



# Hybrid solutions introduction

Terje Pilskog, EVP Project  
Development Solar & Wind

Capital Markets Update 23 March 2021



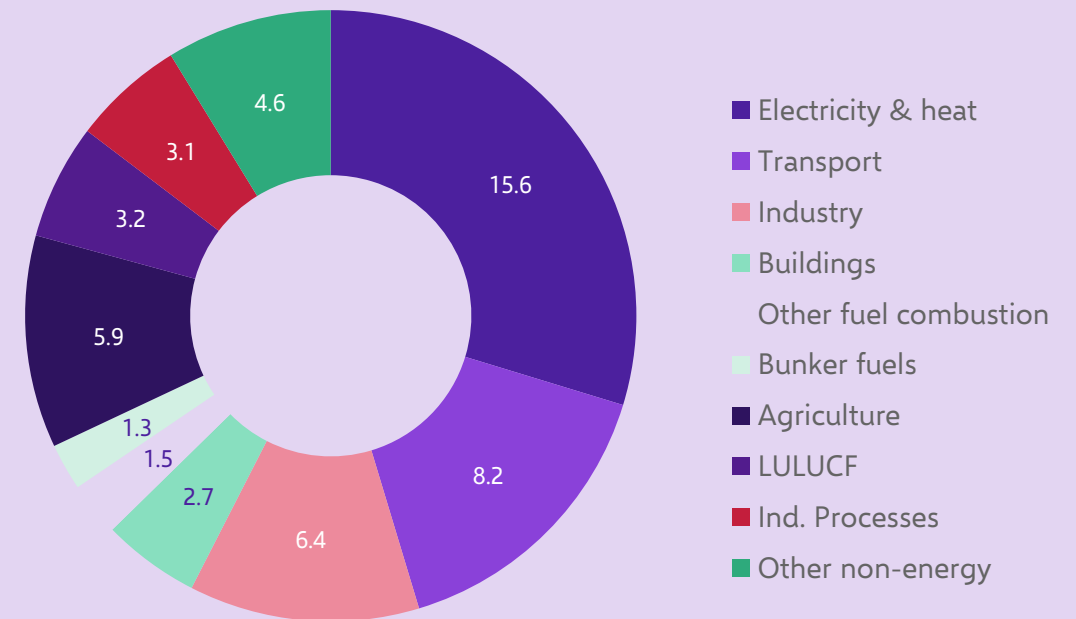


# Combatting climate change

- Global GHG emissions more than 50 Gigatons CO<sub>2</sub>
- Net zero target for 2050
- Renewable energy penetration in power sector
- Electrification of other sectors based on renewables

