

# ENGIE RENEWABLES INVESTOR SEMINAR

London, July 9<sup>th</sup>, 2019

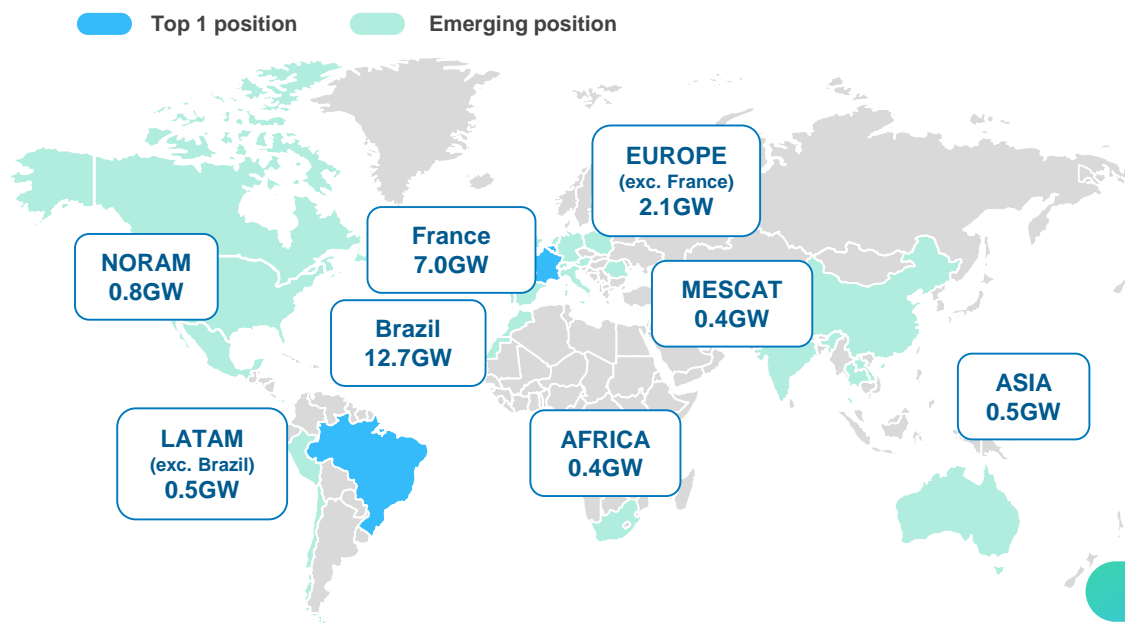
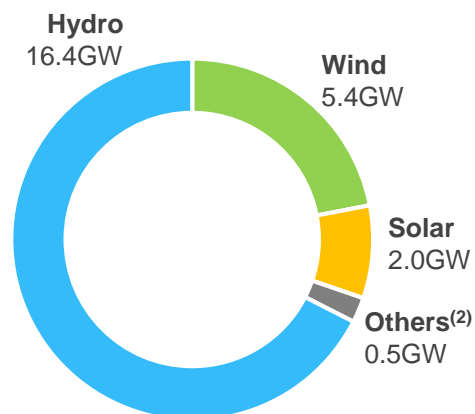


# AGENDA OF THE DAY

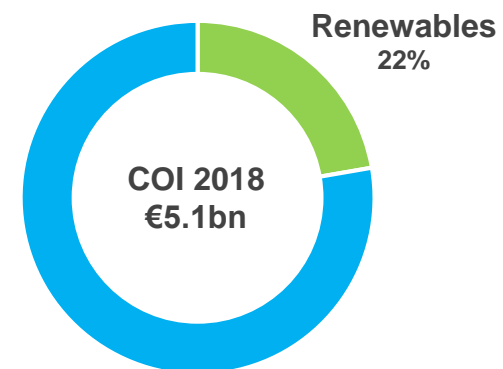
<b>3</b>	<b>INTRODUCTION</b>	<b>ENGIE Renewables</b> <b>Market dynamics</b> <b>Ambition</b>	Gwenaëlle AVICE-HUET
<b>21</b>	<b>HYDRO</b>	<b>ENGIE capabilities &amp; strategy</b> <b>Hydro in France</b> <b>Hydro in Brazil</b>	Thierry KALFON Eduardo SATTAMINI
<b>28</b>	<b>WIND &amp; SOLAR</b>	<b>ENGIE capabilities &amp; strategy</b> <b>France</b> <b>Brazil</b> <b>North America</b>	Thierry KALFON Jean-Claude PERDIGUES Andre CANGUCU
<b>44</b>	<b>OFFSHORE WIND</b>	<b>Update on ENGIE/EDPR Joint Venture</b>	Grzeg GORSKI
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	<b>CLOSING REMARKS</b>	<b>Q&amp;A and Closing Remarks</b>	Gwenaëlle AVICE-HUET

# ENGIE RENEWABLES TODAY<sup>(1)</sup>

Capacities: 24.4GW<sup>(1)</sup>@100%



## Financial Results



~500MW under Corporate PPA<sup>(3)</sup>

Biomethane installation

Pilot projects on Hydrogen

COI: €1.1bn

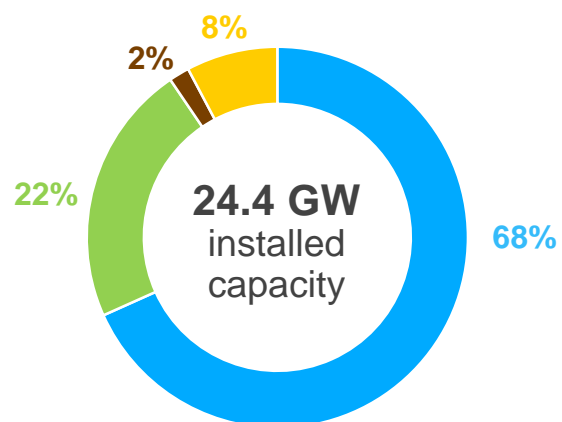
Capital Employed: €9.0bn

ROCEp: 9.6%

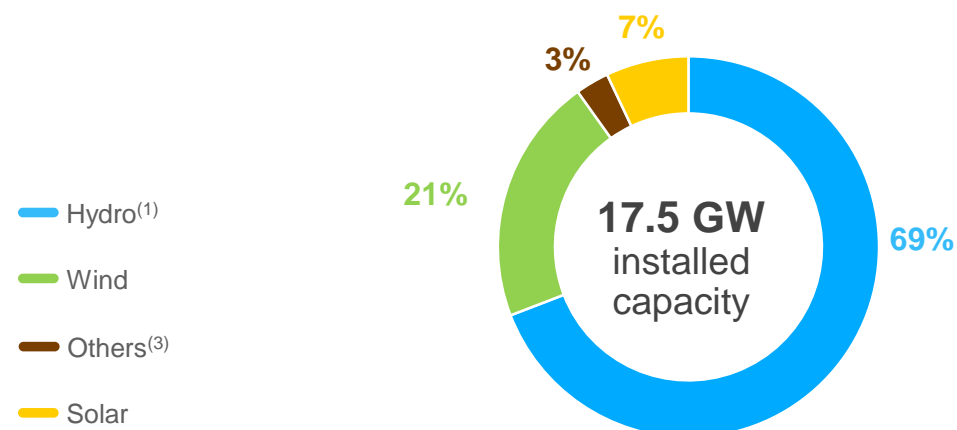
(1) As of 31/12/2018  
 (2) Others: biomass and biogas, geothermal  
 (3) PPA: Power Purchase Agreement

# 24.4 GW OF RENEWABLE CAPACITY O/W ~18 GW CONSOLIDATED

2018 installed capacity at 100%



2018 installed capacity at % of consolidation<sup>(2)</sup>



<i>in GW</i>	Hydro <sup>(1)</sup>	Wind	Solar	Others <sup>(3)</sup>	TOTAL
EUROPE	4.0	3.6	1.0	0.3	<b>9.0</b>
NORTH AMERICA	-	0.7	0.1	0.1	<b>0.8</b>
LATIN AMERICA	12.2	0.6	0.3	0.1	<b>13.1</b>
REST OF THE WORLD	0.2	0.5	0.7	0.0	<b>1.4</b>
<b>TOTAL</b>	<b>16.4</b>	<b>5.4</b>	<b>2.1</b>	<b>0.5</b>	<b>24.4</b>

<i>in GW</i>	Hydro <sup>(1)</sup>	Wind	Solar	Others <sup>(3)</sup>	TOTAL
EUROPE	4.0	2.5	0.5	0.3	<b>7.3</b>
NORTH AMERICA	-	0.3	0.1	0.1	<b>0.5</b>
LATIN AMERICA	7.9	0.6	0.3	0.1	<b>8.9</b>
REST OF THE WORLD	0.2	0.3	0.4	0.0	<b>0.9</b>
<b>TOTAL</b>	<b>12.1</b>	<b>3.7</b>	<b>1.3</b>	<b>0.5</b>	<b>17.5</b>

(1) Excluding pump storage  
 (2) % of consolidation for full and joint operations affiliates and % holding for equity consolidated companies  
 (3) Biomass and biogas, geothermal

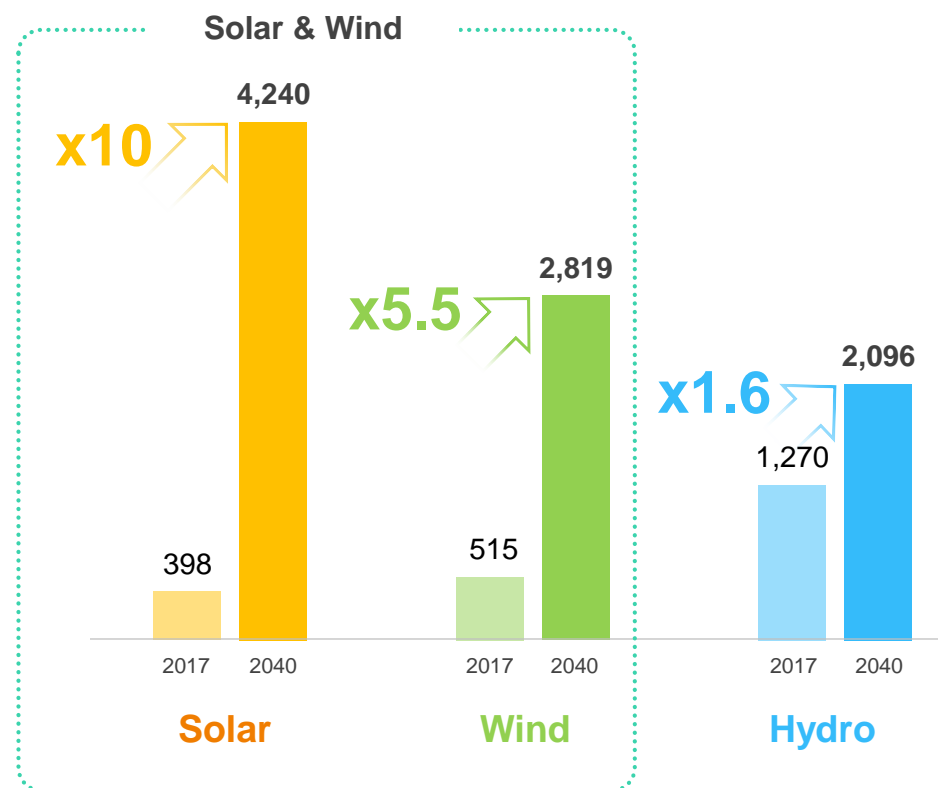
# MARKET DYNAMICS

A large central image showing the silhouettes of four people celebrating with sparklers against a sunset sky. A tall wind turbine is visible in the background. The scene is set against a backdrop of blurred city lights at night.

# SKYROCKETING NEW RENEWABLE CAPACITIES, REPRESENTING MORE THAN 60% OF GLOBAL NEW CAPACITY ADDITIONS

- >2,400GW installed RES capacity in 2018, (34% of total installed capacities) of which 32% in China, 25% in Europe and 16% in North America
- Wind and solar PV are taking the lion's share (38% and 39%, respectively in 2018)
- 2018: 5<sup>th</sup> year of more than \$300bn invested in renewables

Global renewable power generation installed capacity (GW) 2017 vs. 2040

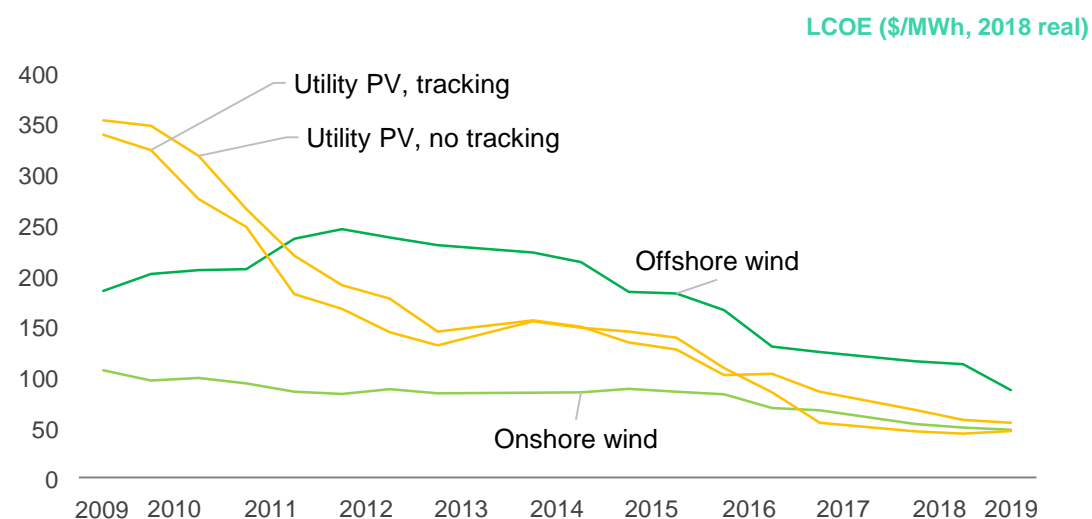


Source: IEA, World Energy Outlook 2018, Sustainable Development Scenario

# RAPIDLY DECREASING COSTS

~-90% IN SOLAR PV AND ~-50% IN ONSHORE WIND IN 10 YEARS

LCOE<sup>(1)</sup> = Average cost per renewable power generation technologies



Sources: BNEF (LCOE 1H 2019)

- Solar PV - wind onshore - wind offshore costs have dropped respectively by 88%, 50% and 57% since 2009, (real terms)
- Further reduction by 49%, 43% and 56% by 2050
- Even excluding subsidies, renewable energy costs can be lower than the marginal cost of conventional energy technologies for energy only
- Cost to deal with intermittency not reflected

(1) LCOE represents the cost of generating electric energy over the asset technical lifetime and taking into account all costs to produce power (construction, maintenance, fuel...), including the cost of capital through normalized WACC. The LCOEs are used to compare various technologies to generate electricity (coal, gas, solar PV, wind, nuclear...). The LCOEs cannot be used to compare dispatchable generation technologies (e.g. gas-fired generation units) with intermittent and non-dispatchable technologies (solar PV, wind) as LCOEs do not take into account intermittency costs - unless intermittent power plant is supplemented by sufficient storage capacity.

# ENERGY MANAGEMENT CAPABILITIES KEY TO MANAGE MARKET EXPOSURE

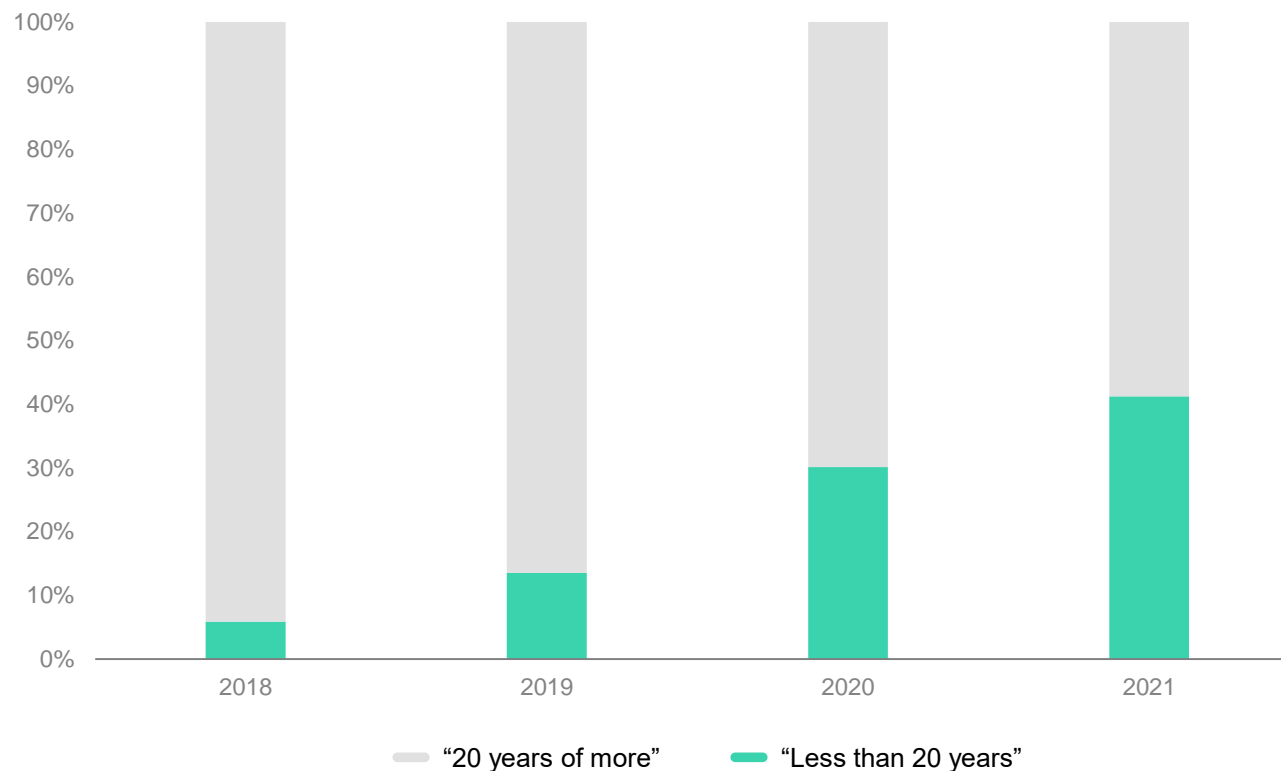
## • Trends driving Corporate PPA market

