meridiam

INVESTING FOR THE COMMUNITY

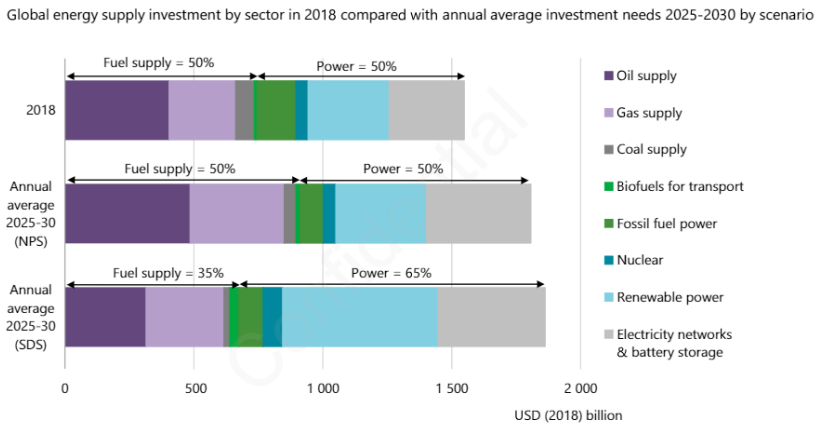
Infrastructure Investment in a context of Energy Transition
Perspectives from a Long-Term Equity Investor

September 2019

A New World for Energy Investment

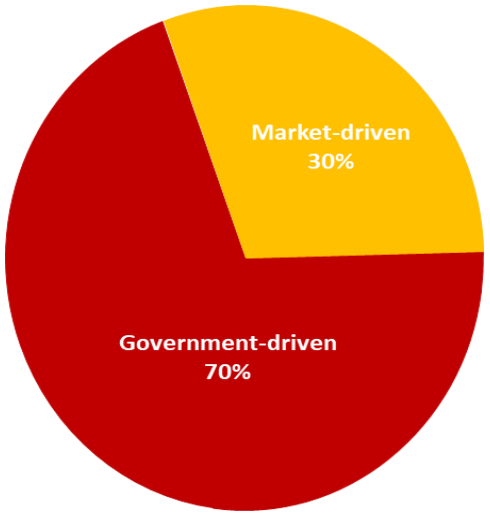
The global low carbon transition is about replacing carbon by long term capital under strong public policy constraints (1)

Global Investment in Energy Supply



Source: International Energy Agency, *World Energy Investment,* 2019

Total investment in energy supply to 2040: $42.3 trillion

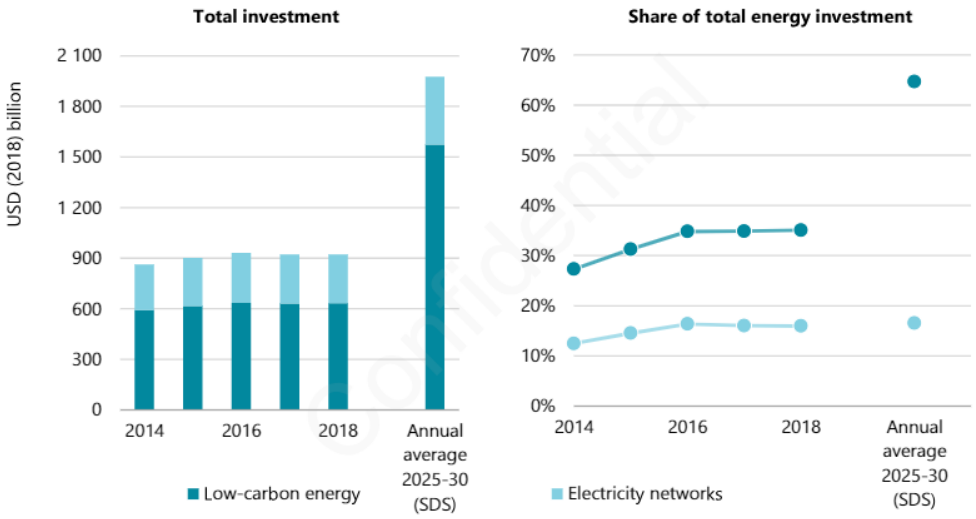


Source: International Energy Agency, *World Energy Outlook,* 2018

A New World for Energy Investment

The global low carbon transition is about replacing carbon by long term capital under strong public policy constraints (2)

Global investment in low-carbon energy, including efficiency, and electricity networks compared with investment needs (SDS)