Source: ZERO, report on renewable investments in emerging economies, 2021

## Source of CO<sub>2</sub> emissions

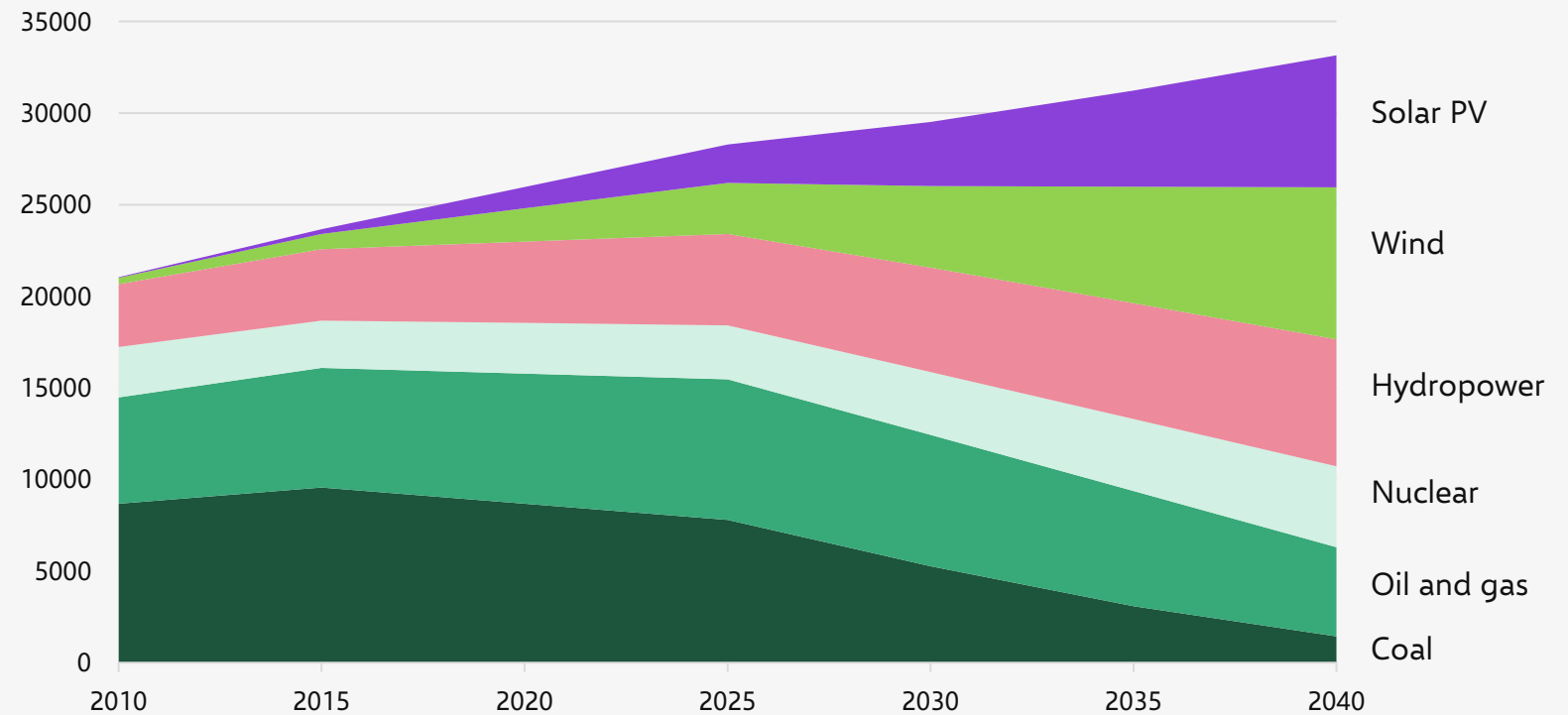




## Managing variable renewable

- Electrification will drive growth of energy generation
- Variable renewable will become major part of generation mix
- Managing the intermittancy will increase in importance
- Especially in smaller energy systems with higher renewable penetration and limited dispatchable power

**Generation mix in IEA's Sustainable Development Scenario (TWh)**



Sources: IEA (2019), World Energy Outlook

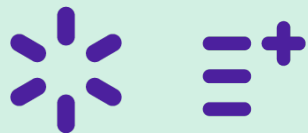


# Technology integration strengthens renewables and expands our market potential



## Firm Renewable Power

PV and/or wind with battery storage to provide stable renewable power



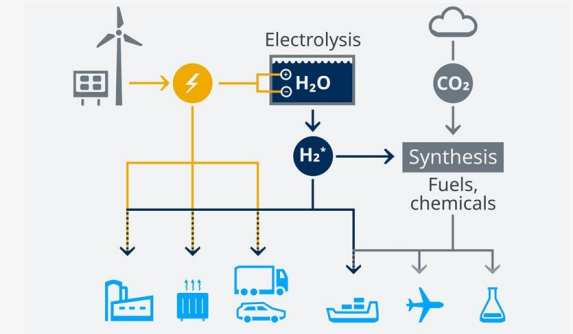
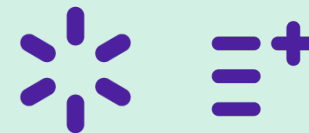
## Hybridising PV and hydro

PV installations mounted on floating supports on the artificial basin of a hydro dam



## Release

Redeployable PV systems to replace diesel and HFO generators as standard solution