- **US:** Utility scale solar PV PPAs with a maximum 20 year tenor accounted for ~20% of signed PPAs in 2018 vs. ~10% in 2016
- **Mexico:** Winning bids in the Nov. 2017 Mexican auction, had a 10% to 20% merchant exposure during the PPA period
- **Europe:** unsubsidized power plants are being built based on PPA with a market price + floor formula



**IMPORTANCE OF ENERGY MANAGEMENT  
& TRADING CAPABILITIES  
FOR FUTURE DEALS**

Duration of US utility scale solar PV PPA<sup>(1)</sup> portfolio



(1) PPA: Power Purchase Agreement

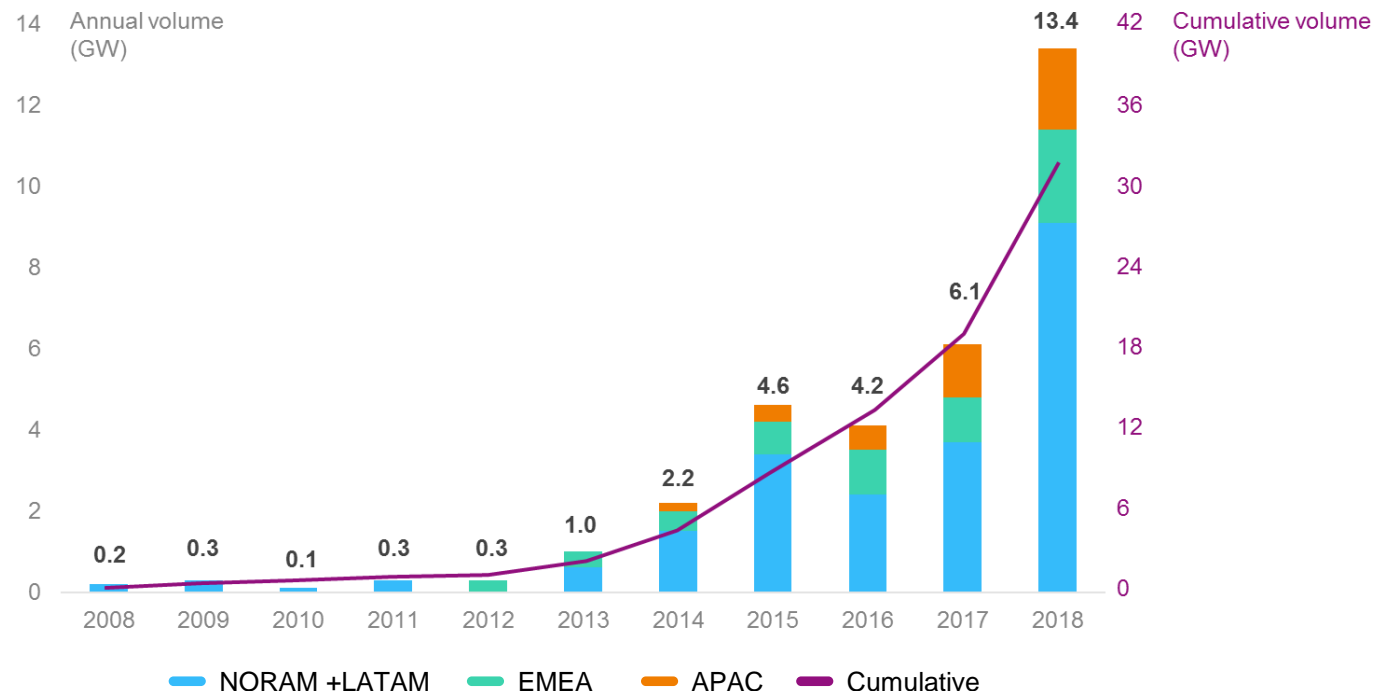
Source: IHS – “US utility-scale solar PV development trends” - April 2019; data as of 30 Nov. 2018



# MORE COMPLEX CONTRACTUAL ARRANGEMENTS AS AN OPPORTUNITY TO DIFFERENTIATE

- **Fast development of corporate PPAs<sup>(1)</sup> (mainly in the US):** 13.4GW in 2018 from 6.1GW in 2017
- **Driven by commitments by corporates and local governments** for green energy supply (i.e. 161 companies' members of "RE 100" committed for 100% renewable supply, 40 cities within C40<sup>(2)</sup>)
- **Supply gradually moving towards 24/7 type offerings:** 100% green electricity – zero carbon – 24 hours a day, 7 days a week

Volume of corporate PPAs signed by year (GW)



Sources: BNEF.

Note: Data in this report is through 2018. Onsite PPAs not included. Australia sleeved PPAs are not included. APAC number is an estimate. Pre-market reform Mexico PPAs are not included. These figures are subject to change and may be updated as more information is made available

Sources: BNEF

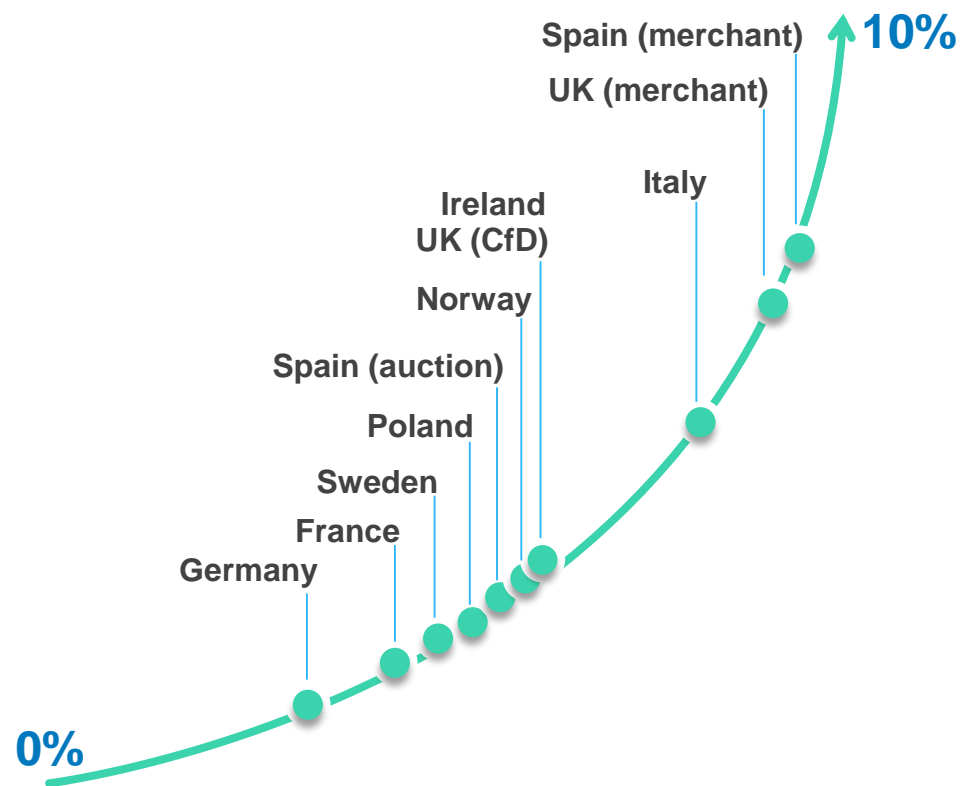
(1) PPA: Power Purchase Agreement

(2) C40: Cities Climate Leadership Group

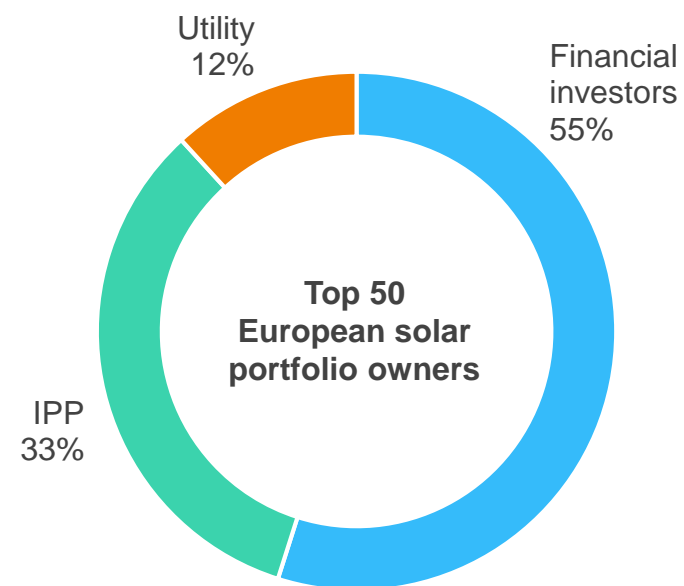
# LOW PROFITABILITY OF COMMODITIZED RENEWABLES

- **Commoditized renewables** lead to a **high competition** amongst investors leading to **lower returns**
- **Contracted**, renewables are an **asset class** that investors value at approx. **300 basis points above government bonds**

Investors' unlevered IRR for onshore wind (May 2019)



Financial investors own almost 50% of European solar assets



Source: Solar Asset Management – TOP 50 European Solar Portfolio – June 2019

# AMBITION

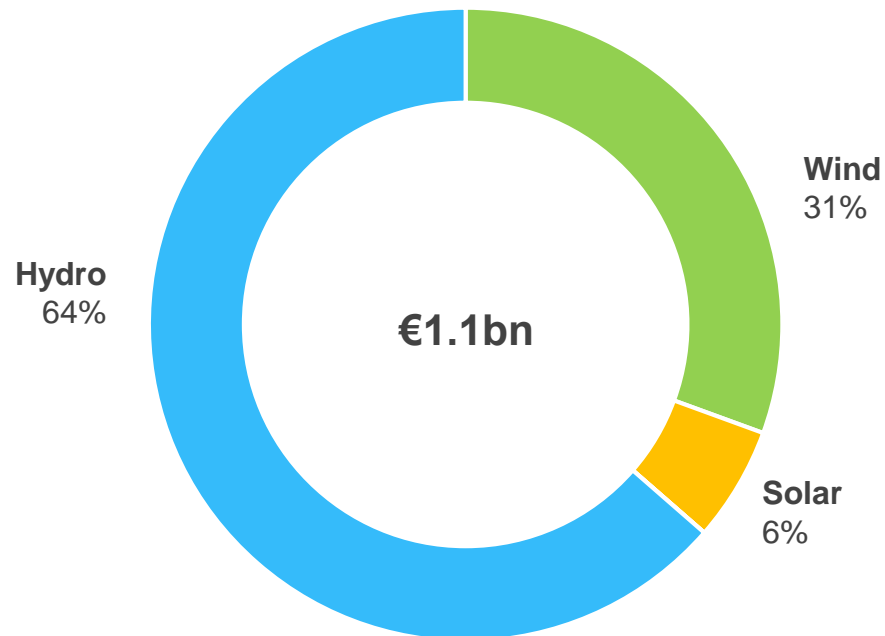
A group of five people are silhouetted against a bright sunset sky. They are holding up sparklers, creating a celebratory atmosphere. In the background, the silhouette of a wind turbine is visible against the sky. The overall scene conveys a sense of achievement and ambition.

# ENGIE DIFFERENTIATING SUCCESS FACTORS



# ENGIE PORTFOLIO COMBINES THE STRENGTHS OF TWO MAIN ACTIVITIES TO MAXIMIZE VALUE CREATION

COI 2018



## Hydro

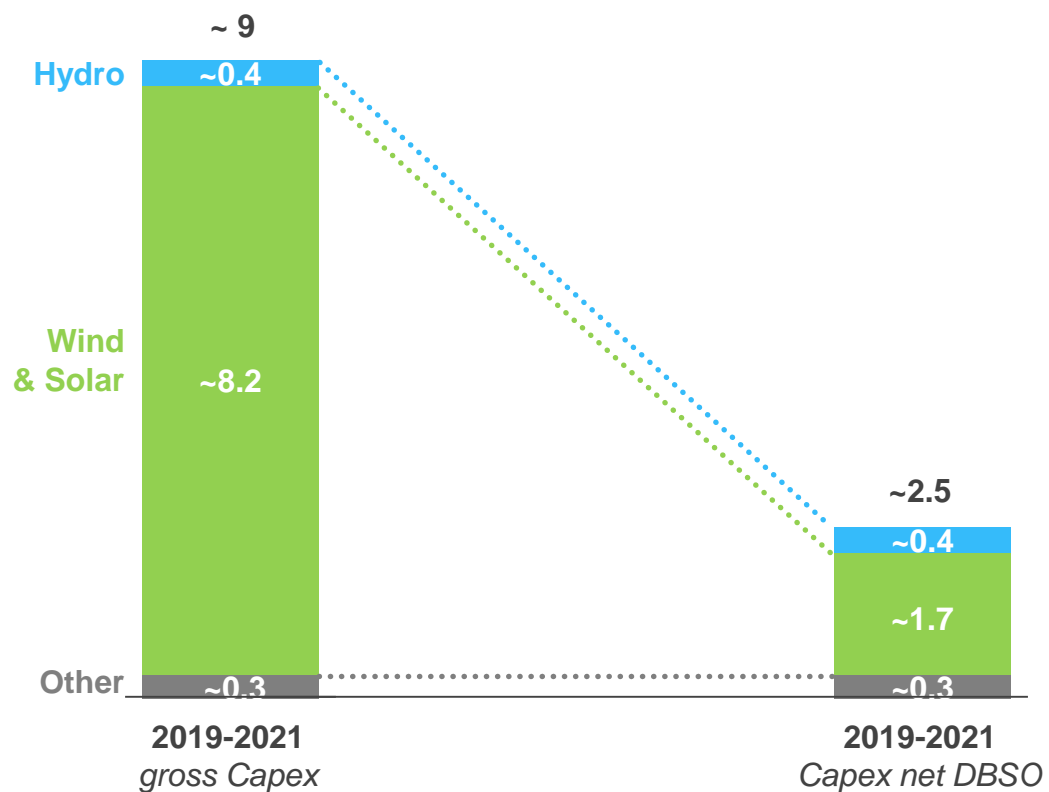
- Largest contributor to renewables earnings, historically providing a stable and recurrent stream of revenues
- Merchant exposure to provide additional growth in the mid-term

## Wind & Solar

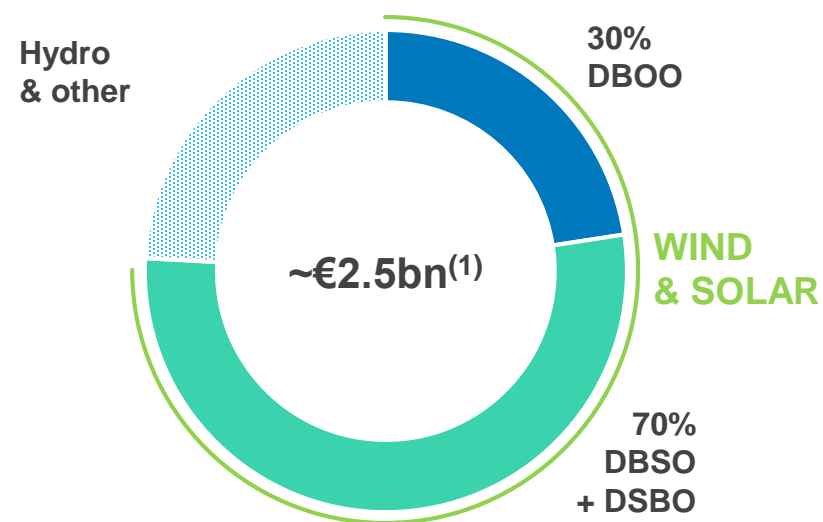
- To provide additional growth on the back of higher assets commissioning, notably driven by the development of corporate PPA

# PRAGMATIC APPROACH TO MAXIMIZE VALUE CREATION

Capex optimization through sell-down (€bn)



2019-2021 Growth Capex net DBSO



(1) Mid-range of €2.3-2.8bn

# ENGIE RENEWABLE AMBITIONS

## Faster Growth

Target of ~9 GW (100%)  
to be added over 2019-21

Tier 1 position in terms  
of development

**COI CAGR 2018-21: 8-11%**

**COI 2021: €1.5-1.6bn**

## Higher Value

### Corporate PPA Leader

- 2019-21: Almost 50% of new RES projects linked to client solutions
- 2/3 of new capacities dedicated to clients after 2026

