



# **SHORT-TERM THINKING, LONG-LIVED VALUE:**

## **HOW ENERGY-AS-A-SERVICE REVOLUTIONIZES PV, STORAGE AND EVEN THERMAL**

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Berlin, June 26 2018

# AGENDA



1. About Younicos+Aggreko: The customer benefits of that partnership.
2. Current situation in the energy market
3. How to address the challenges: Microgrids-as-a-Service
4. Example use cases for PV + Storage as a Service



# YUNICOS AND AGGREKO

# GENERATION AND STORAGE FROM TWO GLOBAL LEADERS.



Aggreko provides **mobile and modular power, temperature control and energy services worldwide**. Younicos, a wholly owned Aggreko subsidiary, has an unmatched track record in **battery-storage-based smart energy and grid solutions**.

# OUR COMBINED STRENGTHS



**aggreko**

**Younicos**  
an **aggreko** company

Thermal generation  
expertise

**Hybrid systems**

Renewable and battery  
expertise

Mobile and modular  
approach

**Microgrids  
as a service**

Smart Software for  
seamless system  
integration

100% reliability thanks  
to generators

**Smarter  
energy systems**

More efficiency, less  
costs and lower  
emissions

# OUR SOLUTIONS ARE DESIGNED TO SOLVE THE ENERGY CHALLENGES OF EVERY MARKET PLAYER



## On Grid

### Power Generation



Stabilization of RE feed-in

Modeling of power gradients

Peak shaving

Price arbitrage

### Power Transmission & Distribution



Ancillary services, e.g. frequency regulation

Voltage control

Blackstart capability

Short circuit capability

### Commercial and Industrial

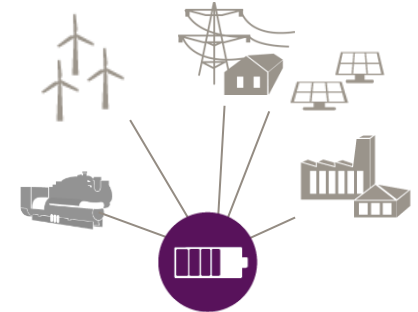


Price arbitrage

Blackstart capability

Short-circuit capability

## Off Grid



Renewables integration

Power quality

Genset optimization



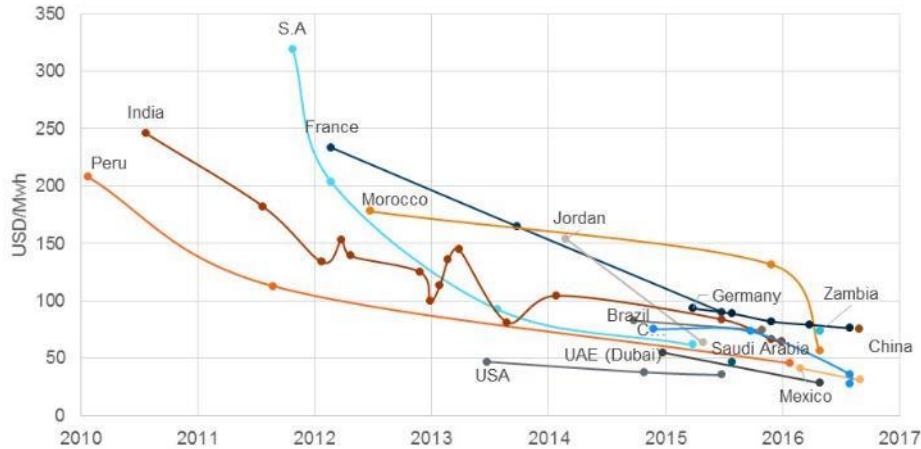


## CURRENT SITUATION OF THE ENERGY MARKET

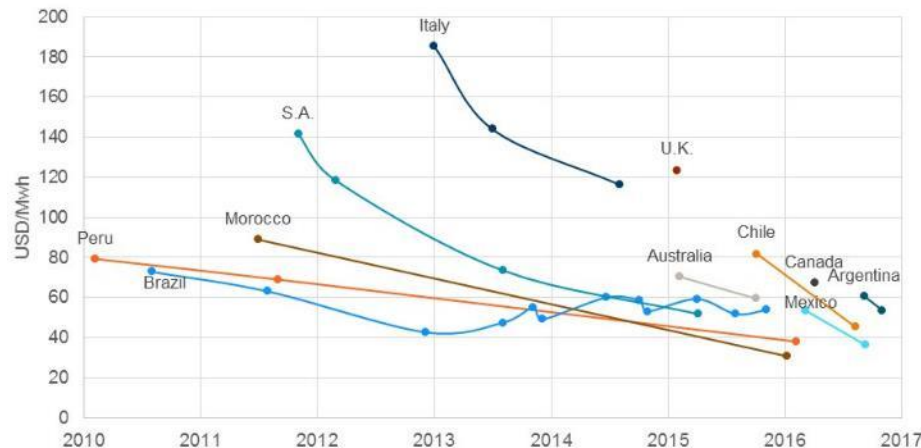
# SOLAR AND WIND ECONOMICS ARE ON PAR OR CHEAPER THAN CONVENTIONAL THERMAL PLANTS



