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10 October 2022

4:00 pm – 5:00 pm | GST, Dubai
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1:00 pm – 2:00 pm | Morocco
2:00 pm – 3:00 pm | CEST, Berlin



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The case for residential, commercial Battery Energy Storage Systems in the MENA region



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Welcome!

Do you have any questions? ? 

Send them in via the Q&A tab.  We aim to answer as many as we can today!

You can also let us know of any tech problems there.

We are recording this webinar today. 

We'll let you know by email where to find it and the slide deck, so you can re-watch it at your convenience.  

The Applications of Battery Energy Storage Systems (BESS)

Solar
Jinko

Introduction To JinKo Solar



No.1 Total Shipments Globally

100GW+

Delivered Globally
Until end of Q1 2022

12.5%

Global Market Share
Until end of 2021

19

World Records
Until May 2022

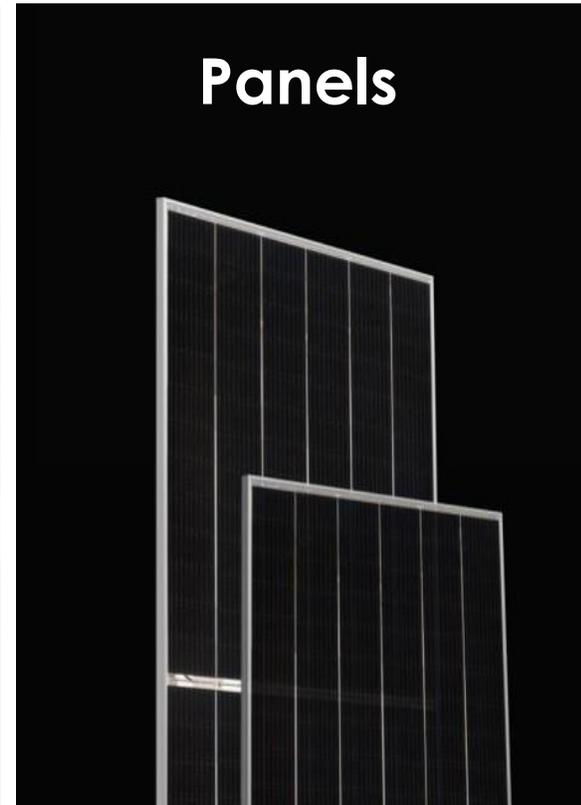
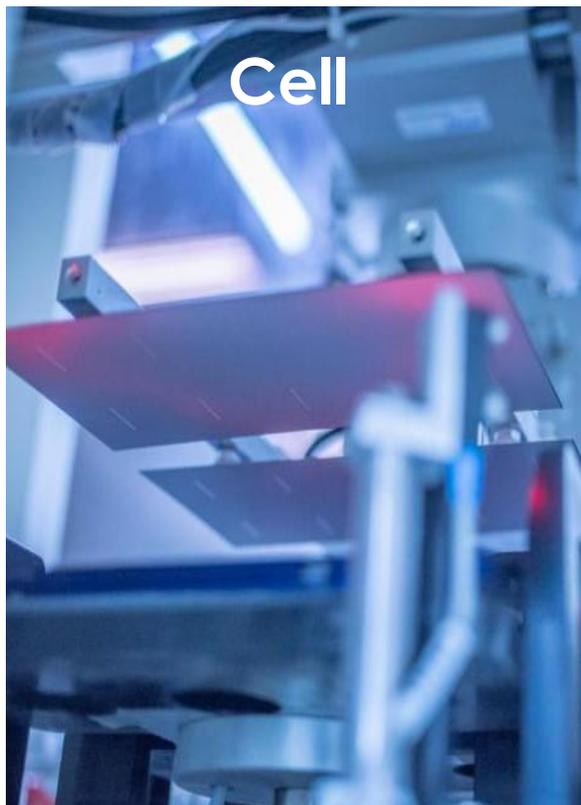
50GW+

Annual Module
Capacity for 2022

Products & Technologies



What We Do – Our Products



Solar Business

Continuously expanding the production capacity of silicon wafers, cells and modules, to create a vertically integrated PV industrial chain

What We Do – Our Solutions

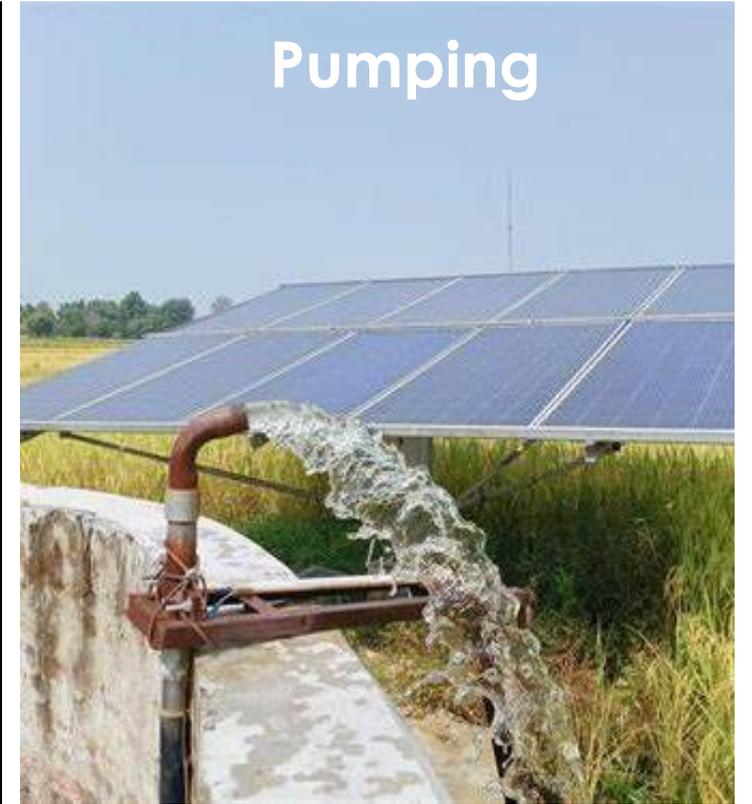
Solar Lighting



ESS



Pumping



Solar Solutions

Adding new variety of Solar Lighting, Energy Storage Systems (ESS) and full turn-key Pumping Systems

Our Products – Energy Storage Systems (ESS)



Residential Storage System
($\leq 20\text{kWh}$)

