
Agency

Guarantees of
foreign direct
investment's
non-commercial
risks

WHAT WE DO

Integrated Solutions, Increased Impact

INVESTMENT

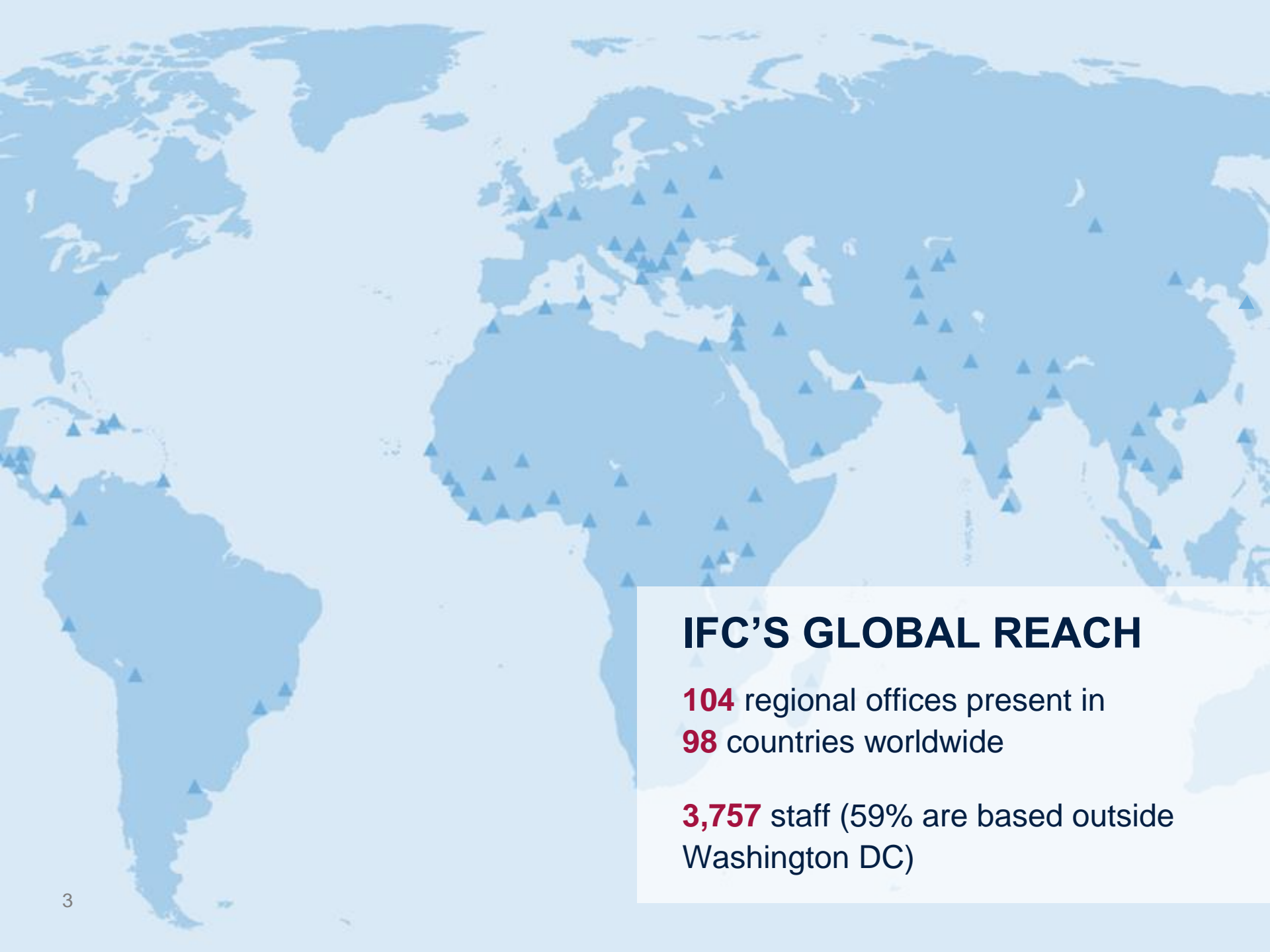
- Loans
- Equity
- Trade and Commodity Finance
- Syndications
- Derivative and Structured Finance
- Blended Finance

ADVICE

- Innovative Solutions Combining IFC's Expertise and Tools to:
 - Help Create New Markets
 - Unlock Investment Opportunities
 - Strengthen Clients' Performance and Impact

IFC ASSET MANAGEMENT COMPANY

- Mobilizing and Managing Capital for Investment



IFC'S GLOBAL REACH

104 regional offices present in
98 countries worldwide

3,757 staff (59% are based outside
Washington DC)

FISCAL YEAR 2016 HIGHLIGHTS

\$18.8 billion in long-term investment:

- **\$11.1** billion for IFC's own account
- **\$7.7** billion mobilized

\$52 billion committed portfolio

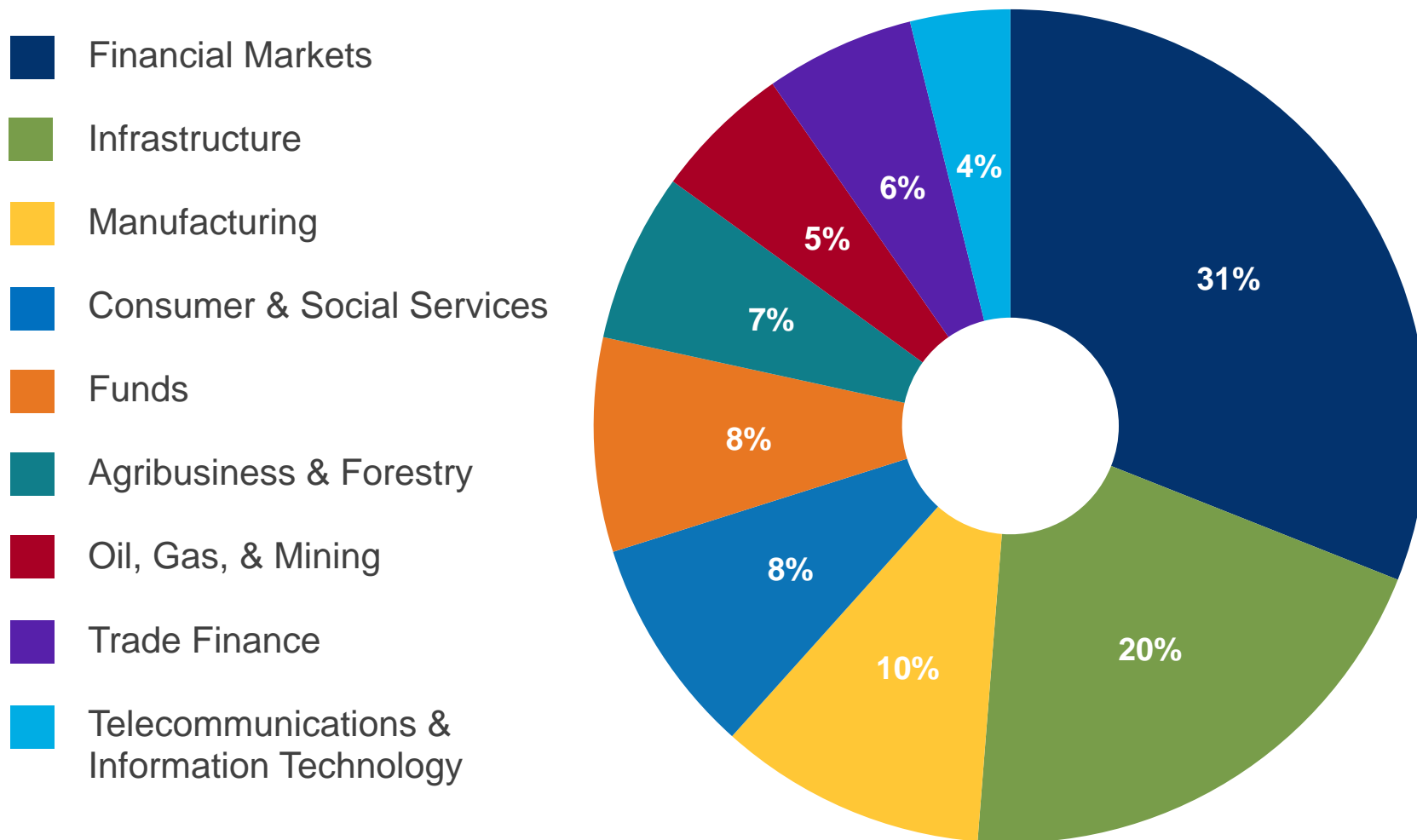
\$5.4 billion invested in IDA countries

Advice: **62%** of program in IDA countries, **21%** in fragile and conflict-affected areas



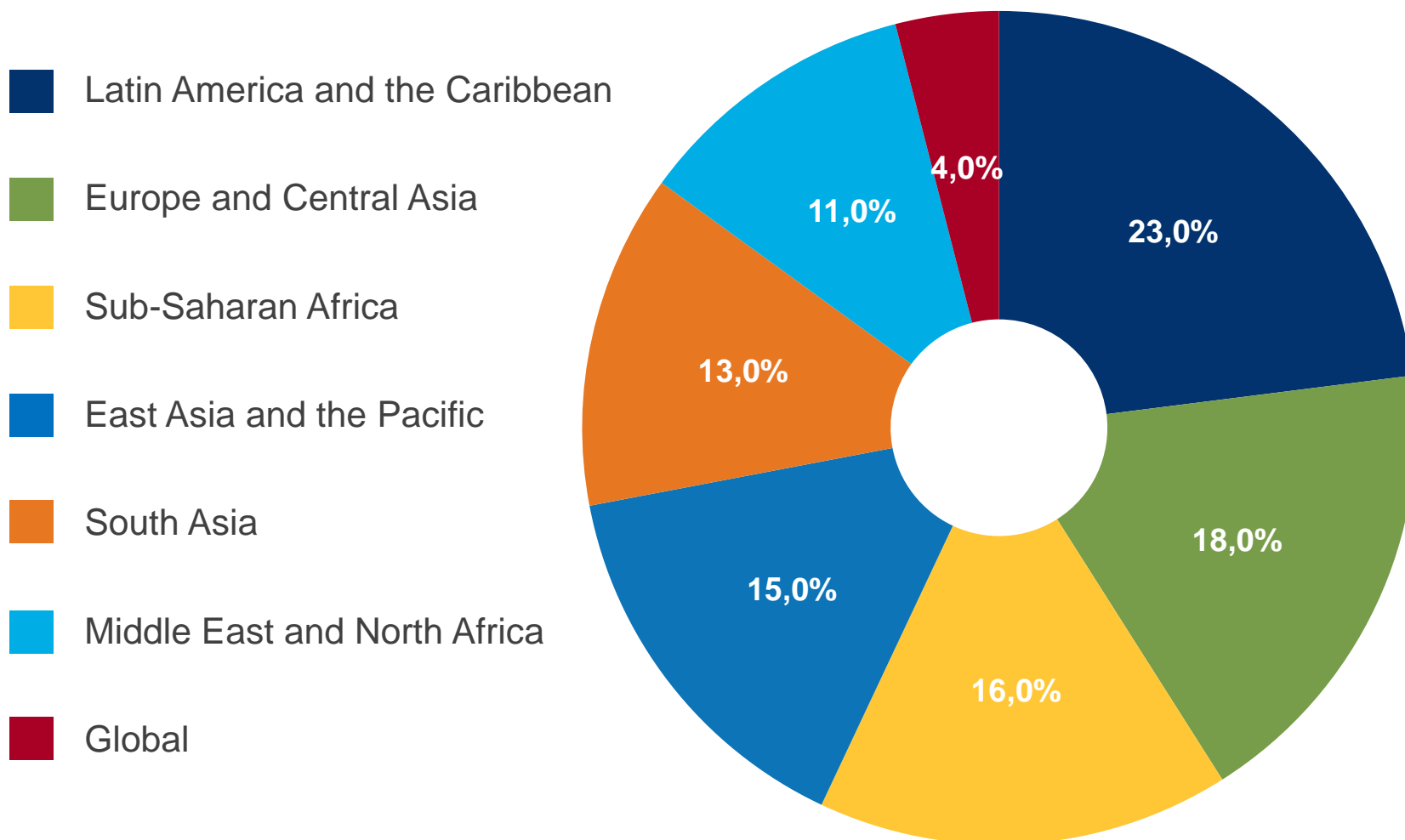
FY16 COMMITTED INVESTMENT PORTFOLIO BY INDUSTRY

TOTAL PORTFOLIO: \$52 BILLION



FY16 COMMITTED INVESTMENT PORTFOLIO BY REGION

TOTAL PORTFOLIO: \$52 BILLION



SETTING THE SCENE: EMERGING BUSINESS OPPORTUNITIES FOR ENERGY SERVICES

- Massive needs
- Established (but dysfunctional) markets
- Emerging opportunities driven by technology and business innovation