**Leader in selected sophisticated technologies** (biogas, offshore)

**Growth Capex 2019-21 net of DBSO: €2.3-2.8bn**

**ROCEp:** increase in 2021 vs 2018

## Better Impact

### Access to energy

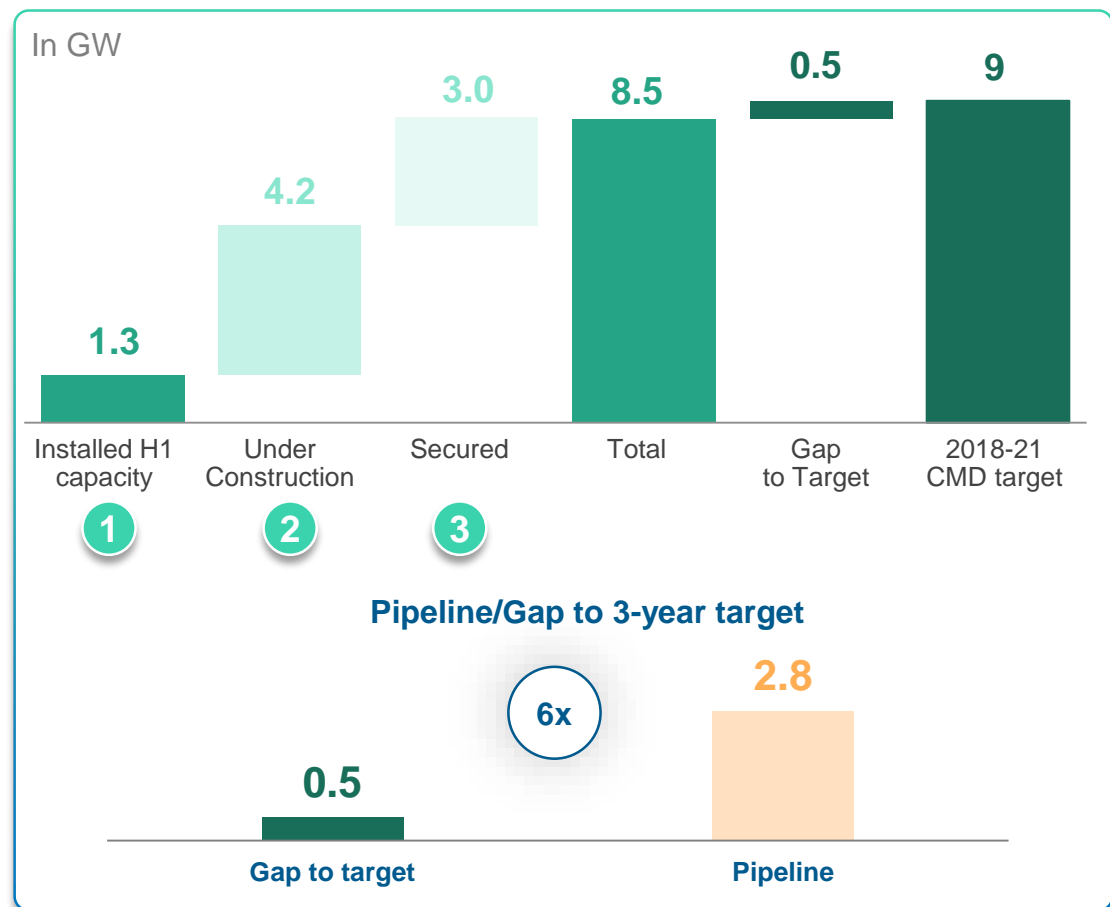
Storage

Cost-efficient renewables

## Faster Growth

# 8.5GW ALREADY INSTALLED, UNDER CONSTRUCTION OR SECURED

1.3GW BUILT AT THE END OF H1: ON TARGET FOR 3GW PER YEAR PLANNED IN CMD



## MAIN PROJECTS (MW @ 100%)

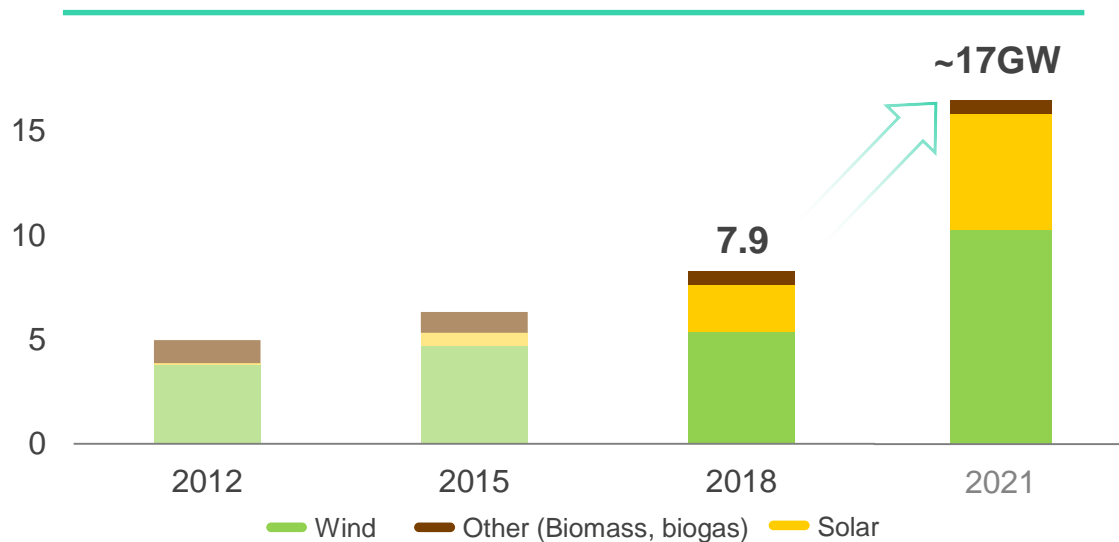




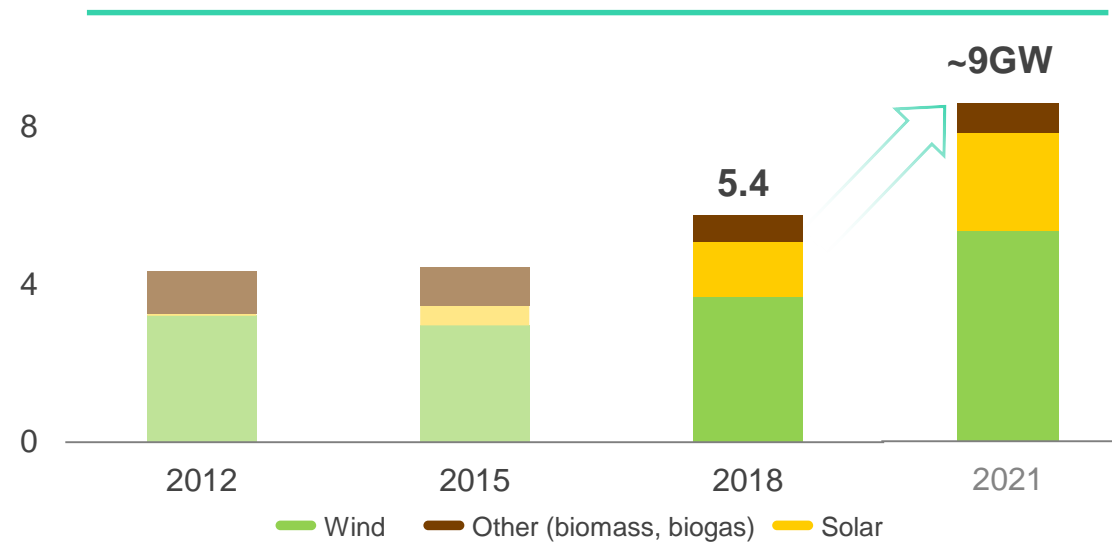
# ACCELERATION BASED ON OUR DEVELOPMENT PLATFORM

ENGIE RENEWABLES CAPACITIES EXCL. HYDRO

At 100%



At consolidation share<sup>(1)</sup>



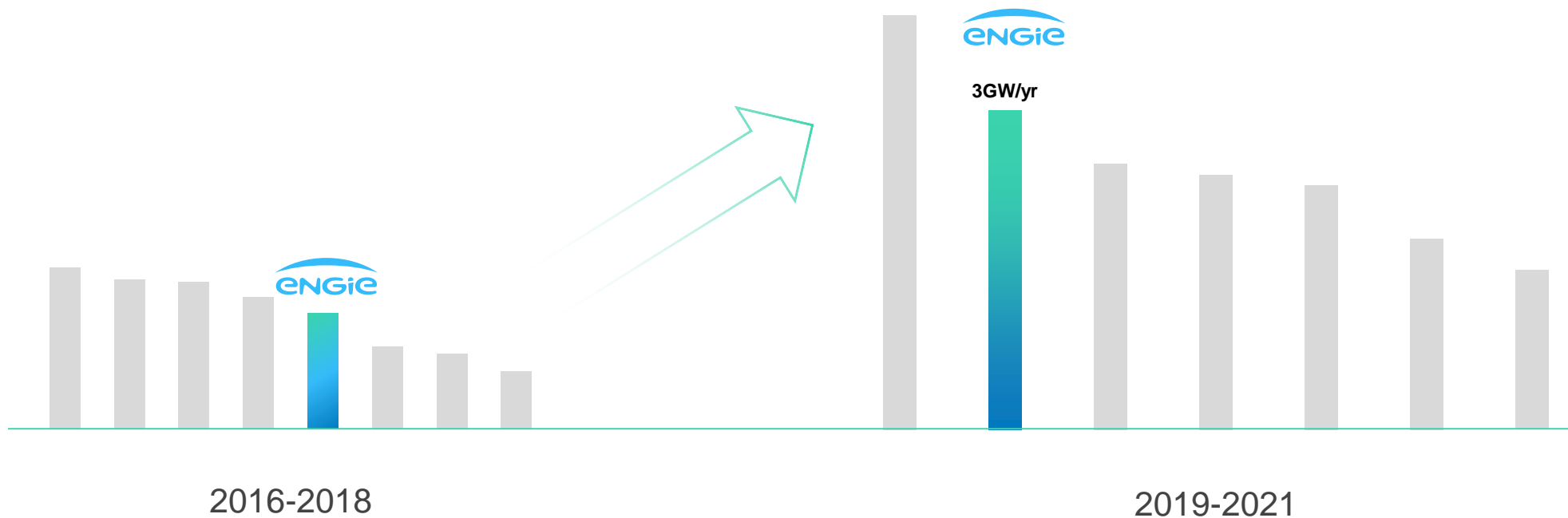
**+3GW/year over 2019-2021**  
compared to an average +0.5GW over 2012-2018

**+1GW/year over 2019-2021**  
compared to an average +0.4GW over 2012-2018

(1) % of consolidation for full and proportionally consolidated affiliates and % holding for equity consolidated companies

# ENGIE NOW RANKS #2 IN RENEWABLE CAPACITY ADDITIONS

Average installed RES capacity, GW/year @100%  
ENGIE vs. competitors (European and US RES developers)



# INCREASING SOPHISTICATION IN TECHNOLOGIES AND OFFERS

## Technologies

TODAY'S NICHE MARKETS MAY TURN GLOBAL

Short Term  
2021

Biomethane Geothermal  
Fixed wind offshore

Medium Term  
2023

Grid scale storage Floating wind offshore  
Microgrids

Long Term  
>2026

Green hydrogen<sup>(1)</sup>

## Offers

FROM "AS PRODUCED" TO "AS CONSUMED"

Standardized  
Renewable  
Plants

Separated  
Upstream &  
Downstream  
Models

Short-Term  
Service  
Contracts

Tailor-Made  
Green Energy  
Solutions

Integrated  
Upstream-  
Downstream  
Models

Risk Sharing,  
Complexity &  
Long-Term  
Commitment

Increased value

(1) Early projects are materializing, that may lead to an acceleration of the development of green hydrogen (e.g. of projects with FID expected in 2019 or 2020: Delfzijl project (NL), RefHyne (GE), Salzgitter (GE))

## STRONG MOMENTUM YEAR-TO-DATE

### IMPORTANT MILESTONES IN SELECTED SOPHISTICATED TECHNOLOGIES

**Vol-V Biomasse acquisition:** ENGIE becomes France's leading biomethane producer (80 projects, aim of producing 5 TWh/year of biomethane by 2030)

**Joint-venture with EDP to create a leading global offshore wind player:** asset base to grow more rapidly and more efficiency in operations

### MOMENTUM OF CORPORATE PPAs IN THE US

1.2 GW signed over the past 12 months with corporate buyers, universities, utilities and municipalities

# HYDRO

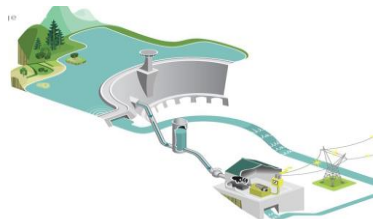
A group of five people are silhouetted against a bright, hazy sky at sunset or sunrise. They are holding up lit sparklers, creating a celebratory atmosphere. In the background, the dark silhouette of a wind turbine is visible against the sky. The overall scene conveys a sense of achievement and sustainable energy.

# 3 MAIN OPERATING MODELS UNDER CONCESSION REGIME

## OPERATING MODELS (excluding Pump Storage)

### FRANCE & BRAZIL

#### Reservoir power plant



Water is stowed and released through turbines & alternators to produce electric power

#### Peak asset

- Good flexibility (water flow can be regulated), dynamic (short response time) and easy to monitor.
- Heavy investment costs and O&M

- KEY CHALLENGES**
- Maximizing generation at peak price
  - Optimize the assets' availability and response time (ancillaries...)

#### Run-of-river plant



Plant turbines run continuously the water coming from the rivers. No limited water storage

#### Base load asset

- Low cost of generation process
- High load factor (~4,000 running hours per year)
- No flexibility for resource

- Optimize the assets' availability
- Optimize O&M costs

### BRAZIL

#### Central dispatcher



In Brazil, the dispatch is centralized, in order to optimize operation

#### Several hydrological regions

- Low cost of generation
- Energy reallocation mechanism
- Best use of water

- GSF<sup>(1)</sup>
- Keep high availability rates
- Optimize O&M costs

(1) Generation Scaling Factor (GSF)

# ENGIE FRENCH HYDRO: 2<sup>ND</sup> HYDRO GENERATOR

## CNR

49.97% ENGIE ownership

19 Hydro Power plants  
& dams over Rhône River

**3,072MW** – Production in 2018: **14.3TWh**

Around 1,000 kT  
of CO<sub>2</sub> emissions avoided/year

Run of river

Merchant

## SHEM

100% ENGIE ownership

**56 Hydro Power plants  
& 12 dams in the Pyrénées**  
mountains & over Dordogne & Lot rivers

**783MW** – Production in 2018: **1.8TWh**

Nearly 600kT of CO<sub>2</sub>  
emissions avoided a year

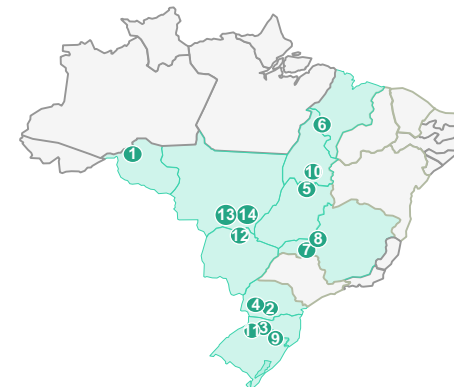
Hydro storage + run of river

Merchant (70%) + Regulated (30%)

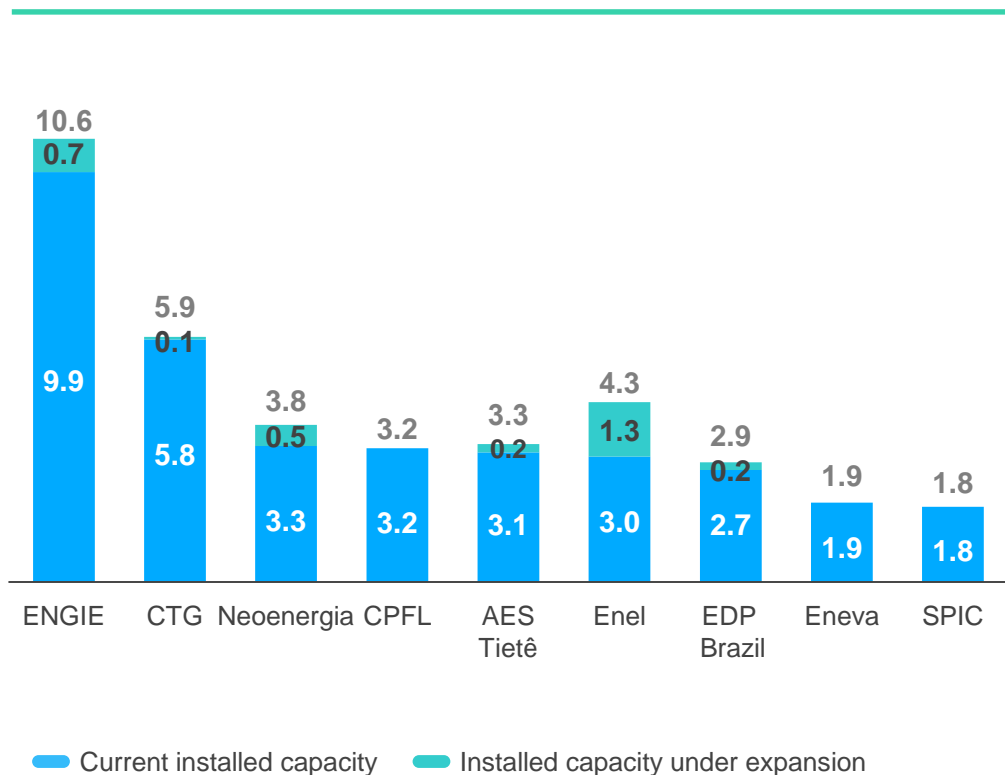
# BRAZIL

## ENGIE BRASIL

STRONG POSITION IN BRAZIL, BEING THE LARGEST INDEPENDENT POWER PRODUCER IN THE COUNTRY



Private Sector - Installed capacity (GW) Net ownership<sup>(1)</sup>



(1) Total capacity including thermal at the end of March 2019  
 (2) Consider long-term PPAs signed with partners

ENGIE's Operated Hydro Installed Capacity (MW)

Hydro Power Plants	Installed Capacity (MW)	Commercial Capacity (aMW)	Offtaker (corporate or captive clients)	COD
1 Jirau	3,750	2,208	Both	Nov 2016
2 Salto Santiago	1,420	733	Corporate	Sep 1982
3 Itá <sup>(2)</sup>	1,450	740	Both	Mar 2001
4 Salto Osório	1,078	503	Corporate	Jun 1981
5 Cana Brava	450	261	Captive	Sep 2002
6 Estreito	1,087	641	Captive	Mar 2013
7 Jaguará	424	341	Both	Nov 1971
8 Miranda	408	198	Both	Oct 1998
9 Machadinho <sup>(1)</sup>	1,140	547	Both	Jul 2002
10 São Salvador	243	148	Captive	Nov 2009
11 Passo Fundo	226	113	Corporate	Jun 1973
12 Ponte de Pedra	176	134	Captive	Jul 2005
13 Rondonópolis (SHP)	27	14	Captive	Dec 2007
14 José G. da Rocha (SHP)	24	112	Captive	Jan 2007
<b>Total</b>	<b>11,903</b>	<b>6,593</b>		