## Power to x

Competitive renewable power as enabler of infrastructure and industrial projects







## Hybrid solutions – next speakers



### **PV + Battery**

Jan Fourie  
General Manager



### **PV + Hydro**

Ernest Kofi Poku  
VP Project Development  
Hydropower Africa



### **Release**

Øydis Gadeholt  
Senior Project Developer



# Providing firm renewable power

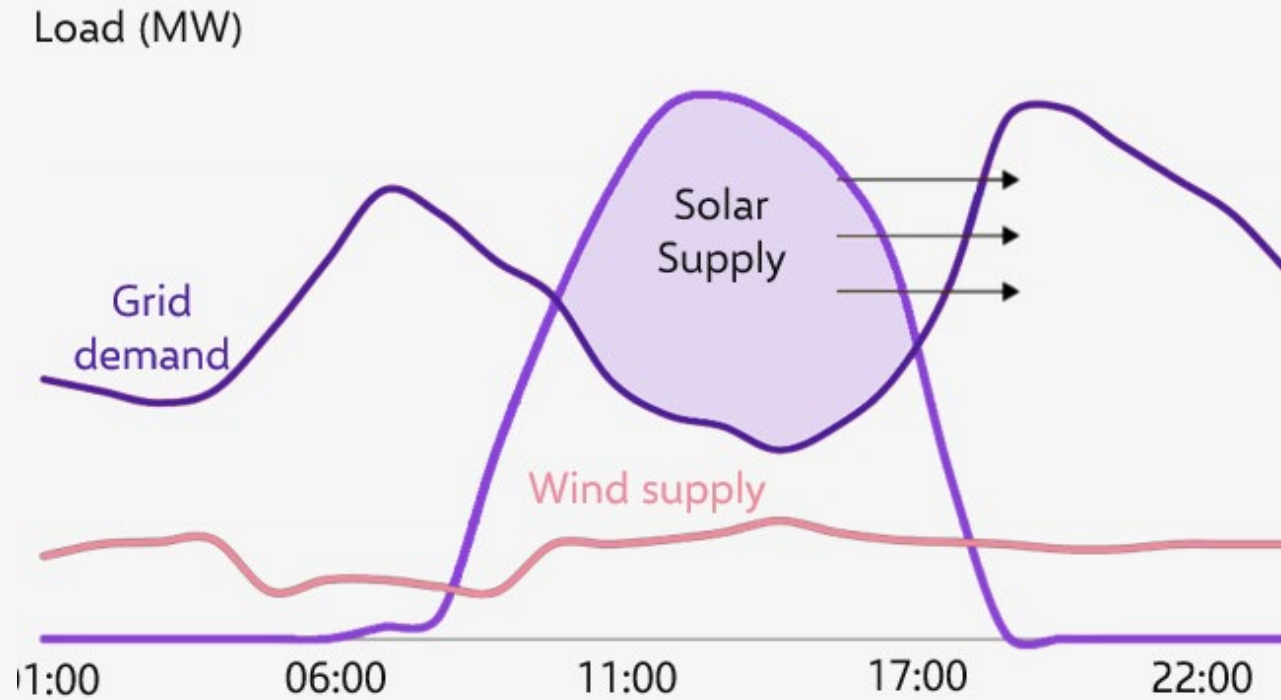
Jan Fourie, General Manager,  
Sub-Sahara Africa