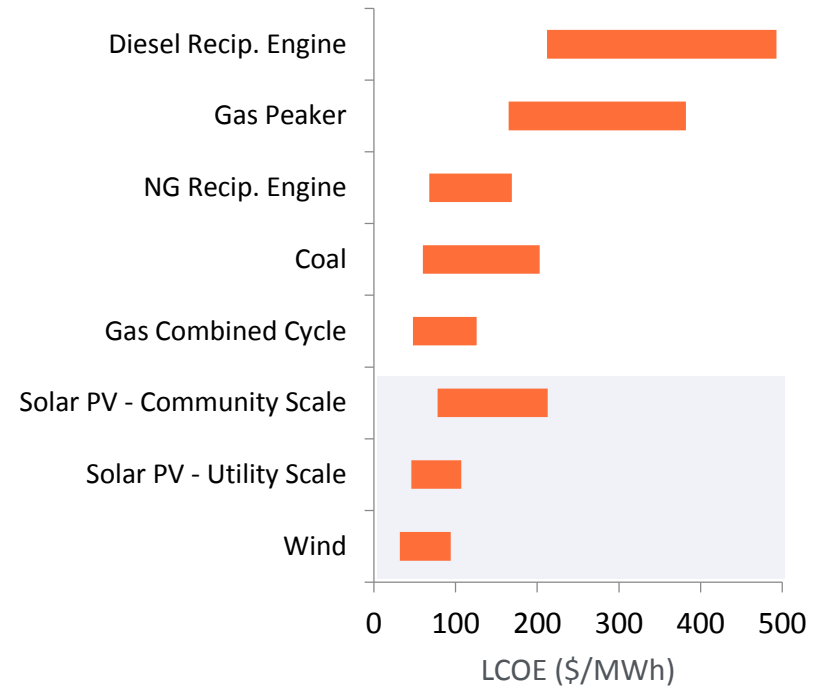
**Solar auction outturn prices in key markets (2010-17):**



**Wind auctions outturn prices in key markets (2010-17):**



**Unsubsidised Levelised Cost of Electricity (LCOE)**



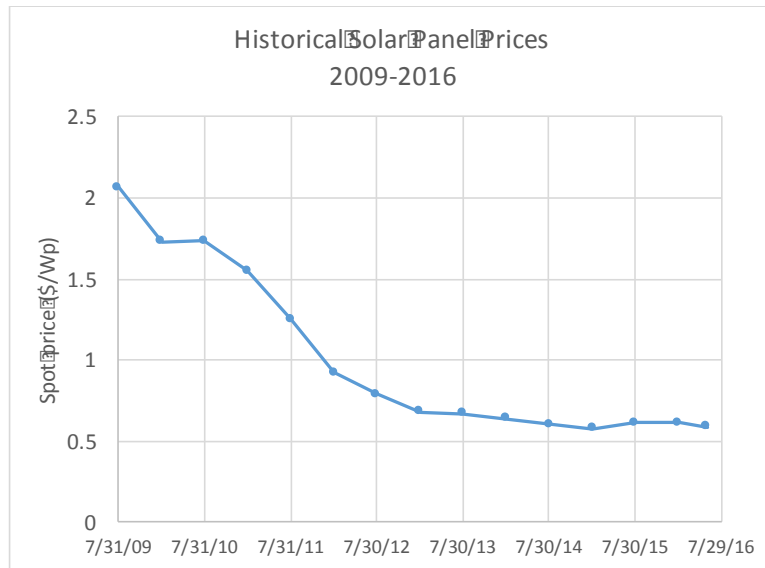
Sources: IRENA for auction prices; Lazard, LCOE analysis V10, Nov 2016 for LCOE chart