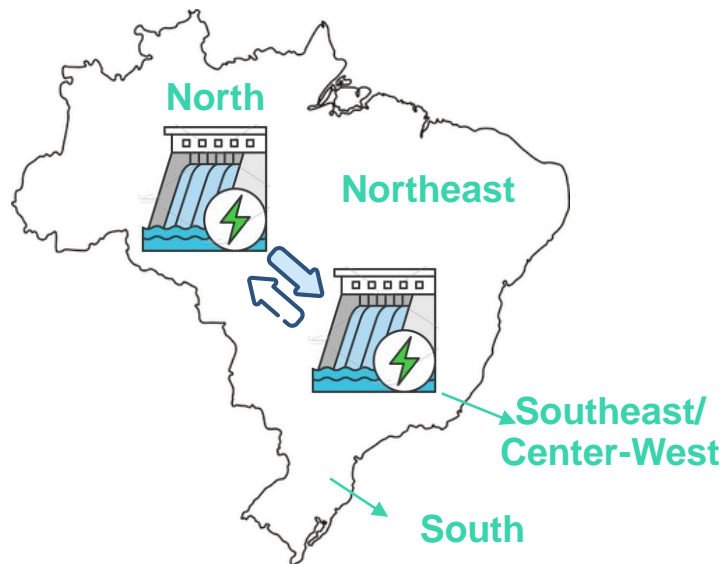
Maximum output

Long-term expected generation

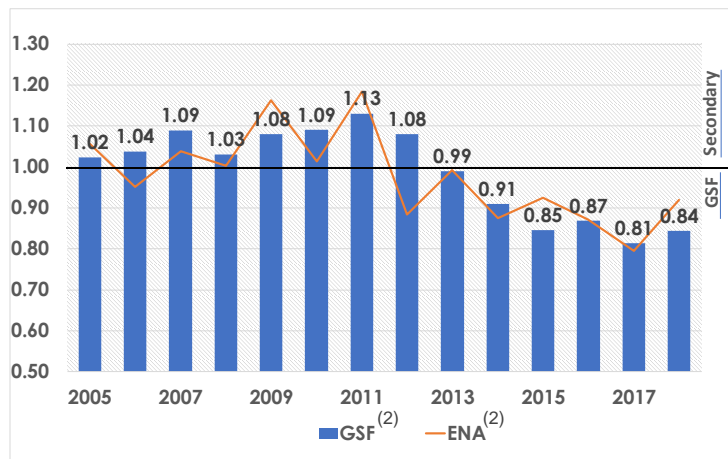


# OPERATING MODEL, GSF AND ENGIE BRASIL ENERGIA PERFORMANCE

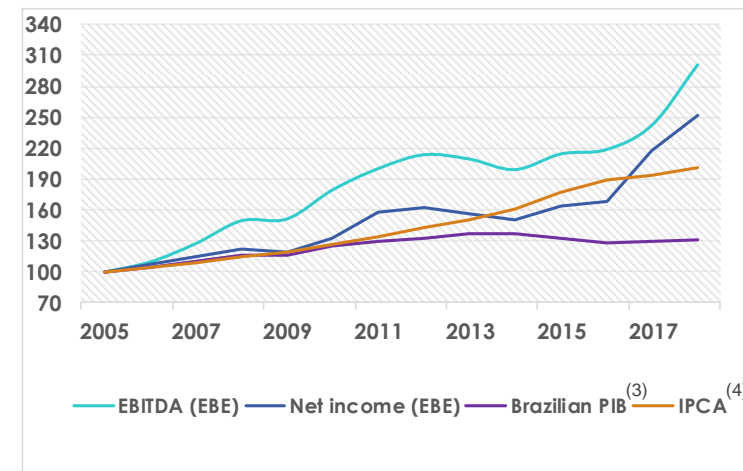
## Hydrology risk mitigation mechanism (MRE)<sup>(1)</sup>



## Difficult hydro conditions since 2014 (GSF)<sup>(2)</sup>



## Strong performance despite hydro headwind



Total electric power output > 1 Secondary energy  
 = 1 System in balance  
 Σ of assured energy < 1 GSF

(1) MRE: Energy Relocation Mechanism  
 (2) Generation Scaling Factor (GSF); ENA: Engia Natural affluente  
 (3) PIB=GDP  
 (4) IPCA: Brazilian inflation rate

# JAGUARA AND MIRANDA HYDRO POWER PLANTS CASE

LEVERAGED  
ACQUISITION OF  
**€950M,...**

...INCREASING EBE'S  
INSTALLED CAPACITY BY  
**10.5%** (832MW)...

...AND BOOSTING  
2018 NET RESULTS BY  
**12.3%**



## COMMERCIALIZATION

- Energy directed to free Market (30%) enhanced EBE's<sup>(1)</sup> portfolio, enabling the creation of new products
- First units of EBE in the system of quotas (*no GSF risk on 70% of capacity*)
- PPA of 30 years indexed to inflation (*IPCA*)



## INVESTMENT

- Cash generation as of day 1
- Synergies with new regional operation
- Expertise in O&M will guarantee optimization of Capex and Opex



## FINANCING

- Fully financed in BRL
- Concession fees funded by bonds issuance both at the SPV as well as at EBE level



## LOCATION

- Projects located in South-East, the main area for consumption nationally



## 2018 COMBINED RESULTS

- Ebitda: €128M
- Net income: €66M

(1) ENGIE Brazil Energia

## MEDIUM AND LONG TERM CHALLENGES & OUTLOOK

### HYDROLOGY FORECAST STRUCTURAL GSF MECHANISM

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Compensation for out  
of merit order dispatch (GFOM)

### LONG TERM POWER PRICES NEW REGULATORY FRAMEWORK

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Introduction of hourly prices

Gradual reduction in subsidies

Breakdown of the capacity  
and energy markets

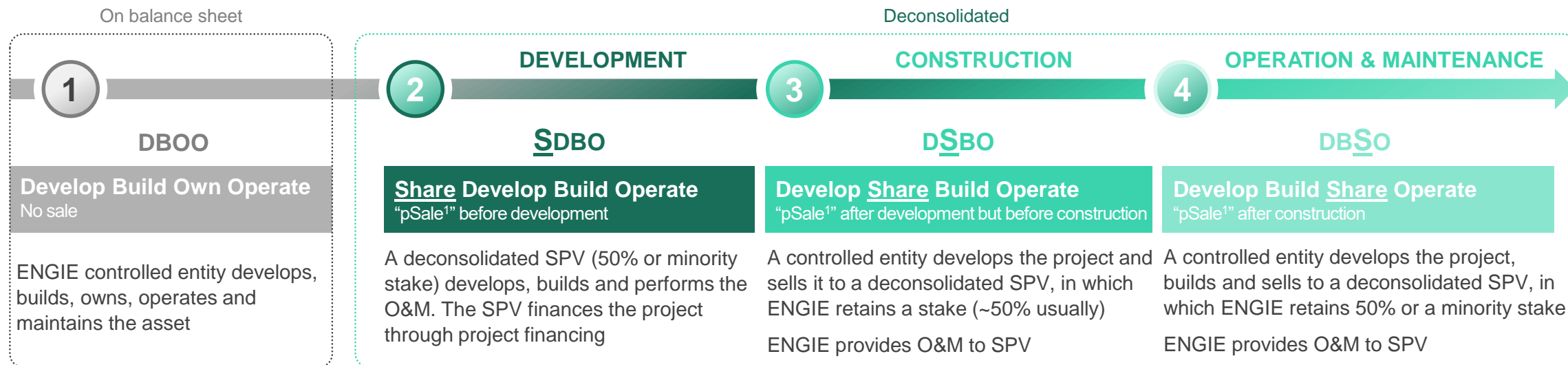
Valuation of plant additional services  
in the new regulatory framework

# WIND & SOLAR



# WIDE RANGE OF WIND & SOLAR BUSINESS MODELS

DEPENDING ON IF & WHEN EQUITY IS PARTIALLY SOLD TO INVESTORS



## EXTENT OF USE BY PEER GROUP



- + Refinancing gains optionality
- + Predictable future cash-flows
- More Capex needed
- Lower risk mitigation

- + Enhanced competitiveness & mitigation of NPV merchant share
- + Lower Capex & front loaded value creation with sell-down margin
- + Scale effects & Industrialization (EPC, O&M, energy management)
- Volatility on EBITDA/ COI due to sell-down model

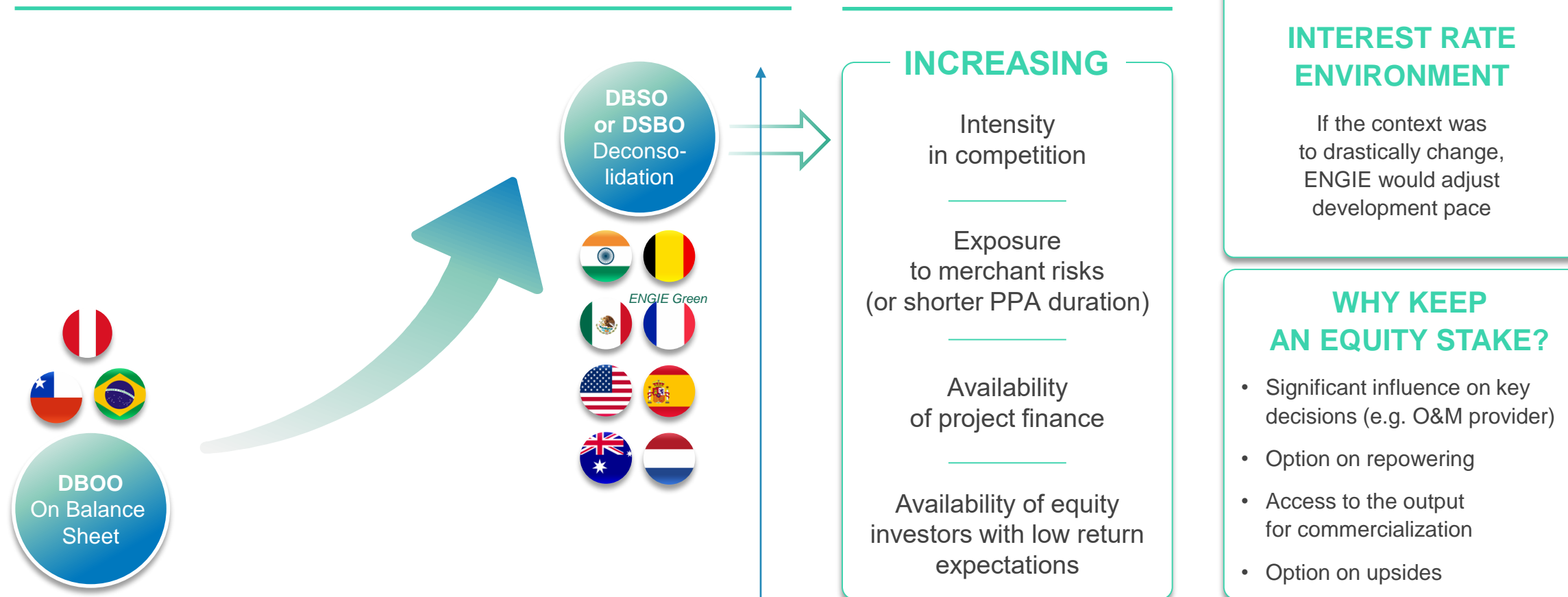
(1) Partial sale  
EPC: Engineering, Procurement, Construction; O&M: Operations & Maintenance

# ENGIE HAS PUT IN PLACE A PRAGMATIC APPROACH

ADJUSTING TO MARKET CONTEXT

## Business models

## Market context



# DBSO MODEL: CAPITAL RECYCLING, UPFRONT VALUE CREATION (1/2)

NORMATIVE 10 MW WIND ONSHORE & SOLAR PROJECT IN EUROPE (COMPETITIVE TENDER)

	DBOO	DBSO with 50% sell down
NET CAPEX	SOLAR €0.6-0.8M/MW	€0.05-0.15M/MW
	WIND €1.1-1.2M/MW	€0.1-0.2M/MW
IRR	WACC-WACC+1% (CoE-CoE+2%)	CoE+4%
NPV	€50-250k/MW gross capacity	

## DBSO assumptions:

70-80% gearing with project finance debt  
50% sell down to an investor with a target return equal to our Cost of Equity (depending on competition, sell-down up to 80%)

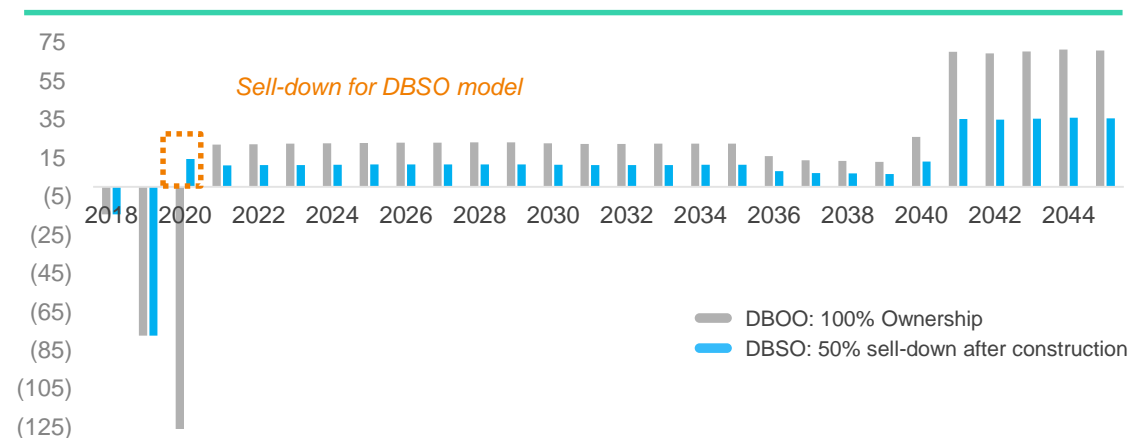
## Tarif competitiveness:

To reach CoE+4% in the DBOO model would have required a bid tariff **€2/MWh** higher

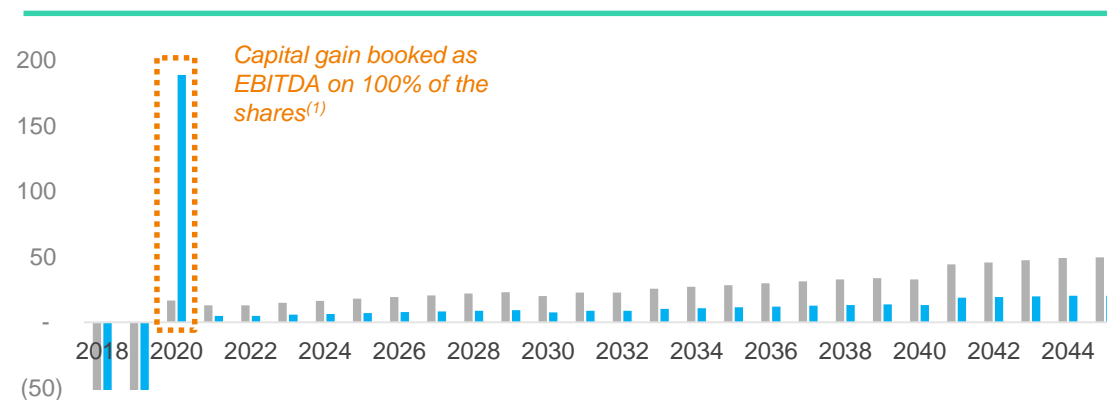
## O&M margin

<€1k/MW

Cash Flow to Equity (€k/MW gross)



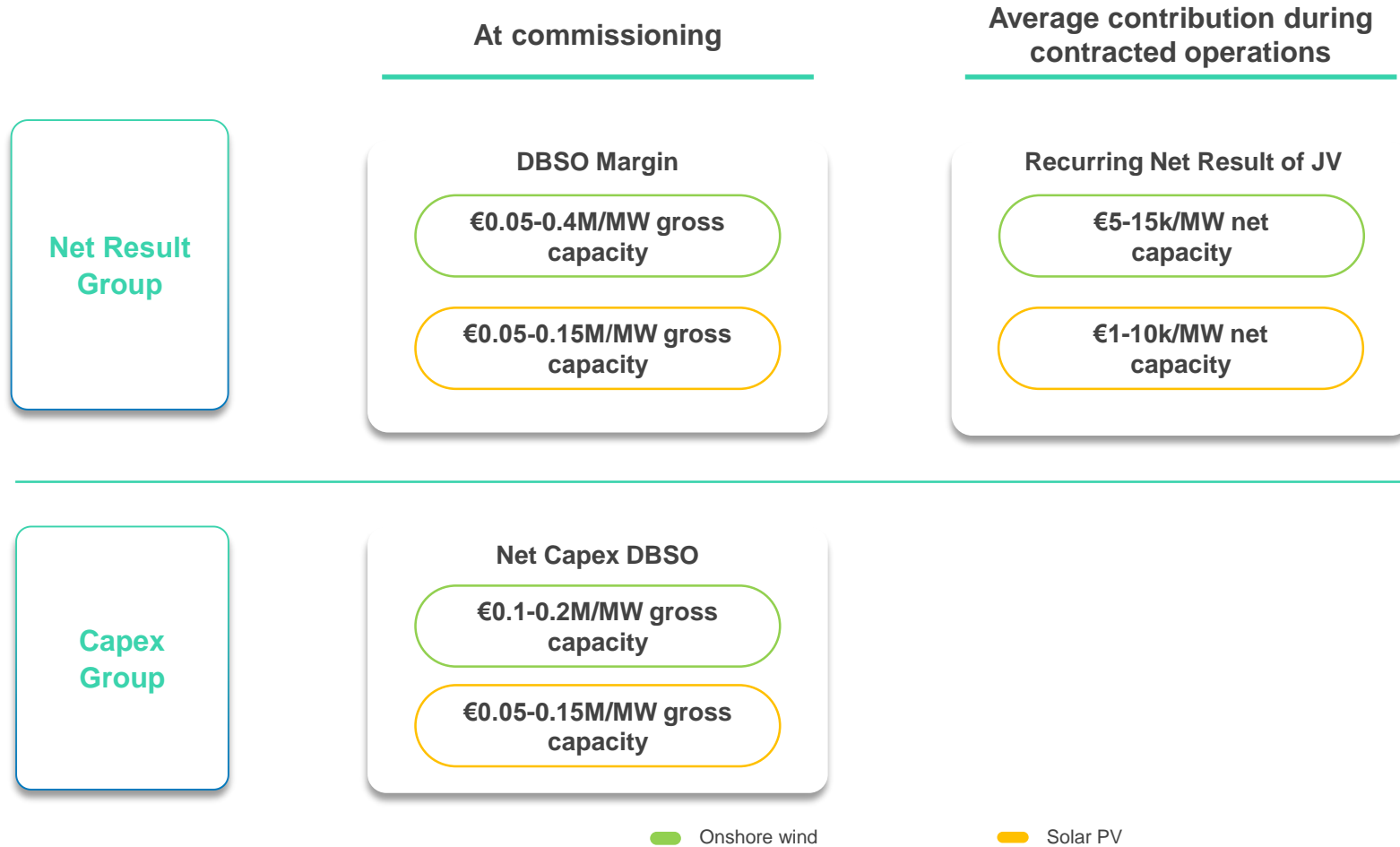
NRIGs (€k/MW)