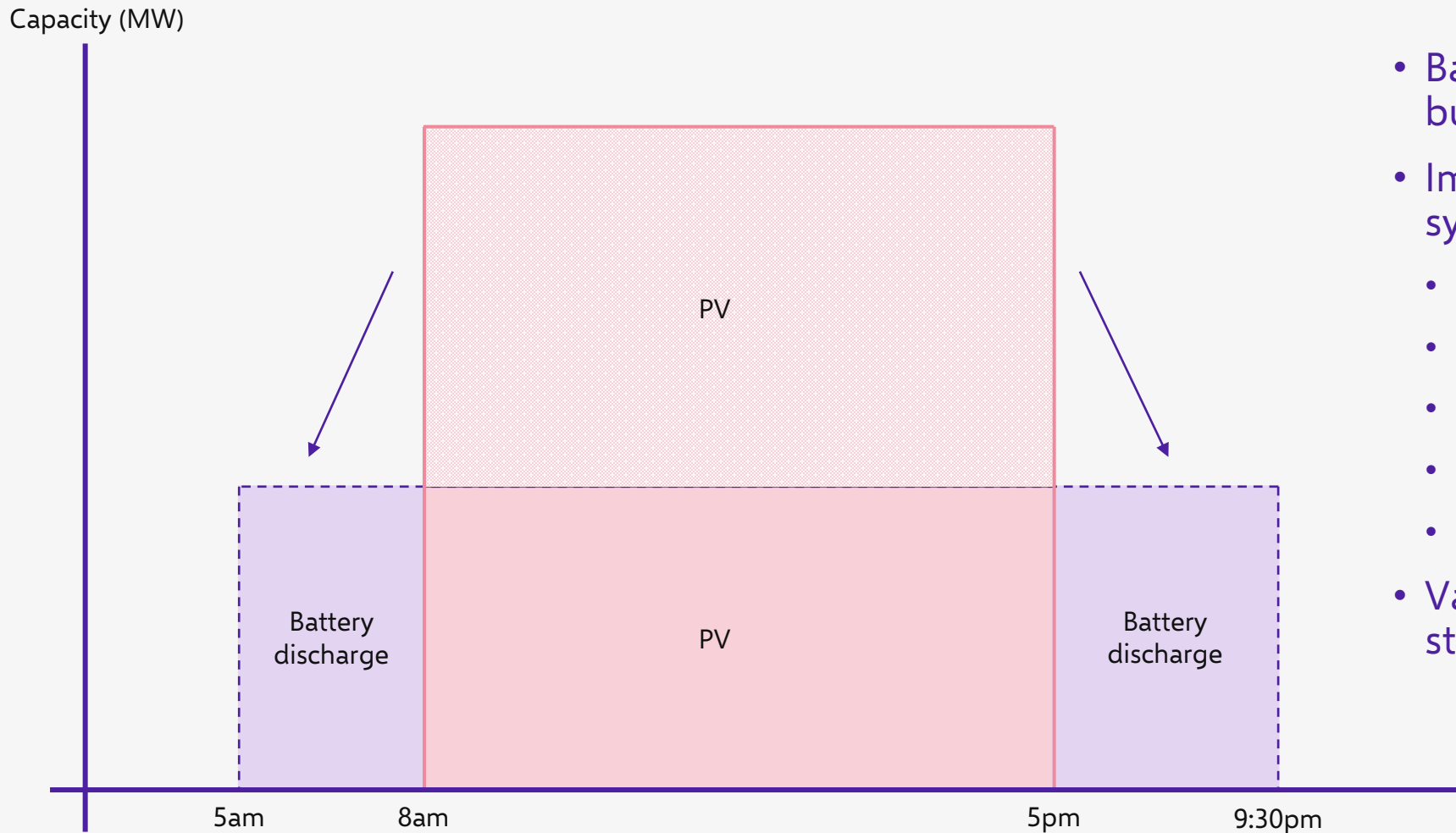


## Why renewable energy and batteries?





# Solar power and batteries explained



- Batteries cannot generate energy, but rather act as energy reservoirs
- Important factors that influence system sizing include:
  - Solar irradiation and day length
  - Seasonal swing
  - Inter annual variations
  - On-grid/off-grid & grid constraints
  - Application & testing requirements
- Variety of use-cases for solar + storage



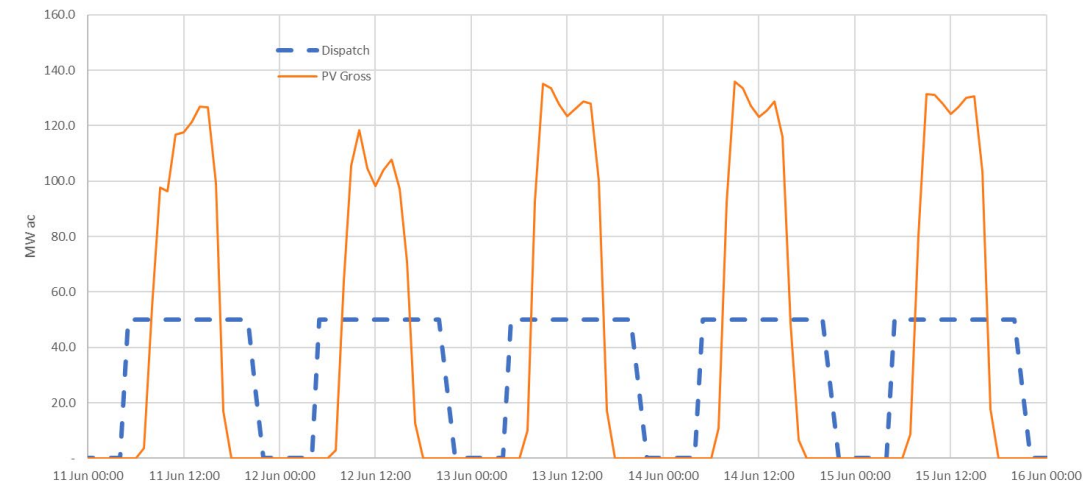


# Hybrid case study: Solar + battery solution in South Africa

- South Africa continues to struggle with a constrained power supply
- A technology agnostic tender was launched in 2020, aiming to add 2 GW of dispatchable power to the grid (RMIPPP<sup>1</sup>)
- Dispatch of Contracted Capacity is required between 5:00 am and 21:30 pm – all year
- System required to be grid connected within 12-18 months of financial close
- Scatec submitted 3 bids totalling 150 MW of Contracted Capacity, purely PV + batteries
- Preferred Bidders announced last week and Scatec is in ongoing discussions with the Department of Mineral Resources and Energy

<sup>1</sup> RMIPPP: Risk Mitigation Independent Power Procurement Programme.