# SOLAR POWER PRICES MUCH MORE PREDICTABLE THAN FOSSIL FUELS

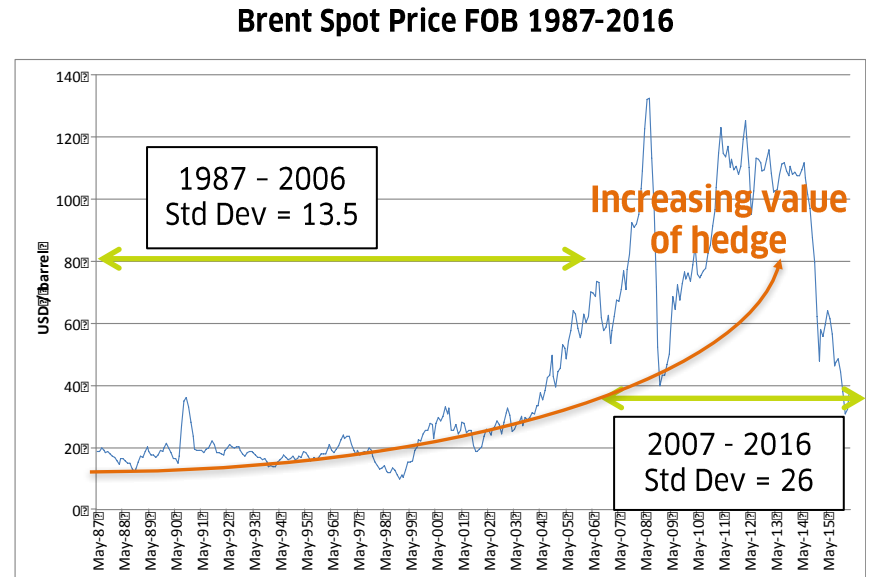


**Solar prices continue to decline steadily**



Source: Pvxchange average spot prices for China and Japan

**Diesel price volatility has doubled over last 10 years**

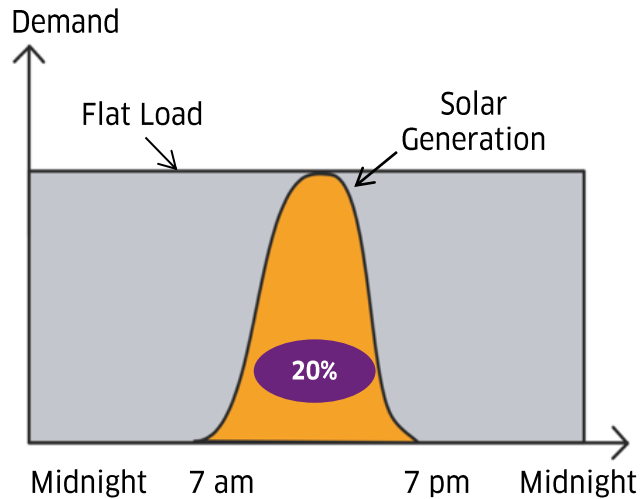


Source: EIA (US), Monthly data

# FUNDAMENTAL CHALLENGES OF RENEWABLES INTEGRATION



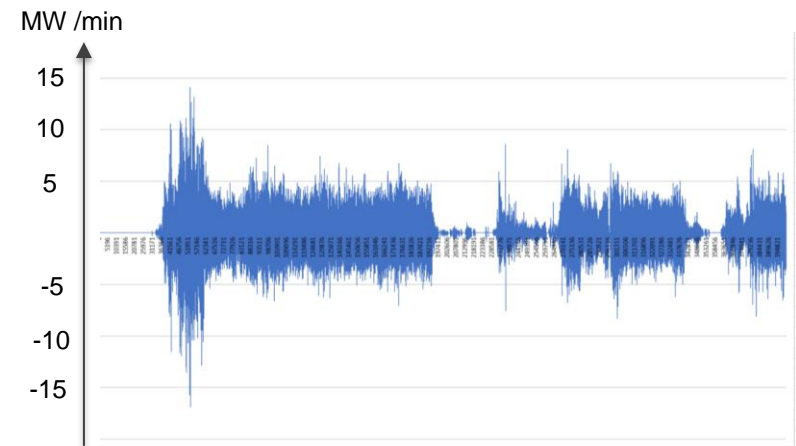
## Low capacity factor



- Fewer MWh of energy delivered / MW of transmission capacity
- Lower utilisation rate of T&D → more T&D required

## High Intermittency

Ramp rate of 57 MW Wind Farm in Japan



- Fast ramping resources required, which are often not fuel efficient
- Grid balancing services required and more valued  
→ Regulations are evolving to firm up renewables and make them more manageable by grid operators