(1) Impact does not include goodwill allocation for DBSO model

# DBSO MODEL: CAPITAL RECYCLING, UPFRONT VALUE CREATION (2/2)

TYPICAL CONTRIBUTION & FINANCIAL IMPACTS AT ENGIE LEVEL

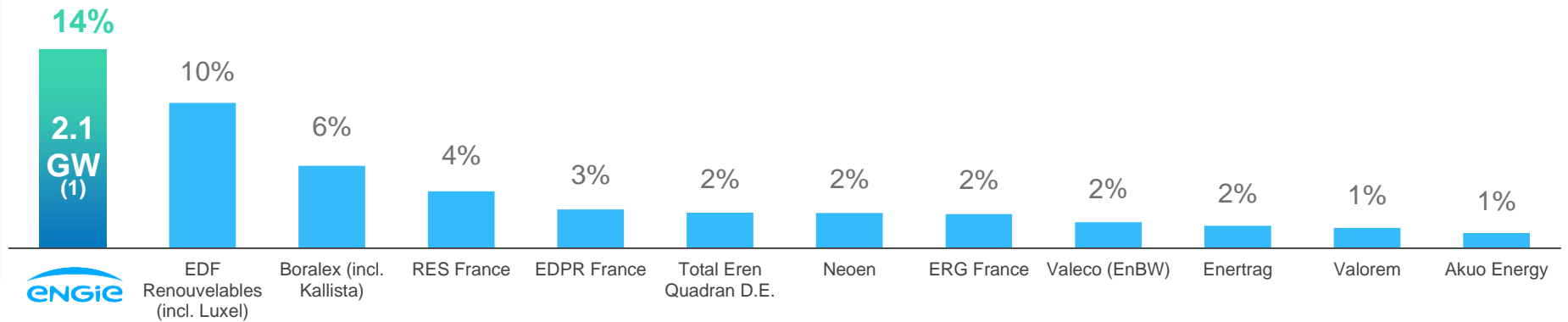




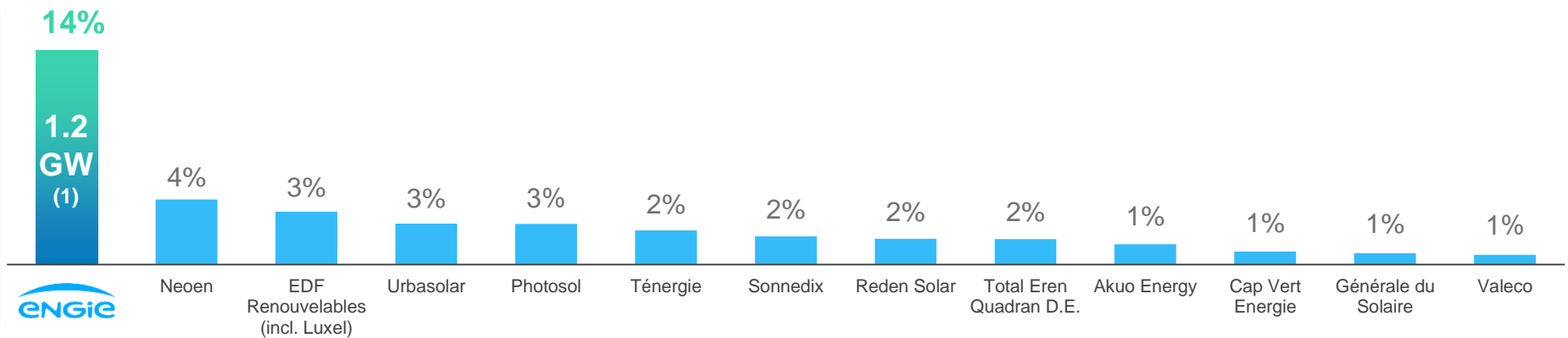
# ENGIE LEADER IN THE FRENCH MARKET



**FRENCH WIND MARKET**  
15GW



**FRENCH SOLAR MARKET**  
8.5GW



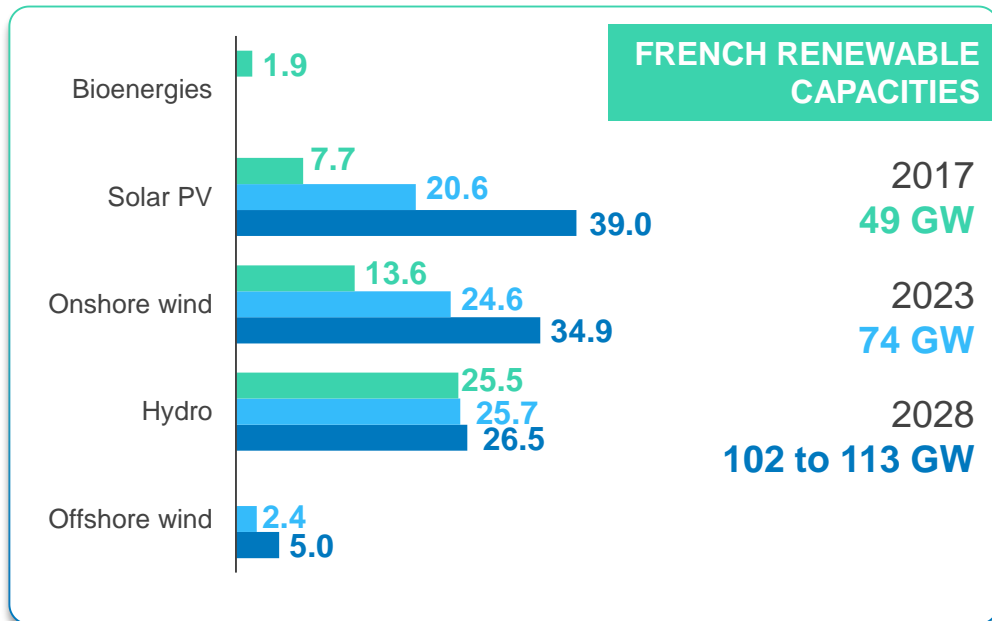
(1) End 2018

# FRANCE: A STABLE AND PREDICTABLE REGULATION WITH ATTRACTIVE GROWTH PERSPECTIVES

## Market perspective

### Energy Transition Law

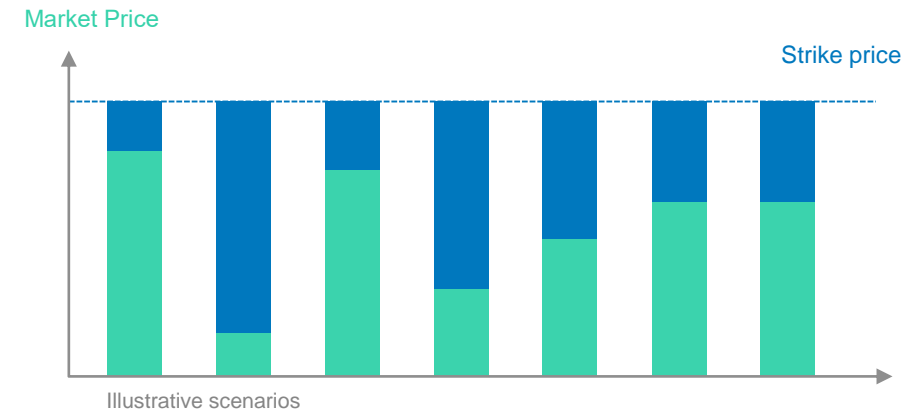
- Increase the share of renewables to 23% of the gross final energy consumption by 2020 and to 32% by 2030
- Reach 40% of renewables in the electricity production in 2030



Source: L'Usine Nouvelle, January 2019

## Auction mechanism

### Feed-in premium (CfD) for 20 years guaranteed by the State



#### ONSHORE WIND

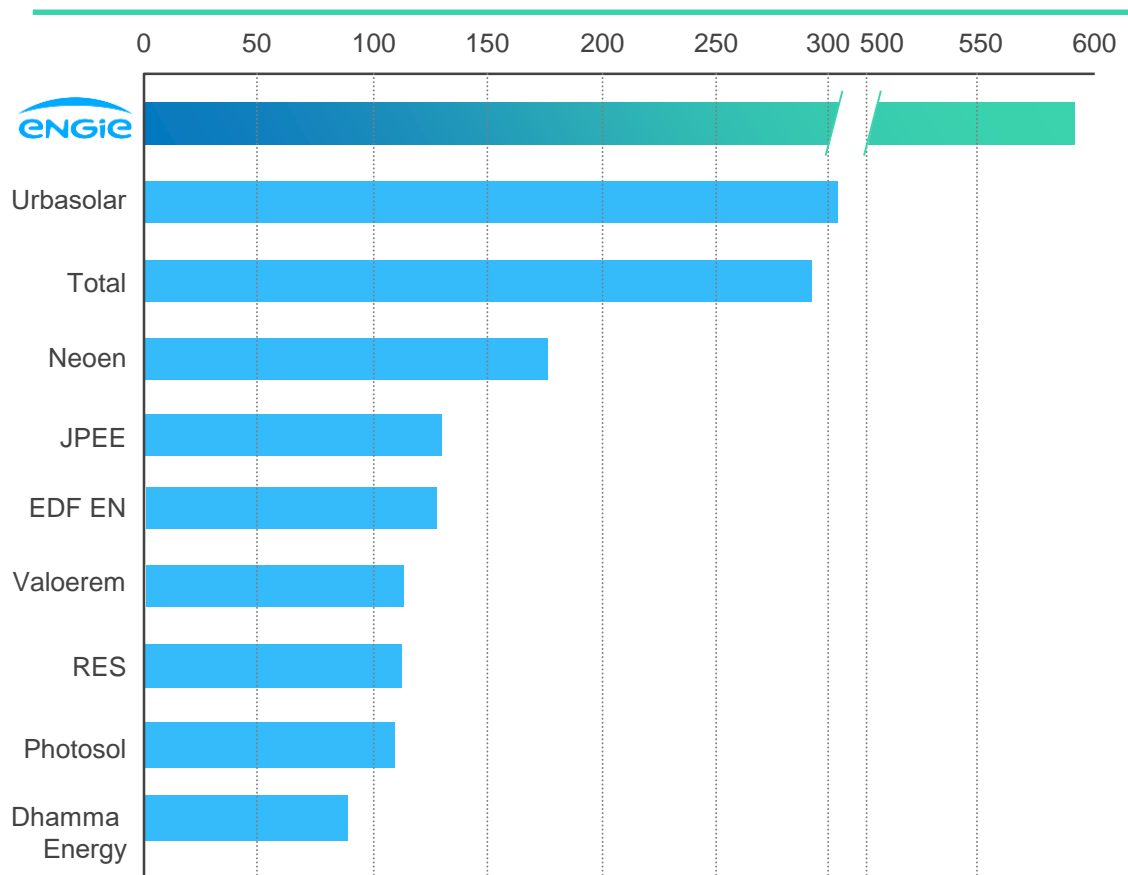
- Mostly awarded by tender: 2 x 500MW/yr.
- Except for small projects (less than 6 turbines) = direct contracting (automatic tariff) of €72/MWh

#### SOLAR

Awarded by tender:  
2 x 850MW/yr only  
for utility scale solar

# ENGIE IS WELL POSITIONED TO CAPTURE THE FRENCH MARKET OPPORTUNITIES

CRE 4 solar tender– cumulative MW won



Source: Finergreen

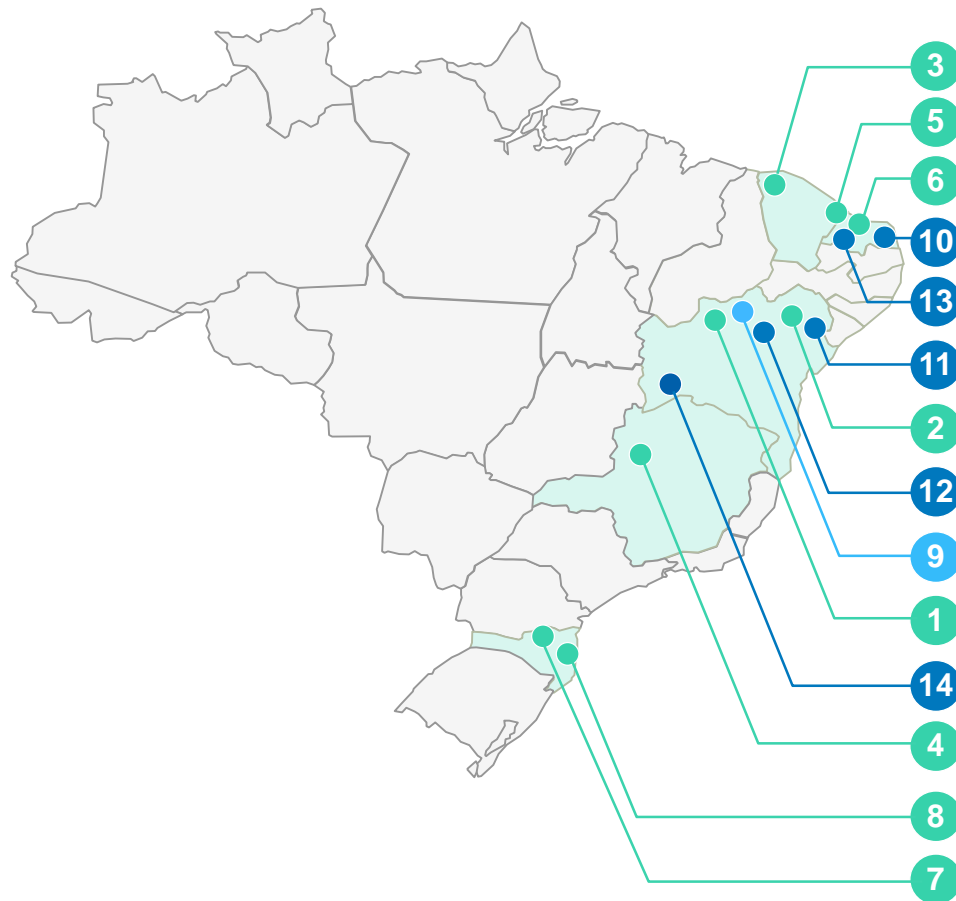
**ENGIE is a big winner of the latest solar auctions in France**

**Strong competitiveness based on strong capabilities:**

- Origination (partnerships, notably with Suez)
- Financing
  - Leverage ENGIE's strong balance sheet and project financing to drive down cost of capital
  - Use of our long term partnership with Predica and attract yield seeking investors to farm down equity
- EPC (ENGIE Solar)
- O&M

# ENGIE WIND AND SOLAR IN BRAZIL IS GROWING RAPIDLY

NCR<sup>(1)</sup> BOOSTING GROWTH: ~1.2 GW INSTALLED IN THE PAST 5 YEARS AND 1.9 GW UNDER DEVELOPMENT



	Power plants in operation	PPAs Duration (years)	Installed Capacity (MW)	Commercial Capacity (aMW)	Offtaker (corporate or captive clients <sup>(2)</sup> )	COD
1	Uburanas Complex (Wind)	20	360	213	Both	04/24/2019
2	Campo Largo I Complex (Wind)	20 (regulated) and 17.5 (free)	327	170	Both	12/21/2018
3	Trairi Complex (Wind)	20	213	102	Both	04/06/2017
4	Paracatu (Solar)	20	132	34	Captive	02/09/2019
5	Floresta (Solar)	20	86	25	Captive	12/23/2017
6	Assú V (Solar)	20	30	9	Captive	12/23/2017
7	Nova Aurora (Solar)	n/a	3	n/a	n/a	03/31/2014
8	Tubarão (Wind)	n/a	2	n/a	n/a	11/04/2014
<b>Total</b>			<b>1,152</b>	<b>553</b>		

	Power Plants under construction	PPAs Duration (years)	Installed Capacity (MW)	Commercial Capacity (aMW)	Offtaker (corporate or captive clients)
9	Campo Largo II Complex (Wind)	~ 5	361	200	Corporate
<b>Total</b>			<b>361</b>	<b>200</b>	

	Power Plants under development	Installed Capacity (MW)	Commercial Capacity (aMW)
10	Sto. Agostinho (Wind)	800	440
11	Uburanas II (Wind)	300	165
12	Campo Largo III (Wind)	250	137
13	Assú I, II, III and IV (Solar)	120	36
14	Alvorada (Solar)	90	27
<b>Total</b>		<b>1,560</b>	<b>805</b>

### COMPETITIVE ADVANTAGES:

- Strong presence in the free energy market speeds up contracting
- Geographic synergies deliver optimization of Capex and Opex
- AAA rating grants access to competitive funding

(1) NCR: Non-Conventional Renewables  
 (2) Contract with distribution companies

# CORPORATE PPA IN THE US: WHY DO CORPORATIONS BUY RENEWABLE POWER?

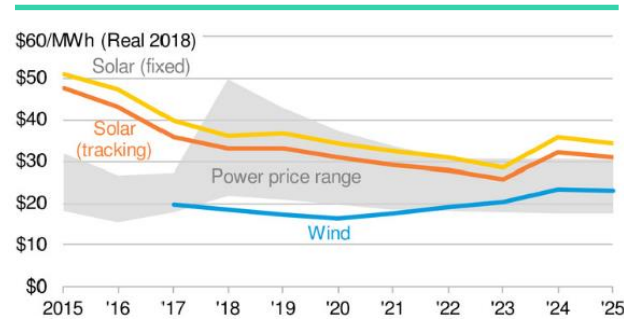
## PRICE COMPETITIVENESS

- Land availability, with limited constraints (social and environmental)
- Excellent wind and solar resources
- Federal and State level incentives (“PTC” & “ITC”)<sup>(1)</sup>
- Renewable Energy Credits (“REC”)

## SUSTAINABILITY

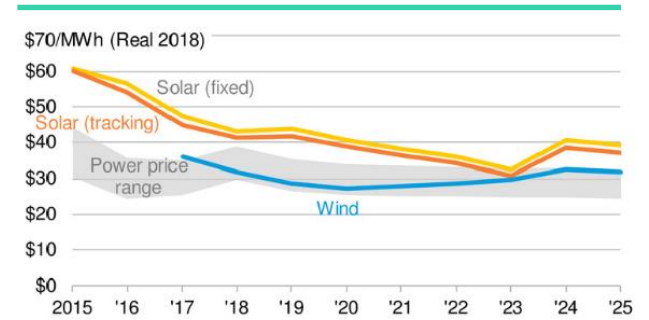
- Utilities operating in states with Renewable Portfolio Standards (RPS), sign PPAs in order to comply with these targets
- Corporations with sustainability goals to be carbon neutral by a certain date