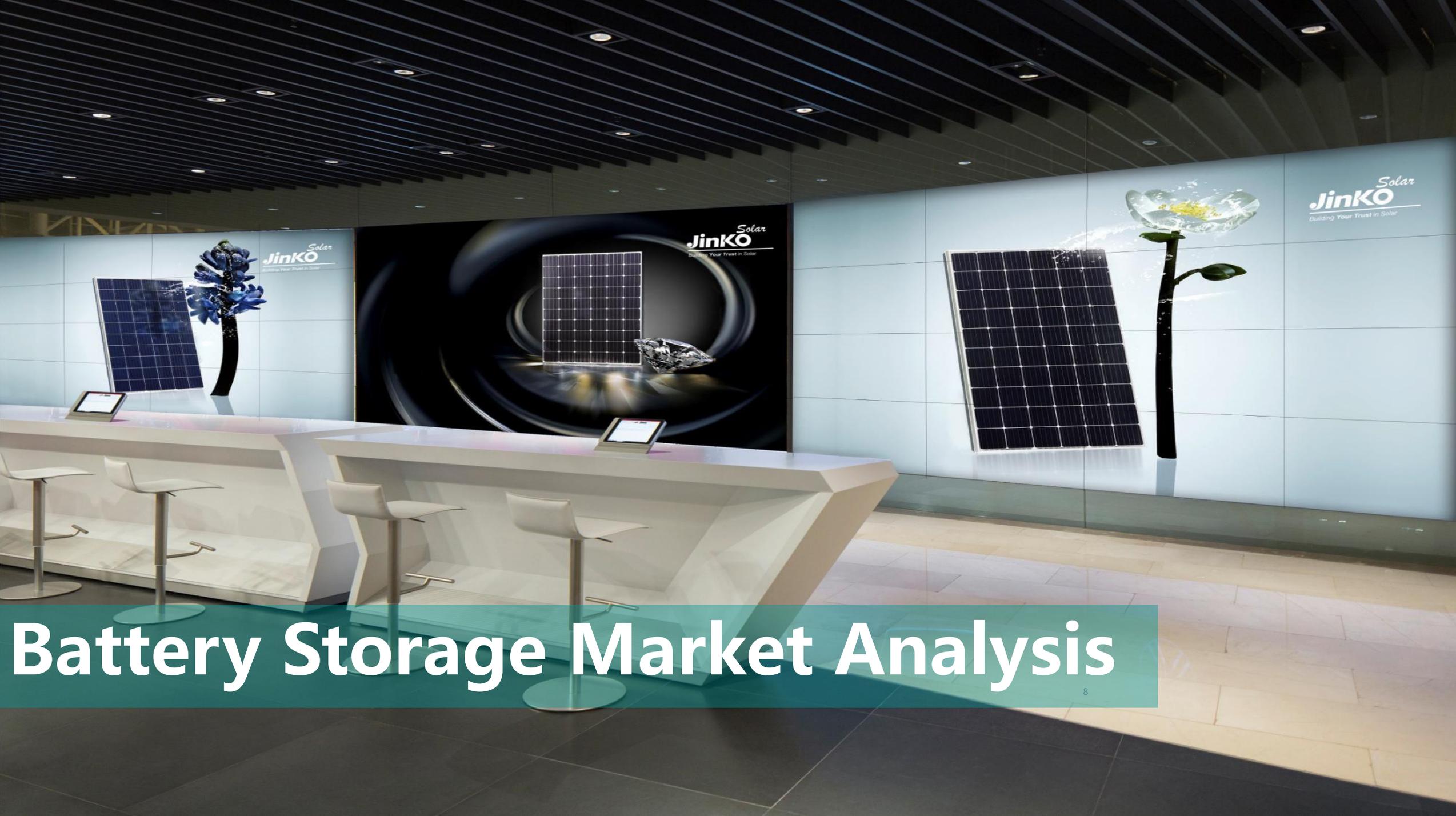


C&I Storage System
($50\text{kWh}-1.0\text{MWh}$)



Utility Storage System
($\geq 1.0\text{MWh}$)

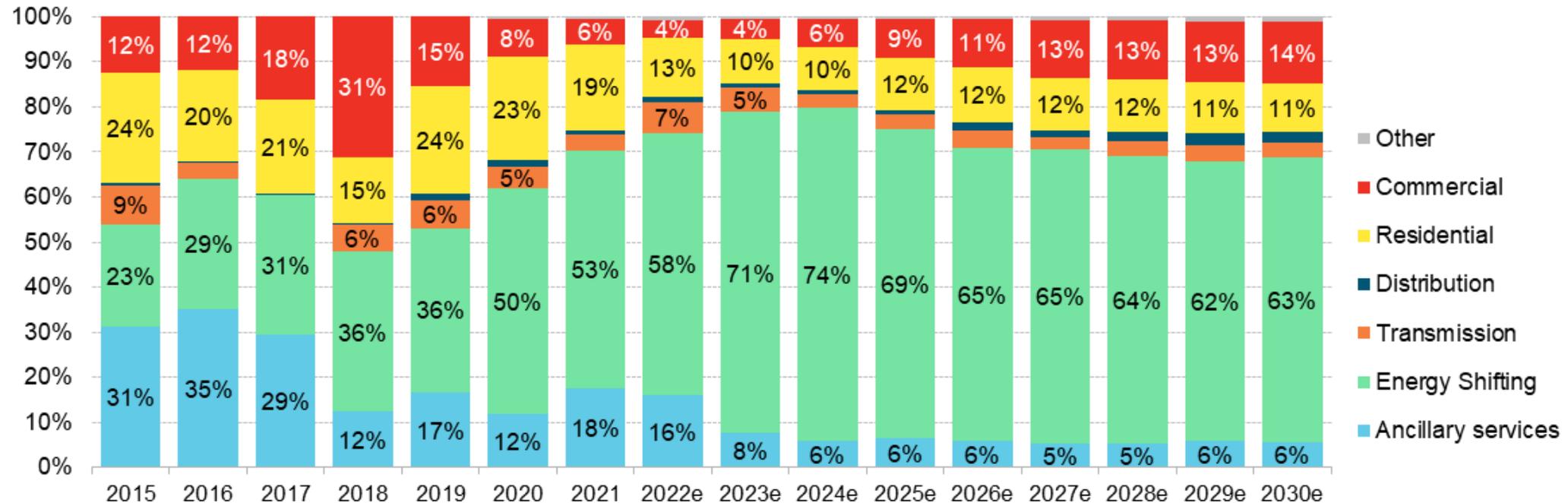
Battery Storage Market Analysis



Global Market Outlook

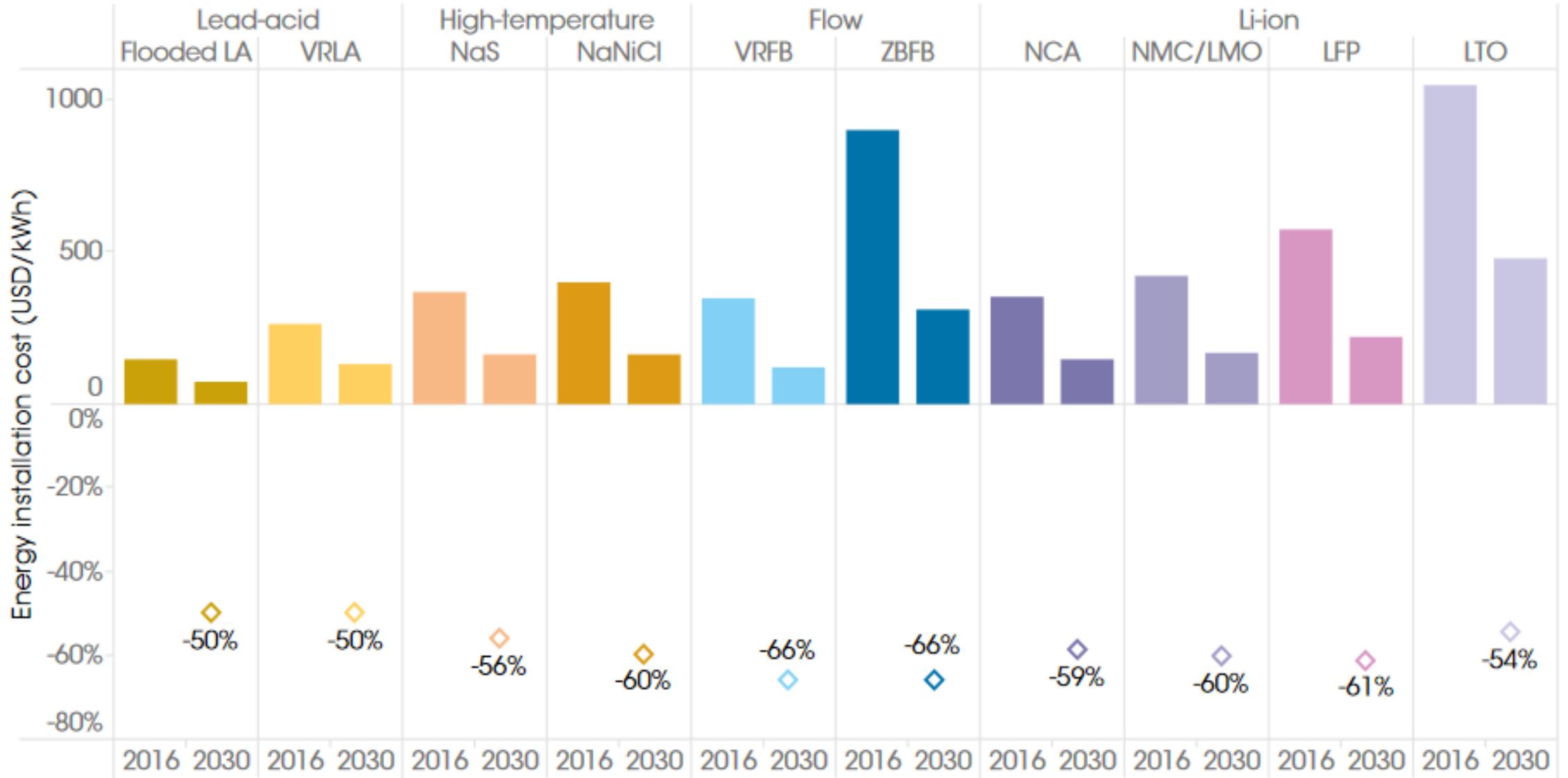
- Energy shifting is leading application, **58%** of expected deployment in 2022.
- Customer-sited storage (residential and C&I), accounts for **17%** in 2022, on the track of growth.
- Ancillary services, to reach **16%** in 2022, will gradually saturated.
- T&D application, accounts for **8%** in 2022, remains marginal.