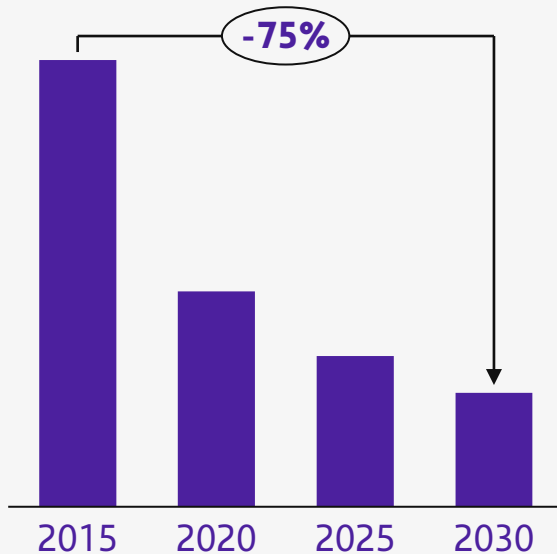
## RMIPPP: Dispatch requirement



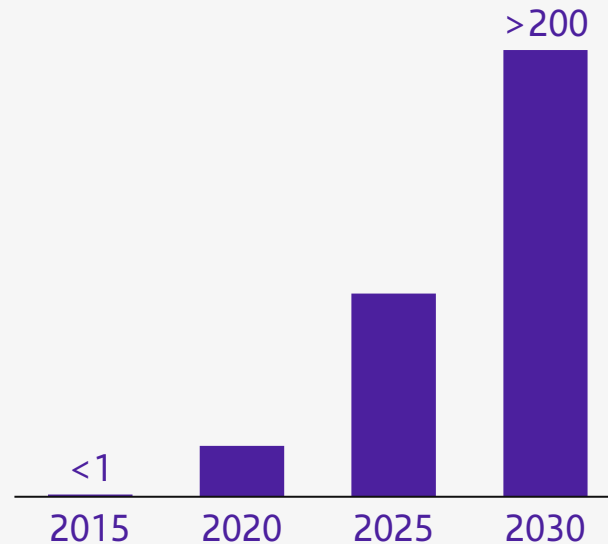


## As costs come down the energy storage market is expected to grow exponentially

Battery system cost development



Cumulative energy storage installations (GW)



- Decreasing technology cost will drive hybrid proliferation and decarbonisation
- Renewables can now compete on a like-for-like basis with traditional power generation technologies
- The addressable market will see exponential growth in the coming decades

Source: Bloomberg New Energy Finance.



## Leveraging Scatec's track record and market presence for hybrids

Immediate opportunities in existing Scatec markets

Building on experience from large scale solar and Release

Applying the integrated business model for system optimisation





# Hybridising PV and hydro

Ernest Kofi Poku, VP Project  
Development Hydropower Africa





# A hydro-solar hybrid system combines low cost PV with the regulating abilities of hydropower

Market potential of  
3 GW in Scatec  
assets

Increased firm  
power from  
hydro-solar plants

Better utilisation of  
Infrastructure

Hybrid hydro-solar  
projects have a  
lower LCOE than  
hydro alone

PV enables faster  
supply growth into  
existing markets





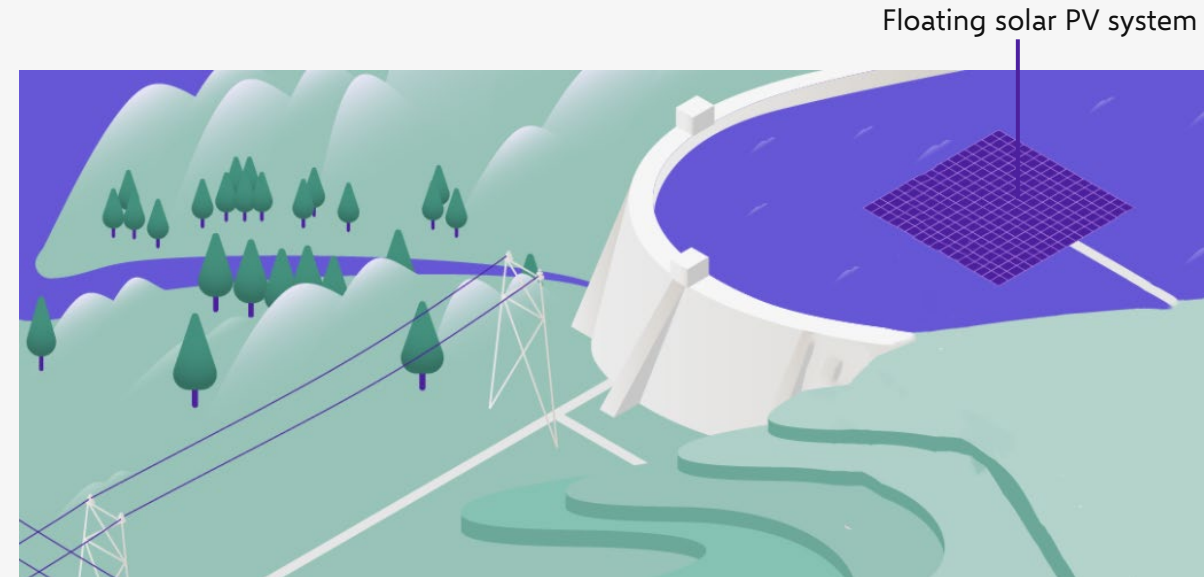
# Hybrid PV + hydro:

## Concept

- Hydro-solar hybrid systems using hydropower and PV (land/reservoir) and shared sub-station and transmission infrastructure.