Estimated Texas LCOEs vs ERCOT<sup>(2)</sup> power prices

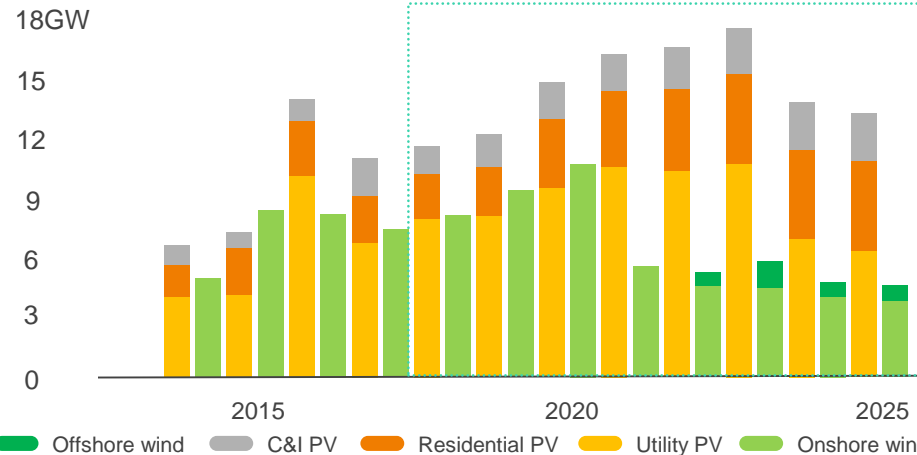


Source: Bloomberg NEF

Estimated mid-Atlantic LCOEs vs PJM<sup>(3)</sup> power prices



Annual U.S. wind and solar capacity additions



**72GW**  
U.S. utility-scale PV build from 2018-25

**56GW**  
U.S. wind build from 2018-25

**45GW**  
U.S. small-scale PV build during 2018-25

(1) PTC & ITC: Production Tax Credit & Investment Tax Credit  
 (2) ERCOT: Electric Reliability Council of Texas  
 (3) PJM: Pennsylvania-New Jersey-Maryland Interconnection

Source: Bloomberg NEF

## ENGIE'S COMPETITIVE ADVANTAGE IN NORTH AMERICA

LARGE PORTFOLIO, DEVELOPMENT TEAM, BROAD SOLUTIONS AND COMMERCIAL RELATIONSHIPS

### Diversified Portfolio

Large portfolio of projects (>10GW) and well diversified (technology, markets and delivery date)

### Experienced Team

Very experienced team from origination to project delivery of more than 50 individuals

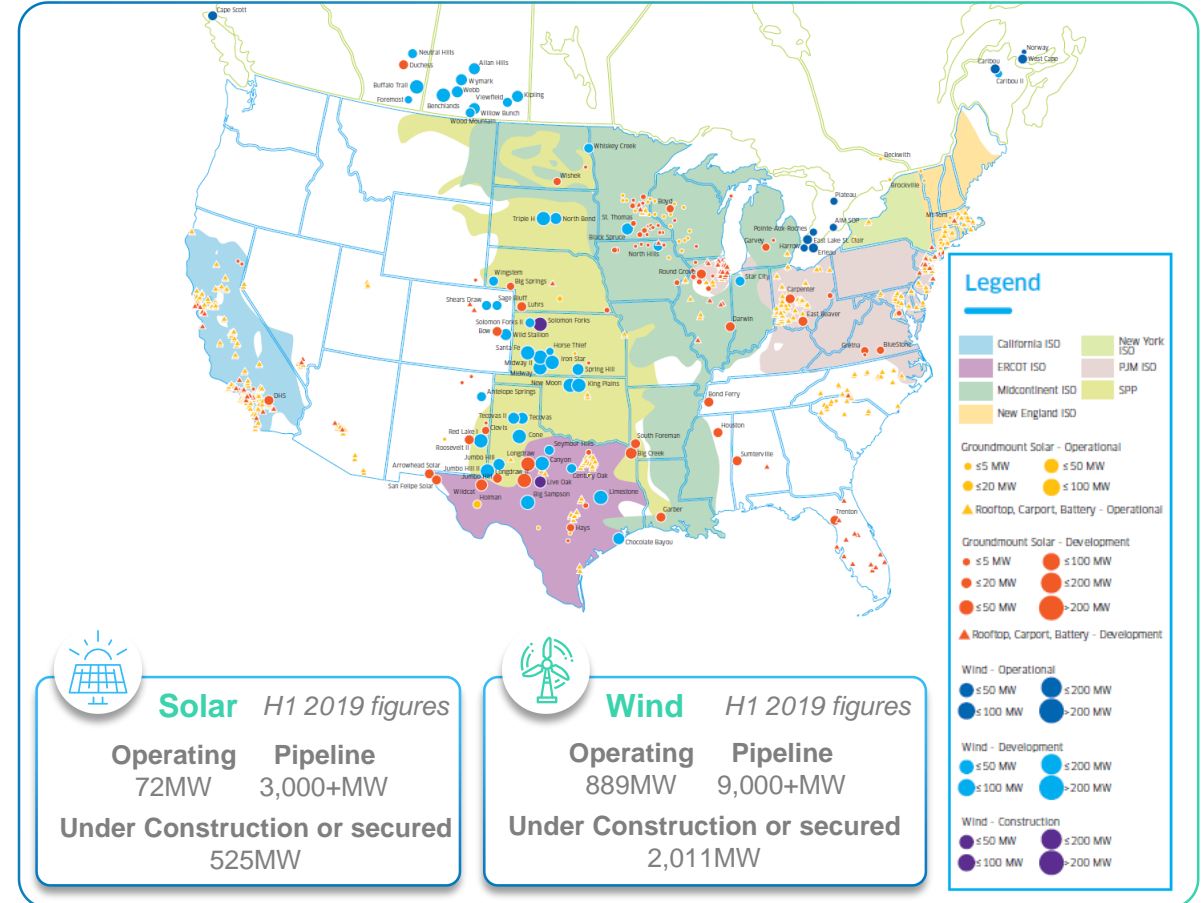
### Customer Base and Portfolio of Solutions

Different customer relationships locally and globally increasing our reach and cross sell and upsell.

Unique portfolio of solutions allowing for stand alone or comprehensive solutions encompassing RES power

### DBSO

Capital recycling allowing us to be cost competitive while continue providing O&M and services to our partner



# CROSS SELL AND UP SELL - EXAMPLE OF TARGET

### ENGIE Insight<sup>(1)</sup>

- Expense Data Management
- Energy Supply Management
- Energy Star Reporting

### ENGIE Resources<sup>(1)</sup>

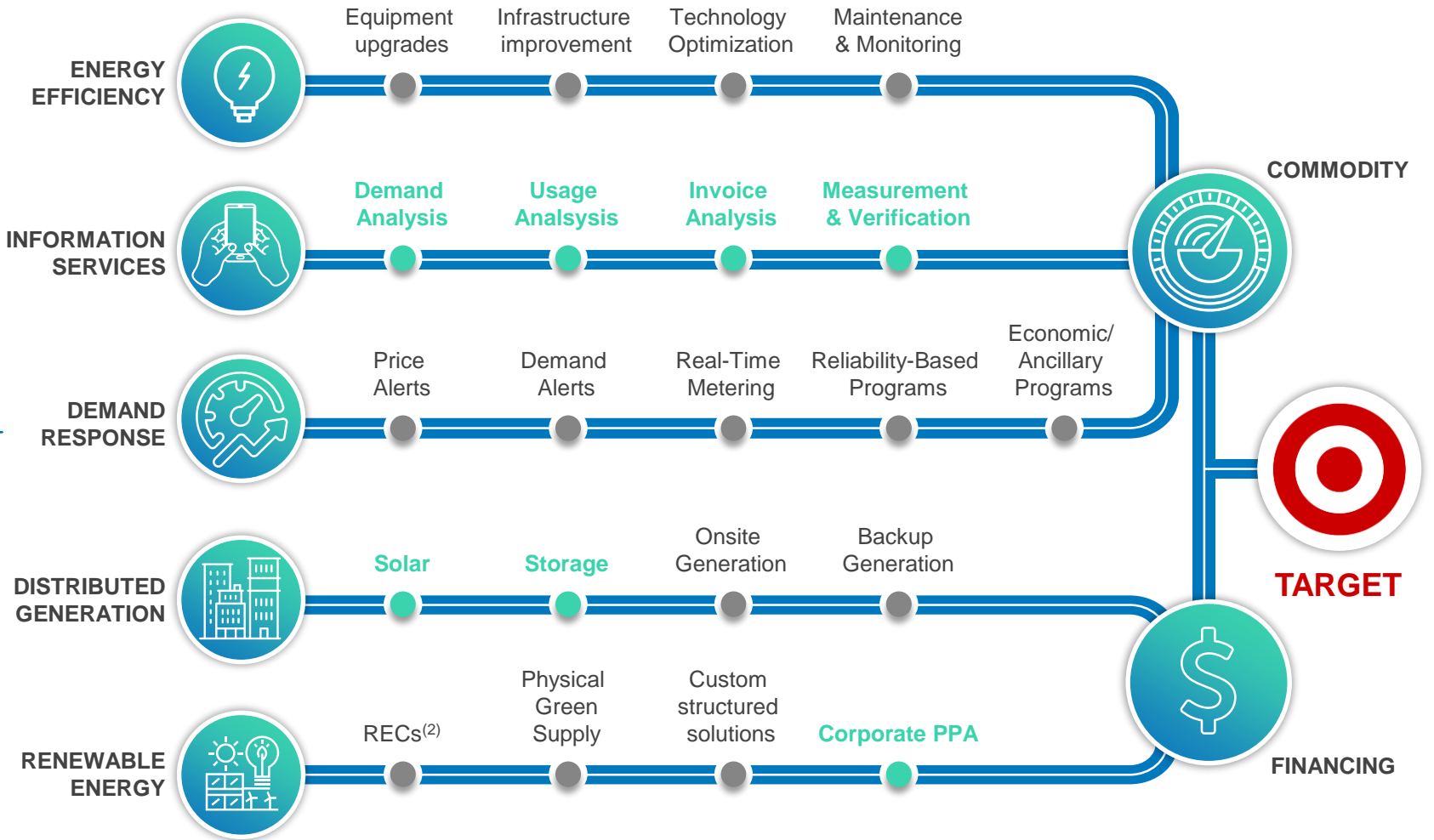
- Power Supply in Texas and New York
- 90MW and 194 locations at client site

### ENGIE Distributed Solar<sup>(1)</sup>

- Solar PV + Storage
- ~80MW of rooftop projects in 12 states, with more than 130 sites
- Long term PPAs and Build & Transfer

### ENGIE Renewables<sup>(1)</sup>

- Wind and Solar PV Corporate PPAs
- Wind:**
- 100MW 15-year as produced from a project in Kansas
- Solar:**
- 90MW 15-year corporate PPA as produced from a project in Texas



(1) All entities/activities in NORAM business unit  
 (2) RECs: Renewable Energy Certificates

# GREEN PPA OFFERINGS

ENGIE'S RENEWABLES CONTINUUM



RECS<sup>(1)</sup>      CORPORATE PPA / VPPA      PHYSICAL GREEN SUPPLY      CUSTOM STRUCTURED SOLUTIONS

## KEY CLIENT PRIORITIES

Key Client Priority	Description	RECS <sup>(1)</sup>	CORPORATE PPA / VPPA	PHYSICAL GREEN SUPPLY	CUSTOM STRUCTURED SOLUTIONS
<b>ADDITIONALITY</b>	A customer's desire to demonstrate that their action directly increments renewable generation...	○	●	◐	◐
<b>LOCALITY/PROXIMITY</b>	A customer's desire to demonstrate actions that directly impact their local geography, to produce where they consume...	●	●	◐	◐
<b>MARKETABILITY</b>	A customer's desire to leverage their commitment to a specific resource in marketing and public relations...	◐	●	◐	◐
<b>CUSTOMER CREDIT RATING</b>	A customer's ability to provide sufficient credit assurance to a developer/financier, longer term commitments require higher assurance...	◐	◐	◐	◐
<b>CONTRACT TERM FLEXIBILITY</b>	A customer's ability or desire to enter into contracts under a certain threshold, often driven by local delegation of authority or market view...	◐	◐	◐	◐
<b>LEAD TIME</b>	A customer's desire to demonstrate a quick win	●	◐	◐	◐
<b>PRICE RISK</b>	A customer's appetite for uncertainty in volume or price (basis) exposure; PPA's are generally variable and not aligned with consumption...	●	◐	◐	●
<b>CONTRACTING SIMPLICITY</b>	A customer's desire to take a more transactional view based on contract structures they are already familiar with...	●	◐	◐	◐

Pie charts filling represent the adequation level between key client priorities and green PPA offerings

(1) RECs: Renewable Energy Certificates



# RENEWABLE ENERGY “AS A SERVICE”

INNOVATIVE STRUCTURE ADDRESSING THE FUTURE OF CORPORATE PPAS



~xxMW PPA

ENGIE Solar Project



~yyMW PPA

ENGIE Wind Project



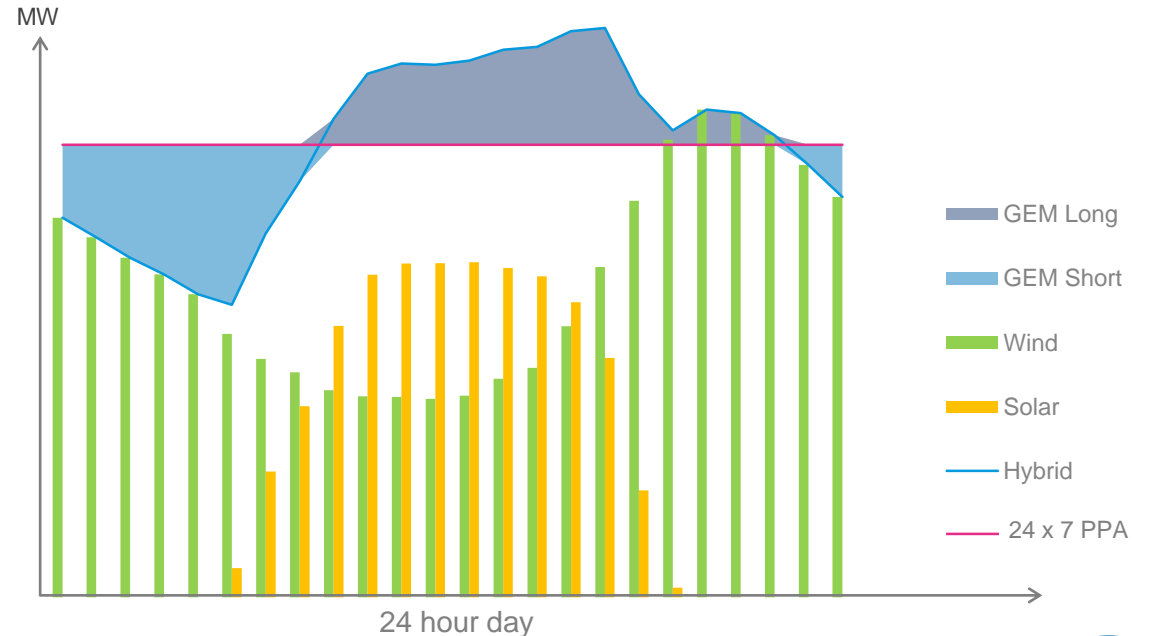
Balancing Power



“ROUND THE CLOCK” “24X7”

~zzMW PPA

- This structure transforms intermittent wind & solar to a firm 24x7 zzMW baseload profile
- “As a Service” because instead of purchasing as-produced renewables commodity, un-matched with its data center load, the customer will be supplied by ENGIE with a block of power that matches their need, in the same market where the load is, effectively servicing it with renewable power
- ENGIE is among the only suppliers in the US market who can offer such a product via in-house capabilities, other competitors may need to bundle several providers to offer the same solution
- By executing this transaction, ENGIE will be extremely well positioned to be the leader in these complex and value added transactions, having sophisticated clients as counterparties and solving a specific customer need



(1) BU Global Energy Management

# STRONG PPA FUNDAMENTALS FOR THIS PORTFOLIO (> 2 GW)

Wind **2,011MW<sup>(1)</sup>**, Solar PV **525MW<sup>(1)</sup>**

Market diversification –  
**ERCOT, SPP, MISO and PJM**

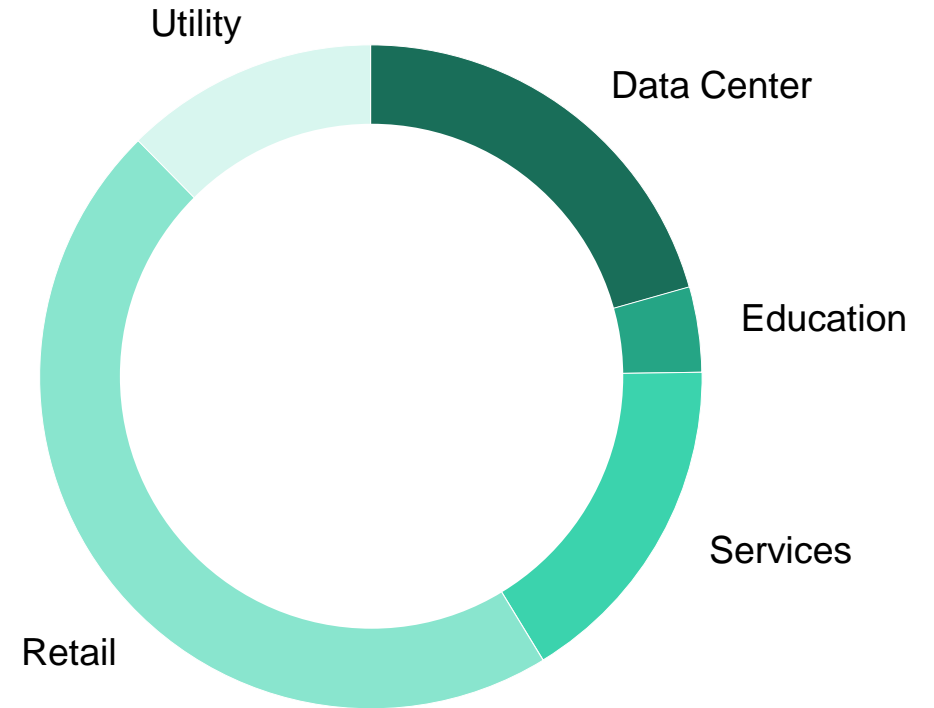
Weighted average life of **13.1 years**

82% with **Investment Grade** customers<sup>(2)</sup>

81% of the contracts settle **“as produced”**

Customers from sectors  
that are **key targets** of ENGIE

Diversity of off-taker types Solar and Wind



(1) Under construction or secured capacities  
(2) Public and private letter rating included

## CORPORATE PPA IN THE US: TYPICAL P/L

Total investment cost of \$100M; 75% sell down

### Project Co. typical P&L (equity consolidated within ENGIE)

<i>In \$M</i>	Average year 1-5	Year 6
Revenues	5	6
EBITDA before Tax Equity Income (TEI)	2	2
EBITDA/COI after TEI	13	5
D&A	-3	-3
COI	10	2
Interest expense	-	-
<b>Net result</b>	<b>10</b>	<b>2</b>