IFC

**International
Finance Corporation**

WORLD BANK GROUP



**International
Finance Corporation**
World Bank Group

LIGHTING GLOBAL
Catalyzing Markets for Modern Lighting



AN INNOVATION OF
WORLD BANK GROUP

IFC International Finance Corporation **THE WORLD BANK**

Lighting Global: The Gov't of Italy-IFC Energy Access Partnership

*Enabling the Solar Off-Grid Energy
Industry To Address An Intractable
Global Problem*

Russell Sturm
Global Head
Energy Access
International Finance Corporation

**Rome Workshop for
Italian Companies
October 27, 2016**



Shedding Light on the Darkness...

Leveraging Market Forces

The Key to Economic Development

DEVELOPING WORLD

2 BILLION+

people without access to reliable energy

© 2014 d.light design. All rights reserved



85%

live in rural areas

© 2014 d.light design. All rights reserved



DENSE POPULATION
SHORT DISTANCE



LOW DENSITY
LONG DISTANCE

© 2014 d.light design. All rights reserved

SEGMENTING THE MARKET

Varied needs and diverse users imply different models of delivery

Improved Cook Stoves



Solar and rechargeable lanterns



Solar Kits



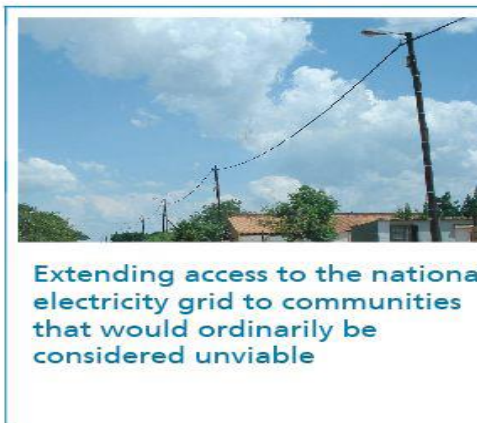
Solar Home Systems



Mini-Grid



Grid Extension

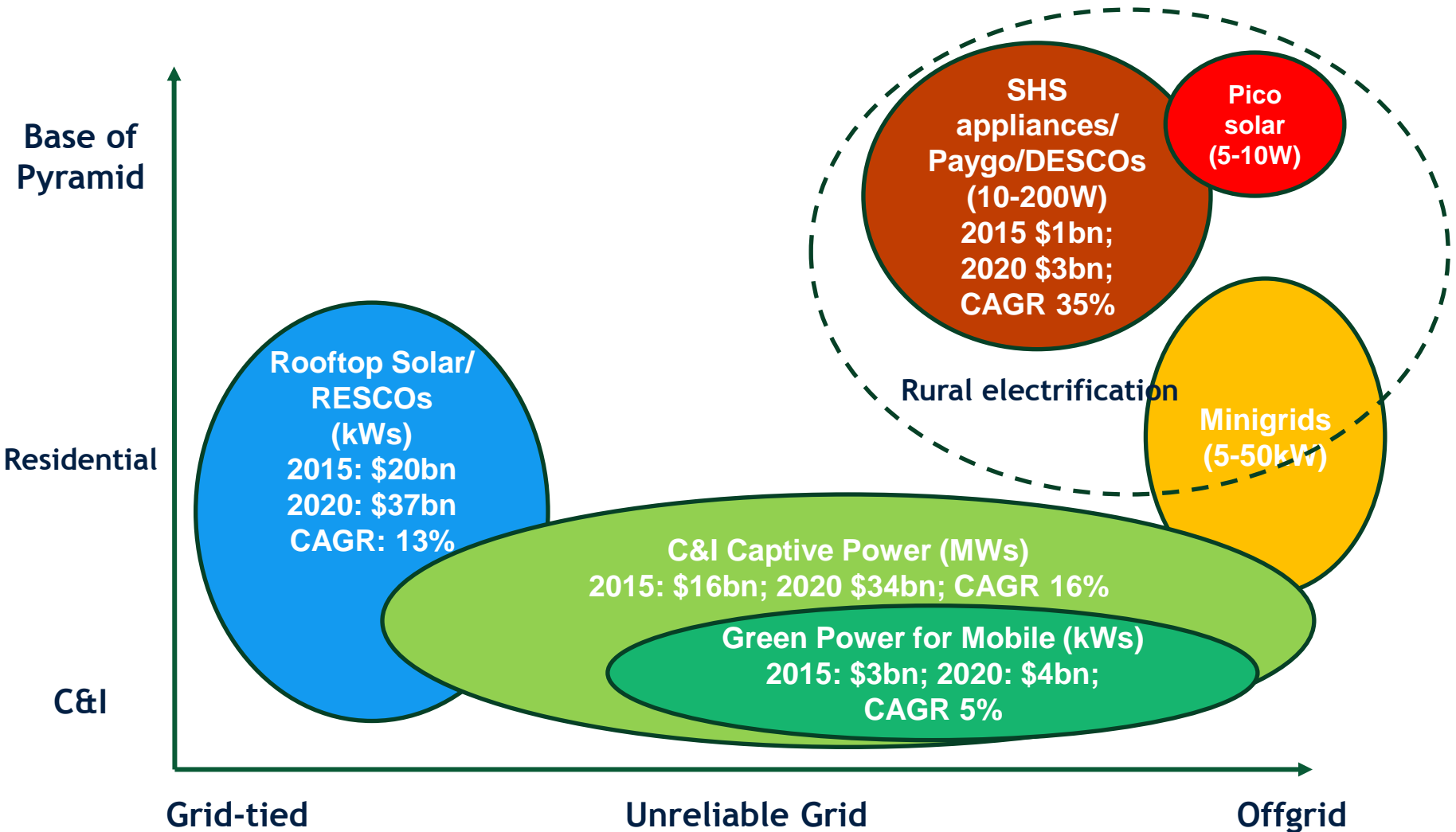




\$700

BILLION

Distributed Power Generation – Market Mapping & Growth Outlook

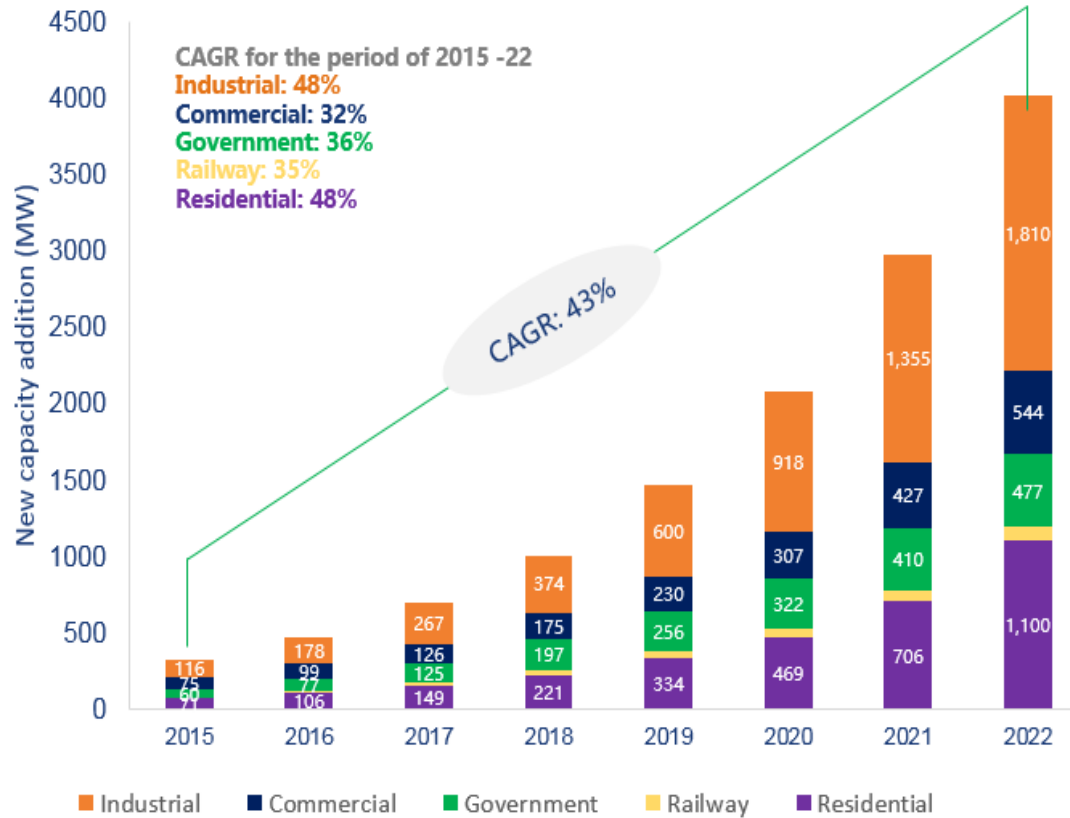


Lingo:

1. RESCO = Renewable Energy Service Company
2. DESCO = Distributed Energy Service Company

DG- GROWTH RATES-EXAMPLE FROM INDIA

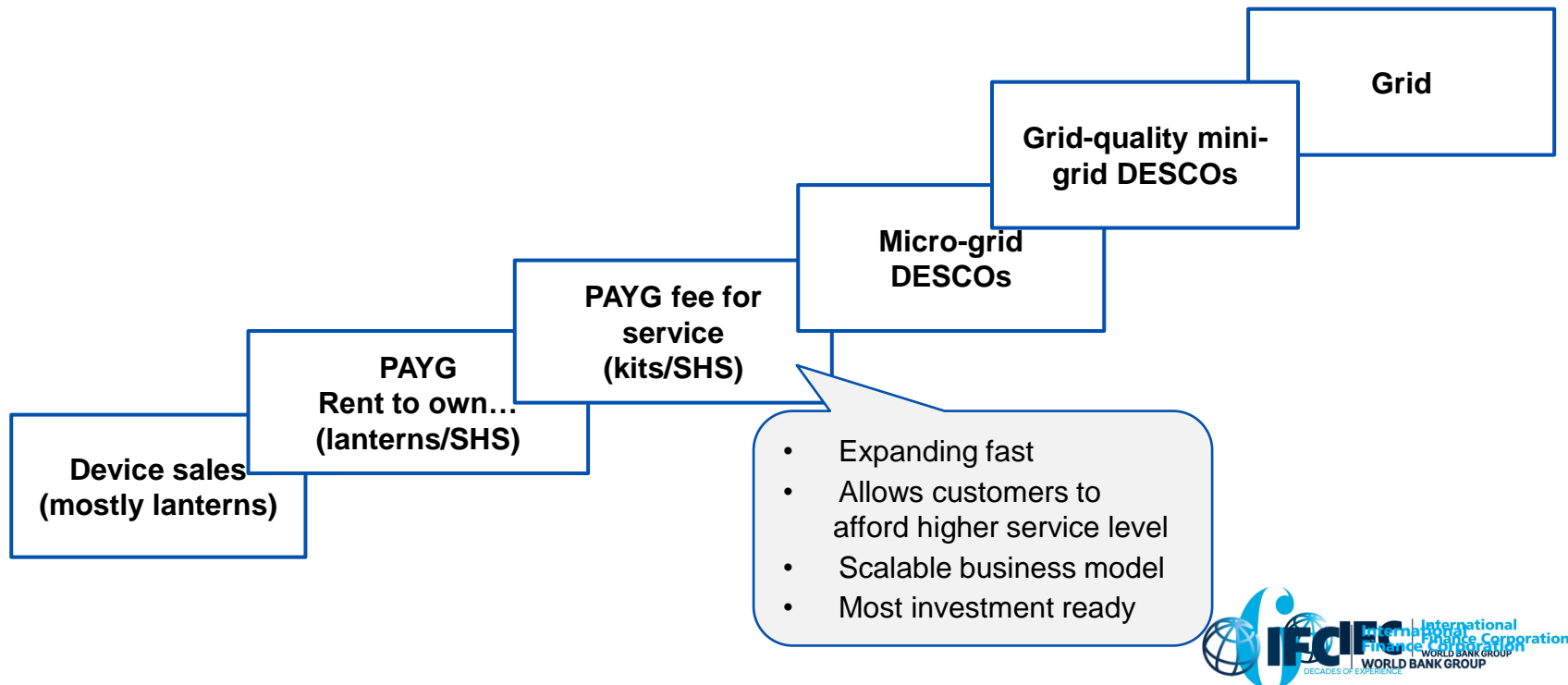
Expected year on year capacity addition for different segments



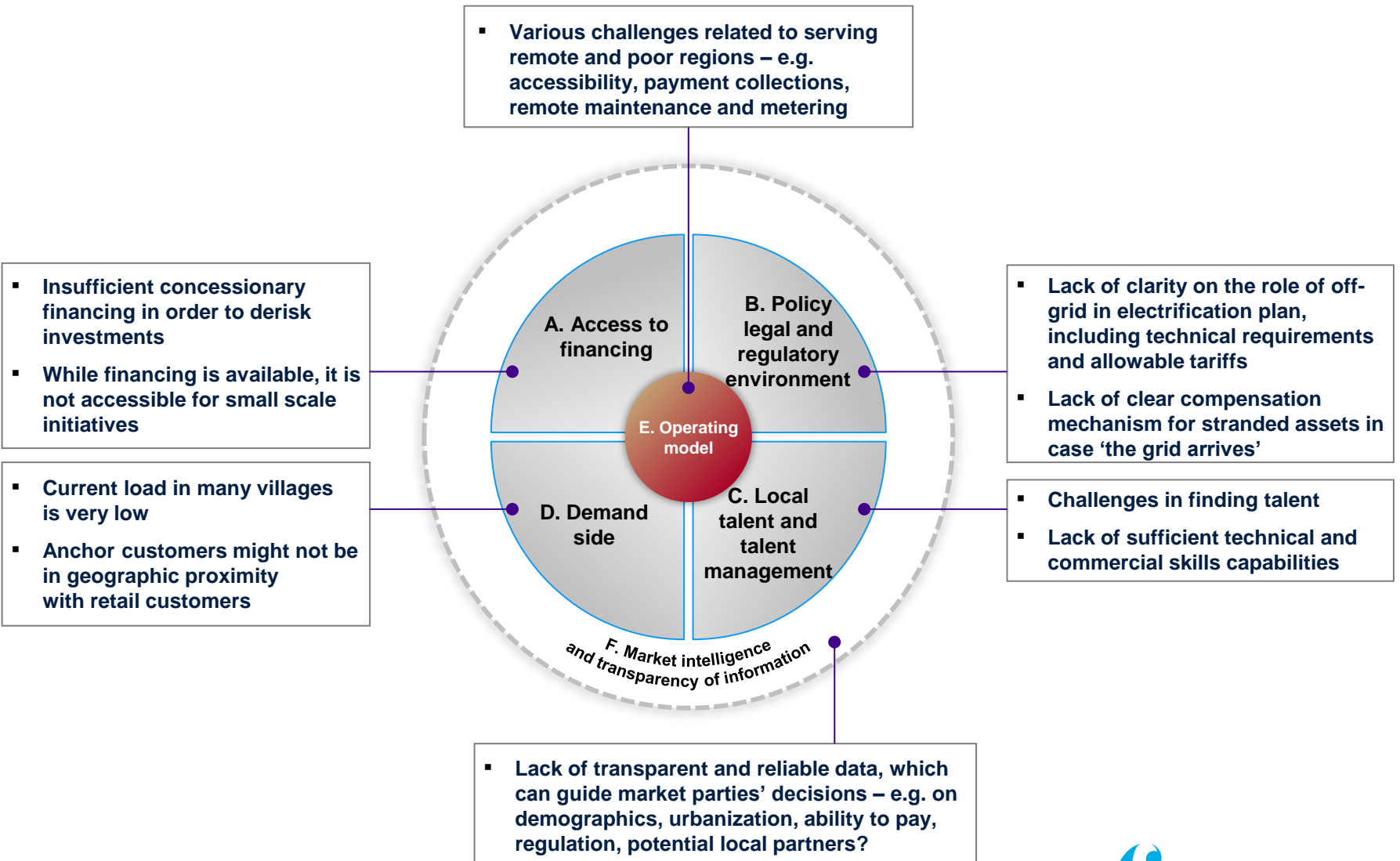
Source: BTI market model

MICRO/MINI-GRIDS IN THE CONTEXT OF A GROWING MENU OF TECHNOLOGY AND BUSINESS MODELS

- Off-grid electricity can be attractive – both for poor and better-off households
- Possibility to satisfy varied income levels and geographic/demographic conditions
- Makes it easier to climb the energy ladder
- Some degree of overlap in technologies and business models



Addressing SIX CRITICAL BOTTLE-NECKS TO SCALING-UP MINI-GRID DESCOS



TANZANIA MINI-GRIDS PROGRAM



Overall Objective: The Tanzania mini-grid program aims to develop a robust distributed power generation sector in the country. Implemented by IFC, in partnership with SREP.

Two interlinked components of the program:



- Development of **Technical Standards and Specifications**
- Development of an **Information Portal for permitting and licensing**
- **Support financial institutions** to help them identify, analyze and finance mini-grid projects
- **Benchmarking** across mini-grids to identify trends and develop metrics.

To address market barriers to mobilize resource and investments so as to commercialize and scale up mini-grids such as:

- **Technical** (assessment of design and advice regarding capacity building)
- **Financial and Legal** (commercial advice, financial analysis and legal requirements to different capital supports)
- **Compliance and access** (registration of permits, and licenses for community engagement)



© 2014 d.light design. All rights reserved



DANGEROUS



EXPENSIVE



UNSUSTAINABLE

© 2014 d.light design. All rights reserved

800,000 deaths
from kerosene
pollution per year

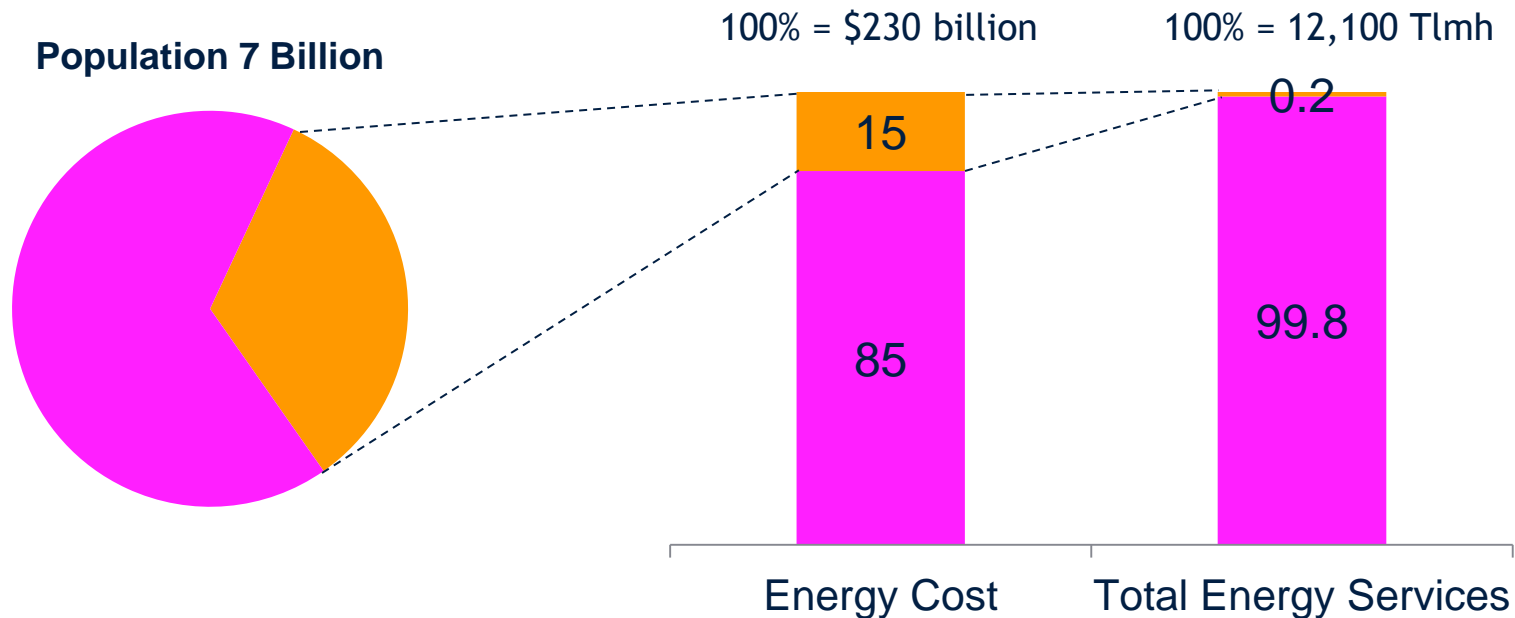
\$40 billion wasted
annually on poor-
quality lighting

190 million tons
of greenhouse gas
emissions per year

Lighting Equity

Although one in three people obtain light with kerosene and other fuels, representing about 15% of global lighting costs, they receive only 0.2% of the resulting lighting energy services