## Hybridisation Benefits

- Adding PV lowers the overall system LCOE\*
- PV & hydropower are complementary on a seasonal basis
- Hydropower can convert intermittent PV into higher value firm power
- Reduced water evaporation and PV cooling effects increasing energy yield



Schematic of Floating PV and hydropower plant hybrid solution

\*LCOE: Levelised cost of energy



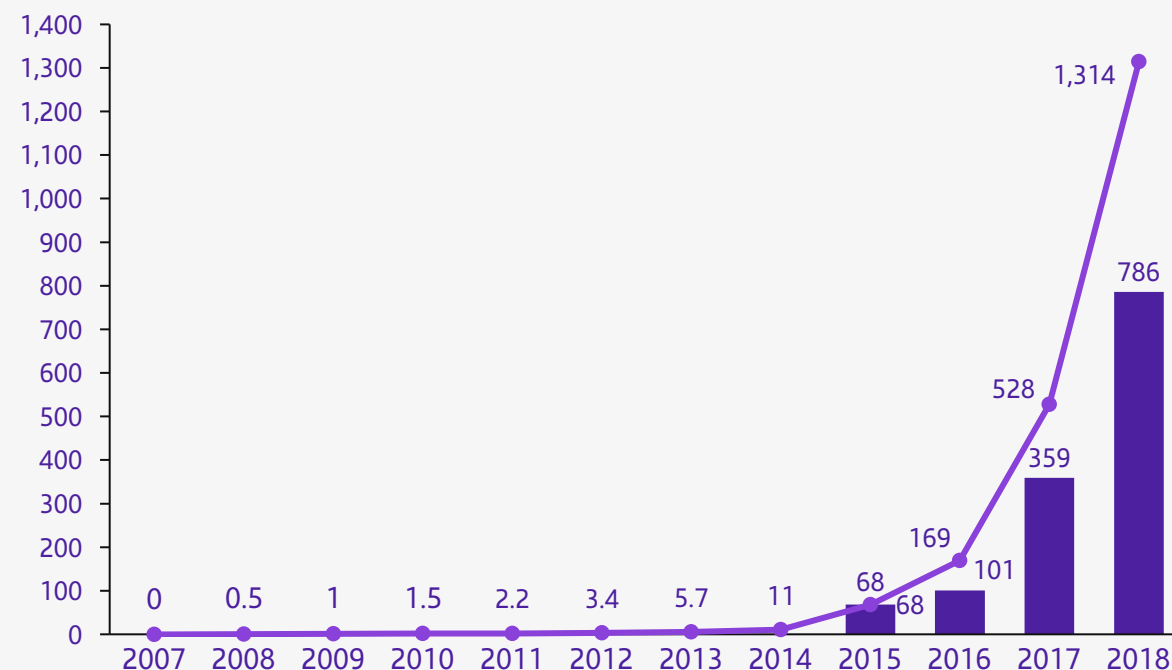
# The floating PV market opportunity

## Opportunity

- Scatec operating hydropower assets have 2GW of floating PV potential based on reservoir size
- Scatec projects under development have 1GW of floating PV potential
- If panels covered 1% of Africa's reservoirs it would increase the 138 TWh generated in 2020 by 50%\*
- The global potential on reservoirs exceeds 400 GW

\*Source: Elsevier, Renewable Energy volume 169 - Assessment of floating solar photovoltaics potential in existing hydropower reservoirs in Africa

Global installed FPV capacity and annual additions



Source: World Bank Group, and SERIS 2019



## Floating solar pilot on Magat

- In March 2019, a 220-kWp floating PV test facility was installed
- 2020 was a year of successful operations
- The plan is to install a full scale 150 MW floating PV plant in two phases on Magat
- Adding the floating PV plant to our portfolio in the Philippines will increase the value of the power
- Floating PV operations in Asia are a focus area for Scatec

