

# Financing Universal Access to Energy

Where we are, and where we need to go

Itamar Orlandi, CFA

October 31, 2018



# Copyright and disclaimer

The Bloomberg NEF ("BNEF"), service/information is derived from selected public sources. Bloomberg Finance L.P. and its affiliates, in providing the service/information, believe that the information it uses comes from reliable sources, but do not guarantee the accuracy or completeness of this information, which is subject to change without notice, and nothing in this document shall be construed as such a guarantee. The statements in this service/document reflect the current judgment of the authors of the relevant articles or features, and do not necessarily reflect the opinion of Bloomberg Finance L.P., Bloomberg L.P. or any of their affiliates ("Bloomberg"). Bloomberg disclaims any liability arising from use of this document, its contents and/or this service. Nothing herein shall constitute or be construed as an offering of financial instruments or as investment advice or recommendations by Bloomberg of an investment or other strategy (e.g., whether or not to "buy", "sell", or "hold" an investment). The information available through this service is not based on consideration of a subscriber's individual circumstances and should not be considered as information sufficient upon which to base an investment decision. You should determine on your own whether you agree with the content. This service should not be construed as tax or accounting advice or as a service designed to facilitate any subscriber's compliance with its tax, accounting or other legal obligations. Employees involved in this service may hold positions in the companies mentioned in the services/information.

The data included in these materials are for illustrative purposes only. The BLOOMBERG TERMINAL service and Bloomberg data products (the "Services") are owned and distributed by Bloomberg Finance L.P. ("BFLP") except that Bloomberg L.P. and its subsidiaries ("BLP") distribute these products in Argentina, Australia and certain jurisdictions in the Pacific islands, Bermuda, China, India, Japan, Korea and New Zealand. BLP provides BFLP with global marketing and operational support. Certain features, functions, products and services are available only to sophisticated investors and only where permitted. BFLP, BLP and their affiliates do not guarantee the accuracy of prices or other information in the Services. Nothing in the Services shall constitute or be construed as an offering of financial instruments by BFLP, BLP or their affiliates, or as investment advice or recommendations by BFLP, BLP or their affiliates of an investment strategy or whether or not to "buy", "sell" or "hold" an investment. Information available via the Services should not be considered as information sufficient upon which to base an investment decision. The following are trademarks and service marks of BFLP, a Delaware limited partnership, or its subsidiaries: BLOOMBERG, BLOOMBERG ANYWHERE, BLOOMBERG MARKETS, BLOOMBERG NEWS, BLOOMBERG PROFESSIONAL, BLOOMBERG TERMINAL and BLOOMBERG.COM. Absence of any trademark or service mark from this list does not waive Bloomberg's intellectual property rights in that that name, mark or logo. All rights reserved. © 2018 Bloomberg.