**Enabling higher renewables penetration will drive innovation in energy storage and energy management software**



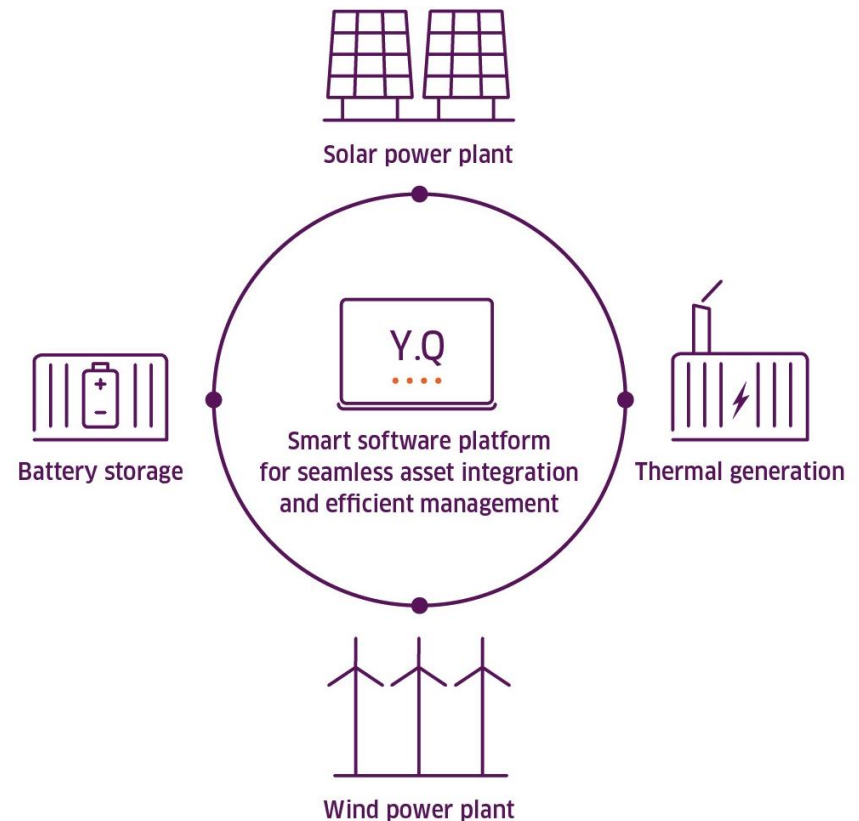
**HOW TO ADDRESS THE CHALLENGES:  
MICROGRIDS-AS-A-SERVICE**

# ONE-STOP HYBRID SYSTEMS FOR FLEXIBLE RENEWABLES INTEGRATION



**One single contract. For your peace of mind.**

- Combine benefits of renewables, thermal generation and battery storage in one single contract
- Better economics, more flexibility and lower emissions
- Increased renewable penetration
- Optimized use of generators to lower fuel and O&M costs



**We optimise the management of DER at the system level to ensure good alignment with customer needs.**

# HYBRID OFFERING REMOVES MAJOR HURDLES TO SOLAR DEPLOYMENT



## Previous hurdles for solar

## Younicos' microgrids as a service

High Capital Cost

### Pay-as-you-go service contract:

- Customers buy energy and capacity delivered by Younicos with no upfront cost
- Service fees include capex amortization and maintenance, 24/7

20-year commitment required

### Minimum contract length: 5 years

Multiple electricity vendors

### One-stop shop:

Younicos can commit to power quality and reliability because it provides all the technologies as well as the energy management system

