

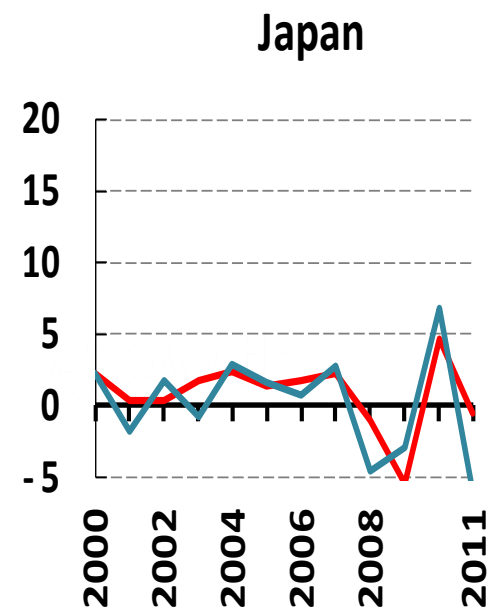
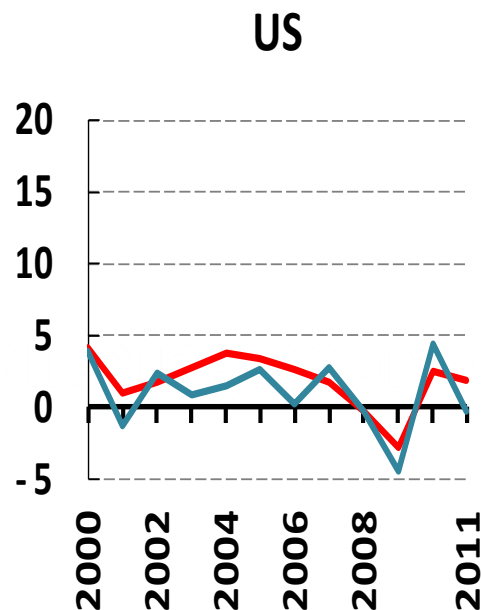
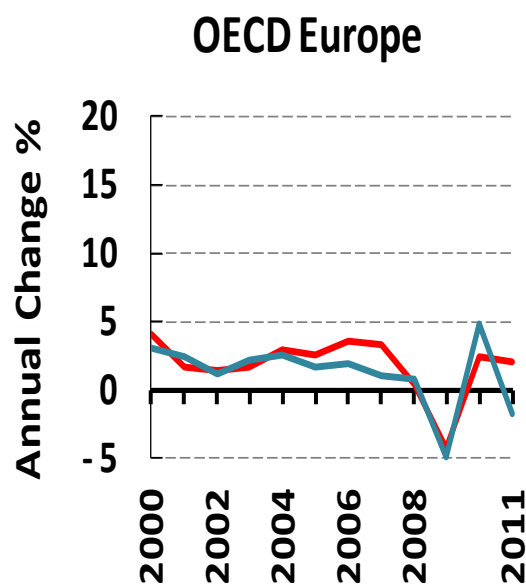
RENEWABLE ENERGY

Can renewables fuel Africa?