# About Bloomberg New Energy Finance

## Clean Energy

---



Solar



Wind



Storage



Decentralized  
Energy



Frontier  
Power



Impact on  
Power &  
Utilities

## Commodities

---



LNG &  
Gas



Oil &  
Products



Power



Carbon

## Advanced Transport

---



Electrified  
Transport



Autonomous  
Driving



Shared  
Mobility



Impact on  
Transport



Impact on  
oil  
demand

## Emerging Technologies

---



Internet of  
Things



Machine  
Learning &  
Analytics

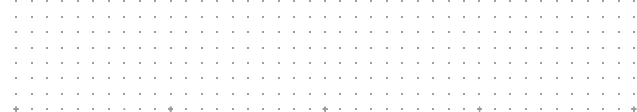


Advanced  
Materials

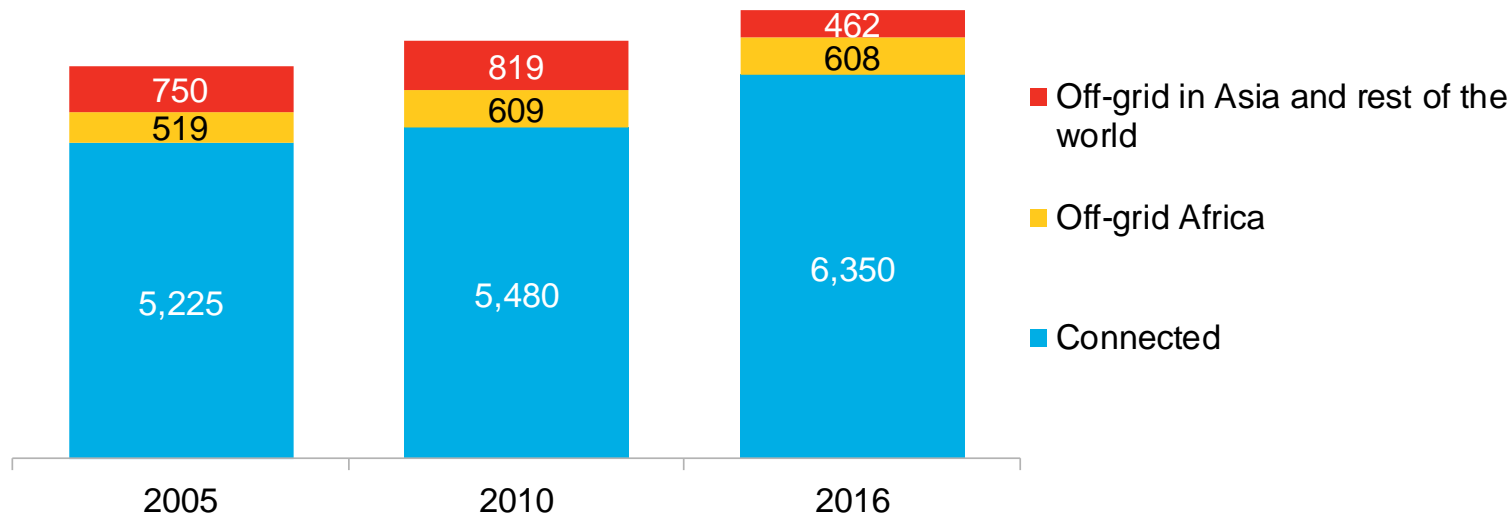


Impact on  
Industrials  
and Energy

# Global population by electricity access status



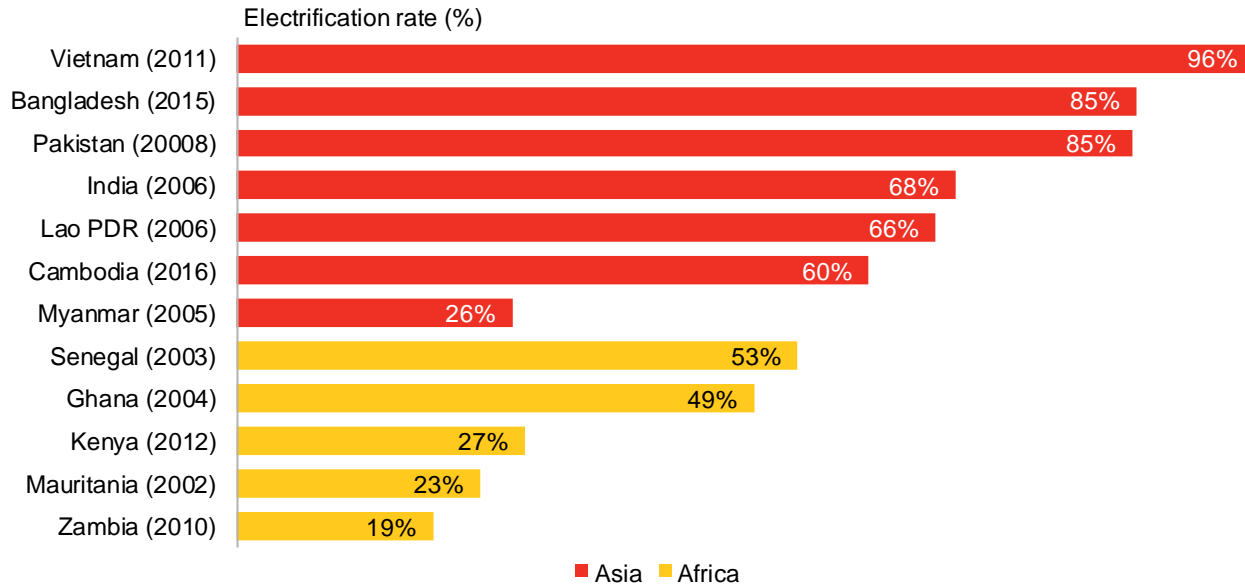
Million people



Source: Bloomberg New Energy Finance

# Economic development on its own will not solve this

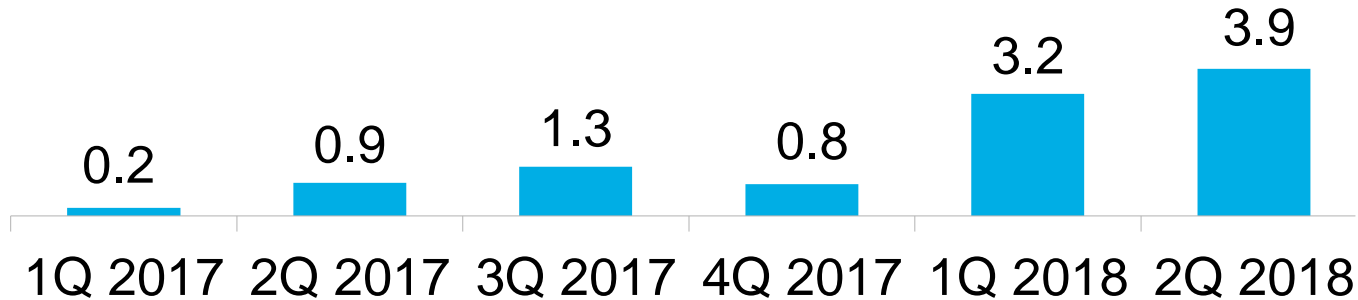
## Electrification rates when reaching \$1,000 GDP per capita