Potentially unreliable power

Single point of accountability

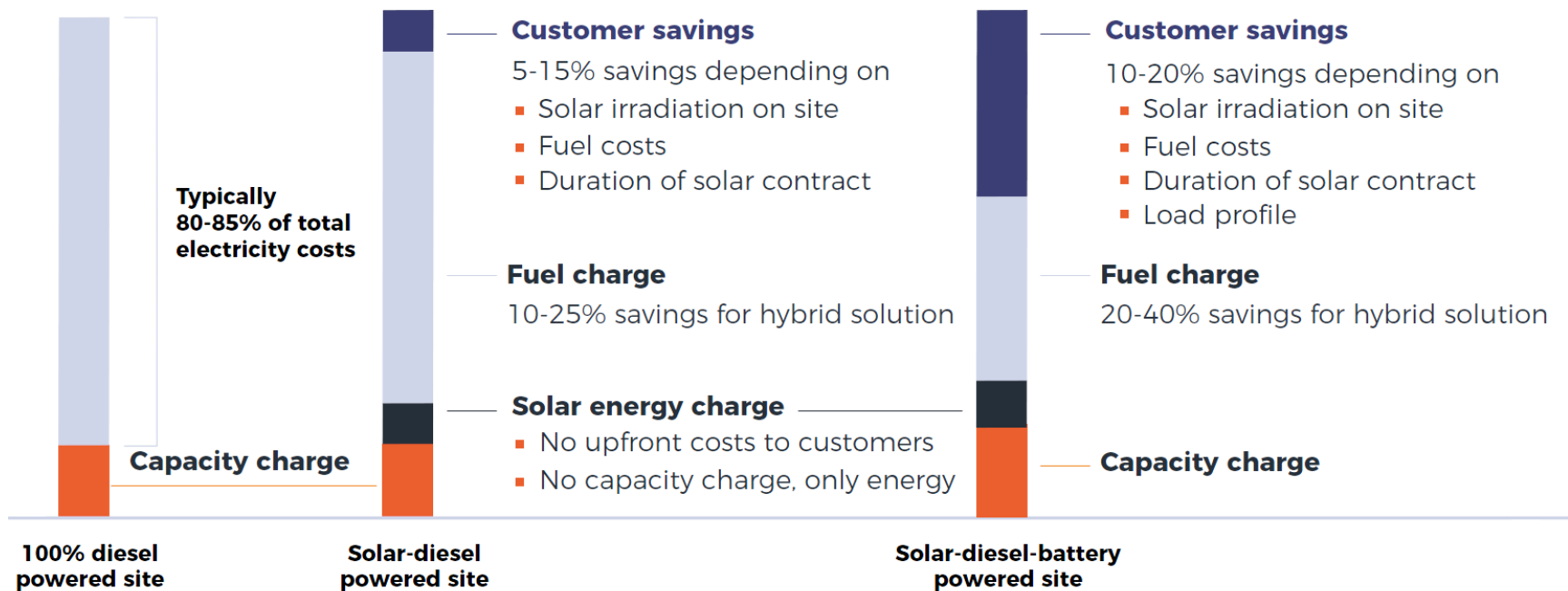
**We ensure cheaper and more reliable electricity for our customers.**



# LOWER COST OF ENERGY WITH NO UPFRONT INVESTMENT FROM CUSTOMERS



## Hedge your fossil fuel costs up to 40% with batteries



With our hybrid solutions you can displace expensive diesel, reduce CO2 emissions and increase your share of solar energy.

# INTRODUCING STORAGE AS A SERVICE



**6 Months**


Minimum duration of contract

**24/7**

Minimum duration of contract

**€0**

No upfront capital outlay

PRODUCT VERSION	ENCLOSURE	POWER [KW]	DURATION [MIN]	TECHNOLOGY	
	Y.Cube 30-min	20-ft ISO	1,000	30	Lithium-Ion
	Y.Cube 60-min	20-ft ISO	1,000	60	Lithium-Ion

# HOW IT WORKS



- Fleet of battery storage systems that we are offering on a rental basis
- Two product versions available as early as Q1 2019
- Rapidly deployable 20' ISO containers including the Younicos software platform
- Providing 20+ applications (ranging from microgrid management, grid services, behind-the-meter energy management, etc.)
- All rental assets are monitored 24/7 and come with full O&M package
- Rental contracts start from 6 months



**RISK-FREE**



**FLEXIBLE CONTRACT**



**MAXIMIZED VALUE**



**BEST-IN-CLASS TECHNOLOGY**

# WHAT STORAGE-AS-A-SERVICE CAN DO FOR YOU



## **Reduce financial risks:**

If the battery does not deliver the expected economic benefits, return it to us. Contracts are very flexible because we can re-use the battery across our huge customer base

## **Eliminate technical risk:**

Younicos has deployed 200MW+ of batteries worldwide and operates all its assets. We have unique technical expertise.

Our contracts include exhaustive performance guarantees backed by Aggreko's strong balance sheet.

## **Eliminate obsolescence risk:**

Your capital is not tied up in an asset that might be replaced by newer and cheaper technologies. As soon as new technology is available, we will offer it to you.



**EXAMPLE BUSINESS CASES FOR MICROGRIDS AS A SERVICE**





Bisha, Eritrea

## PV + Diesel microgrid at copper and zinc mine in Eritrea

Technology: 22 MW diesel station  
7.5 MW<sub>p</sub> solar plant

Applications: Diesel Optimization  
Fuel Cost Reduction  
Reduction in CO<sub>2</sub> emissions



UPCOMING

Western Australia

## Solar-Battery-Gas station to power gold mine Down Under

Size: 2MW/1MWh battery system

7.3MW solar plant

Applications: Spinning Reserve, Ramping  
Frequency Regulation,  
Voltage Control

**QUESTIONS?**

**WE LOOK FORWARD TO HEARING FROM YOU!**

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