Dr. Paolo Frankl
Head, Renewable Energy Division
International Energy Agency



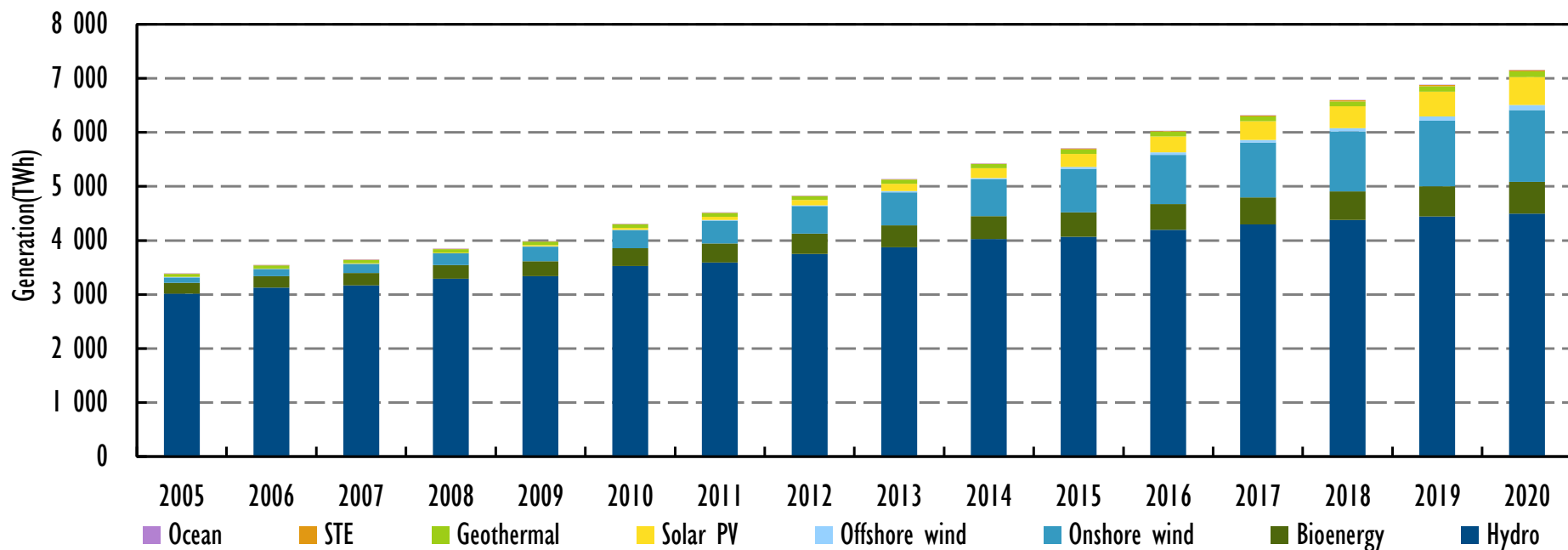
Electricity underpinning economic growth



*Western Economies have fuelled economic growth with cheap electricity – largely from coal
Can Africa do the same with affordable renewables?*

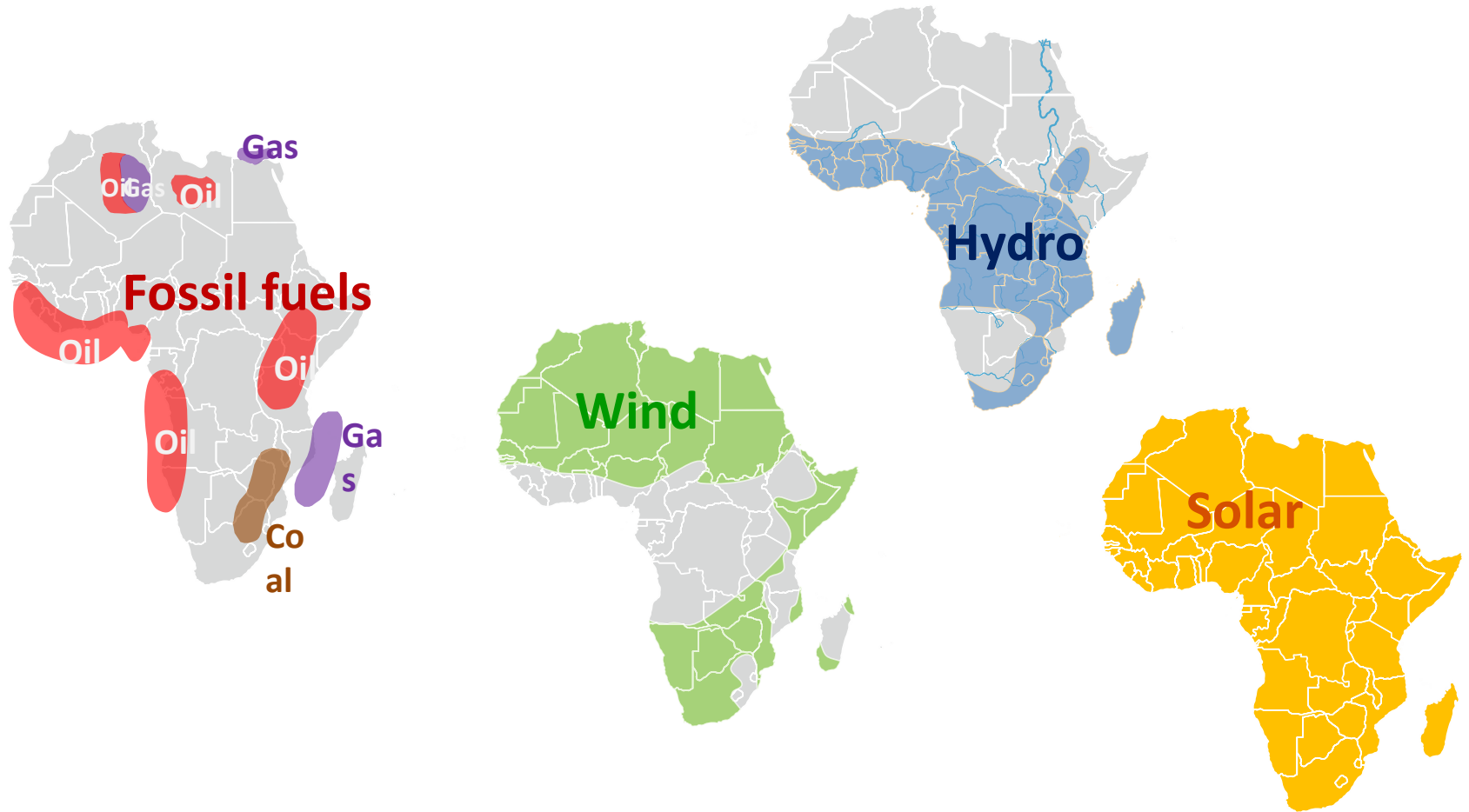
Strong global momentum for renewable electricity generation