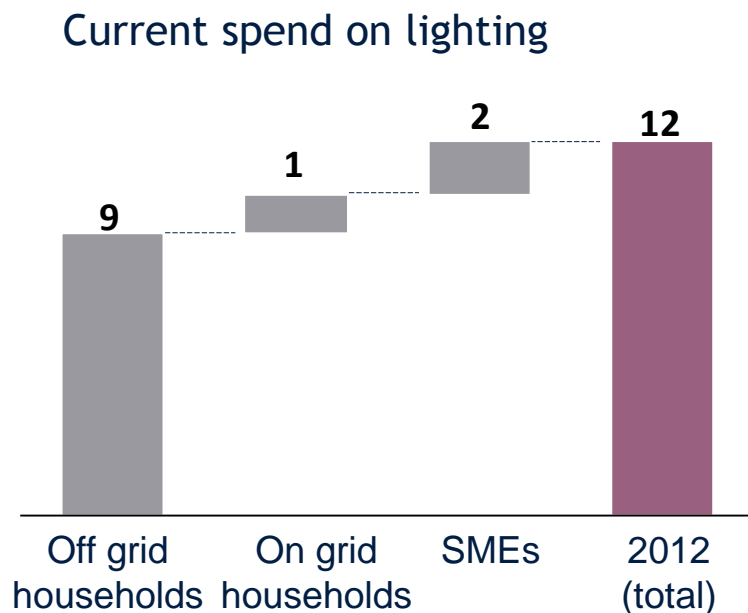
■ Kerosene or other Fuel
■ Electricity



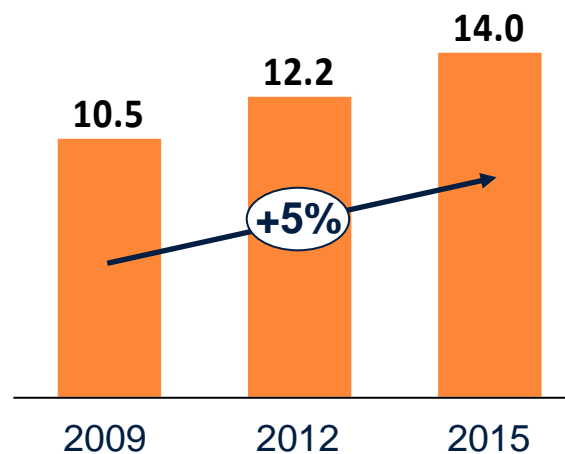
Source: Evan Mills, Lawrence Berkeley National Laboratory

It's a Market: African BoP spends more than USD 12 billion annually on traditional sources of lighting; spend is increasing over time

African BOP spend on non-electrical lighting Billion USD



Evolution of lighting spend over time



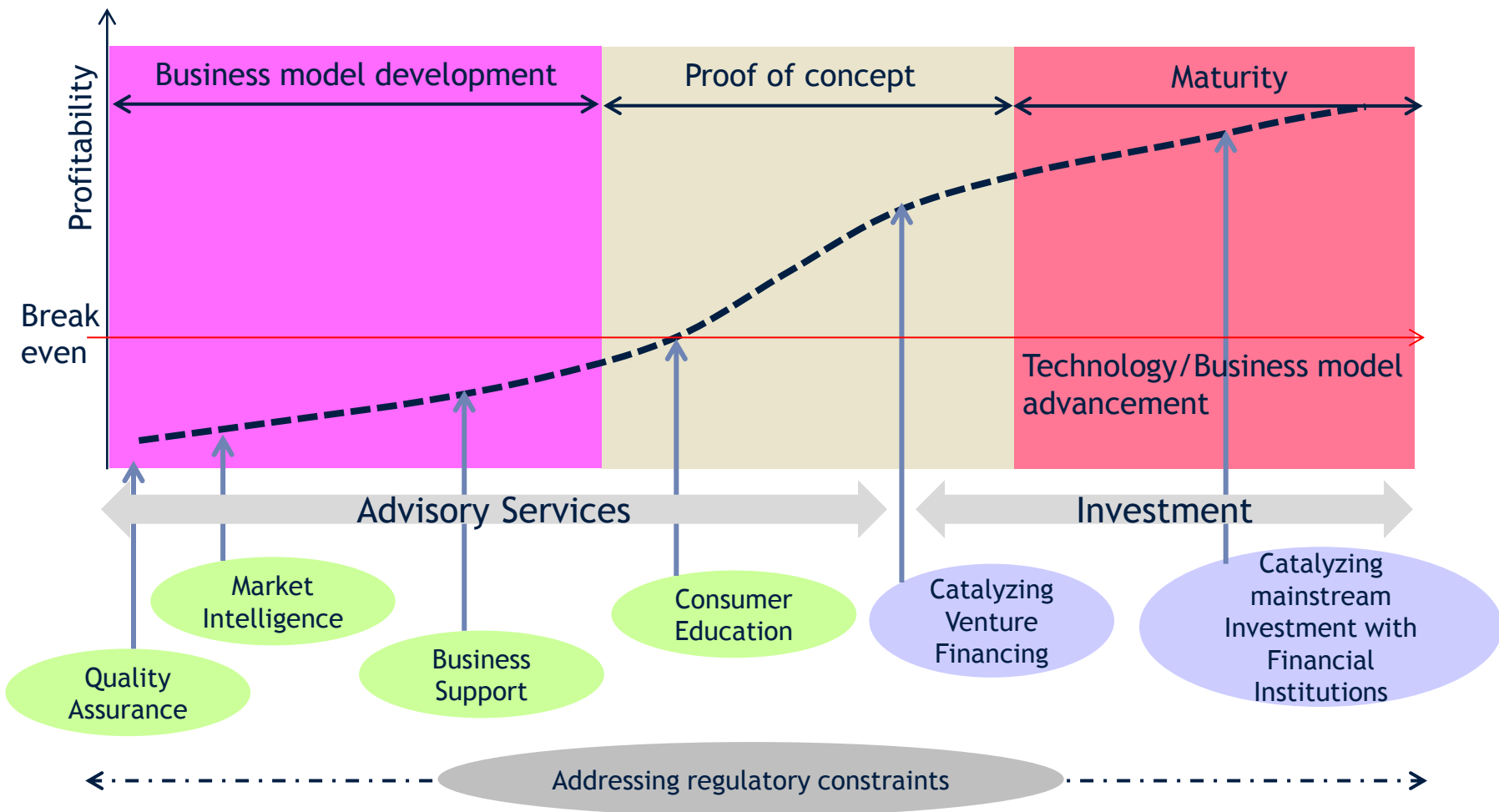
Key drivers

- Increasing kerosene price
- Kerosene premium paid for small-quantity purchases
- Population growth

Source: World Bank Data, African Development Bank, Dalberg model and analysis

Catalyzing market development

Lighting Global operates along the market transformation curve, focusing on specific market support/development activities



LIGHTING GLOBAL'S STRENGTH COMES FROM A PROGRAMMATIC APPROACH THAT ADDRESSES BOTH SUPPLY AND DEMAND.

Quality Assurance

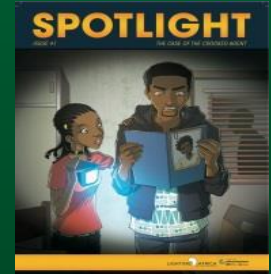
Policy & Partnering with Government

Market Intelligence

Access to Finance

Business Development

Consumer Awareness



Supply

Demand

ENGAGING IN A SPOILED MARKET: BUILDING A SUSTAINABLE MARKET ON A FOUNDATION OF QUALITY



QUALITY ASSURANCE IS FOUNDATIONAL TO GROWING MARKET

Total verified good quality products in service (millions)