Application Mix of Energy Storage Projects Based on Power Output



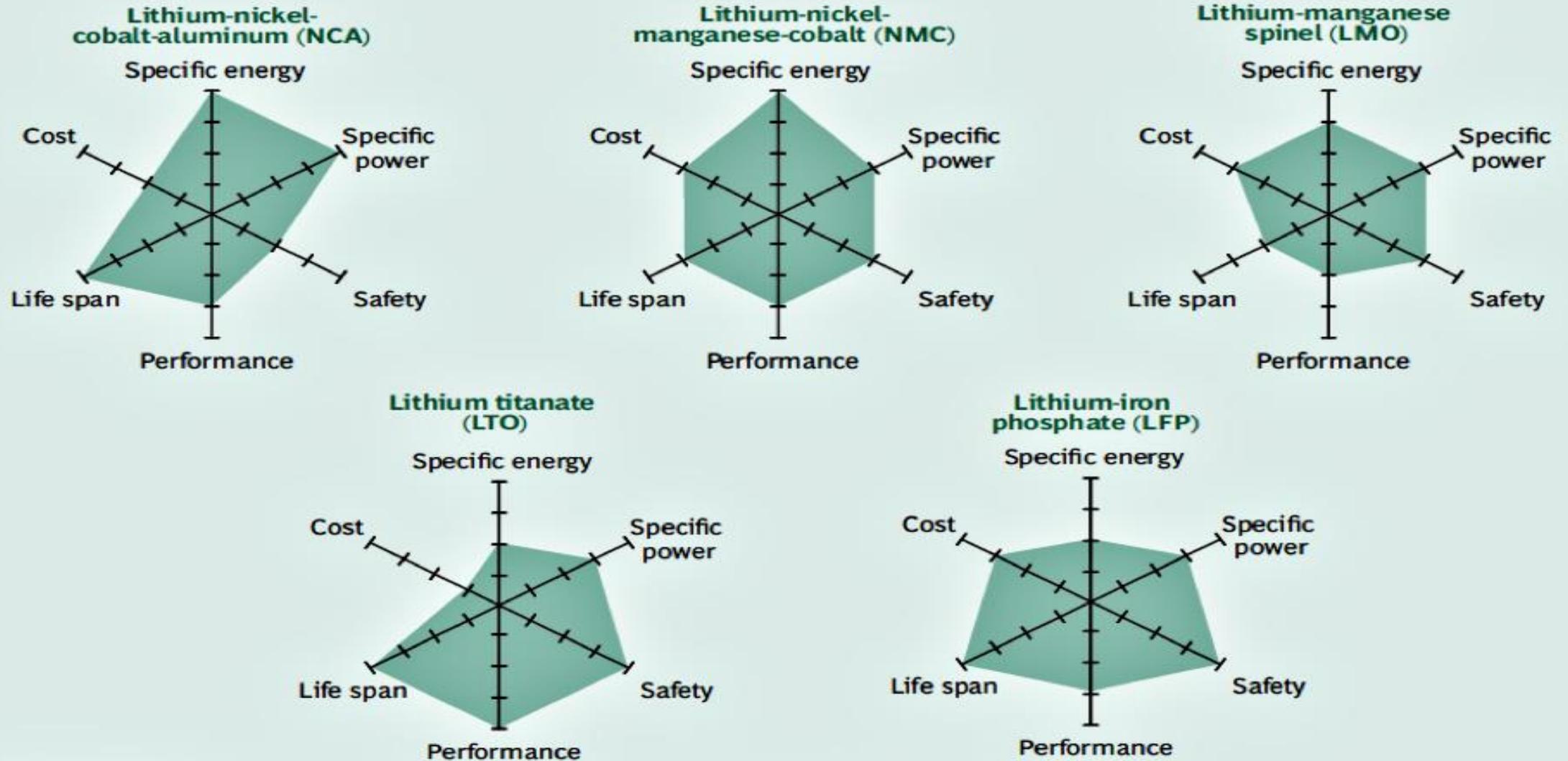
Source: BNEF, 2022/03

Storage Price Reduction



Source: IRENA

Different Batteries Technologies



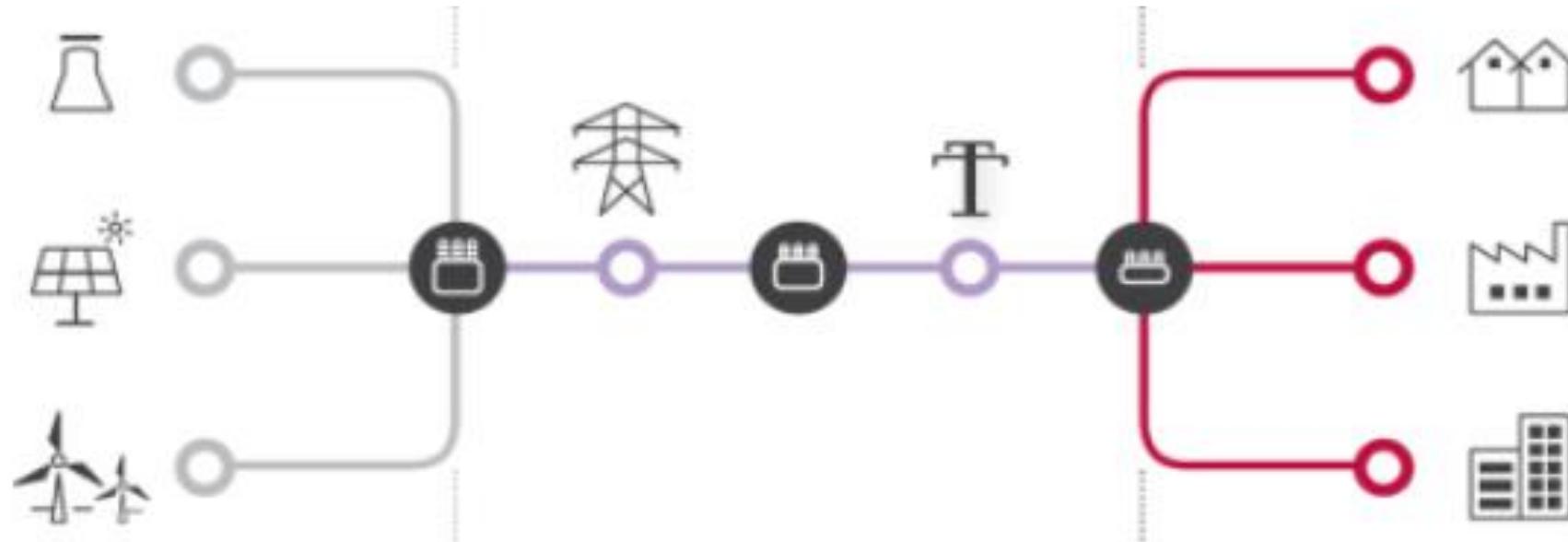
Source: BCG research.

Note: The farther the colored shape extends along a given axis, the better the performance along that dimension.