World renewable generation and forecast (TWh)



In 2020, renewable generation reaches over 7 150 TWh, more than today's combined demand of China, India and Brazil

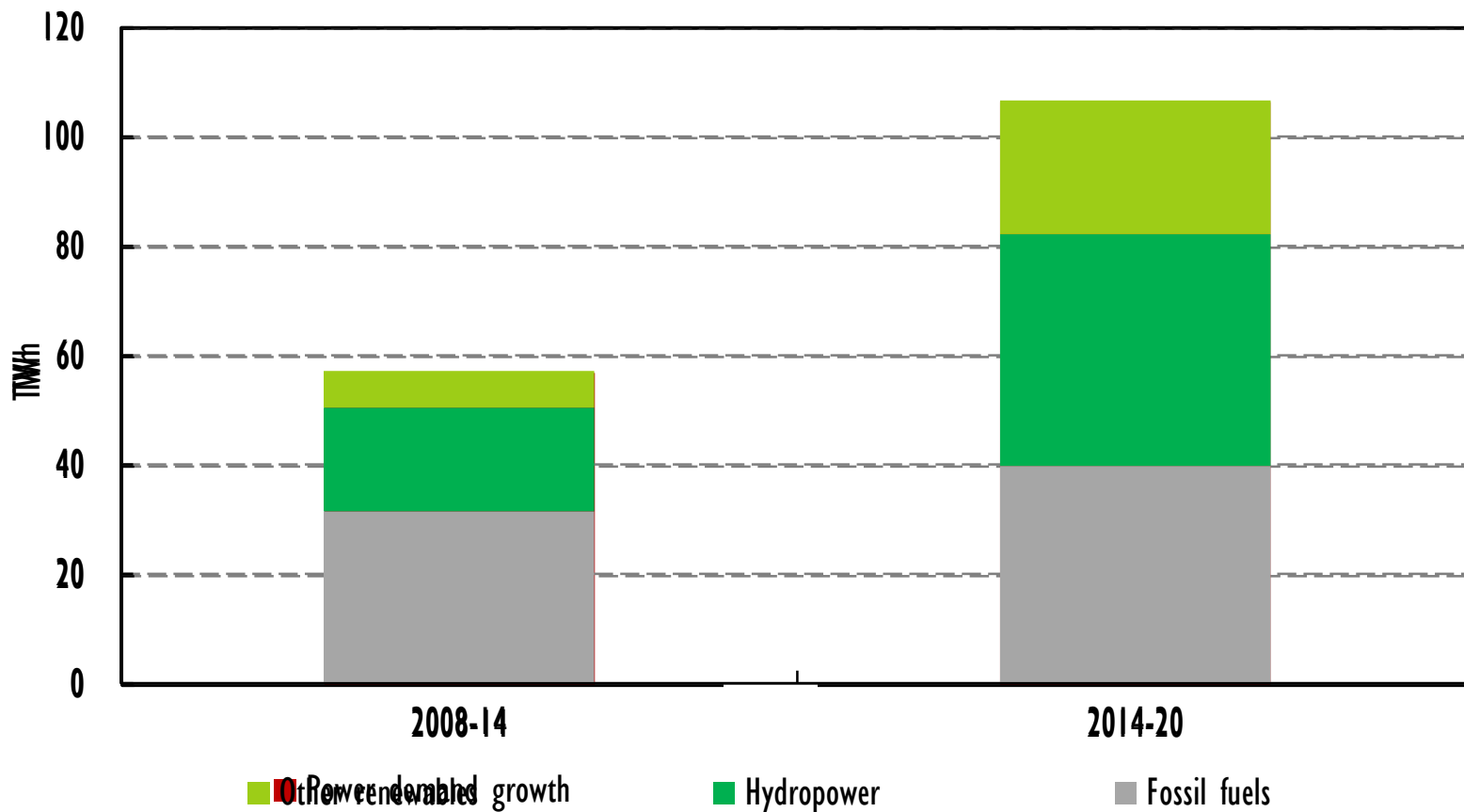
Africa is rich in resources



In the last 5 years, almost 30% of global oil & discoveries were in sub-Saharan Africa; the region has vast untapped renewables potential, notably hydropower & solar