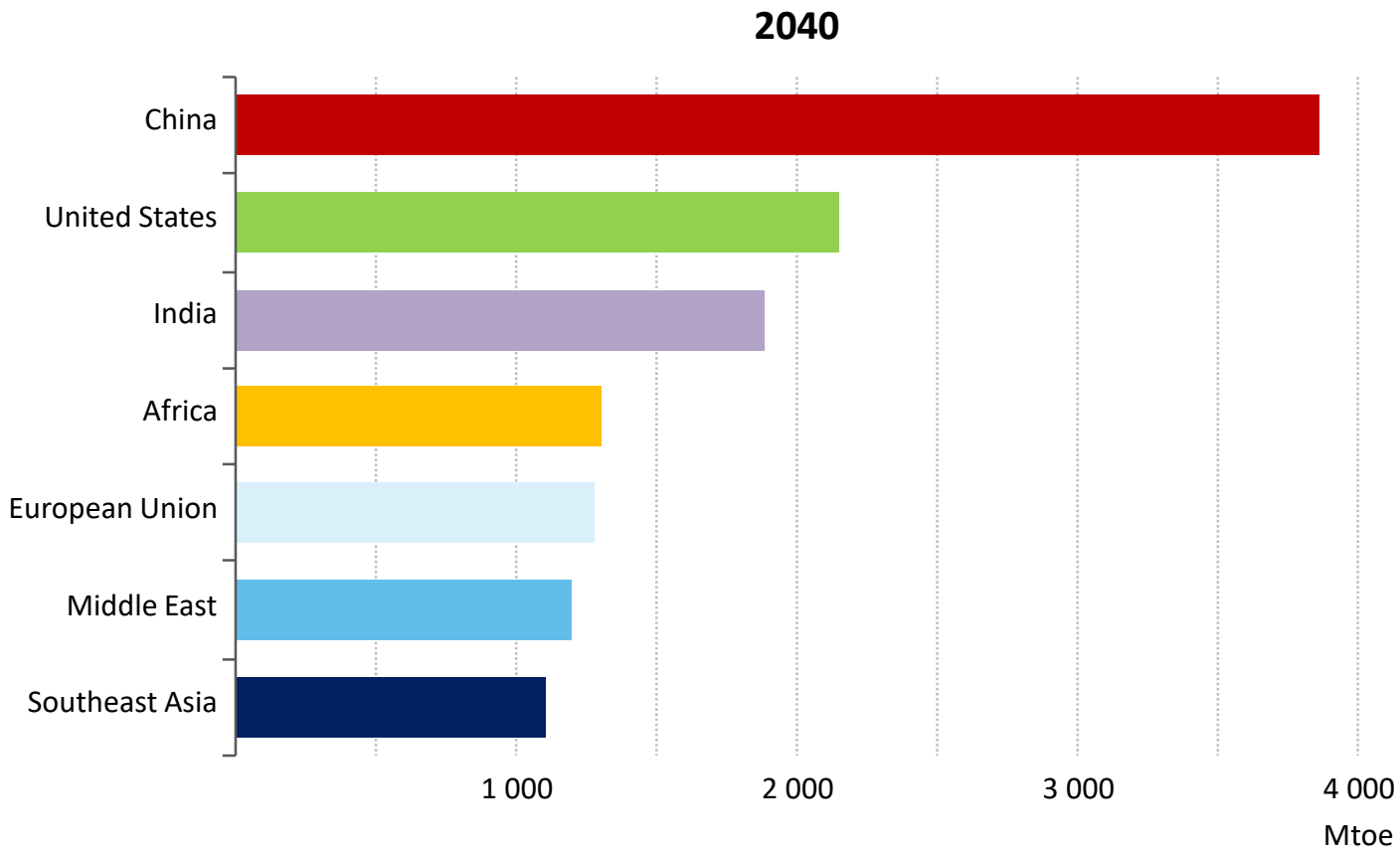


Note: Low-carbon energy investment includes energy efficiency, renewable power, renewables for transport and heat, nuclear, battery storage and carbon capture utilisation and storage. SDS = IEA Sustainable Development Scenario.

Source: International Energy Agency, *World Energy Investment,* 2019

A New World for Energy Investment

OECD Countries are not the center of gravity anymore: towards a global frontier



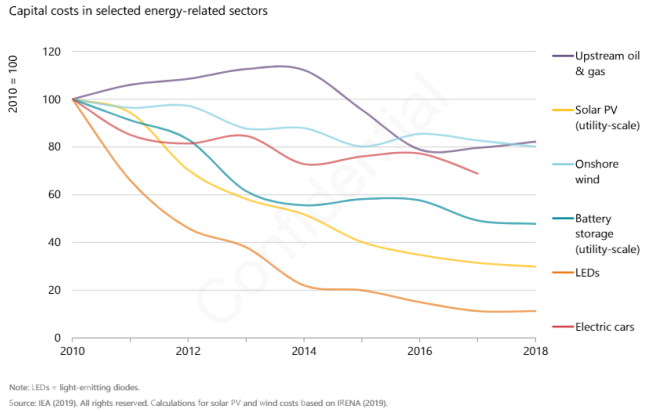
Source: International Energy Agency, *World Energy Outlook*, 2018

In 2000, more than 40% of global demand was in Europe & North America and some 20% in developing economies in Asia. By 2040, this situation is completely reversed

A New World for Energy Investment

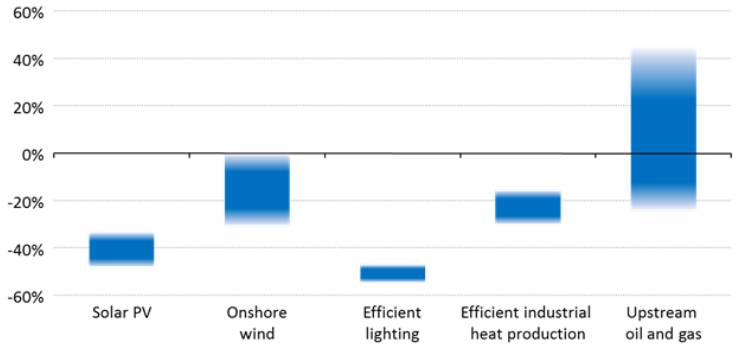
The global low carbon transition happens in a disruptive technology environment (1)