### ENGIE typical P&L (excl. one-off development fee & DBSO margin)

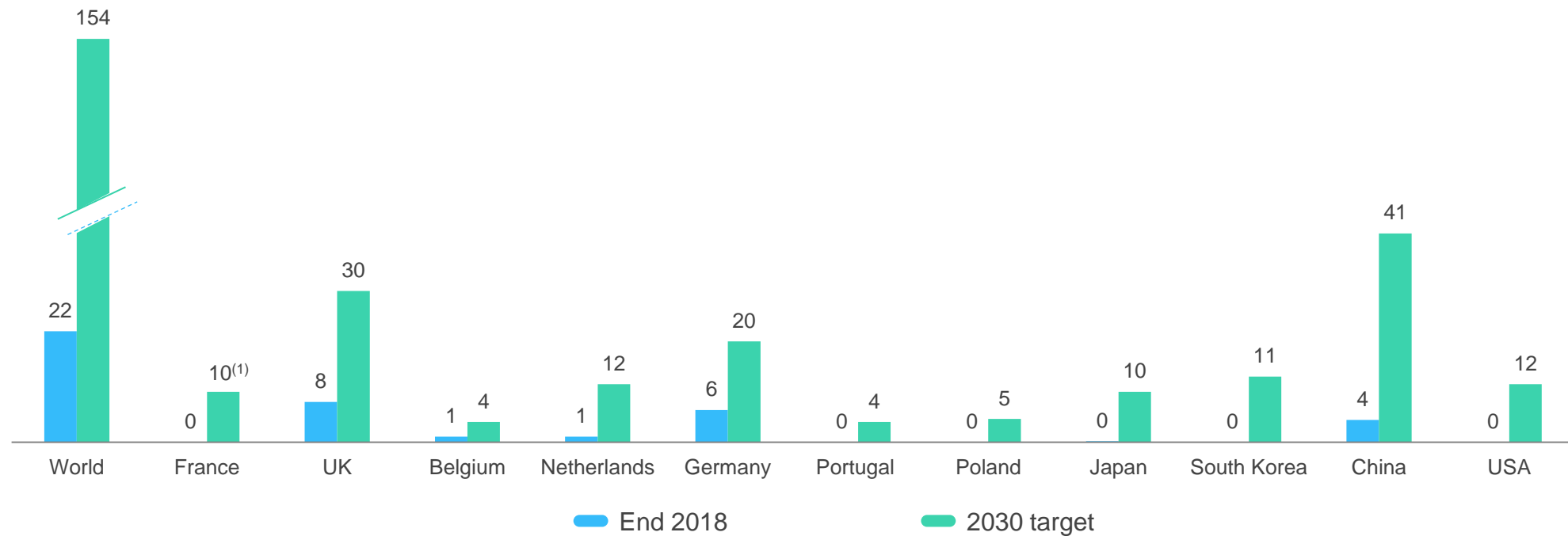
<i>In \$M</i>	Average year 1-5	Year 6
O&M margin invoiced to Project Co.	0.1	0.1
Share of Project Co. net income	2.5	0.5
<b>EBITDA/COI</b>	<b>2.6</b>	<b>0.6</b>
<b>Net result</b>	<b>2.6</b>	<b>0.6</b>

# OFFSHORE WIND

A group of five people are silhouetted against a bright, hazy sky at sunset or sunrise. They are holding up lit sparklers, creating a celebratory atmosphere. In the background, the dark silhouette of a wind turbine is visible against the sky. The overall scene conveys a sense of achievement and progress in the renewable energy sector.

# THE OFFSHORE WIND MARKET IS EXPECTED TO GROW TO MORE THAN 154 GW BY 2030

Growth to be roughly half in Europe already backed by political commitments (installed capacities,GW)



(1) French government to set 1GW annual offshore wind tendering target, 10GW will be awarded by 2028  
Source: BNEF, 2018

# ENGIE & EDP JV – A CLEAR INVESTMENT FRAMEWORK AND AMBITIOUS GROWTH TARGETS

## 50:50 EXCLUSIVE JV WITH JOINT-CONTROL, BALANCED GOVERNANCE AND SELECTIVE INVESTMENT CRITERIA...

Sound market fundamentals

Stable regulatory frameworks

Contracted NPV (i.e. cash flows visibility)

Compliance with target risk return profile

Maximize project self-financing with capital rotation

## ... SUPPORTING VERY AMBITIOUS GROWTH TARGETS (GROSS GW<sup>(1)</sup>)

1.5GW

5-7GW

Operational/  
Under  
construction

4GW

5-10GW

Under advanced  
development

Today

2025E

**DEDICATED TEAM AND JOINT-OPERATIONS FULLY IMPLEMENTED BY THE END OF 2019<sup>(1)</sup>**

(1) Estimate at inception of the JV, after the different approvals will have been received

# ENGIE/EDPR KEY SUCCESS FACTORS IN A HIGHLY COMPETITIVE ENVIRONMENT



## LARGE MARKET AND POTENTIAL MARKET EXPECTED FOR THE NEXT DECADE(S)

Although we are late comers, the market growth is tremendous and leaves enough opportunities for all who have competences and financial strength.

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## SCALE AND COMPETITIVENESS PROVEN ALREADY WITH OUR CURRENT POSITION

Already today both companies have competent resources and are competitive, as illustrated by current portfolios. Combining forces will reinforce competences and increase competitiveness by increasing scale of operations (procurement, Devex, Capex and Opex synergies).

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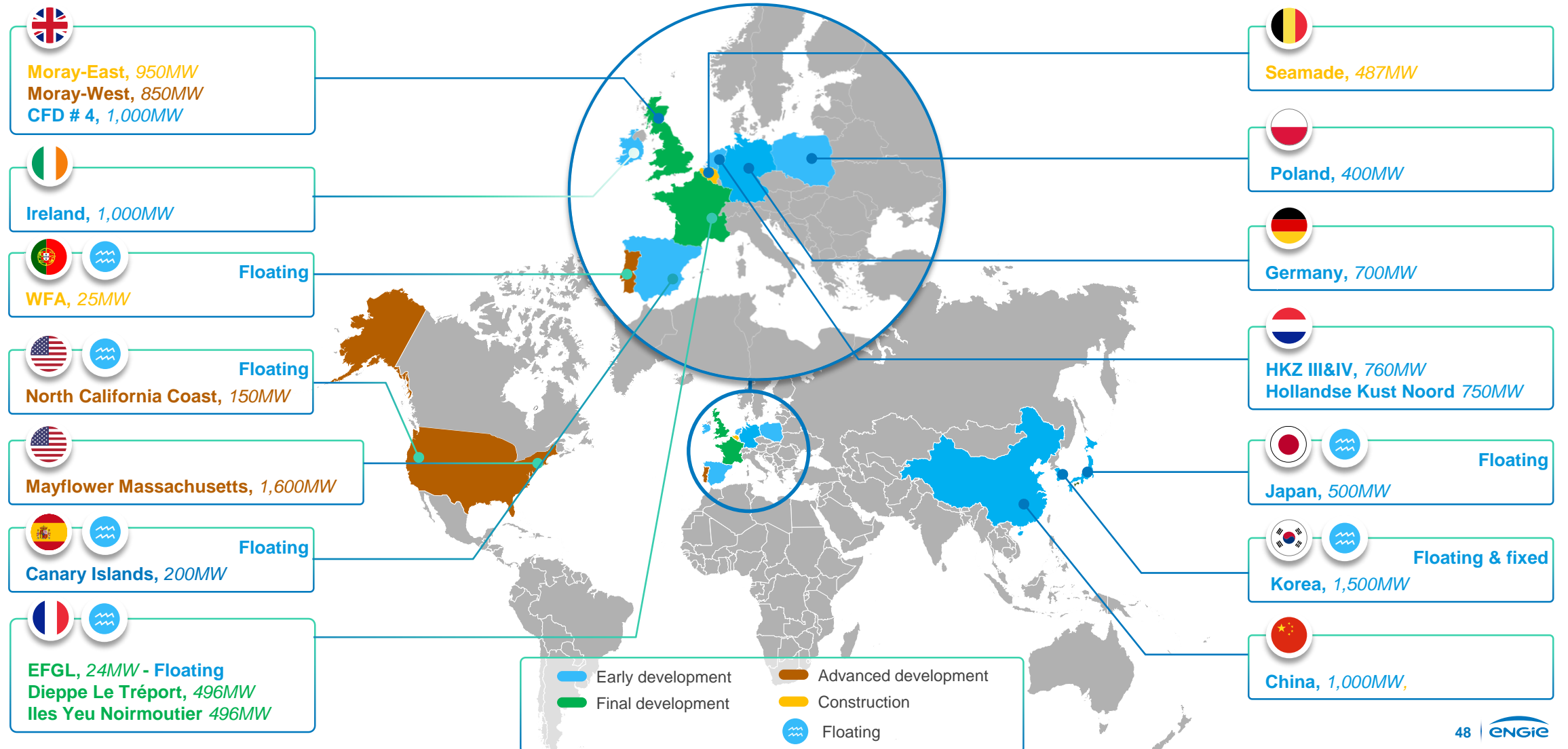


## OUR UNIQUE SET OF COMPETITIVE ADVANTAGES COMPARED TO OUR PEERS

- Global presence (including key new markets for offshore wind) and agility of our business development teams
- Strong position in onshore wind (combined EDPR and ENGIE portfolio is biggest in the world)
- Corporate PPAs ability enabling presence in so-called “zero subsidy” auctions
- OEMs<sup>(1)</sup> relationship and purchasing power
- Strong experience as Independent Power Producer, project finance acumen and relationship with lenders
- Continuous access to ex ENGIE E&P resources and their skills to be employed in our projects

(1) OEM: Original Equipment Manufacturer

# OFFSHORE WIND PIPELINE OVERVIEW



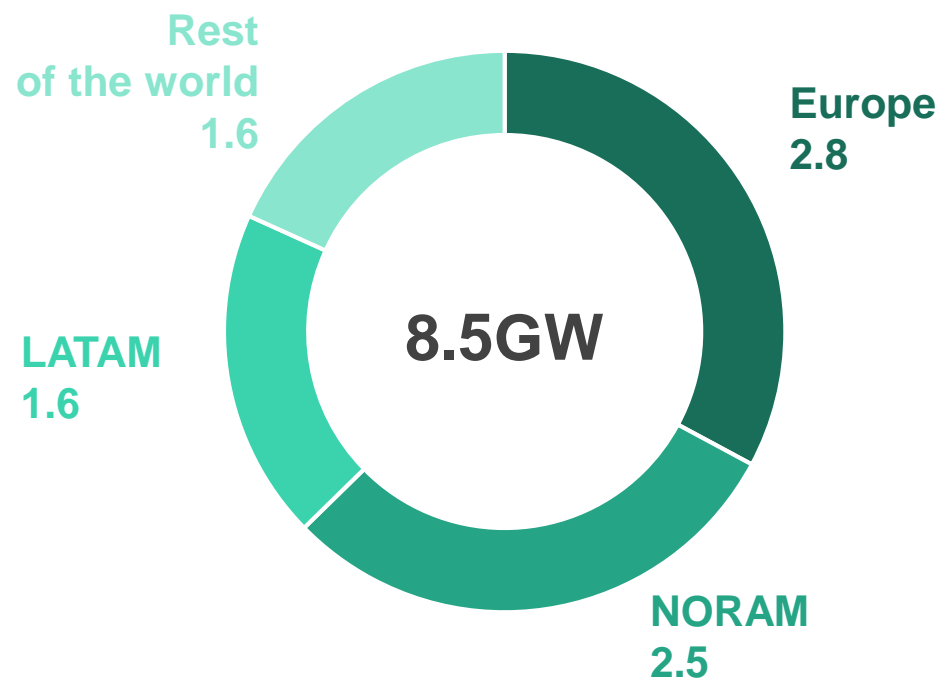


# FINANCIAL OUTLOOK

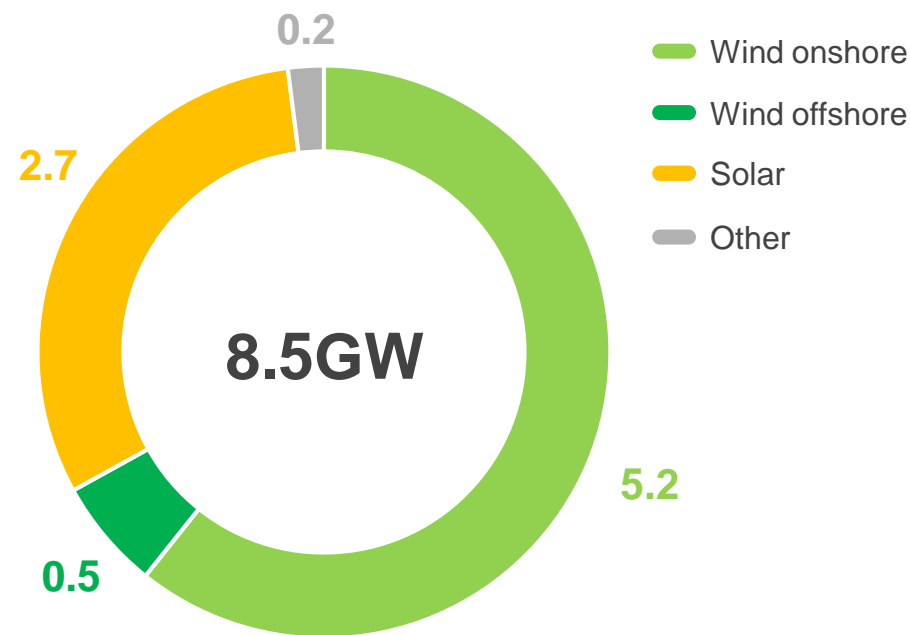


# BALANCED PORTFOLIO OF PROJECTS OVER 2019-21

Capacity commissioned, under construction or secured  
2019-21, split by geography

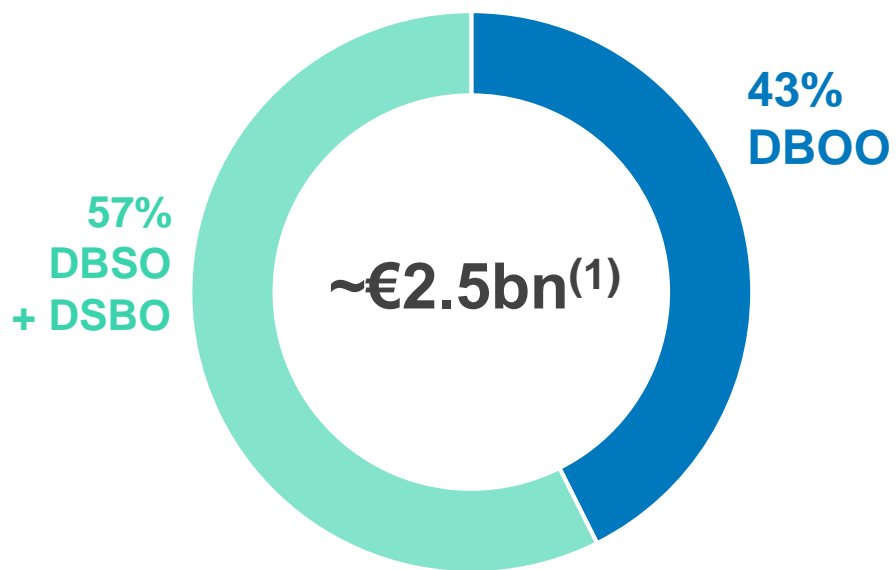


Capacity commissioned, under construction or secured  
2019-21, split by technology