BESS Applications



ESS Interconnection Points



Generation Side

- Improve the accommodation of RE
- Smooth the RE output

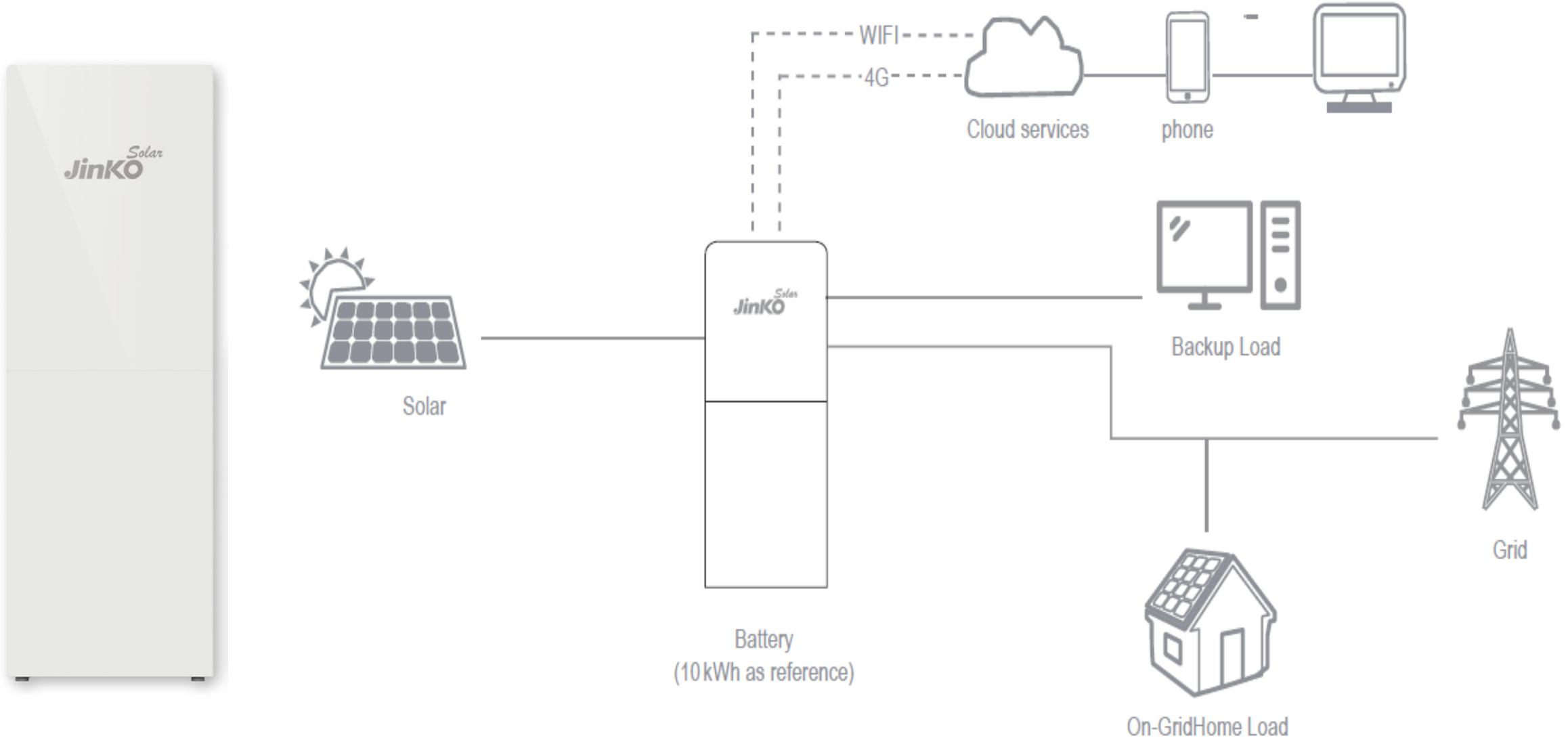
Grid Side

- Relieve the electricity transmission congestion
- Frequency regulation

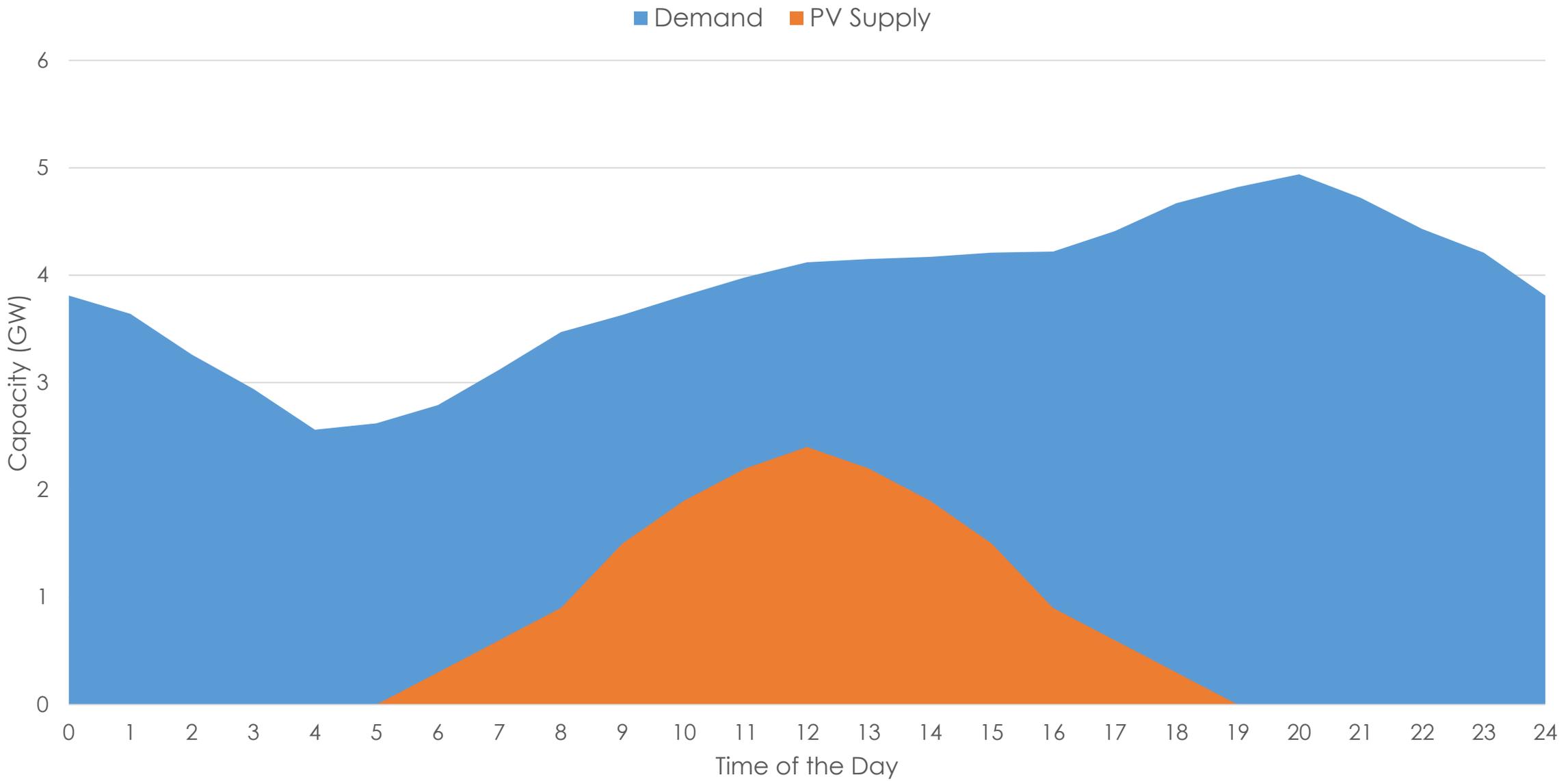
Demand Side

- Peak shaving and tariff control
- Back-up solutions
- Micro-grid

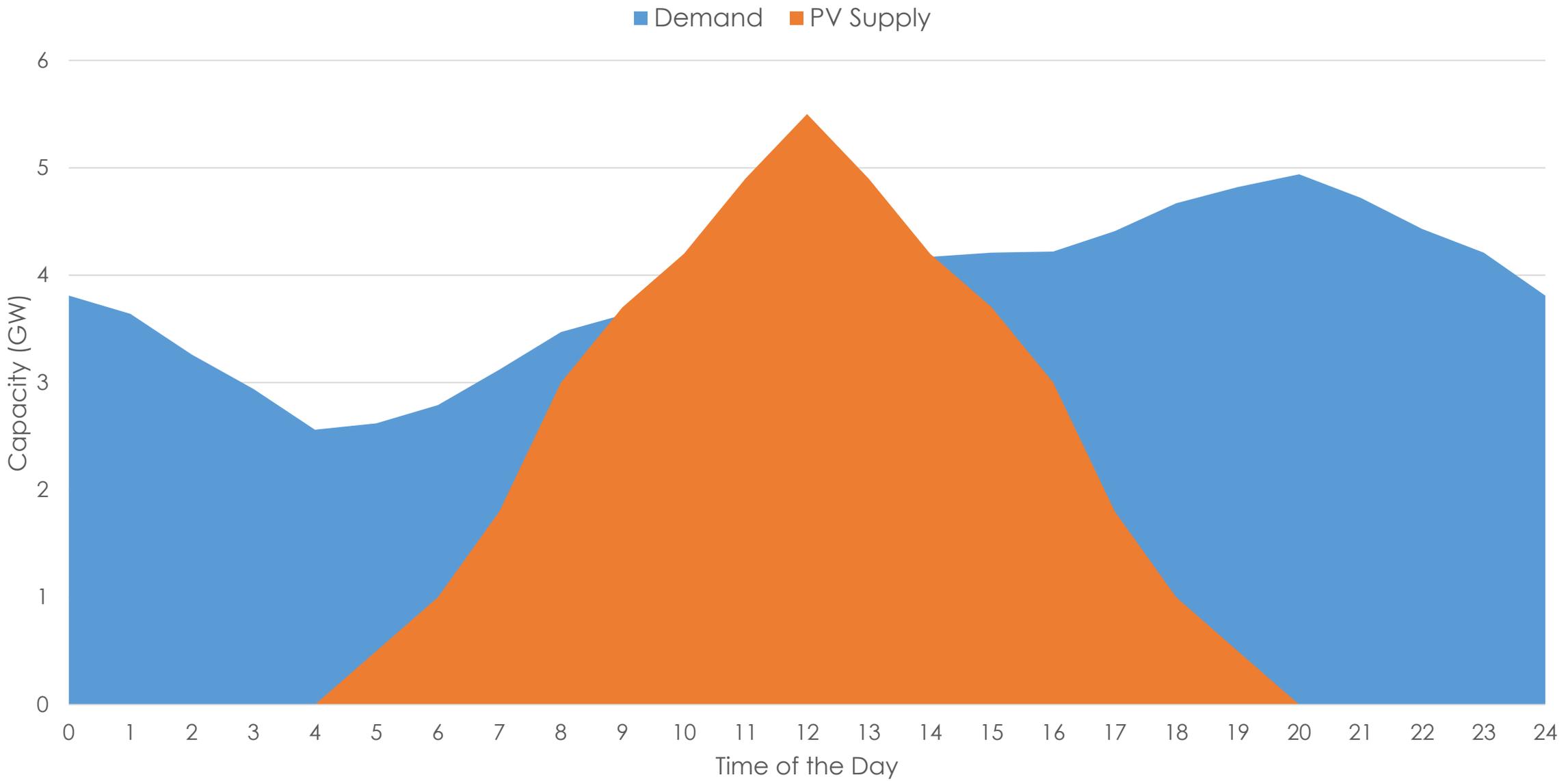
ESS Applications - Res/C&I Application



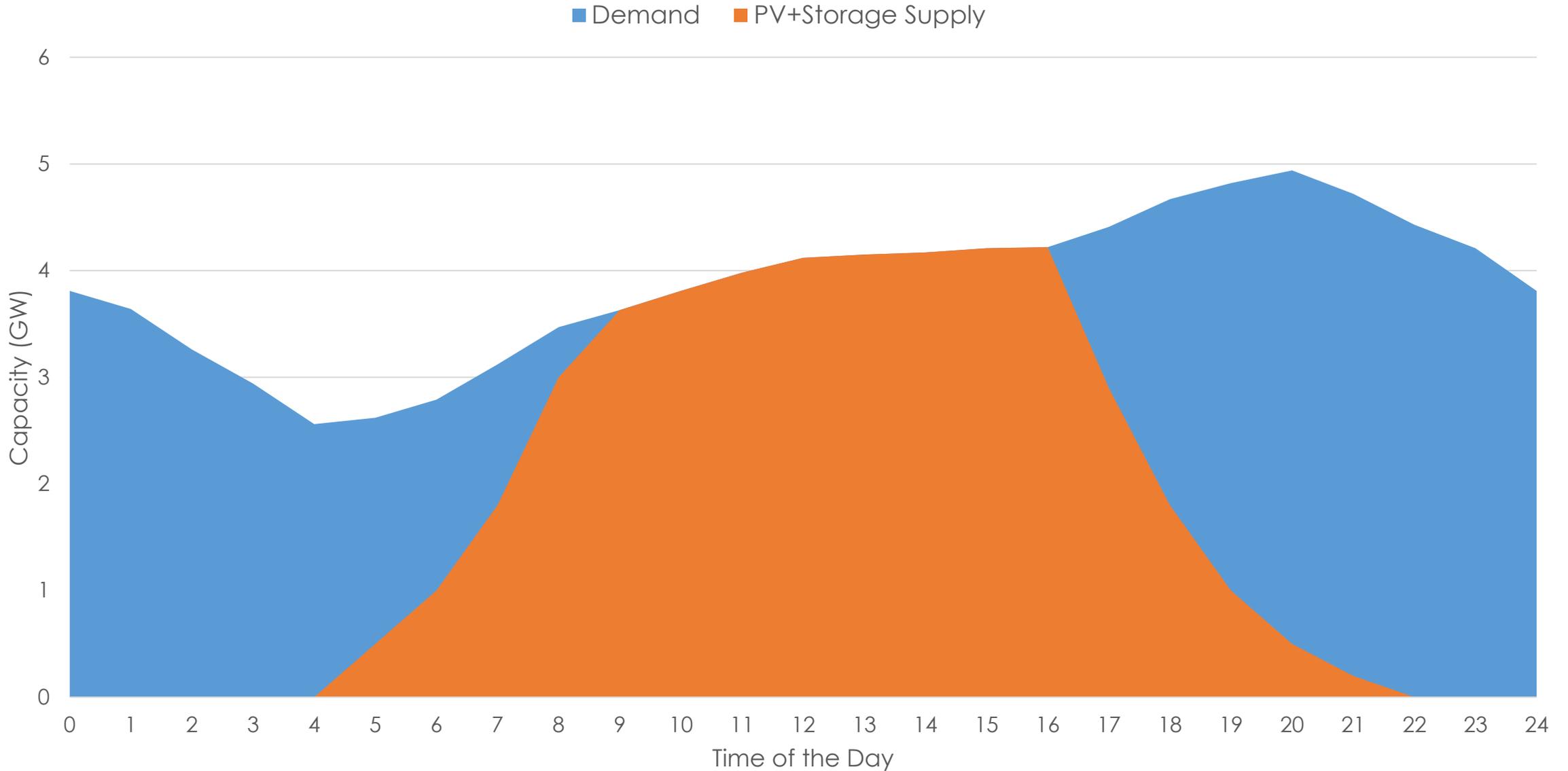
ESS Applications – Peak Shifting



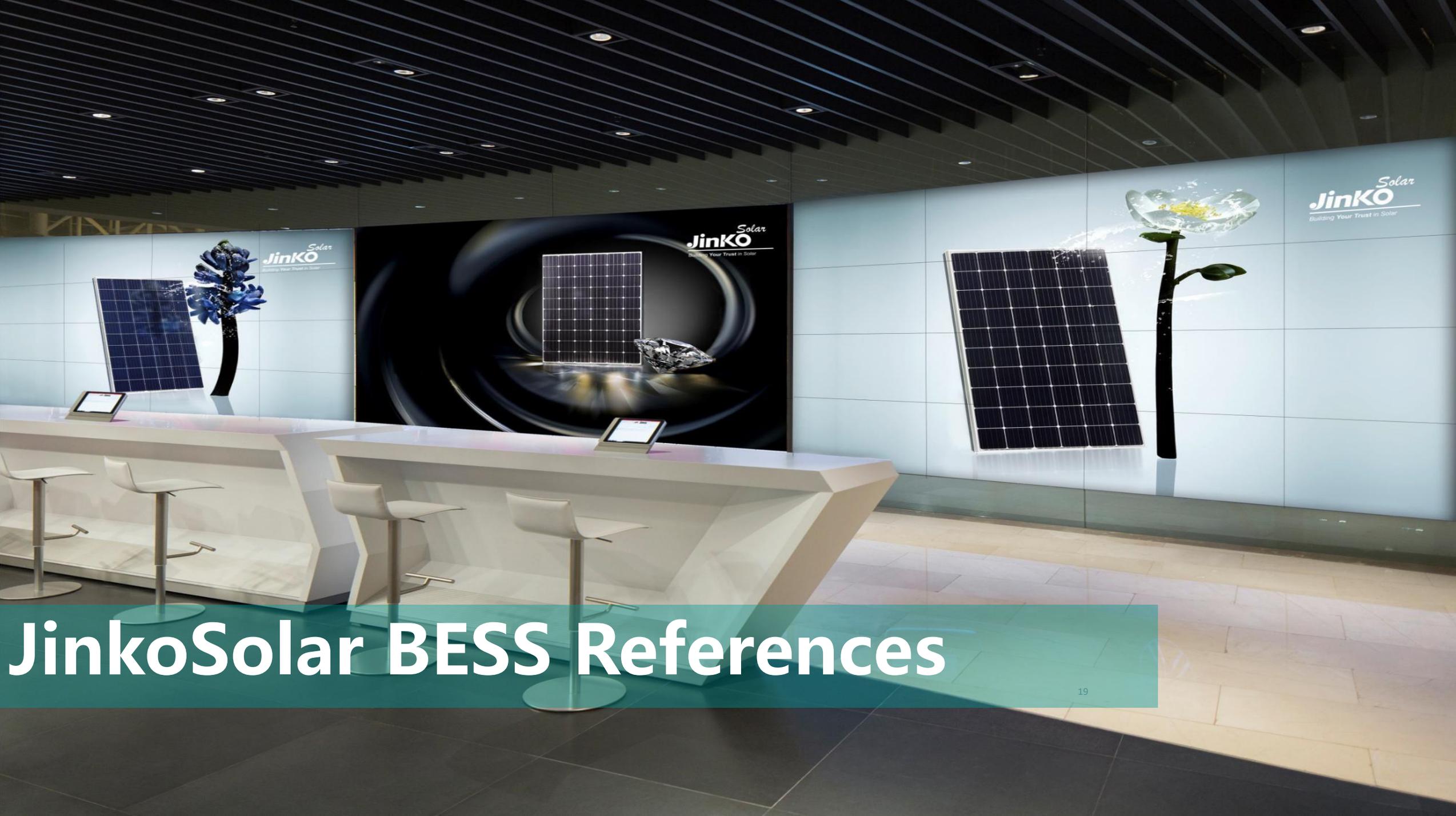
ESS Applications – Peak Shifting



ESS Applications – Peak Shifting



JinkoSolar BESS References



Nigeria

100kW/256kWh





Lebanon
100kW/196kWh



Mozambique

250kW/690kWh



Myanmar

50kW/200kWh



Djibouti

1MW/1.2MWh



China

10MW/20MWh



Conclusions



Energy Storage Systems are Vital to the Expansion on RE (Especially Solar).