Cost developments across the energy spectrum



Source: International Energy Agency, *World Energy Investment*, 2019

Costs in 2040 relative to 2014

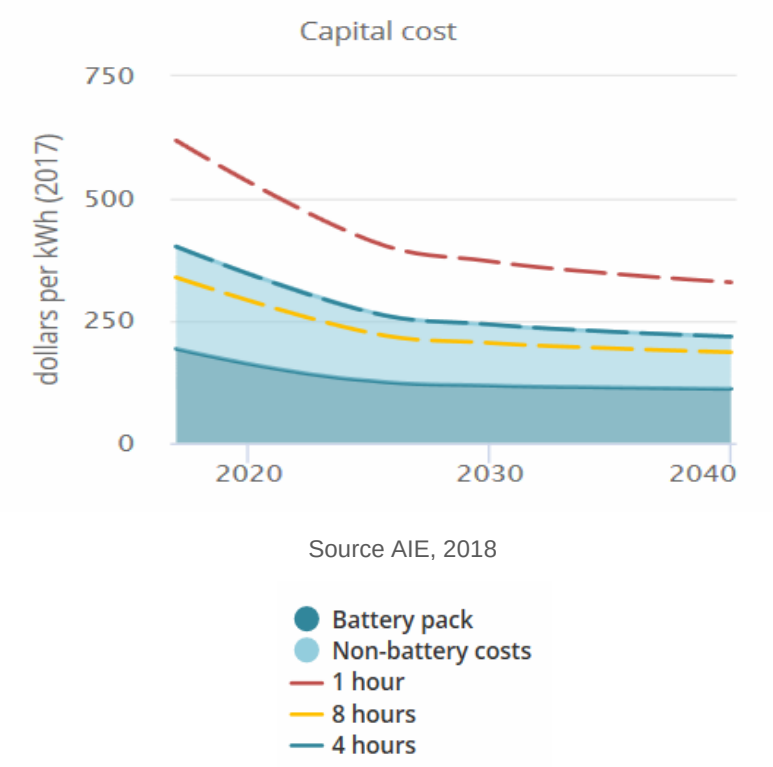


Source: International Energy Agency, *World Energy Outlook*, 2015

A New World for Energy Investment

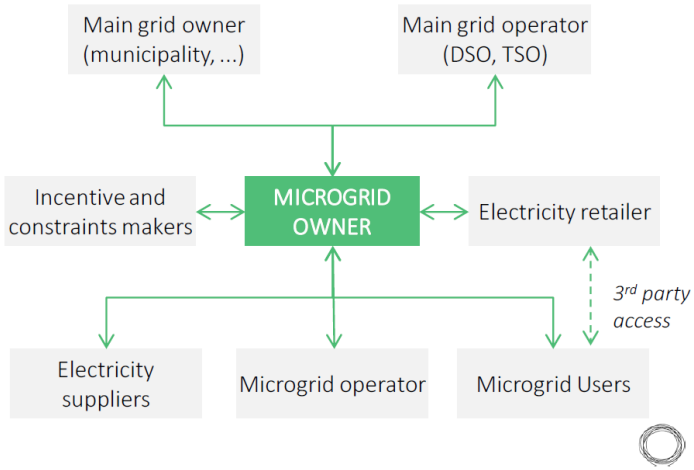
The global low carbon transition happens in a disruptive environment (2)

Lithium-ions battery prices



Source AIE, 2018

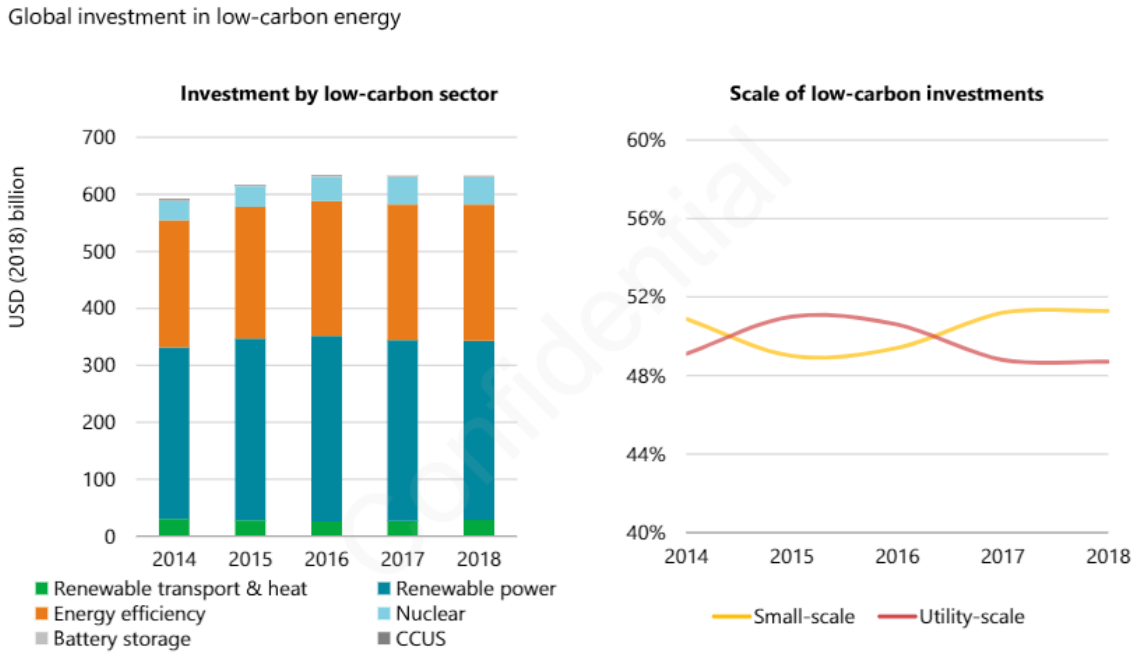
Microgrids: small is beautiful but super complex?



Source ENEA, 2017

A New World for Energy Investment

Capturing and financing small low-carbon assets: a new frontier?