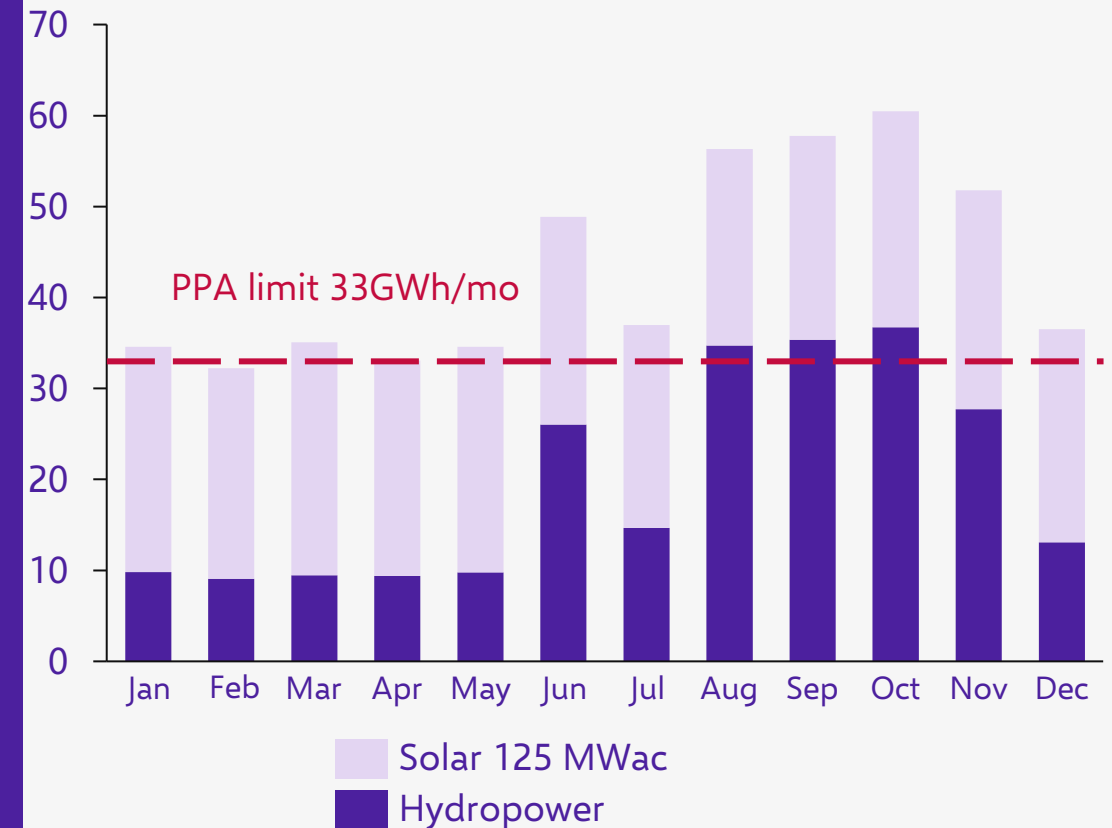






## Hybrid solutions in action

- **West Africa (Greenfield): Original 102 MW hydropower development**
  - **The challenge:** reduce the large number of impacted persons due to potential reservoir size and ensure a minimum firm power year round.
  - **The solution:** 64 MW hydro + 125 MW floating PV allows the size of the reservoir and hydropower impact to be reduced
  - **The impact:** Firm power can be delivered year around with a lower social and environmental impact and a lower tariff
- Scatec is well placed to take advantage of the 3 GW hybrid hydro-solar opportunity across its existing assets and similar opportunities in the future