Energy Storage is Becoming Cheaper and More Feasible in a Fast Rate.

Energy Storage Systems are Adaptable for Various Applications and Uses.



The case for residential, commercial Battery Energy Storage Systems in the MENA region

10 October 2022
Solarabic
Berlin, Germany



Topics Covered

This presentation covers the following topics:

1. Energy Storage Drivers in MENA
2. Focus on the Residential Sector
3. Focus on the C&I Sector



Outstanding MENA Market Reach

- Dedicated platform for Renewable Energy Training
- News, Educational material with focus on EMEA

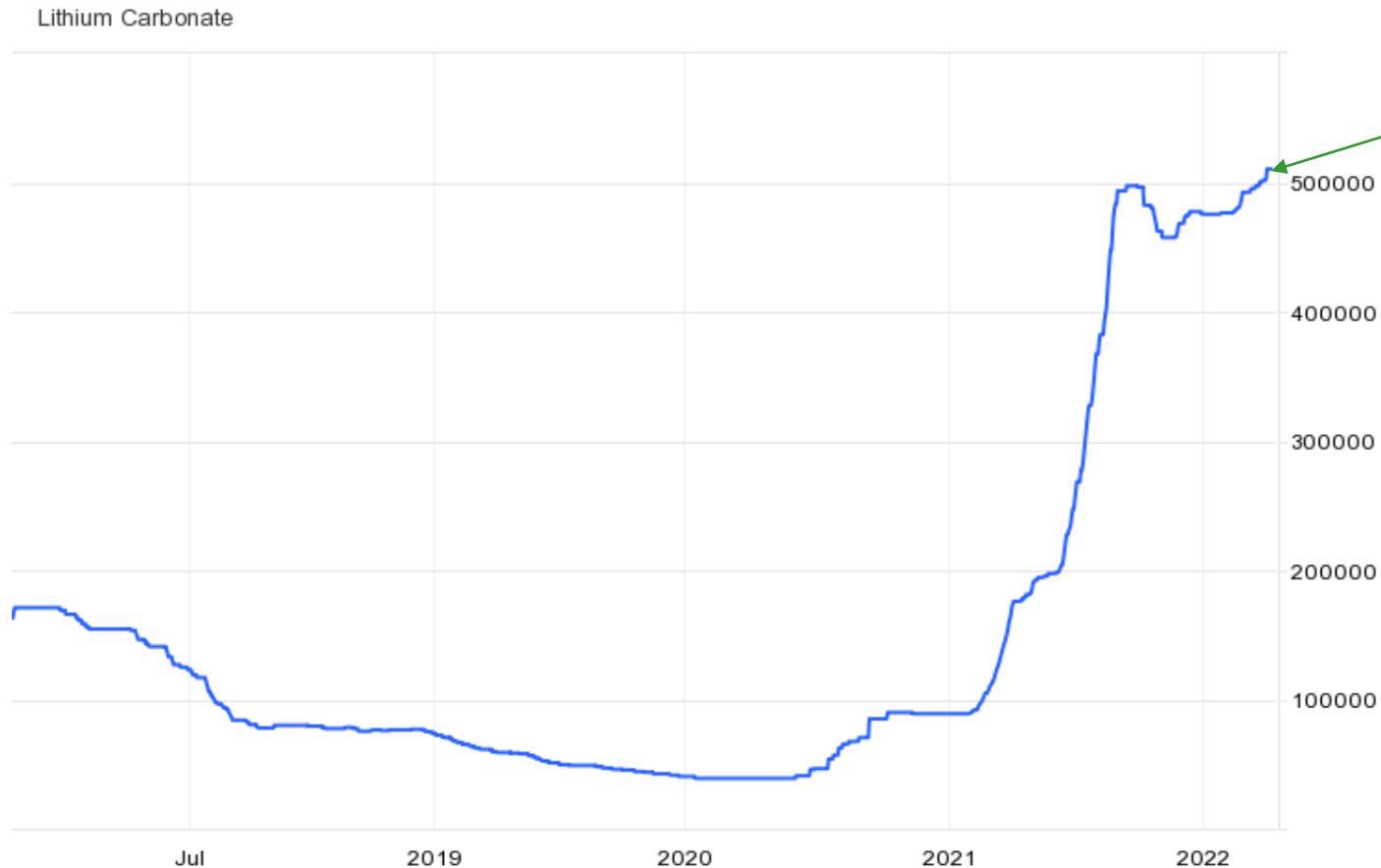
Technical Marketing & Commercial Services

- Market Access Services (distributors, public sector)
- Technical Marketing (papers, marketing content and media creation)
- Impact Campaigns

Part 1:

Energy Storage Drivers in MENA

Record High September for Lithium Carbonate



510,500 CNY/T

Context:

- Record High