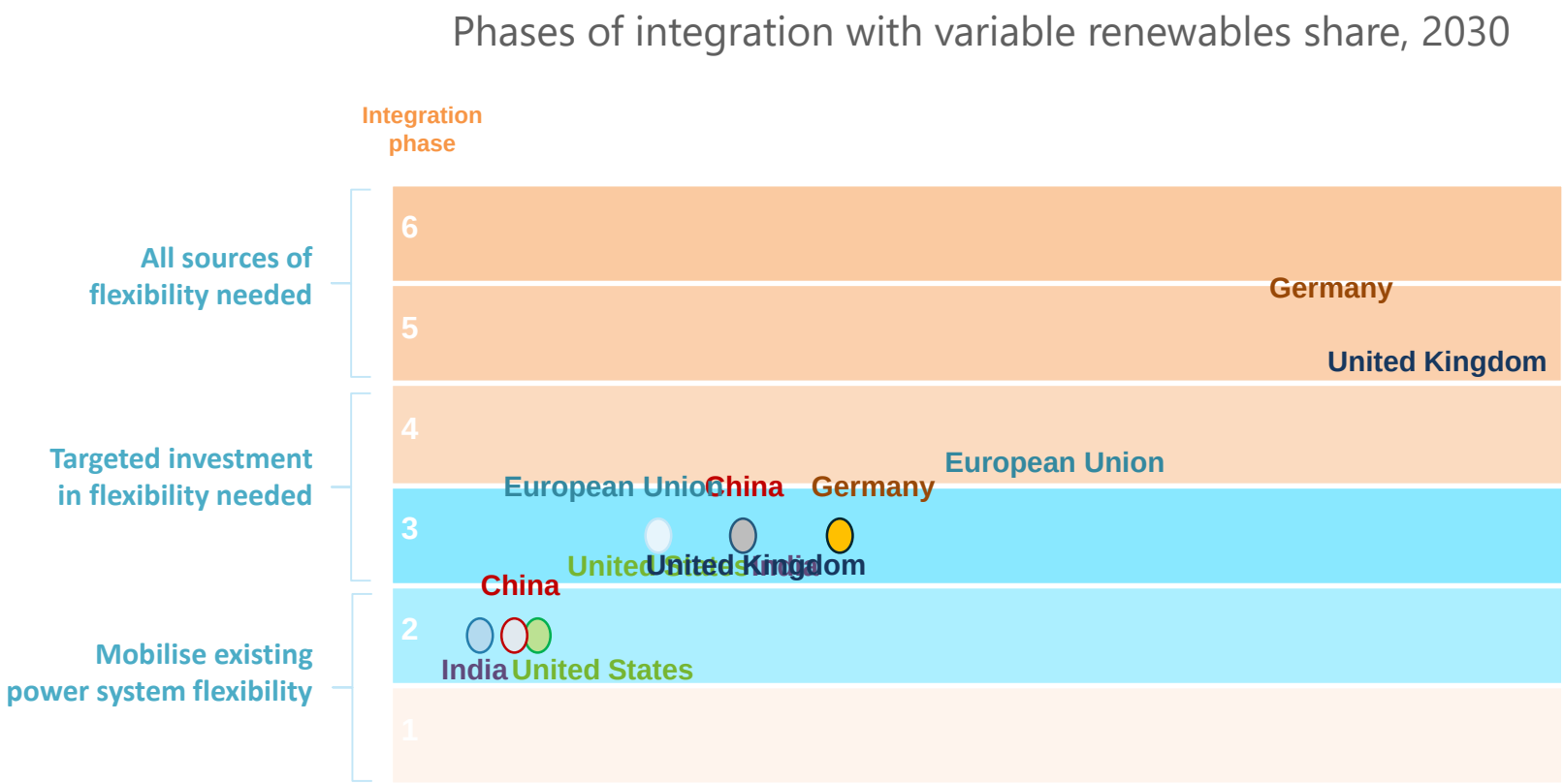


Note: Utility-scale assets include plants producing energy for commercial sale. Small-scale assets are those typically purchased or deployed at the end-user level.

Source: International Energy Agency, *World Energy Investment*, 2019

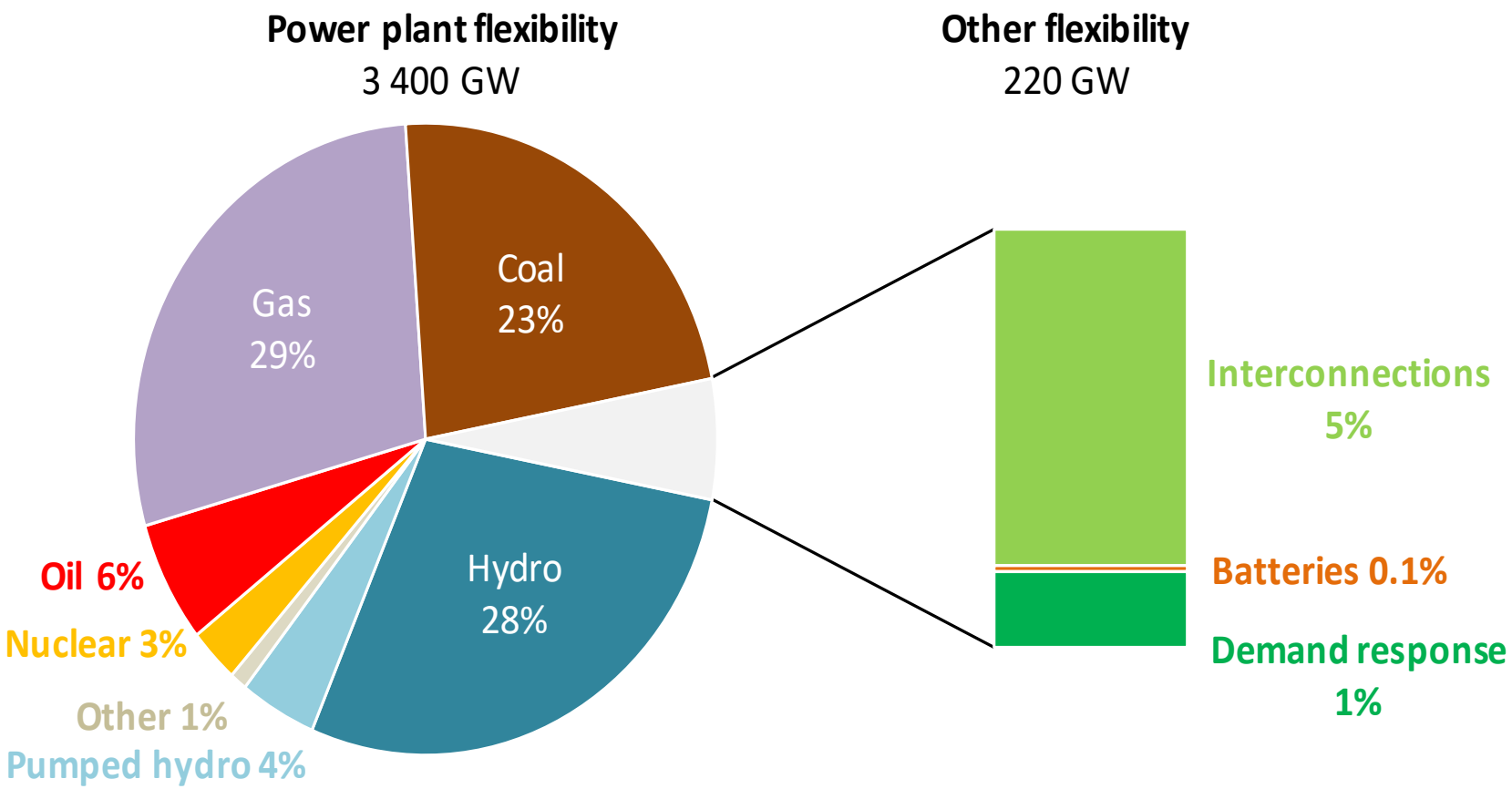
Flexibility: the Next Big Need

Integration of renewables will require to develop low carbon flexibility solutions