Lighting Global | **Independent Certification Body**



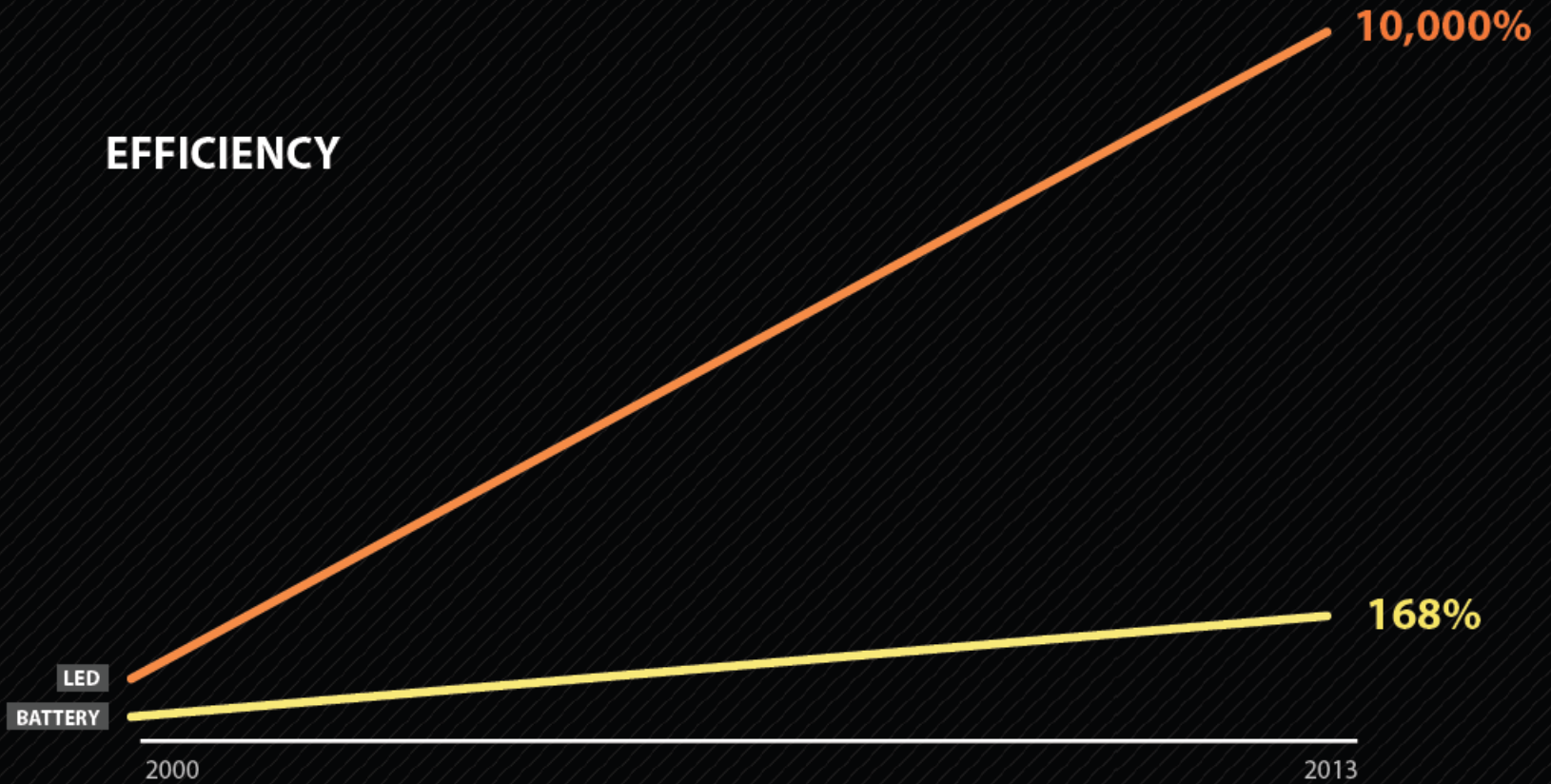
Source: Lighting Global IFC Team



TRANSFORMATIVE TECHNOLOGY IN A DYNAMIC MARKET

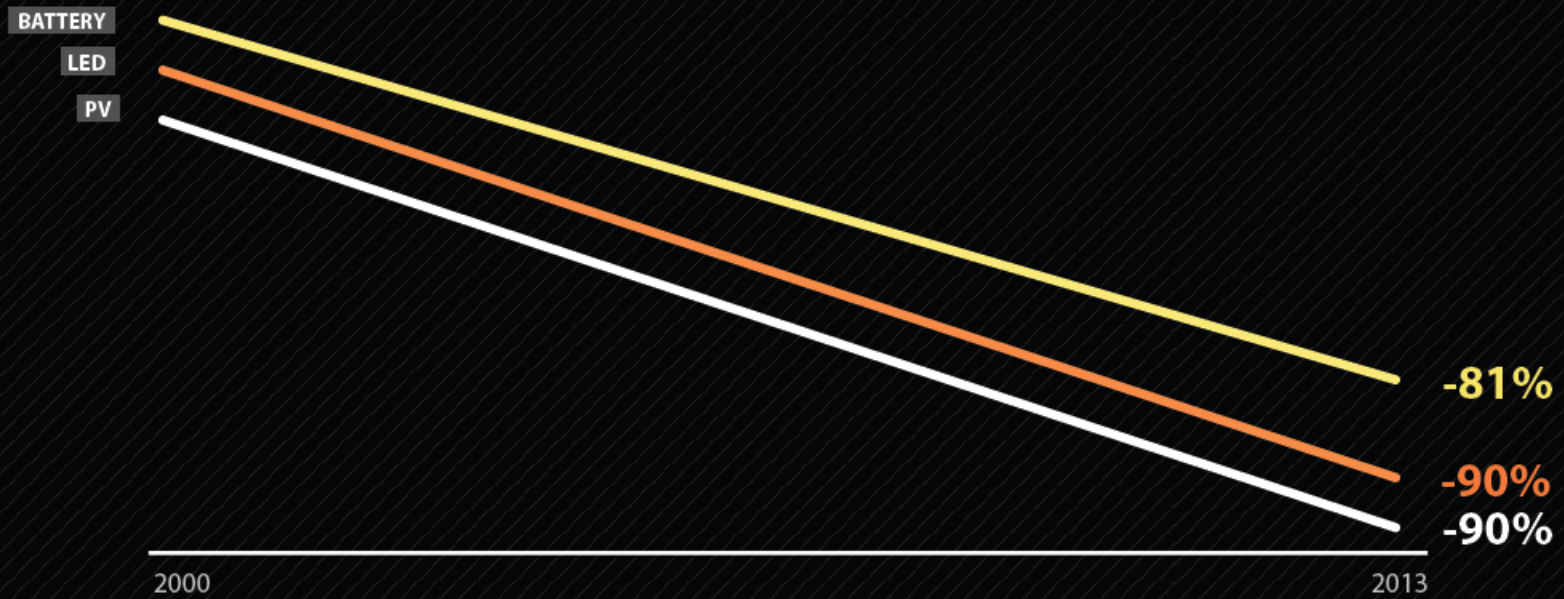


EFFICIENCY



© 2014 d.light design. All rights reserved

COST REDUCTION



© 2014 d.light design. All rights reserved

LIGHTING GLOBAL OPERATES IN 10 COUNTRIES WITH 95 QUALITY-VERIFIED PRODUCTS FROM 32 MANUFACTURERS CURRENTLY IN THE MARKET.

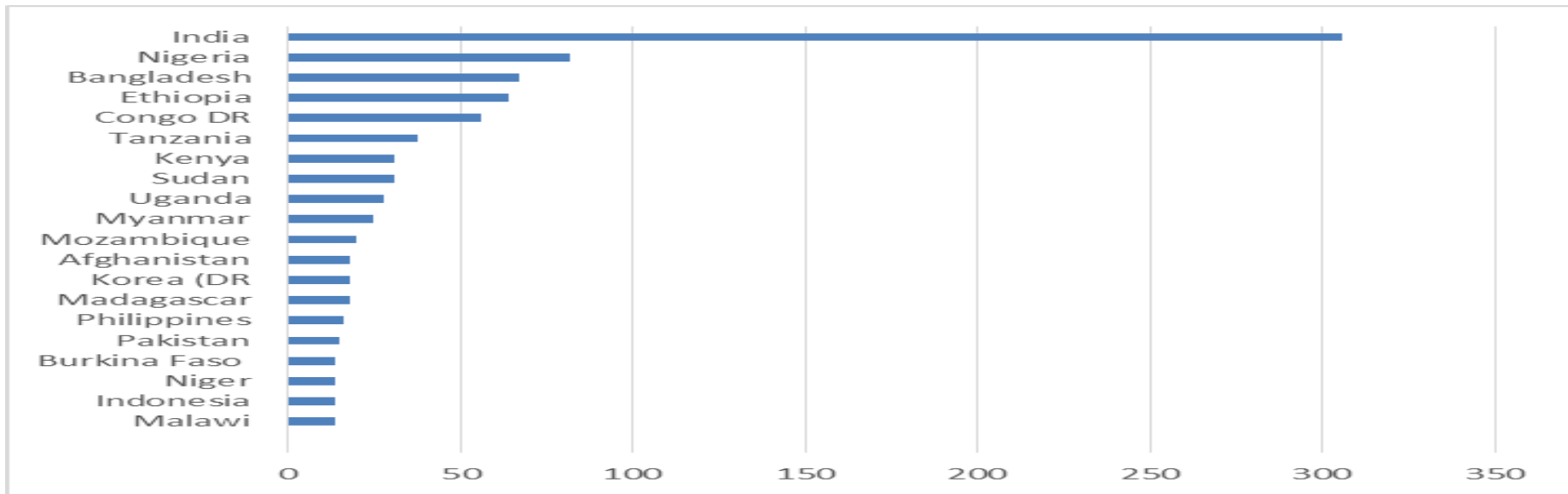
2016



2009



We go where the markets are... And where our clients want to go

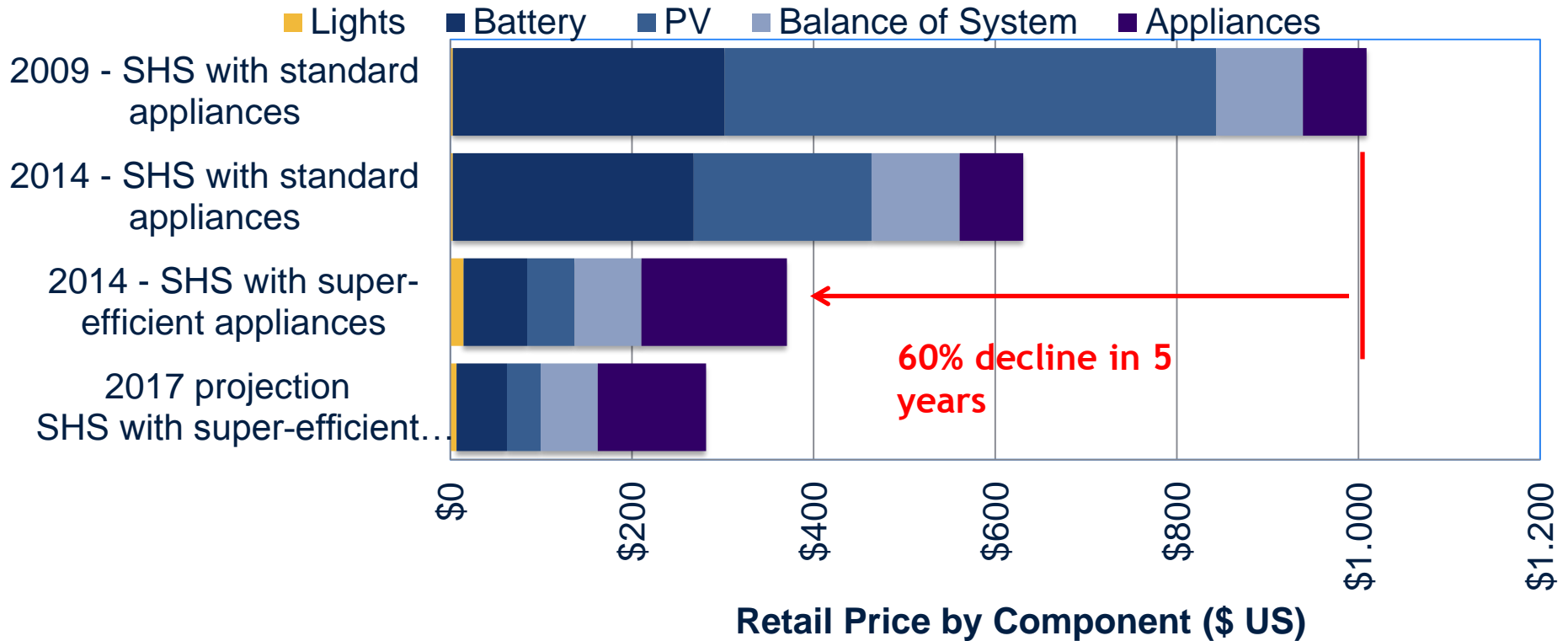


**Electricity Access Deficit,
Top 20 Countries
(population millions),
SE4A**

WHAT ABOUT LARGER SYSTEMS? HIGH EFFICIENCY DC APPLIANCES ARE CONTRIBUTING TO SOLAR HOME SYSTEM AFFORDABILITY



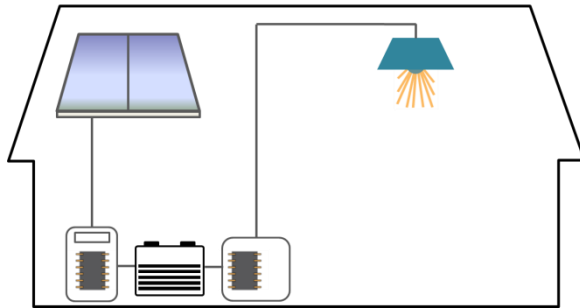
As the cost of Solar Home Systems has fallen dramatically, they have become a viable alternative to the grid.



THE MARKET FOR ENERGY EFFICIENT APPLIANCES IS GROWING IN RESPONSE TO RAPIDLY EMERGING WILLINGNESS TO PAY FOR QUALITY ENERGY SERVICES.

Ten years ago, 40 W solar panel powered:

- a single 25 W incandescent bulb for 5 hours per day



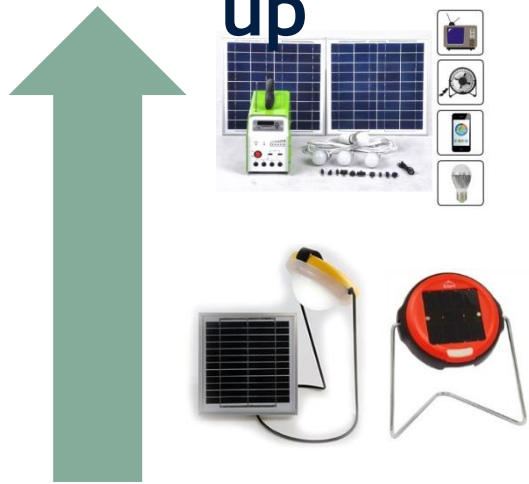
Today, same 40 W solar panel powers:

- four LED lights for 5 hours, and color TV for 4 hours, and
- phone charger for 3 hours, and
- radio for 6 hours