# Update on Release

Øydis Gadeholt, Senior Project  
Developer



# Release - reliable, flexible and low-cost solar power

Containerised, modular and movable  
solar and storage



Short timeline to deployment

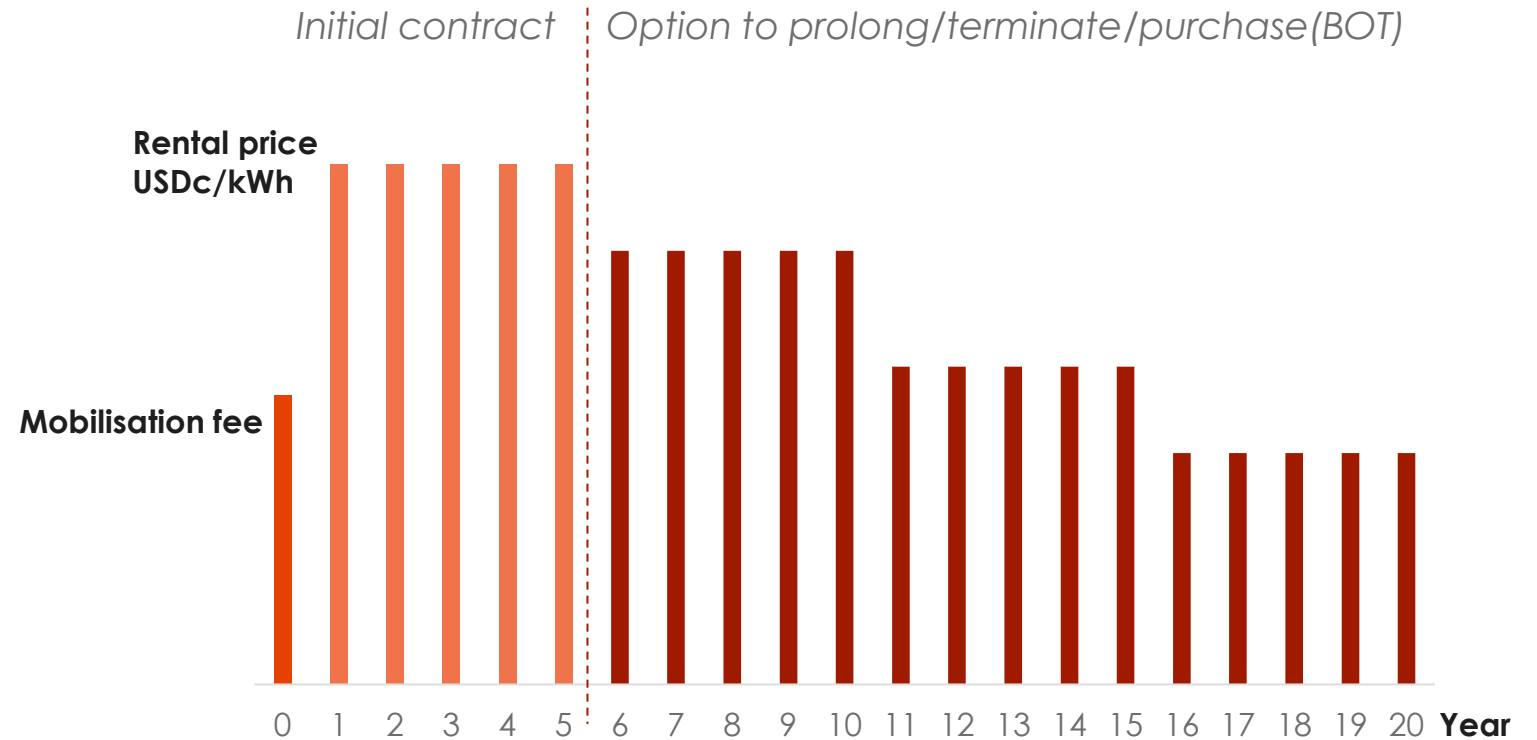


Flexible contract durations



# Contact structure | Solving for flexibility

- Mobilisation fee to cover installation costs
- Short initial commitment (5 years) – limited guarantee requirements and reduced impact on balance sheet
- Long-term tariff similar to PPA





# Scatec Release business model

**Funded on  
portfolio basis**

**Mobilisation  
fee covering  
up to 20 % of  
capex**

**Counterparty  
risk mitigation**  
-> short payback  
-> movable  
-> guarantee

**Simplicity -  
one contract  
only**

# Targeting customers with plant capacity of 1-20 MW in Africa

## Off-grid mining



- 23 GW only in Africa
- High and stable electricity consumption

## UN, NGOs, Microgrids



- Small scale initiatives
- Release supplier of equipment and financing

## Small utilities



- Running on diesel and HFO
- Financial constraints are limitations for regular PPAs

## On-grid industrials



- Self-consumption/captive power is more reliable and cost-efficient

# Small, landmark projects deployed

## Malakal, South-Sudan – Our first base-load hybrid

- Installed at International Organization for Migration (UN) camp
- 0.7 MW PV and 1.4 MWh battery
- Providing up to 90 % of power

## ROAF – Largest ground mounted solar plant in Norway

- 0.6 MW to supply a waste station outside Oslo with energy
- Cooperation with Solenergiklyngen and Multiconsult

## Stellenbosch – Visitor demonstration plant

- Installed at the University of Stellenbosch in 2020
- Customer/partner visits, tests and Scatec trainings





# 16 MW of Release projects signed

## 8.7 MW – undisclosed mining company Mexico

- International customer
- Project to be completed Q4 2021



## 7.7 MW – ZIZ, off-grid utility in Chad

- Customer backed by FMO
- First containers shipped in March 2021 – full delivery within Q3



# Partnership with IFC on utilities in Africa

## Exclusive partnership agreement with IFC to offer Release to utilities in Africa

- IFC provides financing and guarantee structures to support the rental contracts
- Operating out of a joint company in the Netherlands



## Most advanced project in a West-African country:

- 36 MW solar and 24 MWh of storage at 3 sites
- 5-year Build-Own-Transfer model
- Scheduled delivery 2021



## Key focus: Most advanced projects in maturing pipeline of 300 MW

### Off-grid mining



- ~80 MW PV
- 20 MWh storage
- 5-10 projects

### UN, NGOs, Microgrids



- ~20 MW PV
- 3 projects

### Small utilities



- 100 MW PV
- 40 MWh storage
- ~5 projects

### On-grid industrials



- ~20 MW PV
- 5 MWh storage
- 3 projects

- **Total pipeline of active projects about 300 MW across segments and markets**
- Most contracts have buy-out options that will be exercised to variable extent
- About 50/50 mix of fixed rate lease and variable lease based on output (due to IFRS 16)