Source: International Energy Agency, *World Energy Outlook,* 2018

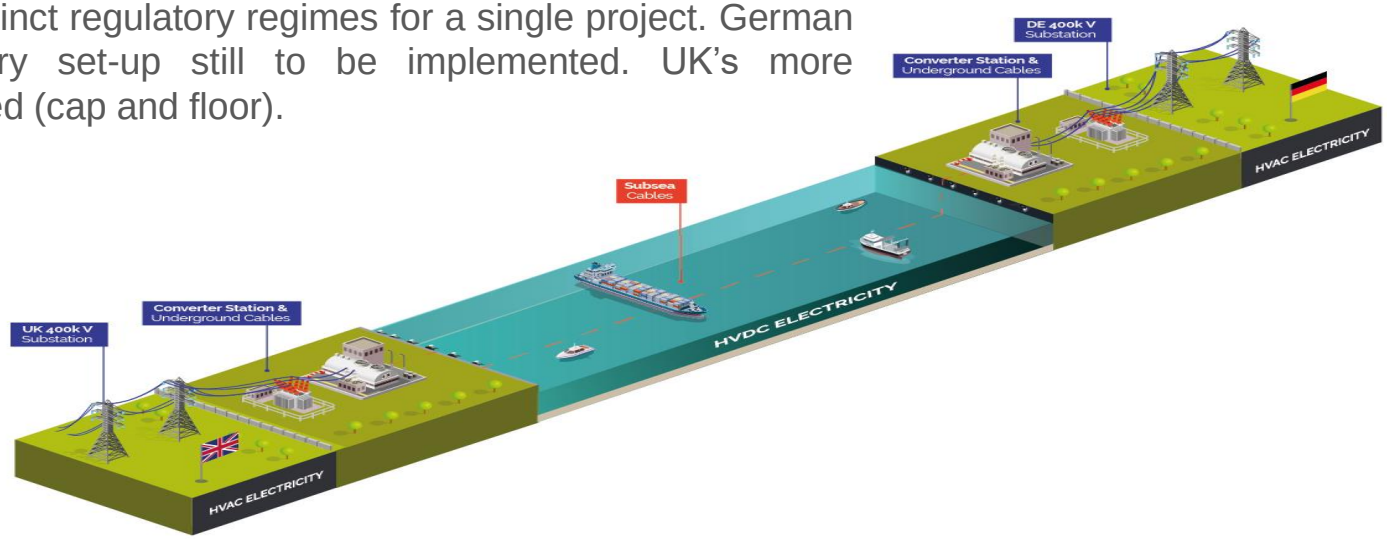
Globally, Flexibility is still provided by Fossil Fuel Energies



Source: International Energy Agency, *World Energy Outlook,* 2018

Meridiam-sponsored UK-Germany NeuConnect Interconnector - Overview

- First direct link between German and UK networks – Connecting two of the Europe's largest energy markets.
- NeuConnect is a 710km invisible highway of up to 1.4GW of electricity, enough to power 35 million homes over the life of the project.
- The link will be a HVDC bi-directional submarine cable (2 x 525 kV) , for an estimated project capital expenditure of £1.4bn – Currently the single largest UK-Germany investment project.
- Two distinct regulatory regimes for a single project. German regulatory set-up still to be implemented. UK's more advanced (cap and floor).



UK-Germany NeuConnect Interconnector - Why NeuConnect is needed

UK ENERGY MARKET

Net importer of electricity, **relies on interconnectors** to provide 5-10% of UK power

German electricity prices **consistently lower**

NeuConnect will play crucial role in **improving supply and lowering costs** in UK

GERMAN ENERGY MARKET

Vast renewables infrastructure and world's third largest producer of wind power

Wind turbines frequently powered-down due to **bottlenecks from excess energy**

NeuConnect provides important outlet to **rechannel excess power into UK market** where demand is greater

Domestic electricity prices (excluding taxes)

	2012	2013	2014	2015	2016	2017
Germany	11.65	12.67	11.57	10.37	11.35	12.16
UK	13.09	14.02	14.66	14.33	14.03	14.97

Pence per kWh

Source: International Energy Agency

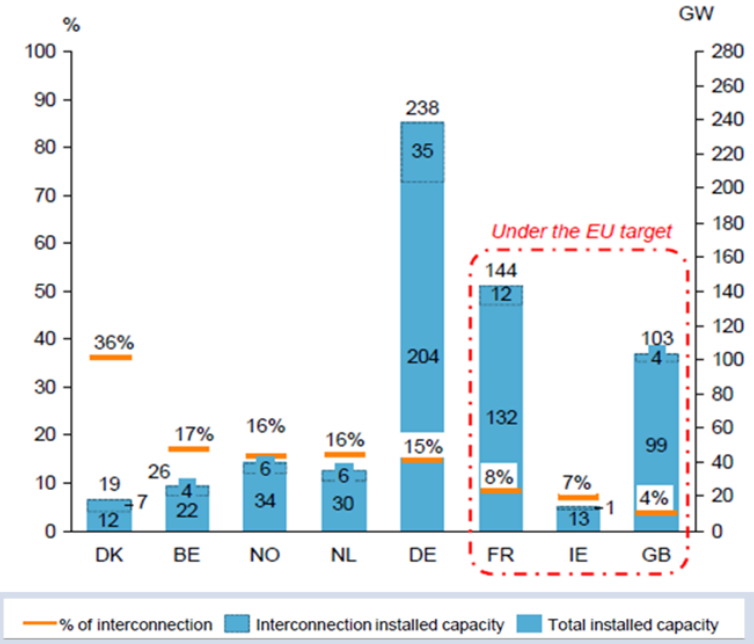
Focus - Benefits

Focus on NeuConnect 2017 Cost Benefit Analysis (CBA) results for both UK and Germany

Germany:
- Low price of electricity and largest market in Europe (2.3x UK)
- Major commitment to renewables
- But - transmission constraints leads to curtailment of renewables