TWO BIG TRENDS IN THE INDUSTRY: (1) LARGER SYSTEMS AND (2) CONSUMER FINANCING SOLUTIONS

Technology: scaling up



Companies responding to customer desire for larger systems with

Business models: rise of PAYG

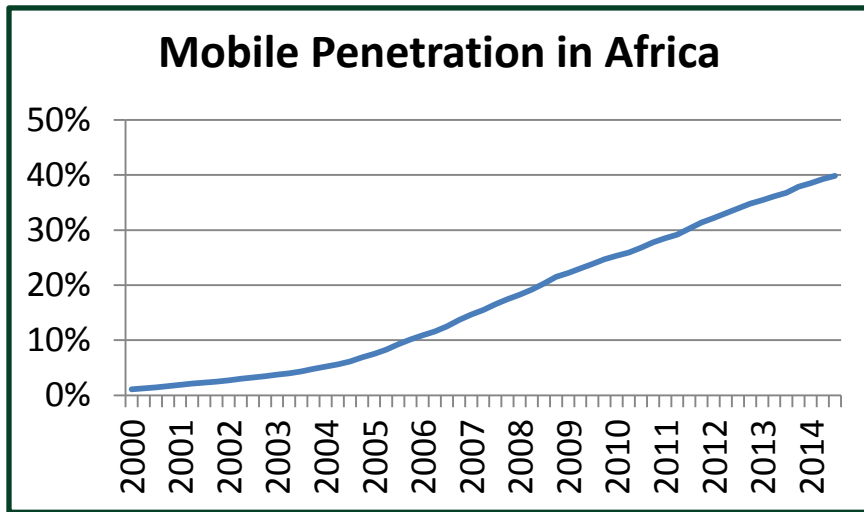


Fast-moving consumer goods models

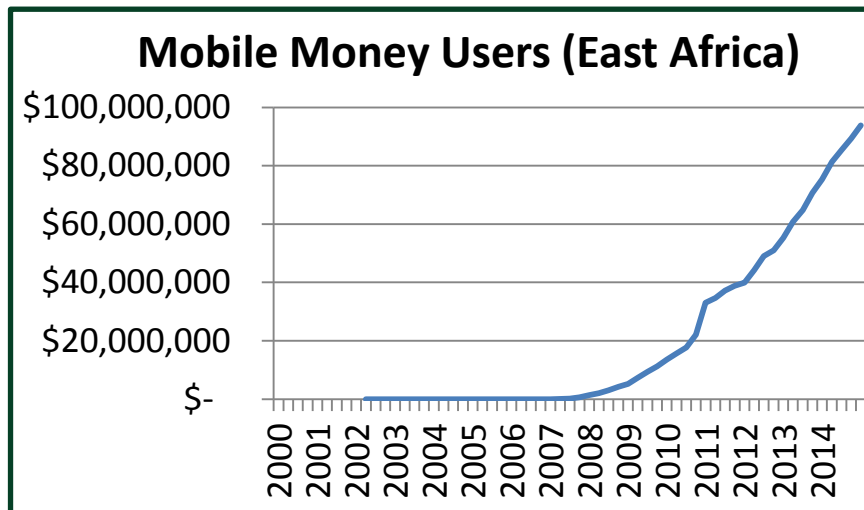
Pay-as-you-go models

Financing upfront cost for consumers is critical for uptake

SHIFT TO PAYG IS ENABLED BY RISING USE OF MOBILE PHONES AND MOBILE MONEY.



Ability to turn products on (and off) by remote means



Ability to process remote, regular payments



NEW PAY-AS-YOU-GO (PAYG) BUSINESS MODELS CAN ELIMINATE AFFORDABILITY GAP AND CAN SCALE RAPIDLY...

Two main PAYG typologies:

Lease-to-own

- Consumer makes small payments over time
- Consumer owns the product in end



Solar-as-a-service / utility model

- Consumer pays fee for defined amount of service (based on time or consumption)
- Service provider retains ownership of product



... AND THEY PRESENT CONSUMERS WITH A NOTABLY DIFFERENT VALUE PROPOSITION.



Rwanda

US\$ 100 connection fee
~US\$ 2.65 / month

\$30 initial payment
US\$ 5 / month

Tanzania

US\$ 205 connection fee
~US\$ 0.75 / month

\$30 initial payment
US\$ 6 / month

Sources:

- *Grid connection costs from respective utilities; monthly cost calculated from the tariff cost with an average consumption of 0.4 kWh/day (SE4All tier 1 access)*
- 4Q *Off-grid costs from actual prices: Off-Grid Electric in Tanzania, Azuri (Smile) in Rwanda*

PAY-AS-YOU-GO SOLAR

CURRENTLY AVAILABLE

SENEGAL
Oolu Power

SIERRA LEONE
Azuri

GHANA
PEG Ghana
Azuri

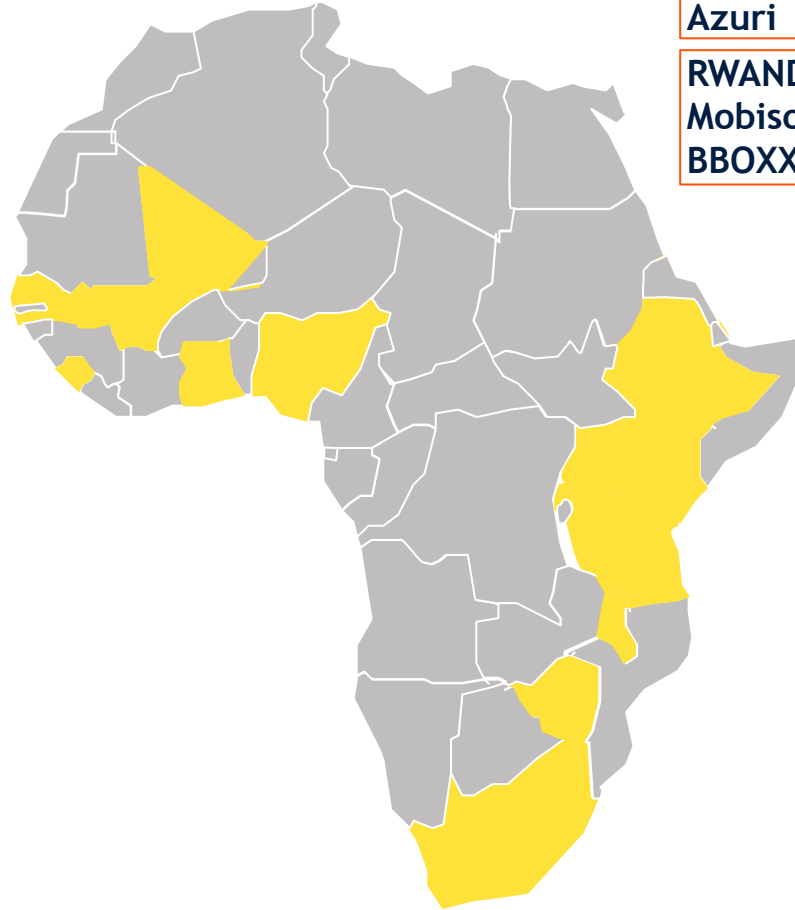
TOGO
Azuri

MALAWI
Azuri

ZIMBABWE
Azuri

NIGERIA
Nova Lumos

SOUTH AFRICA
Azuri
Kingo



ETHIOPIA
Azuri

RWANDA
Mobisol
BBOXX

UGANDA
Fenix
International
BBOXX
Azuri
M-KOPA
Village Power

~~SolarNow~~
KENYA
SunTransfer
BBOXX
M-KOPA
Mibawa

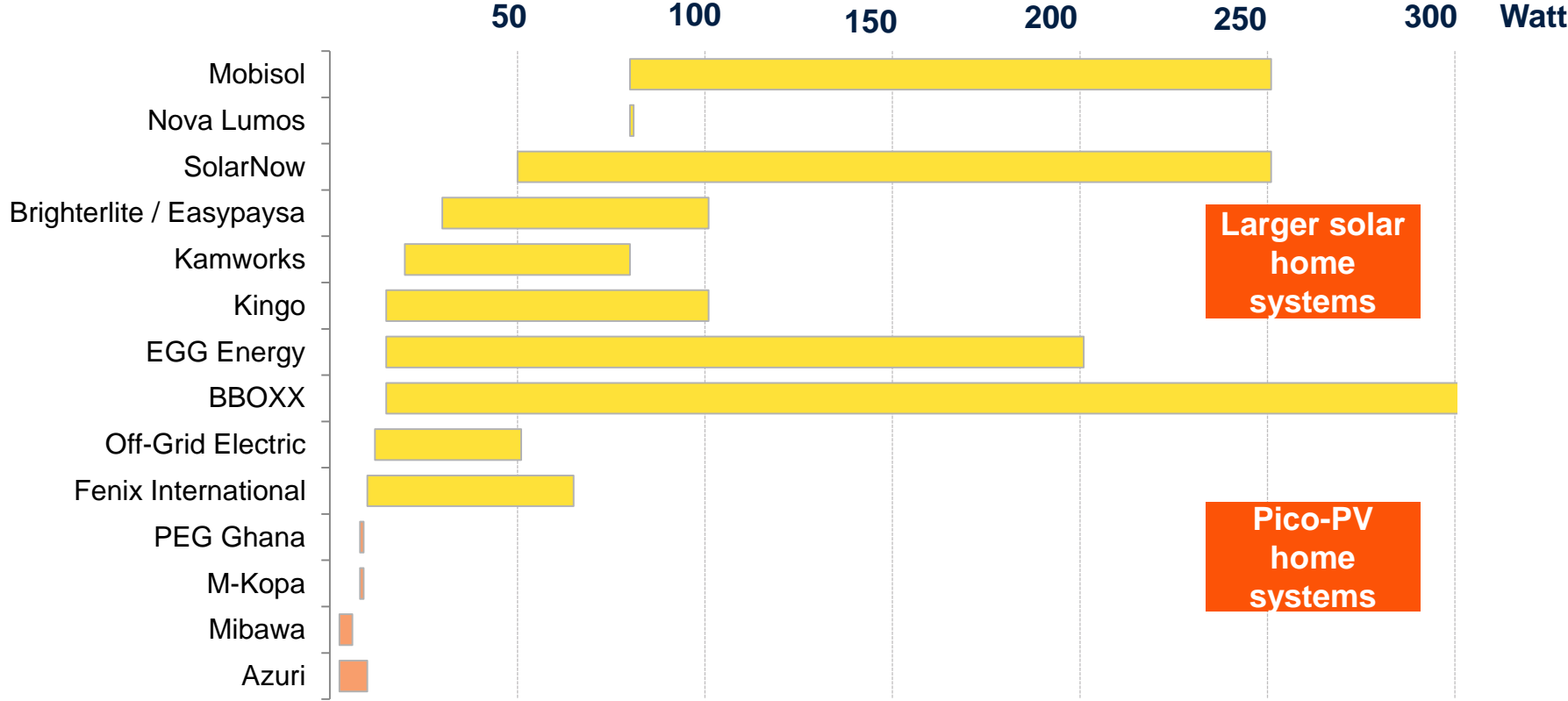
TANZANIA
Mobisol
Fenix
International
M-KOPA
Off-grid Electric
Eternum energy
EEG energy

Note: The list represents a sample and does not claim to be comprehensive.

Source: Bloomberg New Energy Finance

SOLAR PANEL SIZE OF SELECTED PAY-AS-YOU-GO COMPANIES (W)