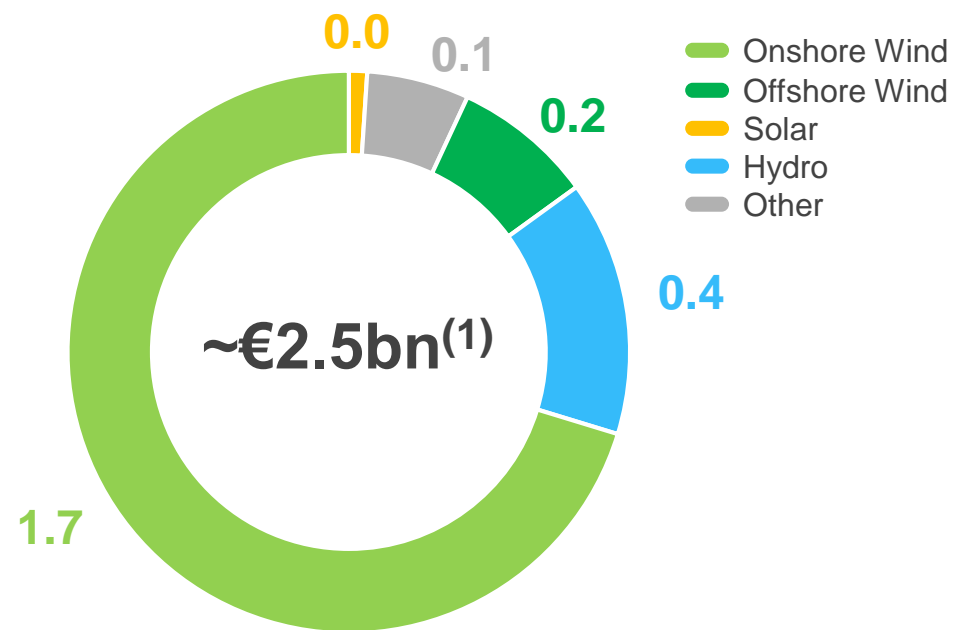


# GROWTH CAPEX NET OF DBSO OVER 2019-21

By operating model



By technology

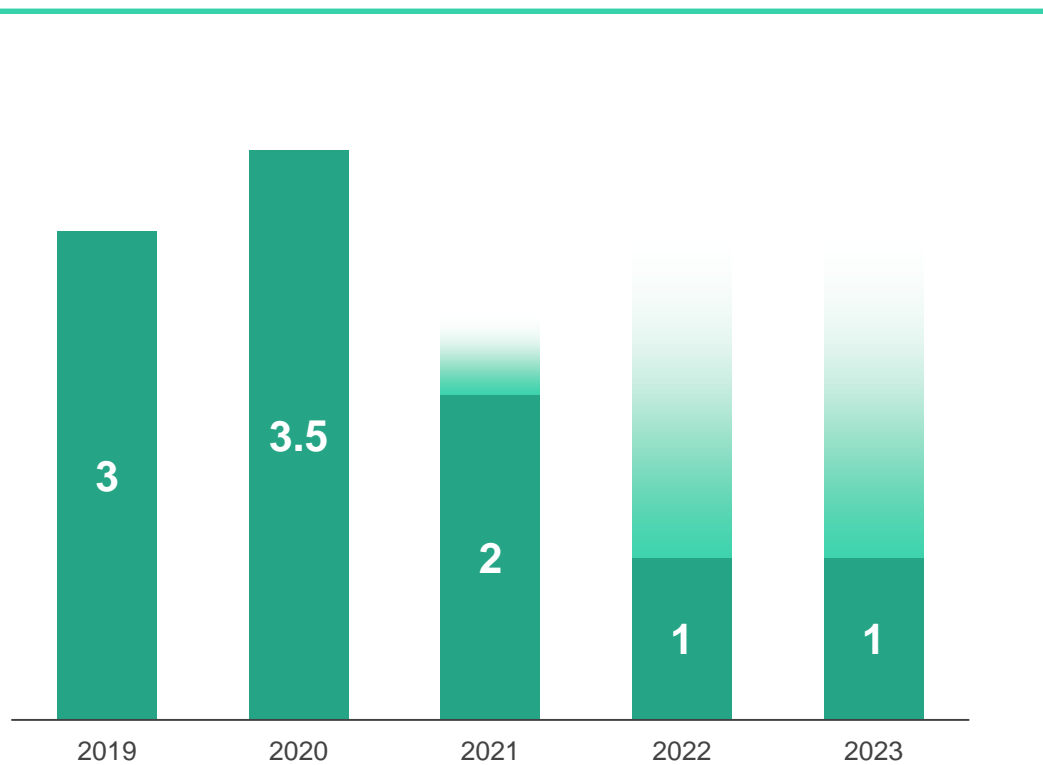


~€2.0BN OF CAPEX WILL BE EARNINGS ACCRETIVE OVER 2019-21

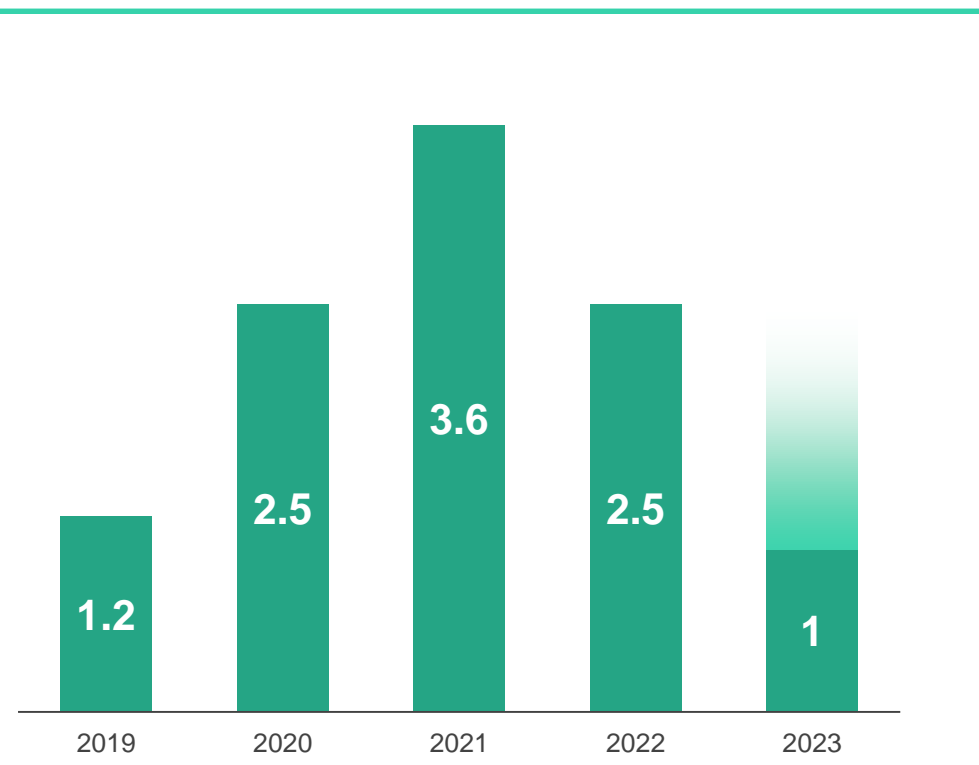
(1) Mid-range of €2.3-2.8bn

# CURRENT PORTFOLIO TO SUPPORT LONG-TERM EARNING GROWTH

COD expectation over 2019-2023 (GW)



Sell-down expectations 2019-2023 (GW)



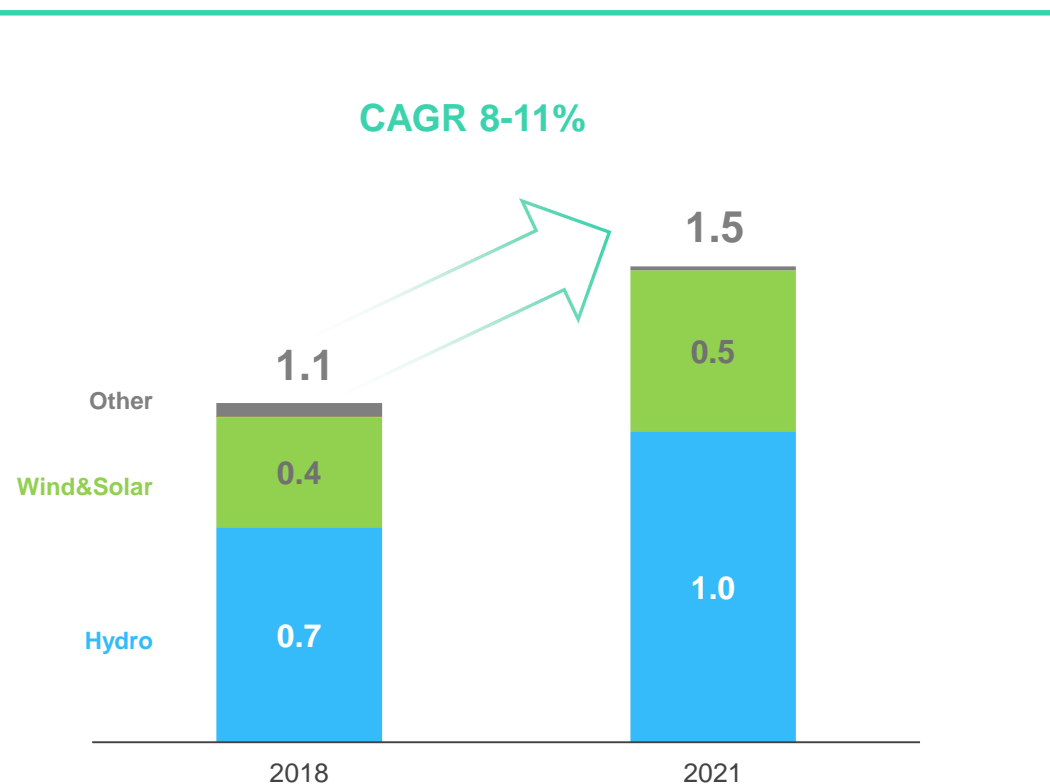
Based on 11GW already secured

Sell-downs in 2022-23 to increase following pipeline development beyond the 11 GW already secured

(1) Other: biomass and biogas, geothermal  
 (2) Assuming an average construction period of 12 months

# COI TO GROW ACROSS ALL TYPES OF BUSINESS MODELS

COI 2018-21 indicative expectations by technology - in €bn<sup>(1)</sup>



	CAGR <sup>(2)</sup> 2018-2021	In(€bn)			
		GROWTH	o/w DBOO	o/w DBSO	o/w ASSOCIATES
HYDRO	8-11%	0.2-0.3	0.2-0.3	-	+0.0
WIND & SOLAR	10-13%	0.1-0.2	~0.1	~0.1	+0.0
OTHER					

**2018-21 DBSO MARGINS INCREASE LIMITED TO €0.1BN DUE TO ONE-OFF MARGINS BOOKED IN 2018  
~25% OF COI TO BE MERCHANT IN 2021, MAINLY REFLECTING HYDRO**

(1) Including Corporate costs and the impact of IFRS 16  
(2) Based on CMD assumptions for FOREX and power prices

# STRONG AMBITION FOR THE RENEWABLES BUSINESS LINES



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**HUGE GROWTH  
POTENTIAL**



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**ENGIE HAS A UNIQUE  
POSITIONING TO CAPTURE  
THESE GROWTH POTENTIAL  
AND DELIVER VALUE**



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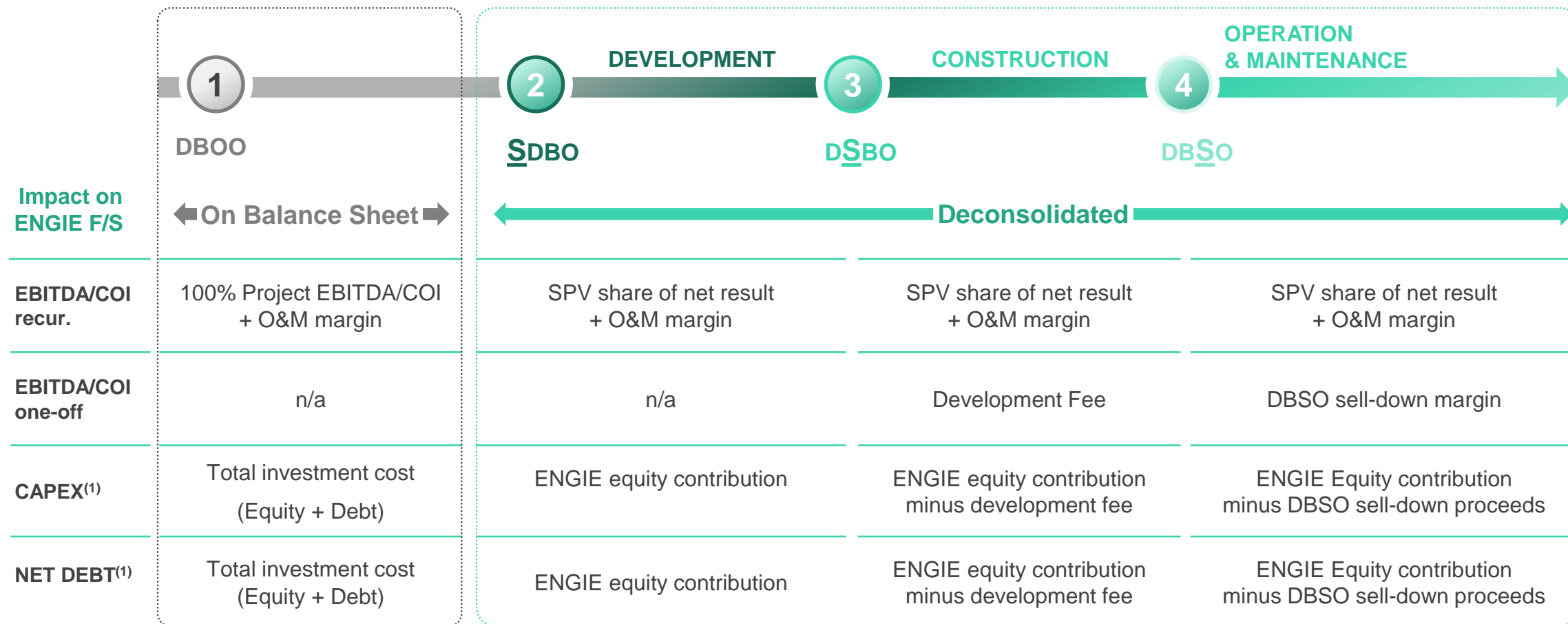
**STRONG MOMENTUM;  
ON TRACK TO REACH  
CMD TARGET**

# APPENDICES

A large central image showing the silhouettes of four people celebrating with sparklers. They are standing in front of a tall wind turbine. The background is a clear sky transitioning from orange at the bottom to blue at the top, suggesting a sunset or sunrise. The overall scene is celebratory and represents sustainable energy.

# WIDE RANGE OF WIND & SOLAR BUSINESS MODELS

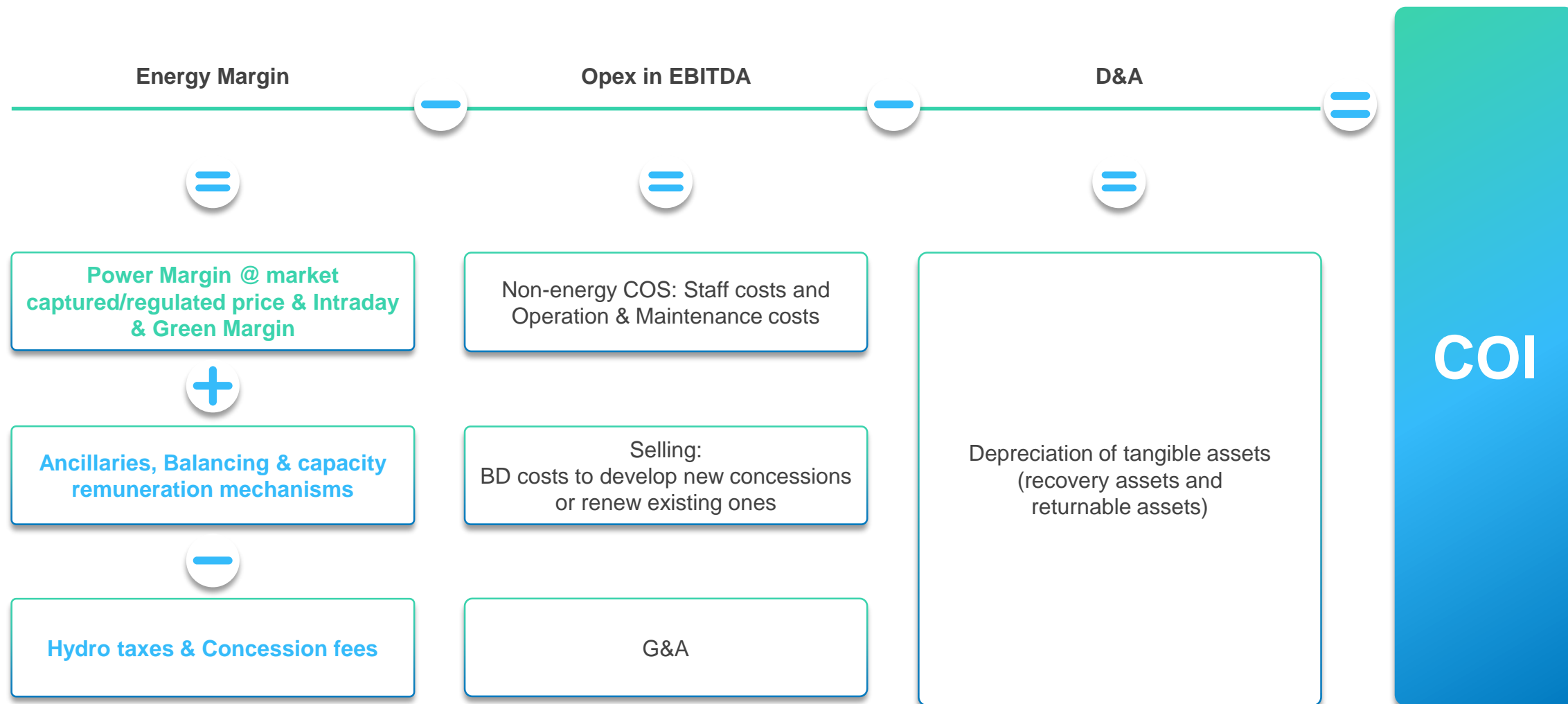
DEPENDING ON IF & WHEN SPV EQUITY IS PARTIALLY SOLD TO INVESTORS



(1) Final impact



# FRENCH HYDRO FINANCIAL MODEL: ILLUSTRATIVE P&L



# RENEWABLES IN THE UNITED STATES

## AN EVOLVING MARKET SINCE THE EARLY 2000S UNTIL TODAY...

EARLY 2000  
TO 2010

1

- Long-term PPAs procured by utilities driven by State level policy defining Renewable Portfolio Standards (“RPS”)
- Prevailing technology is wind, solar PV starts towards the end of the decade

FROM 2010  
TO 2015

2

- Solar PV and wind with continuing decline in prices achieving grid parity in a few markets
- Several new players (developers) competing in the market
- Energy storage (batteries) start to become mainstream, specially in California
- Market starts to shift from utility PPAs to corporate PPAs, in 2010 with Walmart and Google

FROM 2015  
TO TODAY

3

- Wind and solar prices achieved grid parity (or below) in several regions/markets
- Energy storage more common on renewable procurements, especially with utilities
- Strong increase in volume of MW deployed and expected to be deployed but shifting from utilities to corporate PPAs

FROM 2018  
ONWARDS

4

- Corporate PPAs continuing to reduce in size (< 50MW) and tenor (10 to 12 years)
- Combined or structured solutions becoming more mainstream
- Price range for wind and solar will continue to decline
- Offshore wind to be a niche play, limited to some regions (for example New England)

# WHY FLOATING OFFSHORE WIND (FOW)?

COMPLIMENTARY WITH FIXED OFFSHORE WIND AND SYNERGIES

## BENEFITS AND POTENTIAL

FOW allows to tap into areas with much higher wind speeds. At farther distances from the shore, the wind blows stronger and its flow is more consistent. By using FOW, we can make use of larger areas avoiding wake effects from nearby wind turbines or other wind farms. FOW projects can also have a smaller impact on environmental surroundings and fishery.

## FLOATING OFFSHORE WIND IS COMING OF AGE

FOW is no longer confined to R&D and is ready for large-scale deployment. It can benefit from the cost reduction learning curve of fixed offshore wind. It is also using the latest technology available in the rest of the offshore wind supply chain.

## INDUSTRIALIZATION – COSTS ARE FALLING WITH ATTRACTIVE LCOE

Floating offshore wind has a very positive cost-reduction outlook. Prices will decrease as rapidly as they have in onshore and fixed offshore wind, and potentially at an even greater speed. ENGIE is working with supply chain to optimize the complete system with a mid term objective to reach the same LCOE for commercial FOW projects as fixed offshore wind.

## ATTRACTIVE MARKET

Growth to 12GW in 2030 will entail a more accelerated rate of growth than was seen for onshore and fixed offshore wind, but should be possible due to floating offshore wind benefitting from the technological advances and cost reductions already achieved within the fixed offshore wind.

## PIONEER, FIRST MOVER IN FLOATING WIND AND POSITIONING AS KEY PLAYER IN POTENTIAL FLOATING WIND MARKET

-  Wind Float Atlantic (25MW) under construction
-  Eoliennes Flottantes du Golfe du Lion (24MW) final development
-  North California Coast (150MW) advanced development
-  Canary Islands (200MW) early development
-  Korea and Japan (+1000MW) at early stage development

Additional key markets for the JV are **UK, US, and Norway.**