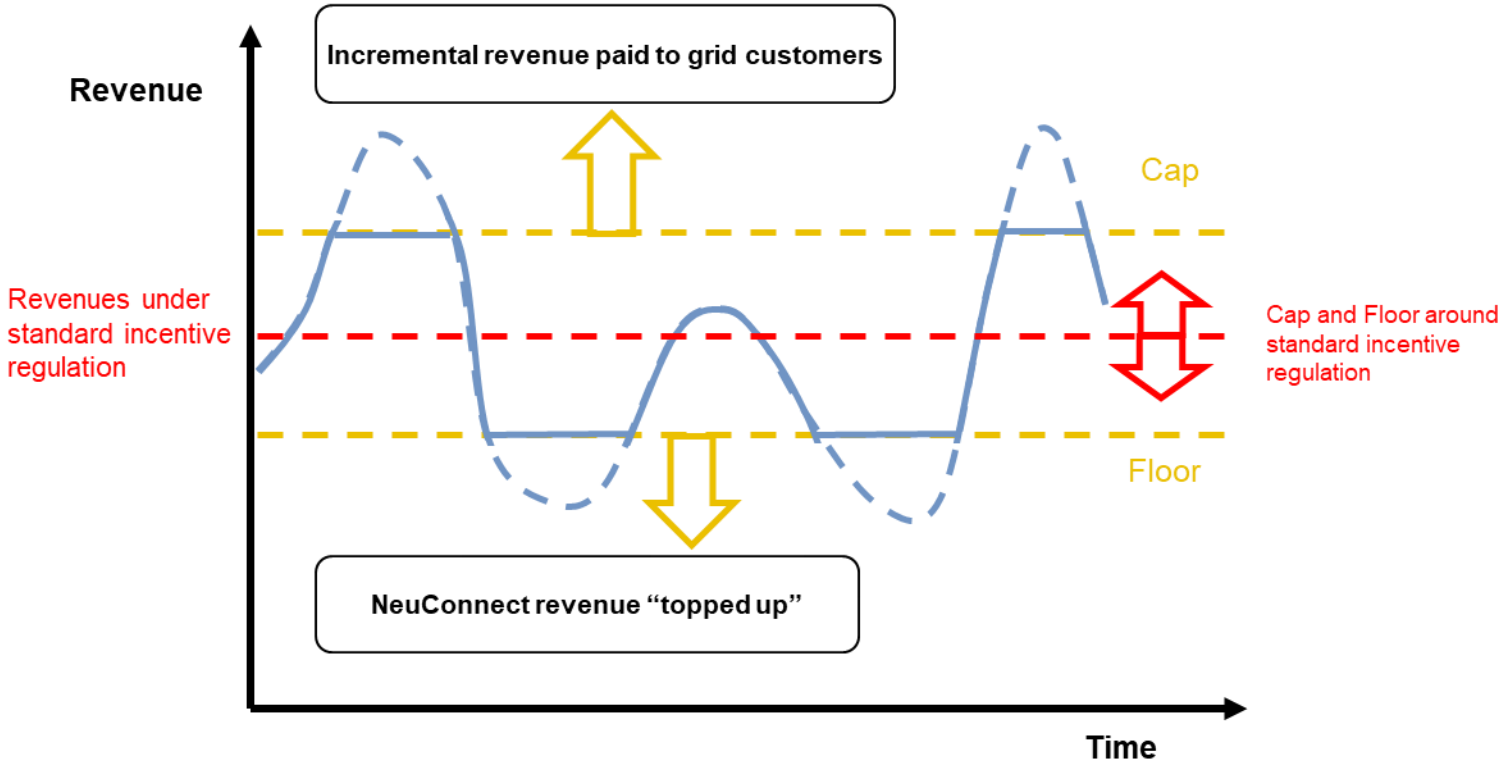
UK:
- High price of electricity
- Growing security of supply concerns, which NeuConnect will help address
- Installed interconnector capacity is 4% against an EU target of 10%-15%.

Key Benefits:
- Wholesale electricity price in DE is 43% lower than UK;
- 25 year licensed regulatory period
- Differences in generation types in Germany and UK benefits both countries;
- Improves flexibility and market liquidity;
- Reduces electricity generation constraints in Northern Germany;
- Total net combined consumer welfare shows a benefit of €2bn
- Long term stable returns possible



Focus on the Cap& Floor regime (UK side)

- Ofgem (UK Regulator) introduced in 2014 a ‘Cap & Floor’ (C/F) model to incentivize investors and non Transmission Operators (TSO) to invest in new interconnectors
- C/F support lasts for 25 years. Revenues below a set floor trigger payments to the interconnector owner and any revenues exceeding the cap are returned to consumers.
- C/F levels established at Final Project Assessment and allow for capital invested and Opex



UK-Germany NeuConnect Interconnector - What benefits does NeuConnect offer

RESILIENCE

- Vital role in improving diversity of supply, offering **resilience, security and flexibility**
- **£1.4bn investment** in proven HVDC technology offers **UK network greater efficiency** to deal with future demand

ECONOMIC BENEFITS

- **Lower consumer costs** through greater competition in Europe's largest energy markets
- Project will deliver net **consumer benefits of over £3bn** and up to **£1.4bn of business opportunities**, with further Operation & Maintenance contract opportunities in future