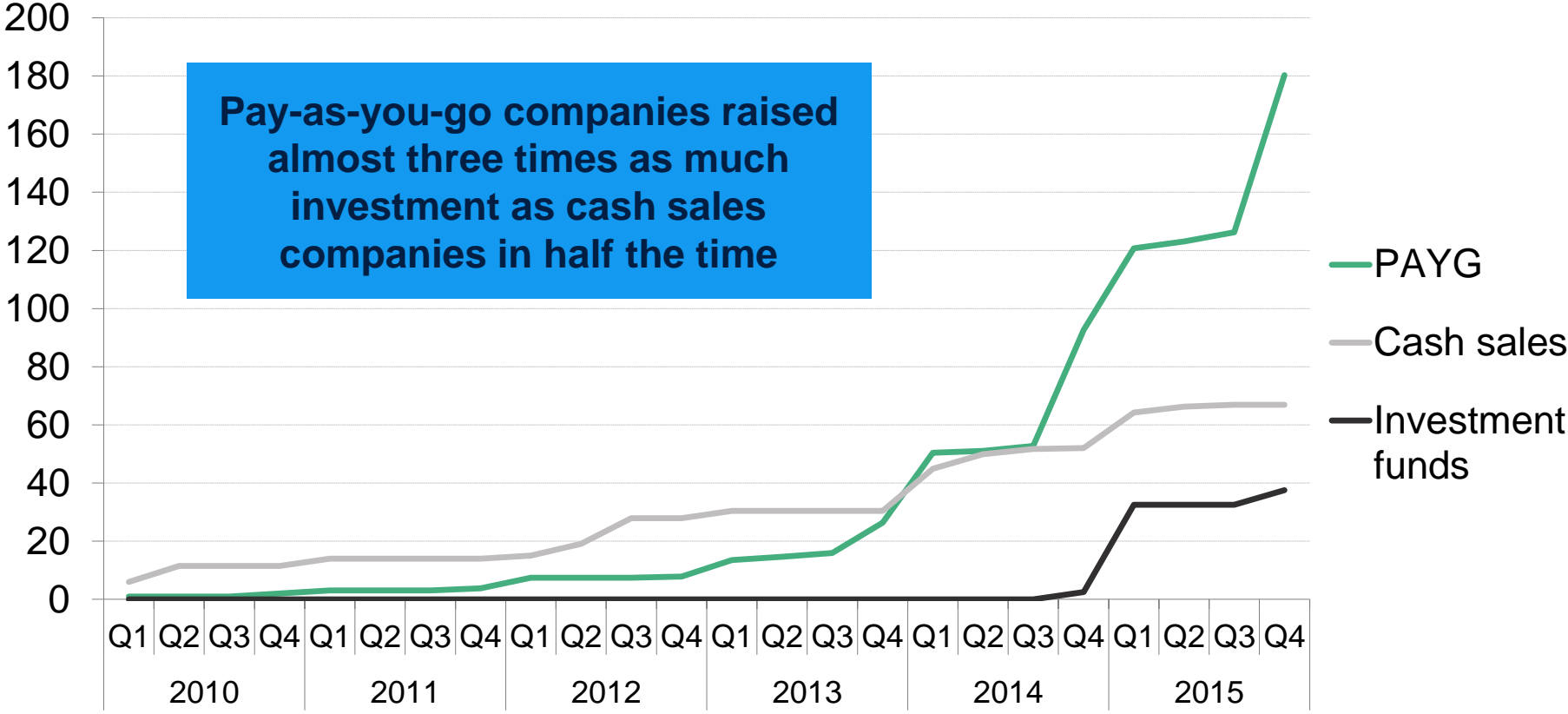
The majority of pay-as-you-go firms offer home systems designed to power more than just a few lights and a phone charger.



Source: Bloomberg New Energy Finance, company websites

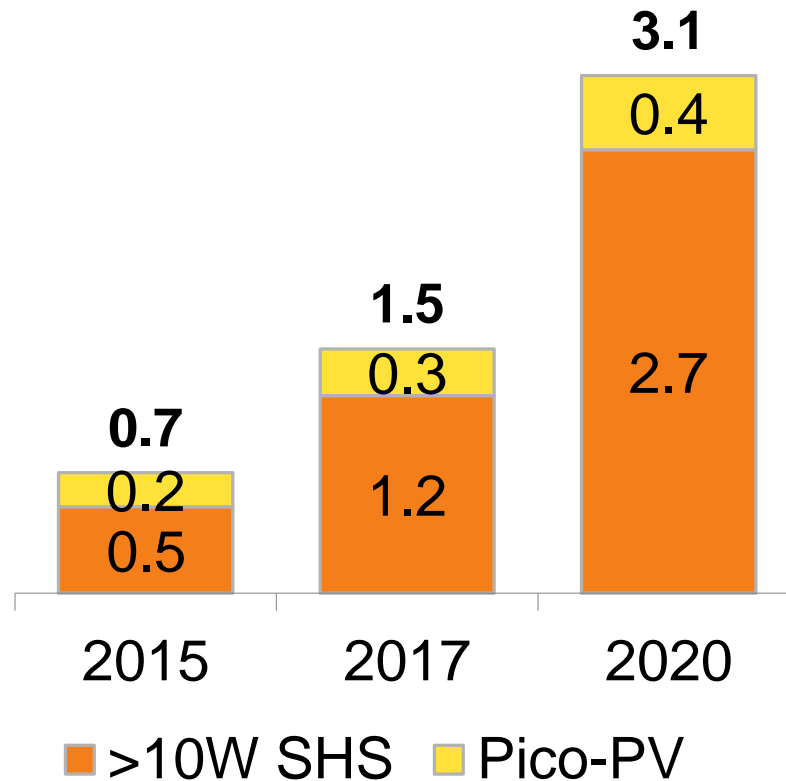
Note: Pico-PV is defined as <10W.

TRACKED INVESTMENTS IN OFF-GRID SOLAR BY RECIPIENT TYPE (USD M CUMULATIVE)



Note: shown data excludes USD 40m of investments with undisclosed date and \$27m of aggregate data for which the recipient type could not be determined.

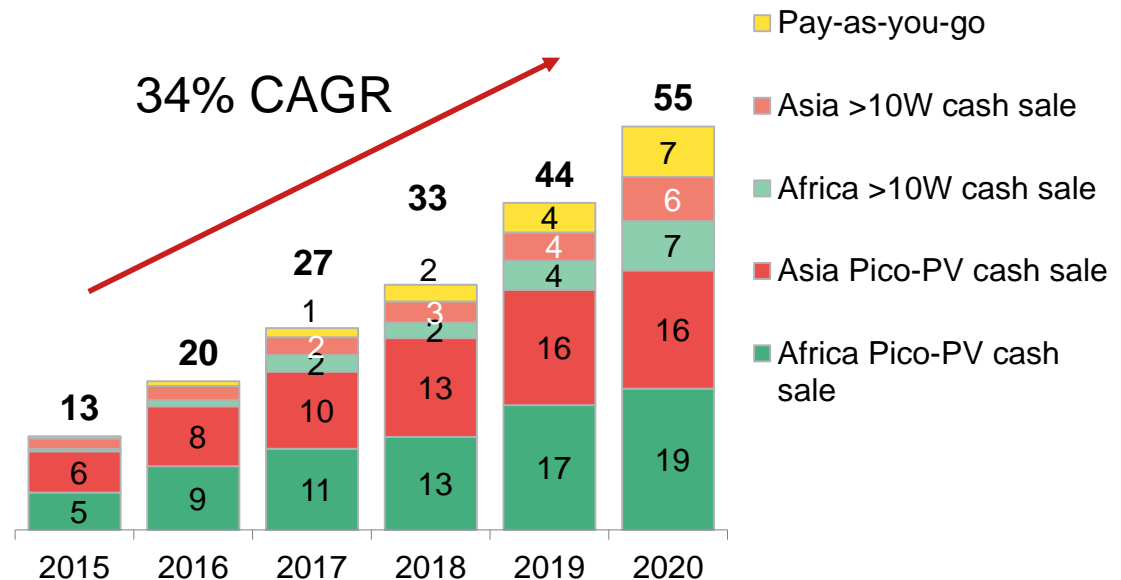
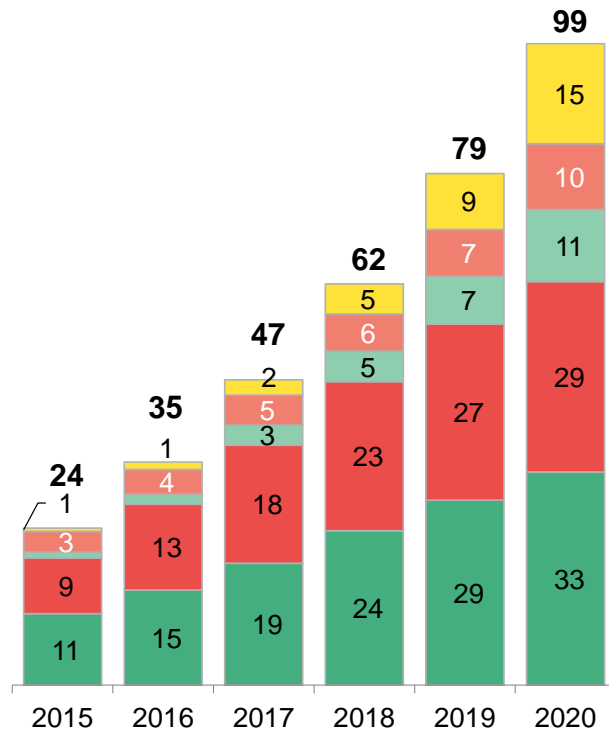
ESTIMATED OFF-GRID SOLAR RETAIL REVENUE (\$BN)



LONG-TERM MARKET OUTLOOK

BASELINE FORECAST OFF-GRID SOLAR USERS (M HOUSEHOLDS)

BASELINE FORECAST ANNUAL SALES (M UNITS)



three years and an increasing share of households to purchase a

product. Unit numbers could be 2-4 times higher if the market shifts towards low-cost products with shorter useful lives and faster

replacement cycles. The forecasts assume that 60-90% of households with a per capita income of \$2-10/day will purchase a >10W system

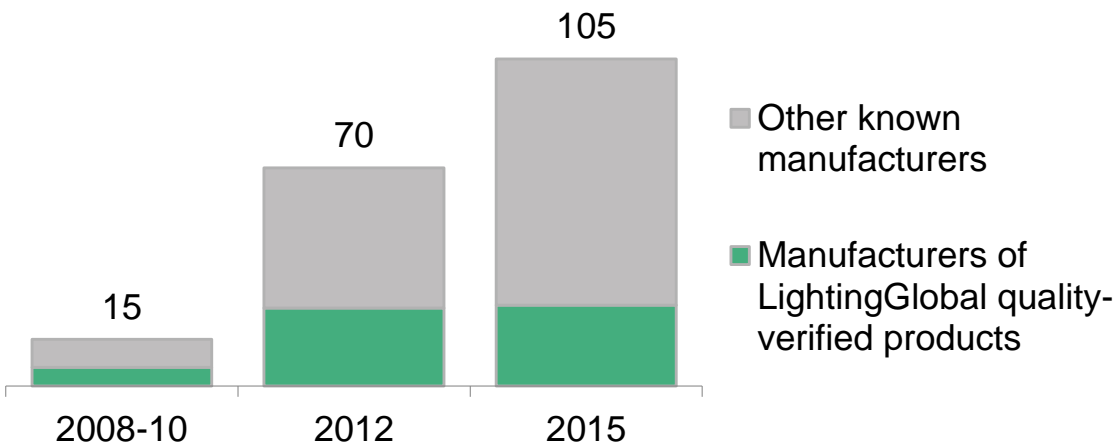
by 2020, whereas only 10-15% of poorer households will do so.