Source: Bloomberg New Energy Finance, World Bank

# India's quarterly rural household electrification

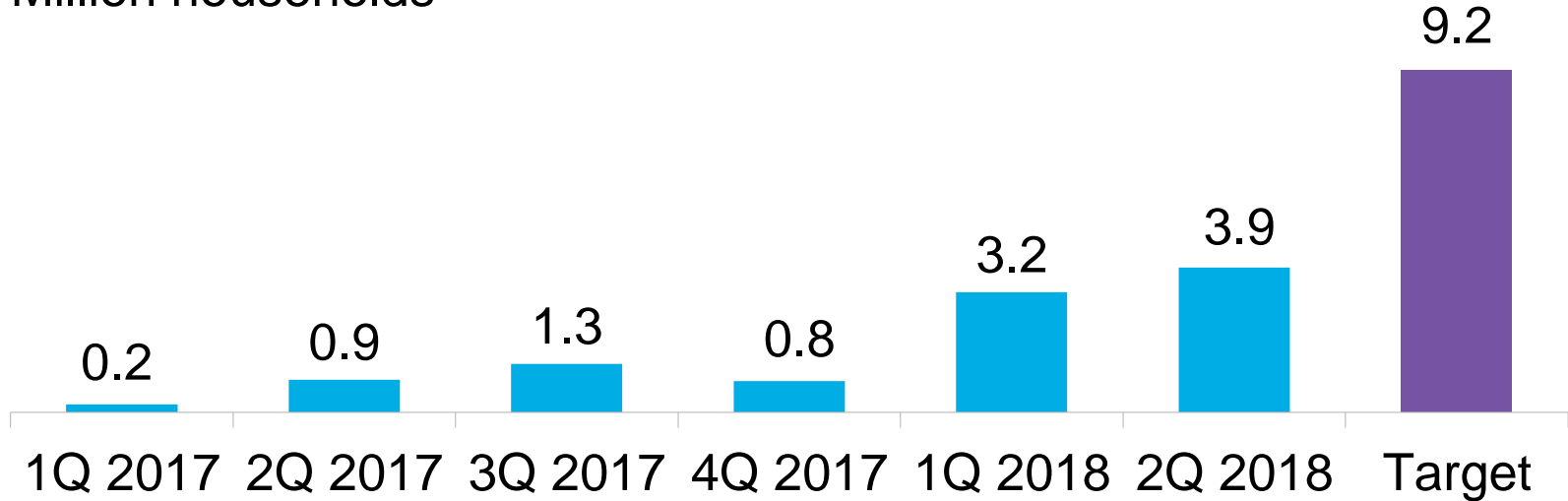
Million households



Source: Bloomberg NEF, India's Ministry of Power

# India's quarterly rural household electrification

Million households



Source: Bloomberg NEF, India's Ministry of Power

# Cost of delivered energy

## Cost of delivered energy for rural customers





# Cost of delivered energy

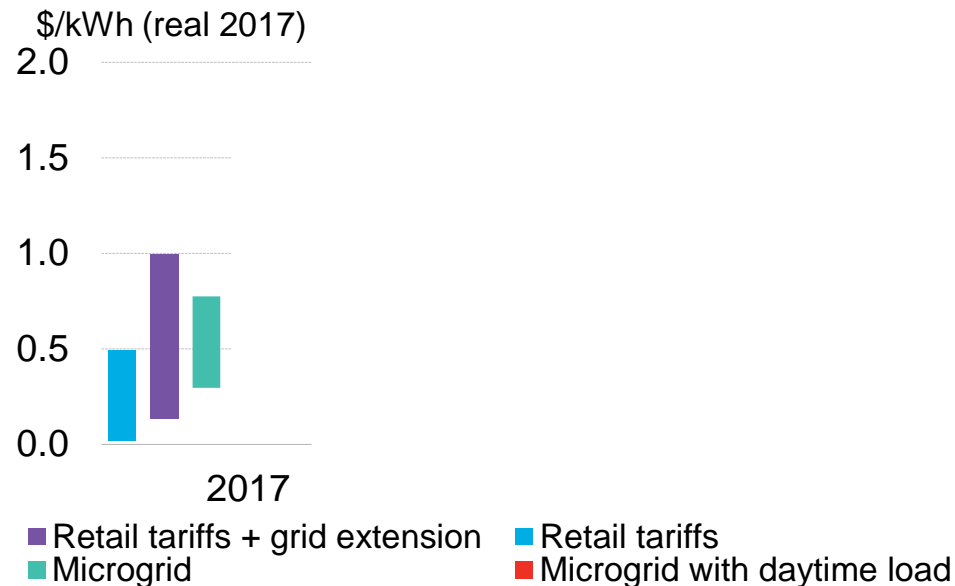
## Cost of delivered energy for rural customers



- Grid extensions more than double the cost of electricity

# Cost of delivered energy

## Cost of delivered energy for rural customers



- Grid extensions more than double the cost of electricity
- Microgrids are competitive with the grid

# Cost of delivered energy

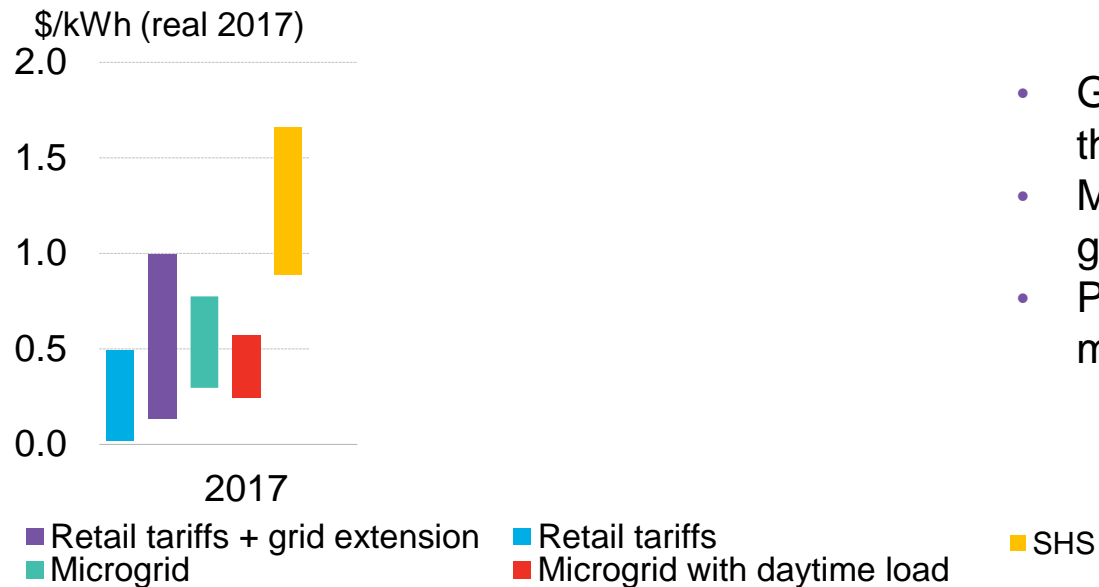
## Cost of delivered energy for rural customers



- Grid extensions more than double the cost of electricity
- Microgrids are competitive with the grid
- Productive loads reduce the cost of microgrid electricity