- 80% year-to-date
- 100% EV demand increase in china
- lithium producers in Sichuan suspend operations

BESS Market News - MENA



السعودية: شركة هواوي وسيبكو 3 توقعان اتفاقية لتطوير محطة طاقة شمسية 400 ميغاواط مع أنظمة تخزين بالبطاريات بسعة 1300 ميغاواط ساعة

أخبار جديد مميز



المغرب: تزويد متحف محمد السادس للفنون الحديثة والمعاصرة في الرباط بمحطة طاقة شمسية باستطاعة 130 كيلوواط مع نظام تخزين الطاقة

أخبار جديد



الإمارات: اختبار نظام تخزين الطاقة الكهروحراري من أزيлио في مدينة مصدر وذلك بالتعاون مع جامعة خليفة للعلوم والتكنولوجيا

أخبار جديد مميز



مصر: شركة صن غرو توقع اتفاقية لتزويد مشروع محطة الطاقة الشمسية في منجم السكري للذهب بعواكس شمسية ونظام تخزين

أخبار جديد

سولارابيك - القاهرة، مصر - 27 أغسطس 2021: شركة «صن غرو - Sungrow» توقع اتفاقية مع شركة «جوي - اسيز» الألمانية لتزويد حلاً يشمل عواكس شمسية ونظام تخزين طاقة كهربائية لمحطة الطاقة الشمسية التي تُهدى لمنح «السكري» للذهب في مصر، واستطاعتها 36 ميغاواط.