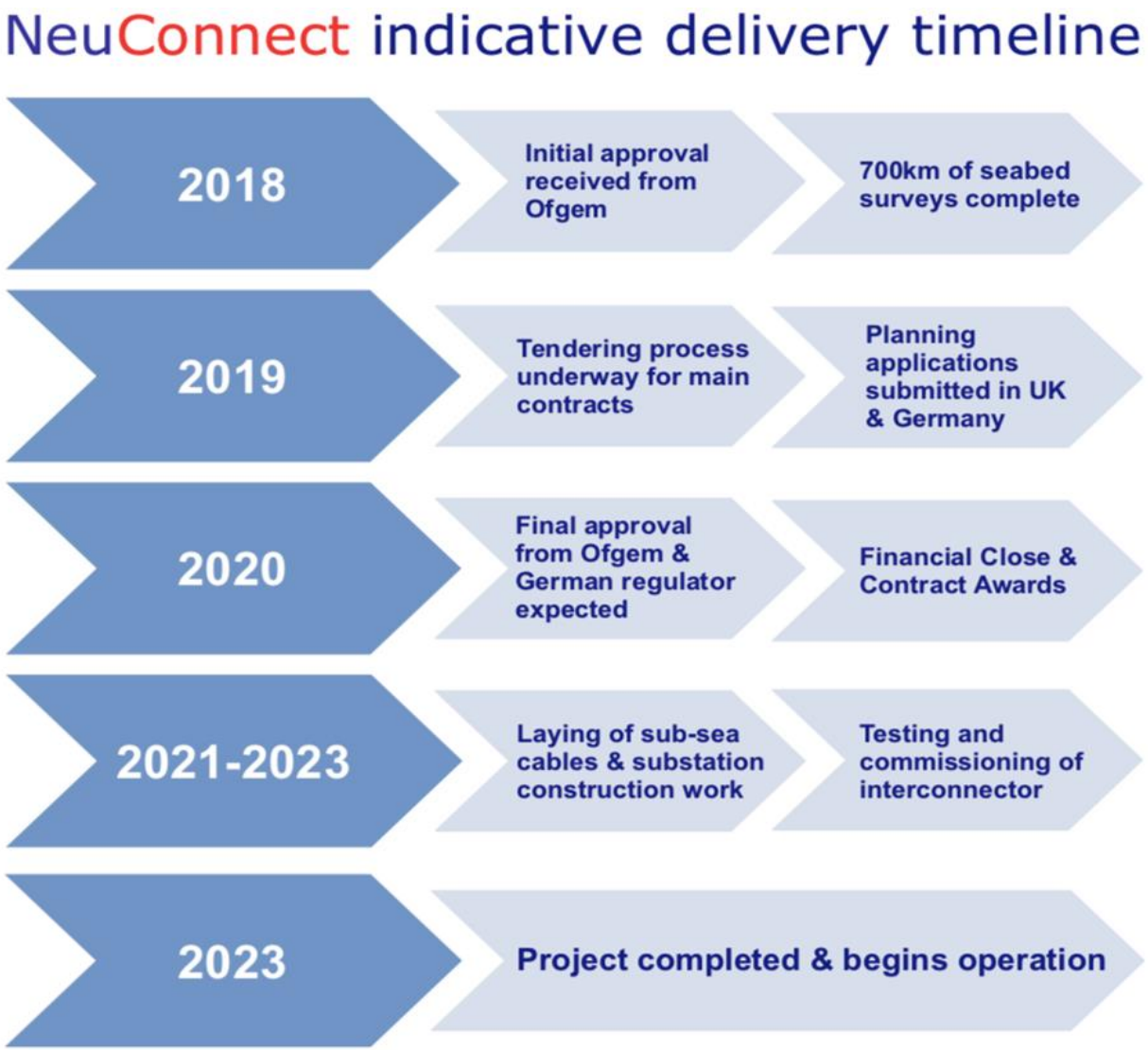
SUSTAINABILITY

- Integration of **renewable energy sources**
- New link will allow flow of **surplus renewable energy** from Germany into UK

CONTINUITY

- Single **largest UK-Germany investment project** and an important **symbolic link**
- Supports UK's continued **links with Europe's biggest economies** post-Brexit

UK-Germany NeuConnect Interconnector - Project delivery timeline



UK-Germany NeuConnect Interconnector - Project key Progress

PLANNING & CONSENTS

- UK **land agreement** secured, **preferred site** location identified in Germany
- UK **connection agreement secured** with National Grid, draft **connection agreement** received from TenneT
- **Public consultation** and **planning applications** in Germany and UK to take place this year

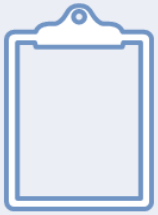
REGULATION

- UK **interconnector licence** secured
- NeuConnect project included in Germany's **Ten Year Network Development Plan** with **strong political support** for project from BMWi (German Energy Ministry)
- Initial Project Assessment (IPA) **approval received from Ofgem** - Final Project Assessement (FPA) to be submitted to Ofgem next year

UK-Germany NeuConnect Interconnector - Project key Progress

PROCUREMENT

- Major procurement launched through public tender (OJEU) in **April 2019** with s**trong interest** in project so far from supply chain – prequalification stage concluded in June 2019
- Over **£1bn of contract opportunities** - circa £1bn for cable and converter stations, £400m for ancillary services (civils, engineering, structural works etc)



PCI APPLICATION

- PCI application **submitted in 2018**, determination expected in **late 2019**
- Primary aim of PCI application is to help with consenting

OFGEM VARIATIONS

- **Variations submission** made to Ofgem on default regime for interconnectors
- Crucial for NeuConnect project to be assessed as a **project-financed interconnector**, unlike other similar schemes led by incumbents in the energy market
- Variations are essential to allow **new entrants and more competition** in the market

Back-up: Overview of Meridiam Involvement in Energy Transition in Europe and Africa

Focus on Meridiam Transition

Meridiam Transition targets unaddressed energy transition opportunities to contribute to deliver the COP 21 Paris Agreement in Europe

Context

COP21 · CMP11
PARIS 2015
UN CLIMATE CHANGE CONFERENCE

Leading investors

CNP ASSURANCES
AXA
AVIVA
Allianz
CARDIF GROUPE BNP PARIBAS
Caisse des Dépôts
SOGECAP
PRO BTP GROUPE
CNP ASSURANCES
FRR[1] FONDS DE RESERVE POUR LES RETRAITES
RAFP[2] Retraite additionnelle de la Fonction publique

Meridiam Transition Approach

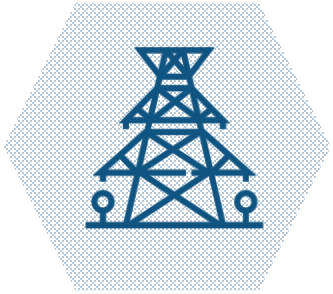
Background and objectives	• In 2015, Meridiam launched Meridiam Transition, together with French insurer CNP Assurances • Support French insurers and long-term institutional investors seeking to invest in projects designed to help Europe transition towards a low carbon economy
Targeted segments	• Resilience of electric systems • Circular Economy & Biogas • Smart grids & smart cities
Targeted projects	• Target unaddressed energy transition market opportunities • Relatively small and midsize projects contributing to the low carbon transition
Targeted geographies	• Europe (50% min in France and 80% min across the Eurozone)
Financial instruments	• Equity and quasi-equity with potential financing up to 100% of projects
Investment capacity/size	• Final closing reached at €485m in excess of target

1. *Fonds de Réserve pour les Retraites: investing by the public authorities on behalf of the community with the aim of financing the pension system.*

2. *Le Régime de Retraite additionnelle de la Fonction publique: mandatory scheme for the benefit of public servants of the French State (civil and military), territorial and hospital, as well as magistrates*

Meridiam Transition portfolio by the end of 2019

RESILIENCE OF ELECTRIC SYSTEMS
€80m



- Decentralized electricity demand side management with Voltalis
- Guiana hydrogen storage project