# Cost of delivered energy

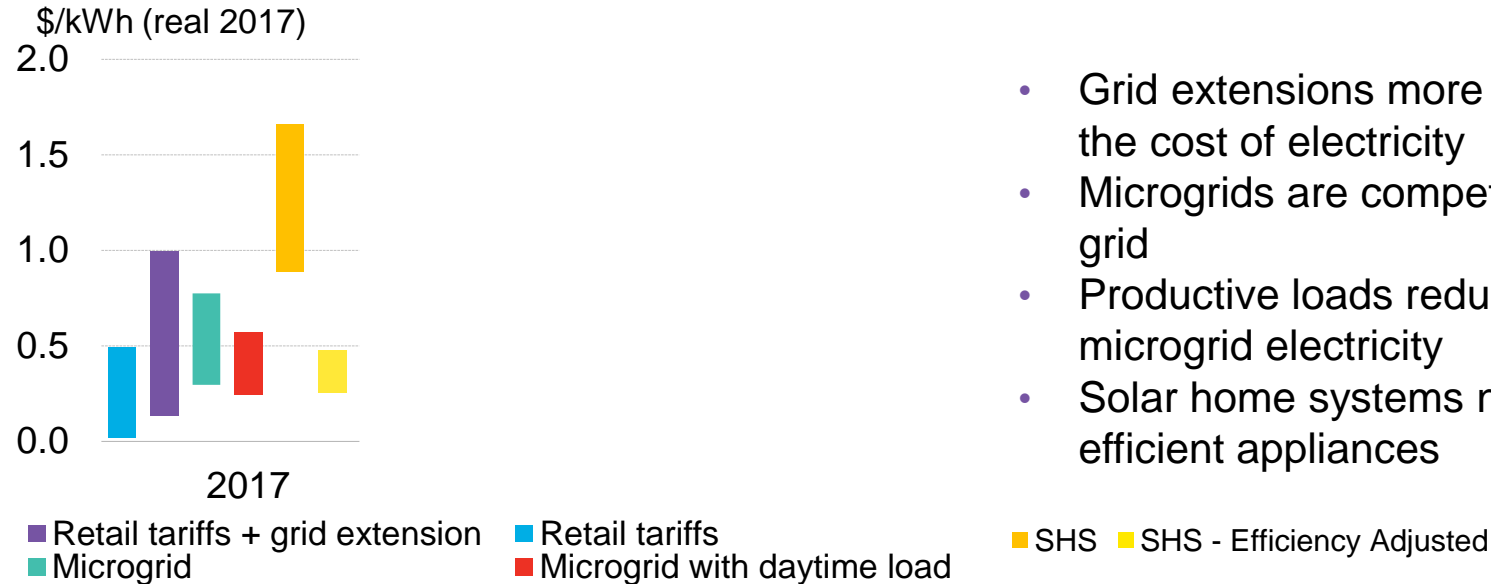
## Cost of delivered energy for rural customers



- Grid extensions more than double the cost of electricity
- Microgrids are competitive with the grid
- Productive loads reduce the cost of microgrid electricity

# Cost of delivered energy

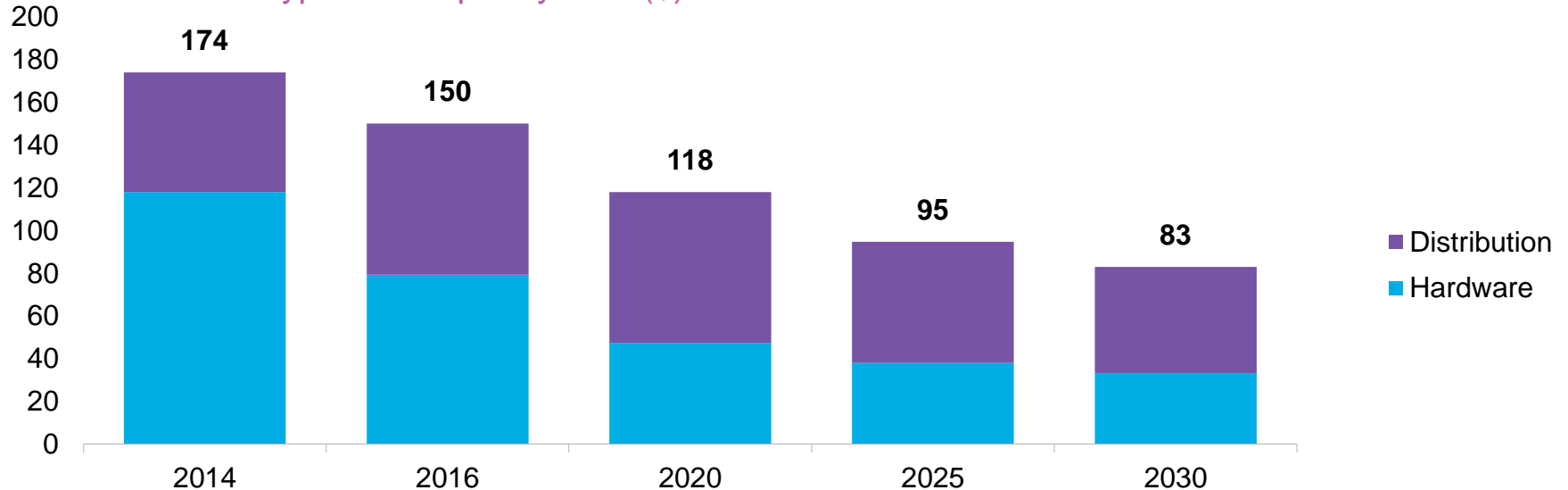
## Cost of delivered energy for rural customers



- Grid extensions more than double the cost of electricity
- Microgrids are competitive with the grid
- Productive loads reduce the cost of microgrid electricity
- Solar home systems need super-efficient appliances