1 min read 28 أغسطس 2021



هيئة كهرباء ومياه دبي تدشن مشروعاً تجريبياً لتخزين الطاقة باستخدام بطاريات الليثيوم أيون من تسلا

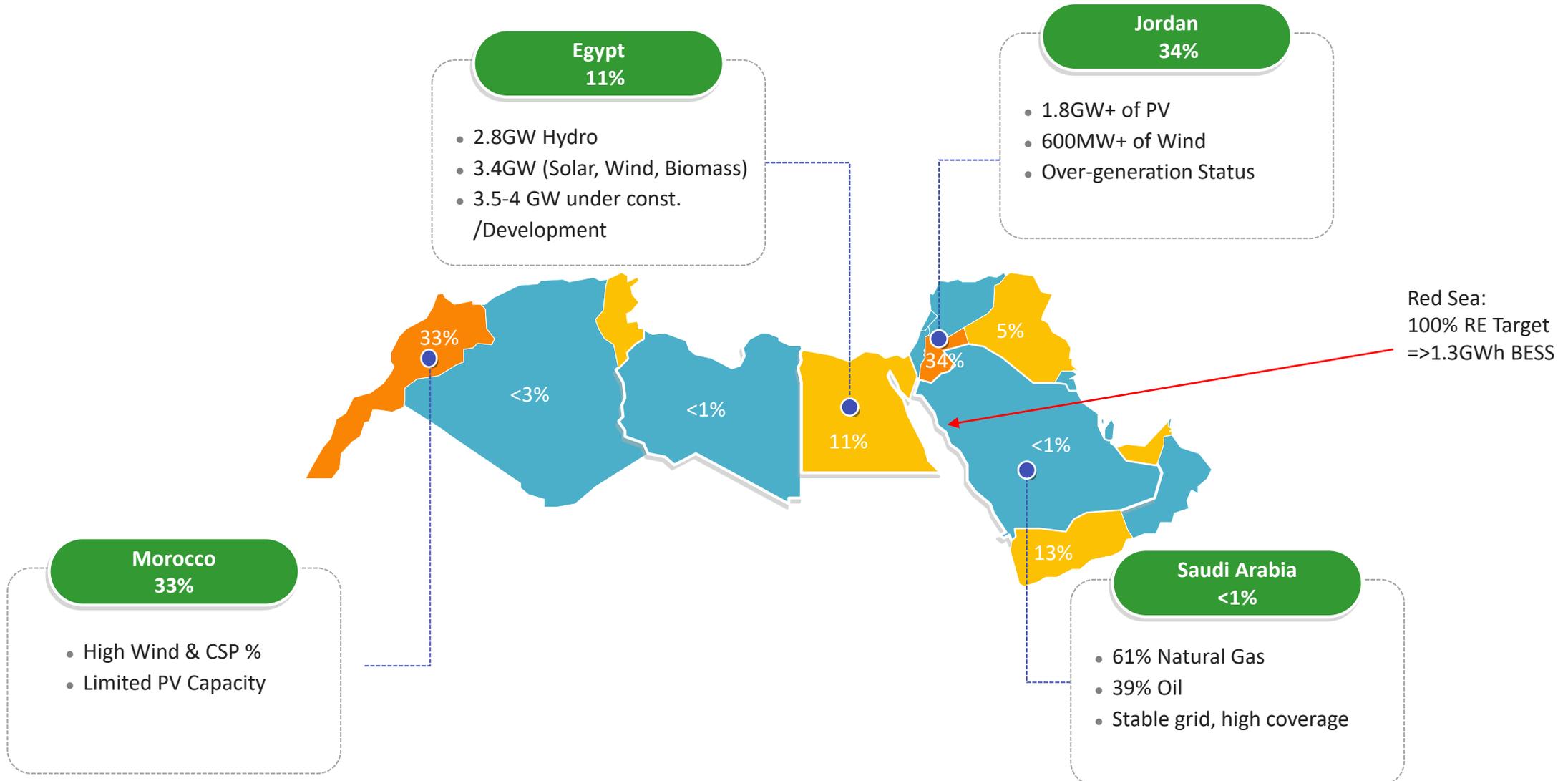
أخبار جديد

سولارابيك - دبي، الإمارات العربية المتحدة - 26 أيلول 2021: دشنت هيئة كهرباء ومياه دبي «DEWA» مشروعاً تجريبياً في مجمع محمد بن راشد آل مكتوم للطاقة الشمسية لتخزين الطاقة باستخدام أنظمة بطاريات الليثيوم-أيون «Li-Ion» من شركة تسلا العالمية، باستطاعة تصل إلى 1.21 ميغاواط وسعة 8.61 ميغاواط ساعة، ويعمر افتراضياً يصل إلى 10 سنوات. يسمح المشروع التجريبي بتخزين الطاقة من شبكة الكهرباء أو من محطة الطاقة الشمسية، مع ربط أنظمة التخزين بشبكة الهيئة.

3 min read 27 أيلول 2021

2 min read 17 فبراير 2022

Driver 1: RE Share of Electricity Capacity



Driver 2: Offgrid/Microgrid Applications

Major Off-grid/Microgrid Examples for BESS



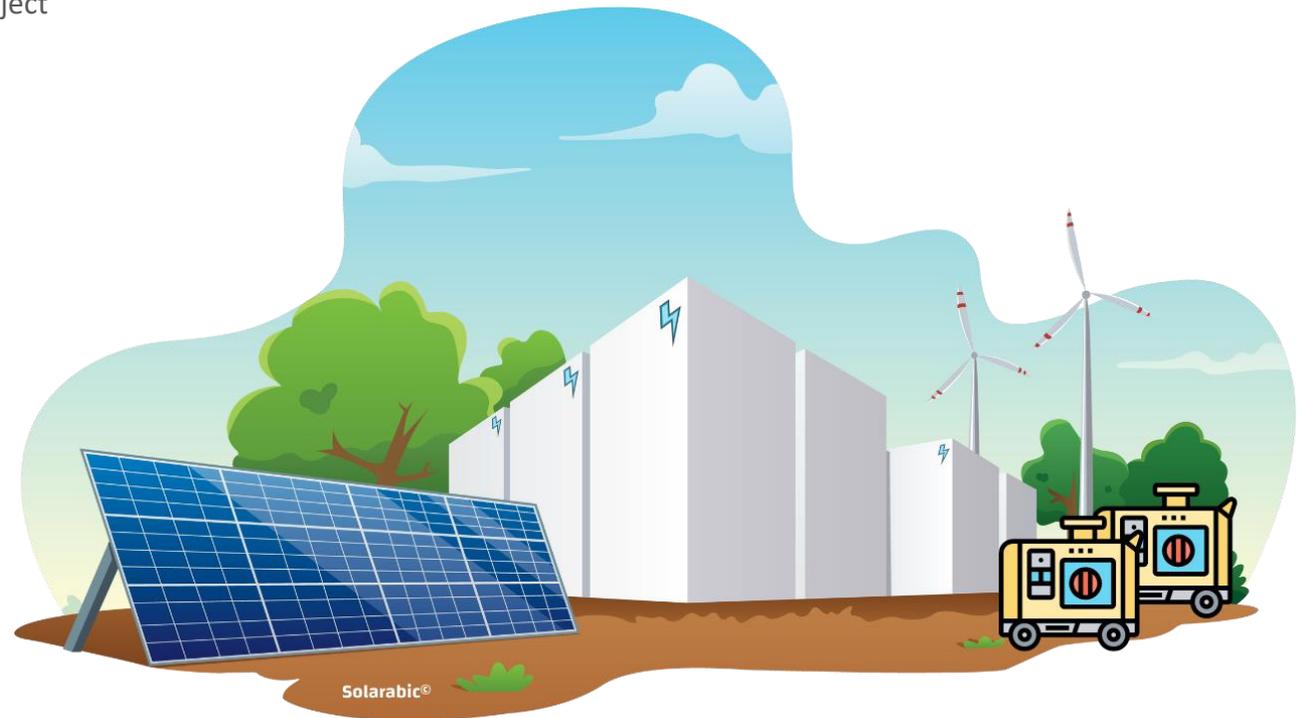
Oman: Tanweer 11 SITES: 48MW PV, 70MW Diesel, 28MW Storage hybrid project