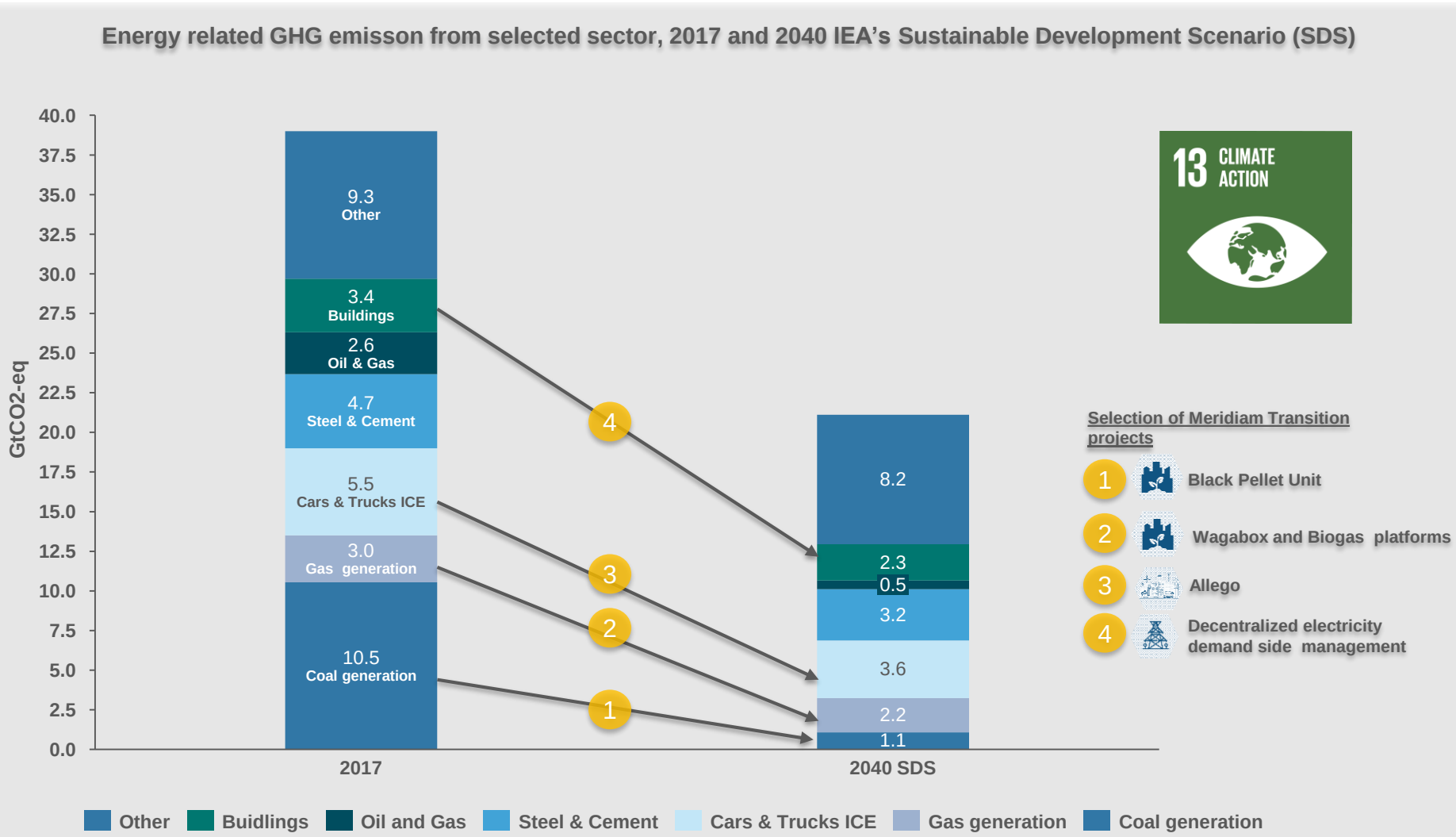
CIRCULAR ECONOMY & BIOGAS
€160m

- German Biogas platform
- French Biogas platform
- Mayenne Biogas Cogeneration
- Waste Gas Recovery platform (WAGABOX)
- Black Pellet Unit and Biomass Cogeneration plant

SMART CITIES & ELECTROMOBILITY
€180m

- Allego European EV charging infrastructure platform
- MEGA-E (Metropolitan Greater Areas Electrified) pan-European high-power charging network

Illustration of Meridiam Transition contribution to SDG 13 “Take urgent action to combat climate change and its impacts”



Illustrative examples of Meridiam Energy Transition Oriented Projects in Africa

Senergy & Ten Merina Solar

- 60MW of sustainable, low cost power
- Micro-credit facility for women & young adults
- Renewable energy research centre

Kahone & Touba Solar

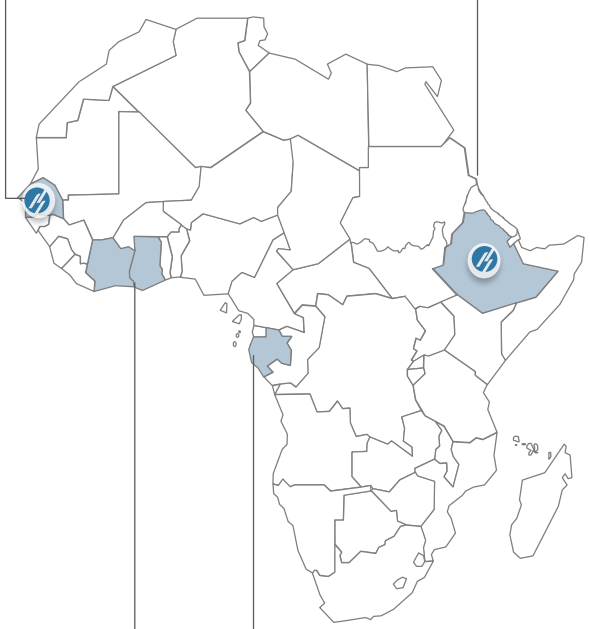
- 80MWp of sustainable, low cost power
- First projects in West Africa under the IFC's Scaling Solar
- Targeted capacity building with the implementation of innovative technologies
- Lowest tariff in Sub-Saharan Africa

NEOT Offgrid

- Provide access to reliable renewable energy for local communities
- Enables new businesses
- Capacity building with the implementation of innovative technologies for the country

Biokala Biomass

- 46MW Biomass plant providing baseload clean energy.
- Create commercial opportunities for small local producers



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Energy Assets in Portfolio

Tulu Moye Geothermal

- Ethiopia's first major IPP
- 500MWp clean baseload geothermal power to meet the demands of a booming economy and population

Kinguele Hydro

- Country's first IPP
- Detailed biodiversity action plan
- Contribute to the sustainable use of freshwater resources in accordance with rigorous conservation and biodiversity protection measures