# Distribution makes up the majority of costs

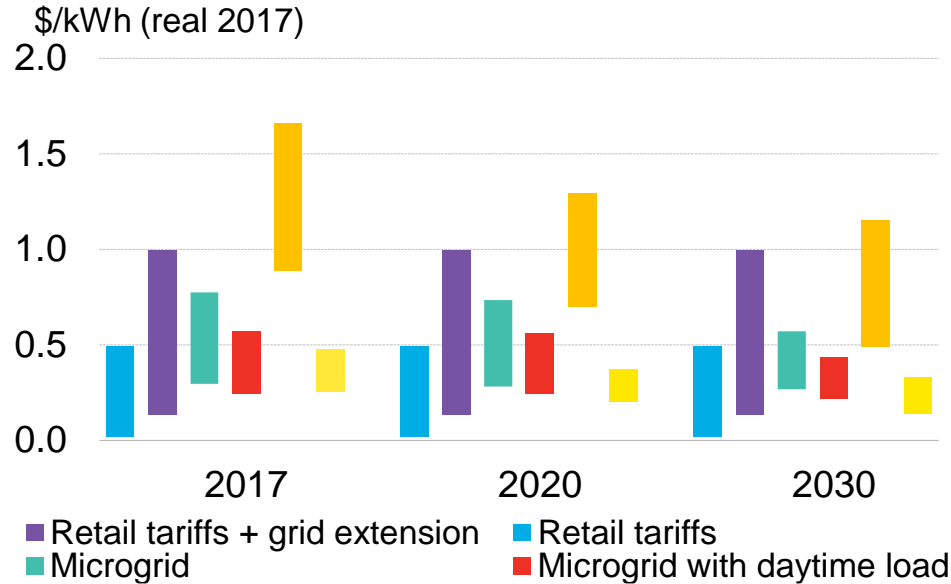
Evolution of the typical cost per system (\$)



Source: Bloomberg NEF

# Cost of delivered energy

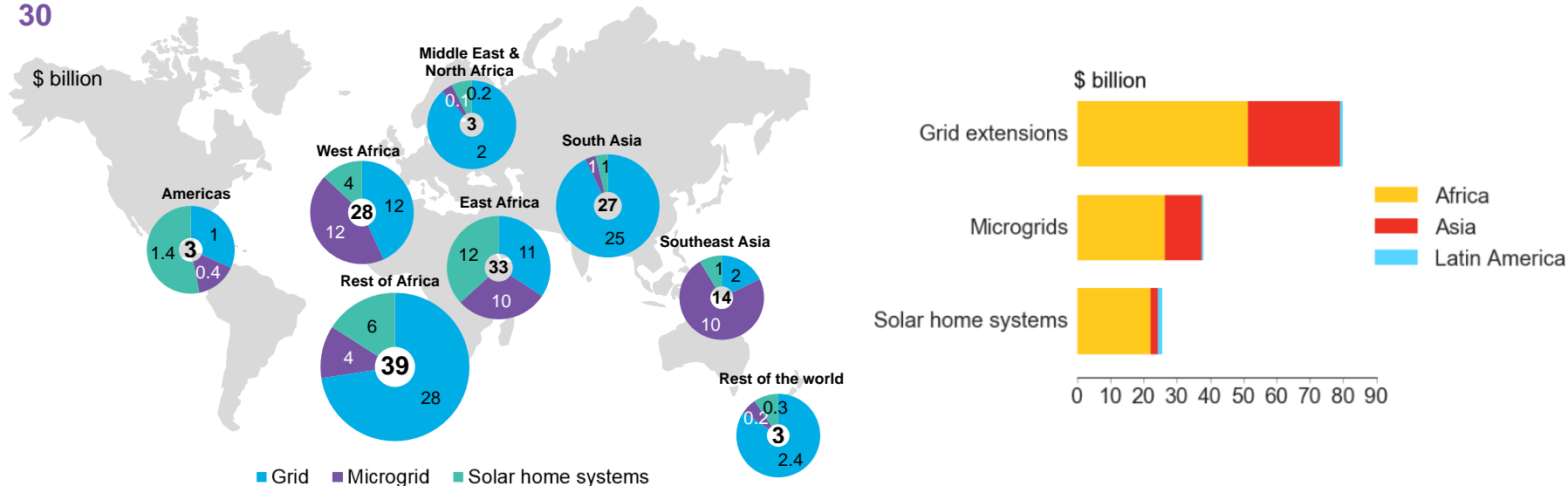
## Cost of delivered energy for rural customers



- Grid extensions more than double the cost of electricity
- Microgrids are competitive with the grid
- Productive loads reduce the cost of microgrid electricity
- Solar home systems need super-efficient appliances