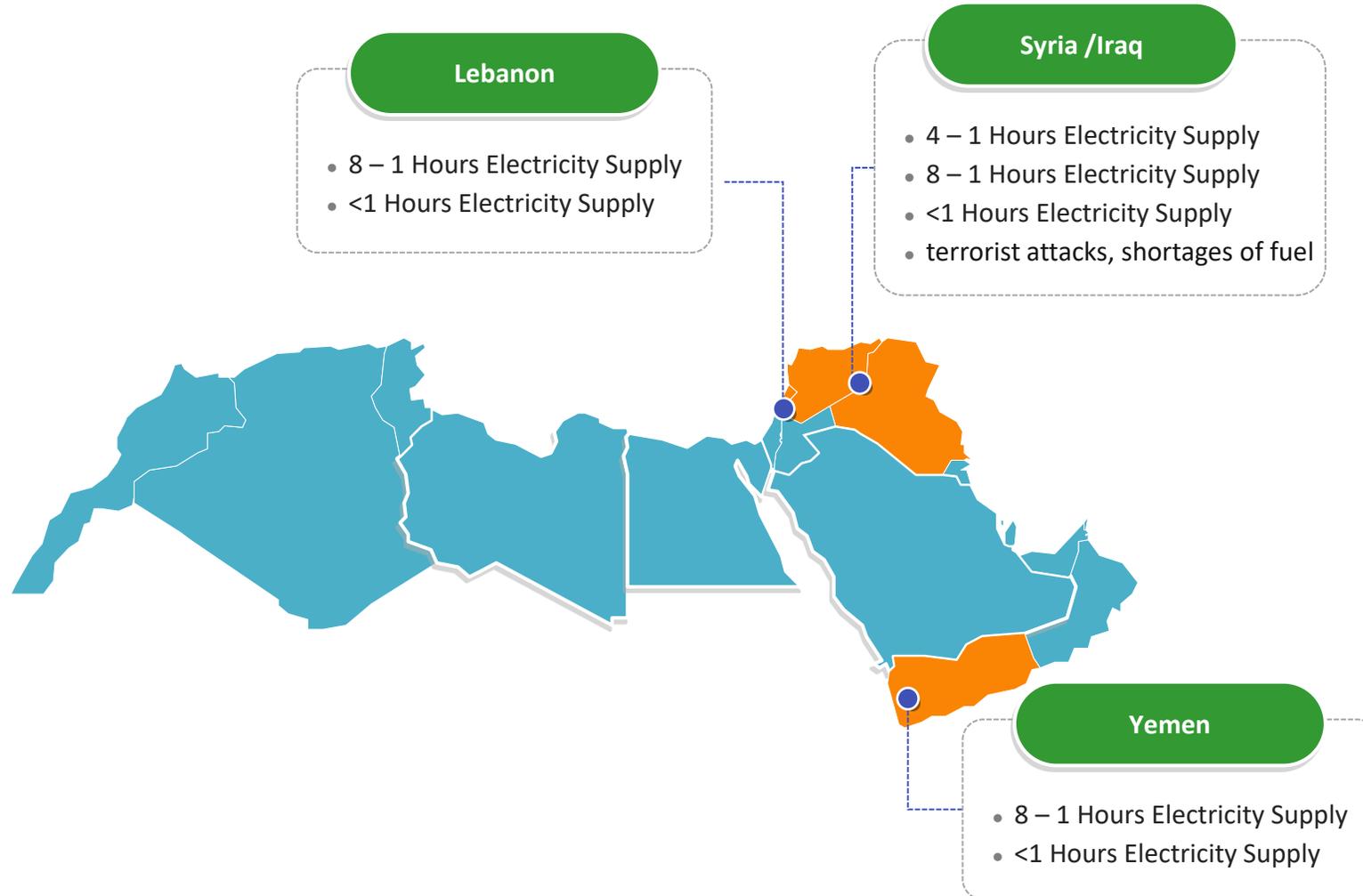
Lebanon: Regional Micro-grids with PV, Generators, Storage



Egypt: Sukari Gold Mine (36MW PV, 7.5MW BESS)



Driver 3: Residential Sector



Part 2:

Residential Sector

Net Metering vs. Net Billing: Impact on ESS



Net Metering

- Widely Applied in:
Egypt, Jordan and the UAE
- Import = Export Price (note: minor fees might apply)
- Flat Rate throughout the Day
- Energy storage Value:
 - A. Energy Security
 - B. Maximize the self-consumption from PV to avoid higher tariff-slots

Net Billing

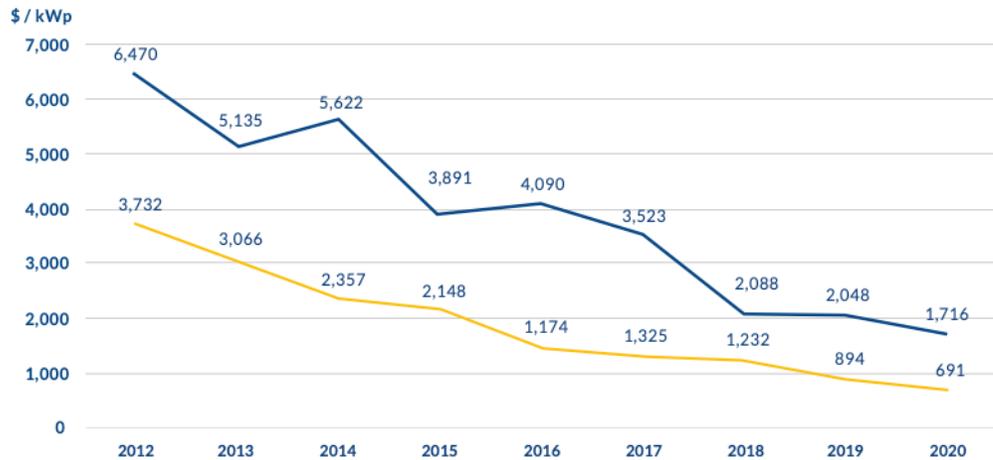
- Limited Application in: KSA
- Buy electricity at 0.18 Riyal/kWh (up to 6,000 kWh/Month and then 0.30)
- Export PV excess at 0.07 Riyal/kWh
- Flat Rate throughout the Day
- Energy storage Value:
 - A. Energy Security
 - B. Maximize the self-consumption from PV to save the delta between buy and sell prices, and to avoid higher tariff-slots

Note: In both cases, no clear regulations for adding storage to on-grid systems

Case Study: Lebanon

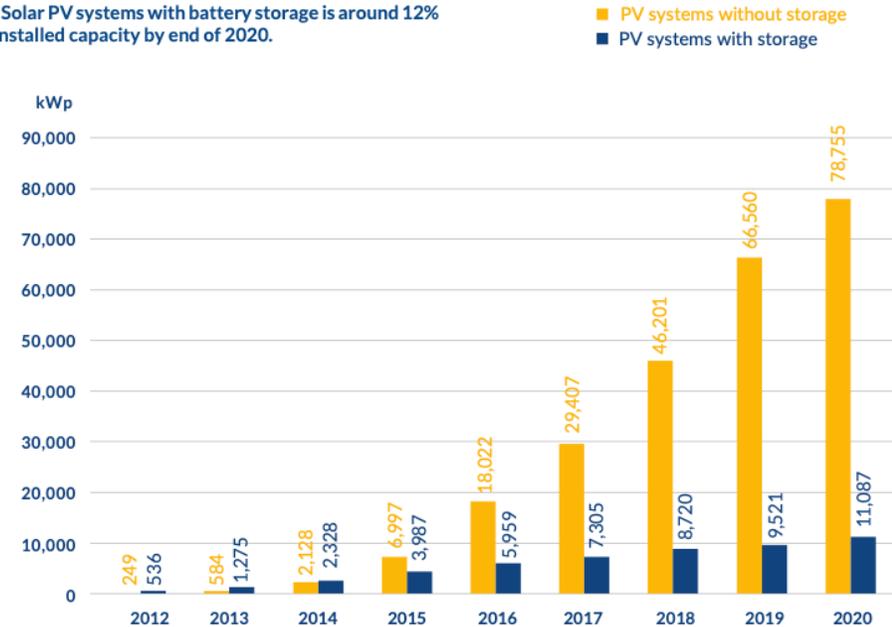


PC and ESS Prices



PV + Storage Trend

The share of Solar PV systems with battery storage is around 12% of the total installed capacity by end of 2020.



Charts Source: The 2020 Solar PV Status Report for Lebanon, Lebanese Center for Energy Conservation (LCEC)

Part 3:

C&I Sector

Case Study: Factory in Iraq

Study (Implement PV + BESS)

Replace Diesel Genset with PV + BESS

- 1MW PM + 1MW/1MWh BESS
- \$1.6mil CAPEX
- Assume all kWh savings from genset



Customized Version of
JKS1104K-500H
1MW/1MWh

| | |
|---|-------------|
| PV+BESS System Generation Per Year (kWh) | 1,400,000 |
| Annual Consumption (kWh) | 2,089,400 |
| New Annual Consumption from Grid (kWh) | 689,400 |
| New Electricity Bill (\$/Year) | \$68,940 |
| Annual Savings (\$/Year) | \$225,750 |
| CAPEX (\$) | \$1,600,000 |
| Payback Period (Years) | 8 Years |
| NPV (\$) | \$2,032,690 |

Thanks for listening

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Q&A



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by Ryan Kennedy



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Wednesday, 12 October 2022

3:00 pm – 4:00 pm CEST, Berlin

2:00 pm – 3:00 pm BST, London

Wednesday, 19 October 2022

2:00 pm – 3:00 pm EDT, New York City

8:00 pm – 9:00 pm CEST, Berlin

Many more to come!

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for
decentralized
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without
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spend**

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