Source: Bloomberg

11/2/2016

A RAPIDLY EVOLVING GLOBAL MARKET

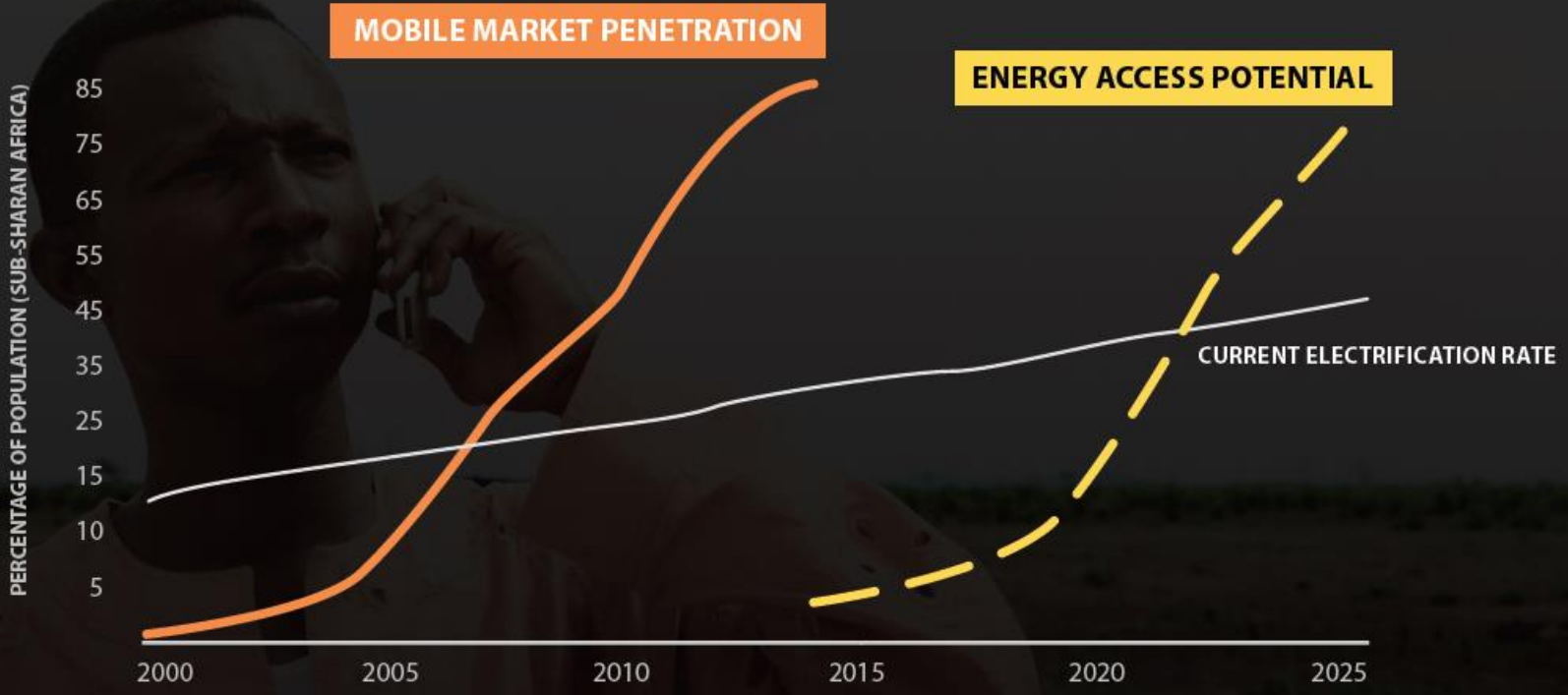
NUMBER OF KNOWN PICO-SOLAR MANUFACTURERS



Note: Contract manufacturers and non-specialized centers are not included.

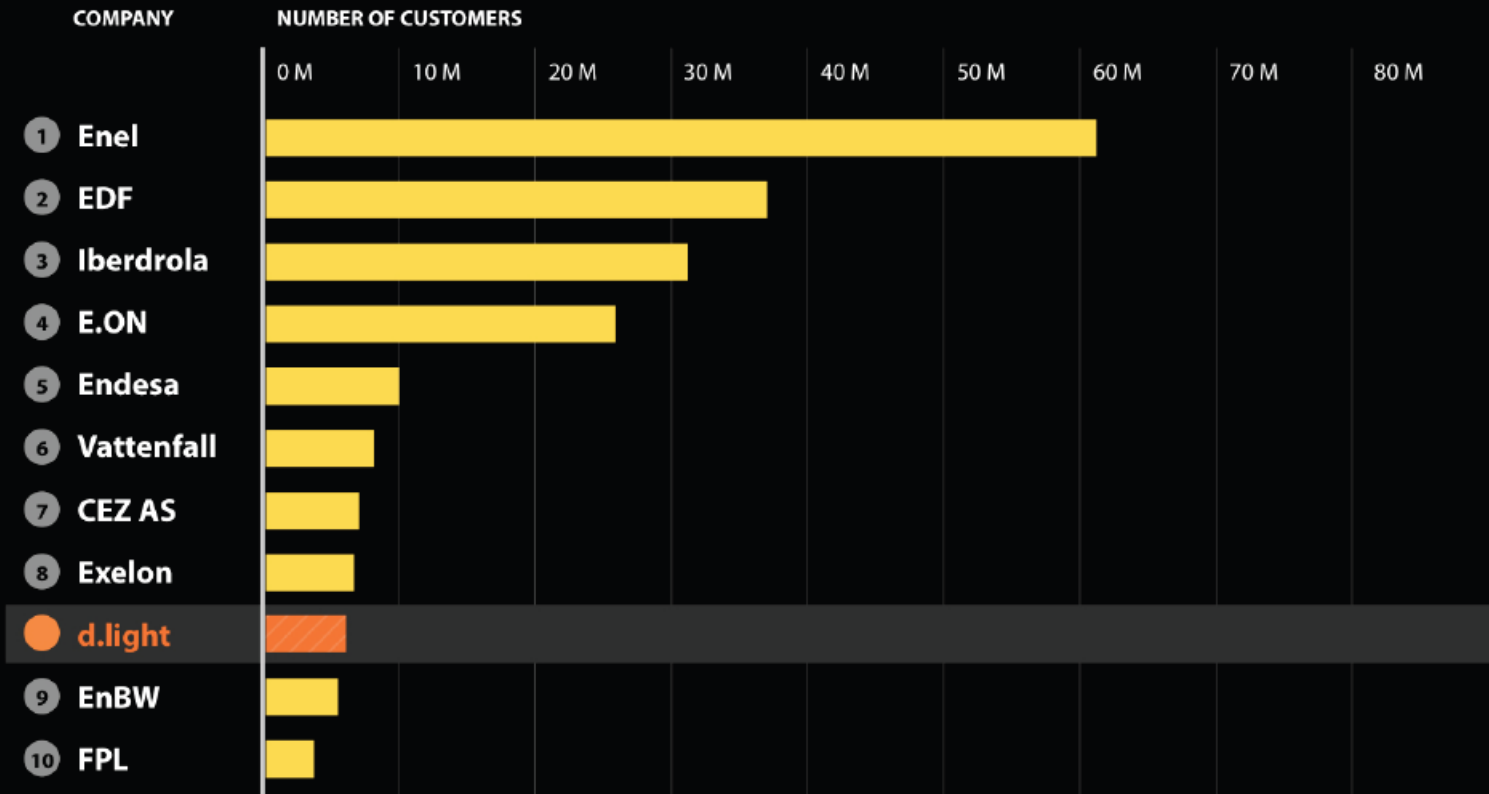
Insert Date (go to
Insert Tab,
Month 6, Year 1





© 2014 d.light design. All rights reserved

LARGEST GLOBAL ELECTRICAL UTILITIES



© 2014 d.light design. All rights reserved

10% cost



HALF time



NEW REPORT

LIGHTING GLOBAL
Catalyzing markets for modern off-grid lighting

AN INNOVATION OF
WORLD BANK GROUP
THE WORLD BANK IFC International
Finance Corporation

2016 Lighting Global Market Trends Report (3rd in a series)



Off-Grid Solar Market Trends Report 2016

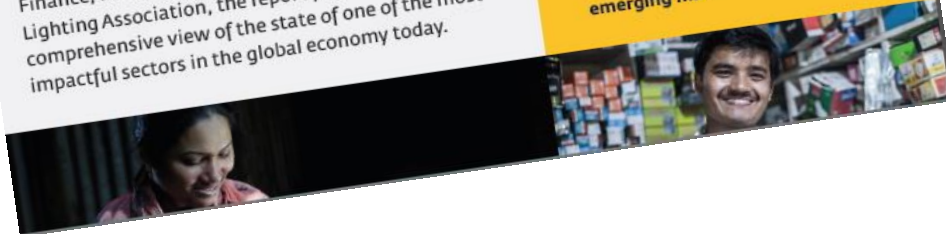
A lively read for companies, investors, governments, and other key players interested in the opportunities and challenges presented by the dynamic off-grid solar market. The report tracks the groundbreaking technological advances and innovative business models which have emerged to transform the lives of millions through affordable modern solar energy services. This is the third in a series produced by the World Bank Group's Lighting Global Program since the young industry's emergence seven years ago. Written in collaboration with Bloomberg New Energy Finance, and in cooperation with the Global Off-Grid Lighting Association, the report provides a comprehensive view of the state of one of the most impactful sectors in the global economy today.

OFF-GRID SOLAR MARKET TRENDS REPORT 2016

January 2016 - 284PT (with 1000 copies)

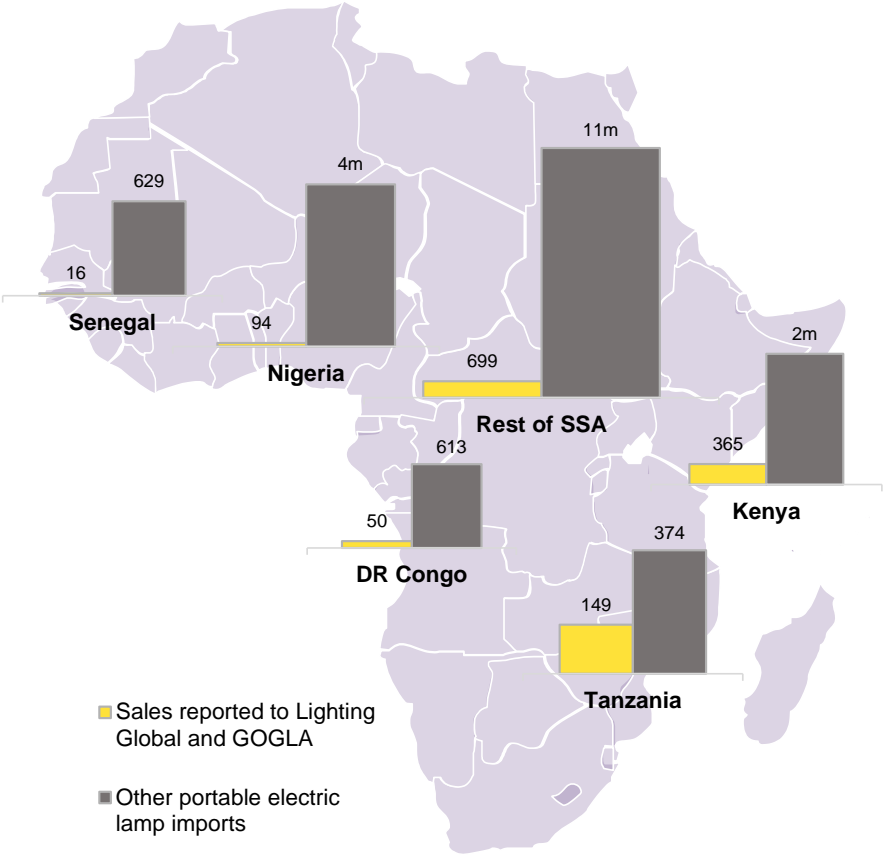
Bloomberg | LIGHTING GLOBAL | THE WORLD BANK GROUP
in collaboration with IFC

- 1.2 billion people without access to the power grid
- \$27 billion spent annually on lighting and mobile-phone charging technologies
- 89 million people in Africa and Asia with improved access to energy by using off-grid solar products
- \$276 million invested in the off-grid solar industry in 2015, a 15-fold increase since 2012
- \$3.1 billion market opportunity for the off-grid solar industry by 2020, reaching 99 million households in emerging markets



AFRICA IS A DIVERSE COLLECTION OF DISCRETE MARKETS

EXPORTS FROM CHINA OF PORTABLE ELECTRIC LAMPS WITH FOB VALUE >\$2.50 AND REPORTED SALES OF BRANDED PICO-SOLAR PRODUCTS, H1 2015 (THOUSANDS OF UNITS UNLESS STATED)



- Sales reported to Lighting Global and GOGLA
- Other portable electric lamp imports

Note: Export data for products under HS category 851310, "portable electric lamps" (flashlights, non-solar lanterns, solar lanterns, parts, etc.) of FOB price >\$2.50. This price threshold excludes 205 million sales that are likely to primarily be flashlights. Retail value estimates use 1.5 times FOB price.

Insert Date (go to
Insert Tab,
Month 6, Year 1

OFF GRID SOLAR ENABLES BOP CONSUMERS TO CLIMB THE ENERGY ACCESS LADDER