# Africa will spend the most on off-grid solutions

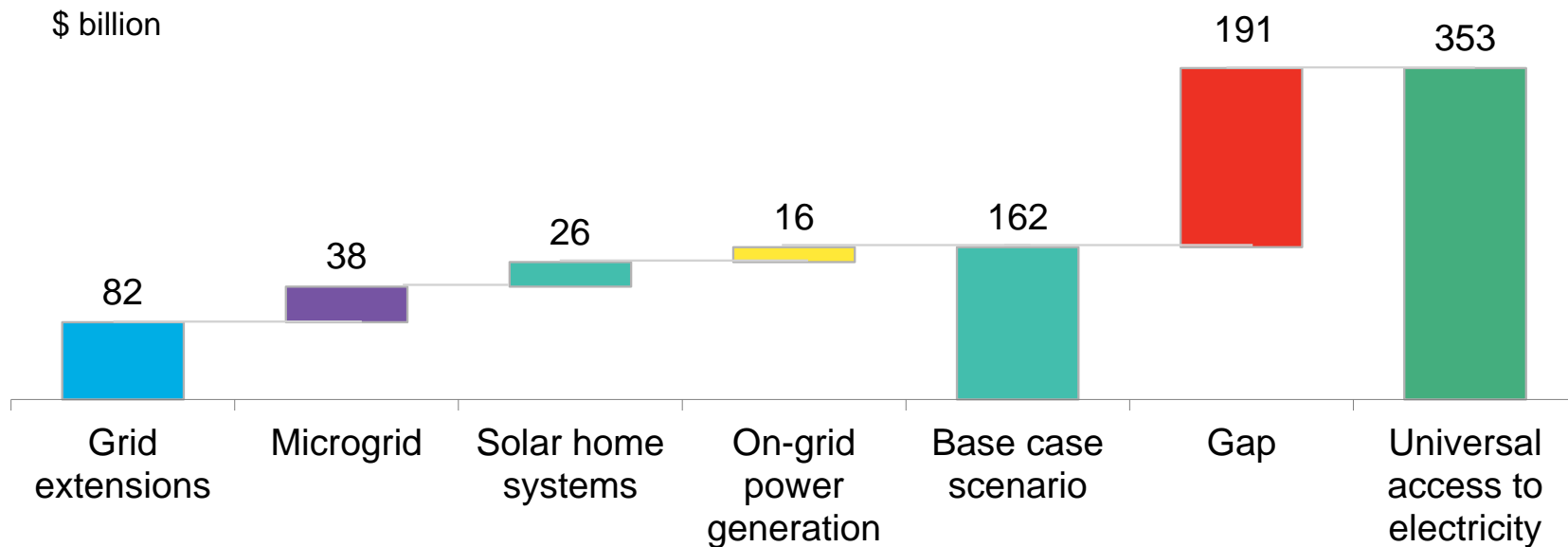
Projected household electrification capital spend, base case scenario 2018-30



Source: Bloomberg New Energy Finance. Note: East Africa refers to the six countries of the East African Community. Numbers may not add up due to rounding.



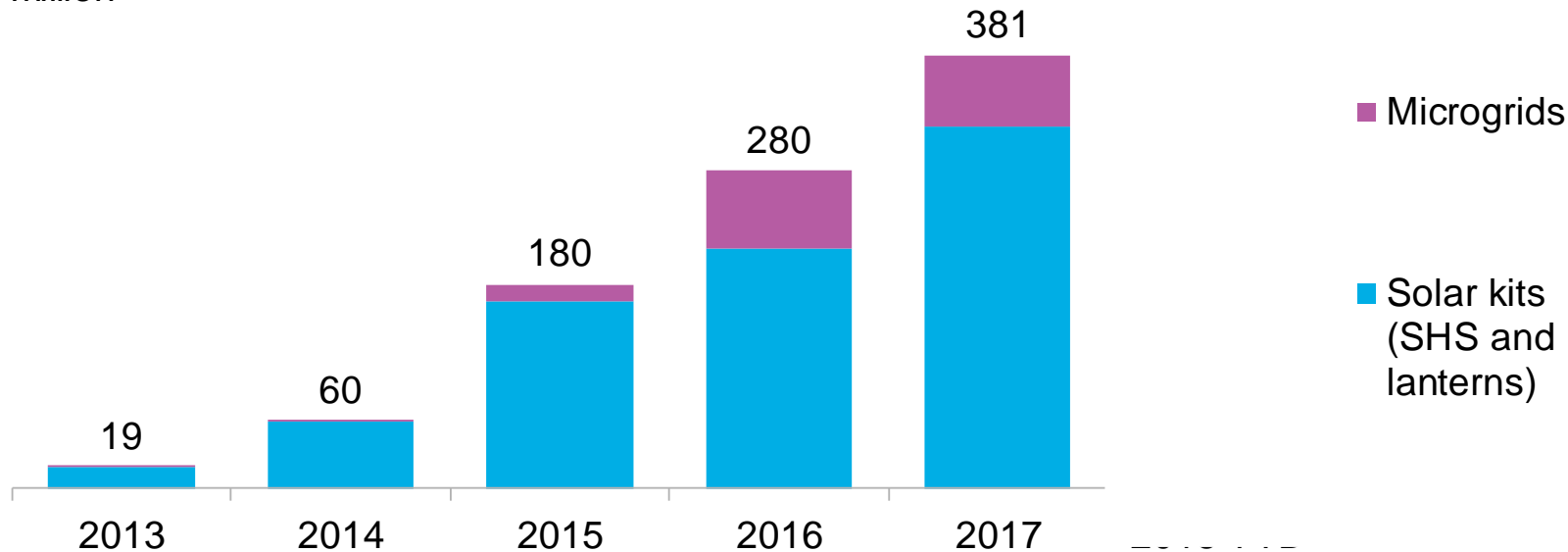
# The gap to universal access remains overarching



Source: Bloomberg New Energy Finance

# Venture financing rose steadily

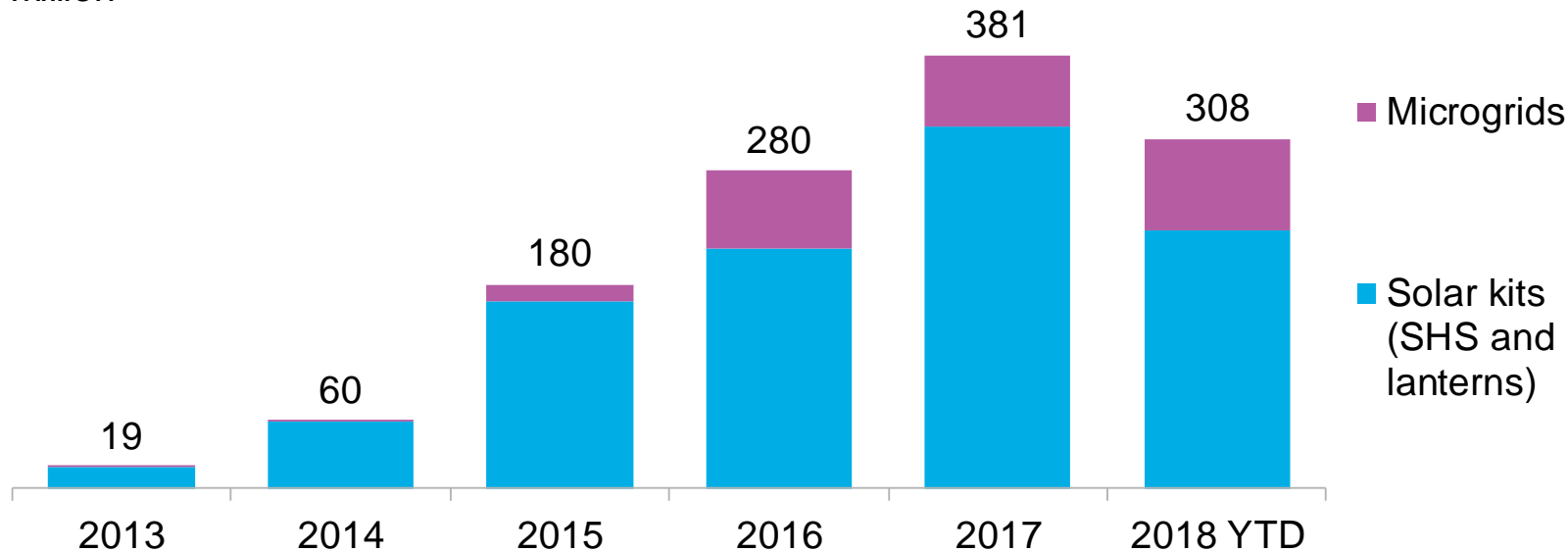
\$ million



Source: Bloomberg NEF. Microgrid financing refers to rural microgrids for energy access only. \*YTD as of October 2018









# Venture financing rose steadily, but is that sustainable?

\$ million



Source: Bloomberg NEF. Microgrid financing refers to rural microgrids for energy access only. \*YTD as of October 2018




# European energy majors are investing in energy access

Company	Million people reached		Notable activities	Company	Million people reached		Notable activities
	By 2017	2020 target			By 2017	2020 target	
<b>Top-5 utilities in EMEA</b>				<b>Top-5 utilities in AMER</b>			
	1.7	3	Microgrids in Africa, Latin America, Asia Pacific		-	-	-
	3.9	4	Investment in off-grid solar firms, microgrids in Brazil		-	-	-
	2.4	20	Acquired Fenix International, EPS		-	-	-
	0.2	Unknown	Off-grid solar in South Africa, Ivory Coast and Ghana.		-	-	-
	-	-	-		-	-	-
<b>Top-5 utilities in APAC</b>				<b>Top-5 oil majors globally</b>			
	-	-	-		-	-	-
	-	-	-		54	Unknown	Investment in off-grid solar and microgrid startups.
	-	-	-		-	-	-
	-	-	Rural electrification in villages in Sabah, Malaysia		10	25	Off-grid solar kits distribution through its partners in Africa.
	-	-	PV tender to electrify villages in Jharkhand, India		-	-	-
<span style="color: green;">■</span> SDG7 commitment with specific target <span style="color: yellow;">■</span> SDG7 commitment without specific target <span style="color: red;">■</span> No mention of the SDG7 in most recent annual report							

Source: Bloomberg New Energy Finance

# There is a lot of potential for cross-sector partnerships

 +  +  +  = Pay-as-you-go trial

 +  +  = Micro health insurance

 +  +  = \$2.4/month smartphone plans

 +  +  = WiFi – enabled kiosks with cold drinks

ZAMBIAN BREWERIES

 +  = Pay-as-you-go 24” satellite TV

Source: Bloomberg New Energy Finance

# Potential alternatives for last-mile connectivity



Cell Tower  
Grid or solar hybrid  
(1,500 – 3,000 Watts)



Small Cell Antenna  
Solar  
(50-100 Watts)



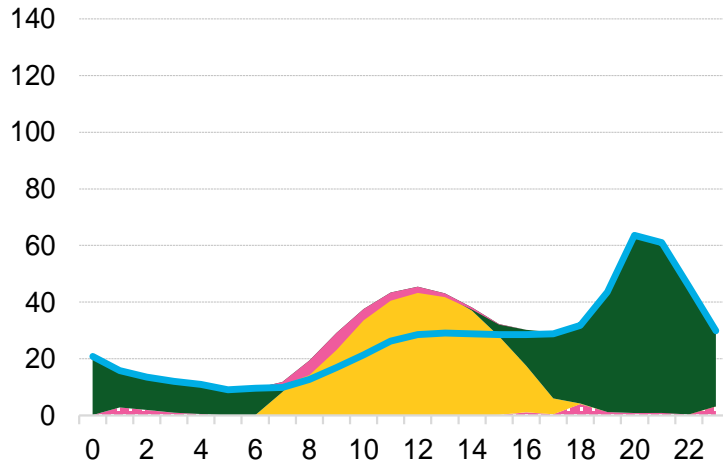
Wifi Hotspot  
Solar  
(50-100 Watts)

Source: Bloomberg New Energy Finance, Facebook

# Developing countries are only starting to adopt mobile data

Microgrid dispatch profile with an evening peak...

Supply (kW)

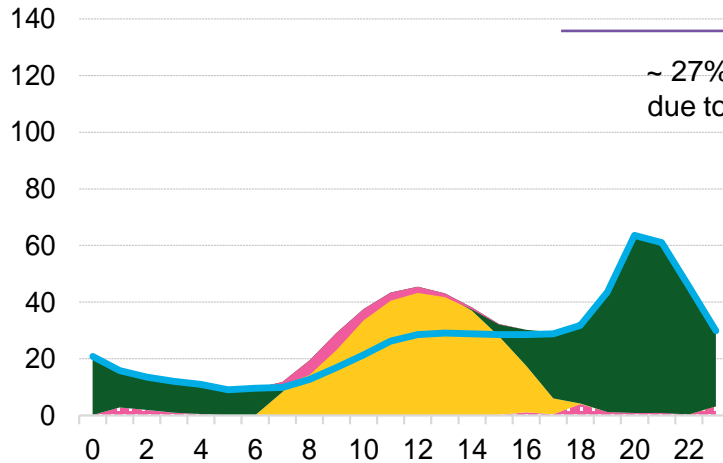


Source: Bloomberg New Energy Finance.

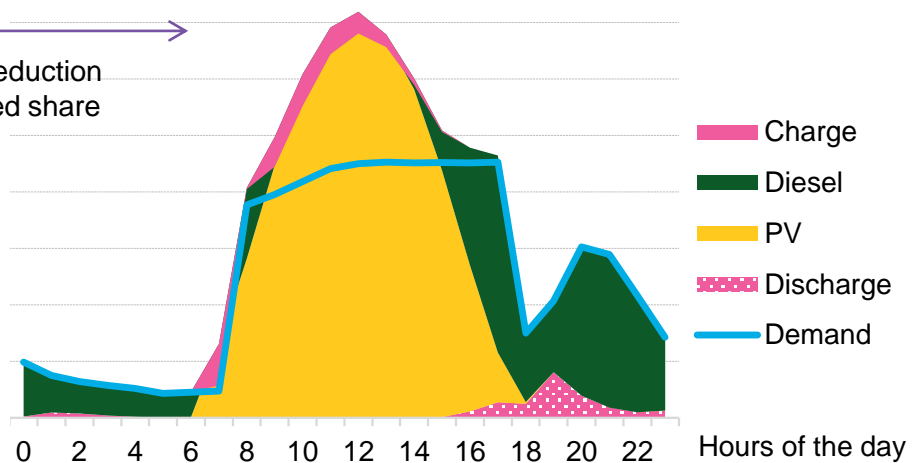
# Developing countries are only starting to adopt mobile data

Microgrid dispatch profile with an evening peak...

Supply (kW)



...and with added midday demand



~ 27% LCOE reduction  
due to increased share  
of PV

Source: Bloomberg New Energy Finance.



# Copyright and disclaimer

The Bloomberg NEF ("BNEF"), service/information is derived from selected public sources. Bloomberg Finance L.P. and its affiliates, in providing the service/information, believe that the information it uses comes from reliable sources, but do not guarantee the accuracy or completeness of this information, which is subject to change without notice, and nothing in this document shall be construed as such a guarantee. The statements in this service/document reflect the current judgment of the authors of the relevant articles or features, and do not necessarily reflect the opinion of Bloomberg Finance L.P., Bloomberg L.P. or any of their affiliates ("Bloomberg"). Bloomberg disclaims any liability arising from use of this document, its contents and/or this service. Nothing herein shall constitute or be construed as an offering of financial instruments or as investment advice or recommendations by Bloomberg of an investment or other strategy (e.g., whether or not to "buy", "sell", or "hold" an investment). The information available through this service is not based on consideration of a subscriber's individual circumstances and should not be considered as information sufficient upon which to base an investment decision. You should determine on your own whether you agree with the content. This service should not be construed as tax or accounting advice or as a service designed to facilitate any subscriber's compliance with its tax, accounting or other legal obligations. Employees involved in this service may hold positions in the companies mentioned in the services/information.

The data included in these materials are for illustrative purposes only. The BLOOMBERG TERMINAL service and Bloomberg data products (the "Services") are owned and distributed by Bloomberg Finance L.P. ("BFLP") except that Bloomberg L.P. and its subsidiaries ("BLP") distribute these products in Argentina, Australia and certain jurisdictions in the Pacific islands, Bermuda, China, India, Japan, Korea and New Zealand. BLP provides BFLP with global marketing and operational support. Certain features, functions, products and services are available only to sophisticated investors and only where permitted. BFLP, BLP and their affiliates do not guarantee the accuracy of prices or other information in the Services. Nothing in the Services shall constitute or be construed as an offering of financial instruments by BFLP, BLP or their affiliates, or as investment advice or recommendations by BFLP, BLP or their affiliates of an investment strategy or whether or not to "buy", "sell" or "hold" an investment. Information available via the Services should not be considered as information sufficient upon which to base an investment decision. The following are trademarks and service marks of BFLP, a Delaware limited partnership, or its subsidiaries: BLOOMBERG, BLOOMBERG ANYWHERE, BLOOMBERG MARKETS, BLOOMBERG NEWS, BLOOMBERG PROFESSIONAL, BLOOMBERG TERMINAL and BLOOMBERG.COM. Absence of any trademark or service mark from this list does not waive Bloomberg's intellectual property rights in that that name, mark or logo. All rights reserved. © 2018 Bloomberg.

Bloomberg NEF (BNEF) is a leading provider of primary research on clean energy, advanced transport, digital industry, innovative materials, and commodities.

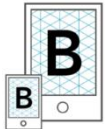
BNEF's global team leverages the world's most sophisticated data sets to create clear perspectives and in-depth forecasts that frame the financial, economic and policy implications of industry-transforming trends and technologies.

BNEF research and analysis is accessible via web and mobile platforms, as well as on the Bloomberg Terminal.

### Coverage.

Clean energy  
Advanced transport  
Commodities  
Digital industry

Get the app



On IOS + Android  
[about.bnef.com/mobile](http://about.bnef.com/mobile)

# BloombergNEF

### Client enquiries:

Bloomberg Terminal: press <Help> key twice  
Email: [support.bnef@bloomberg.net](mailto:support.bnef@bloomberg.net)

### Learn more:

[about.bnef.com](http://about.bnef.com) | [@BloombergNEF](https://twitter.com/BloombergNEF)