Renewables can power Africa's economic growth

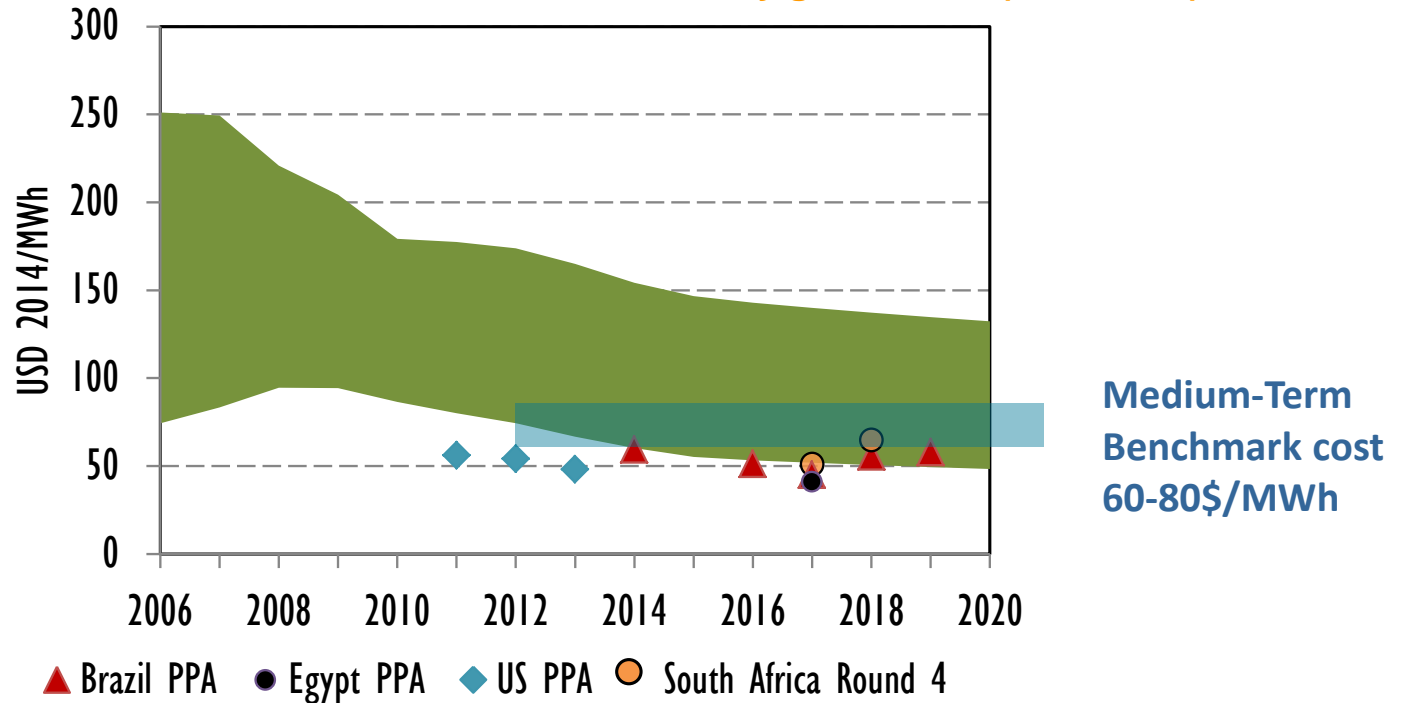
Sub-Saharan Africa power demand growth versus supply sources



With huge resources, improving cost-effectiveness and policy momentum, renewables account for almost two-thirds of demand growth in Sub-Saharan Africa

How quickly can RE costs converge towards best world benchmarks?

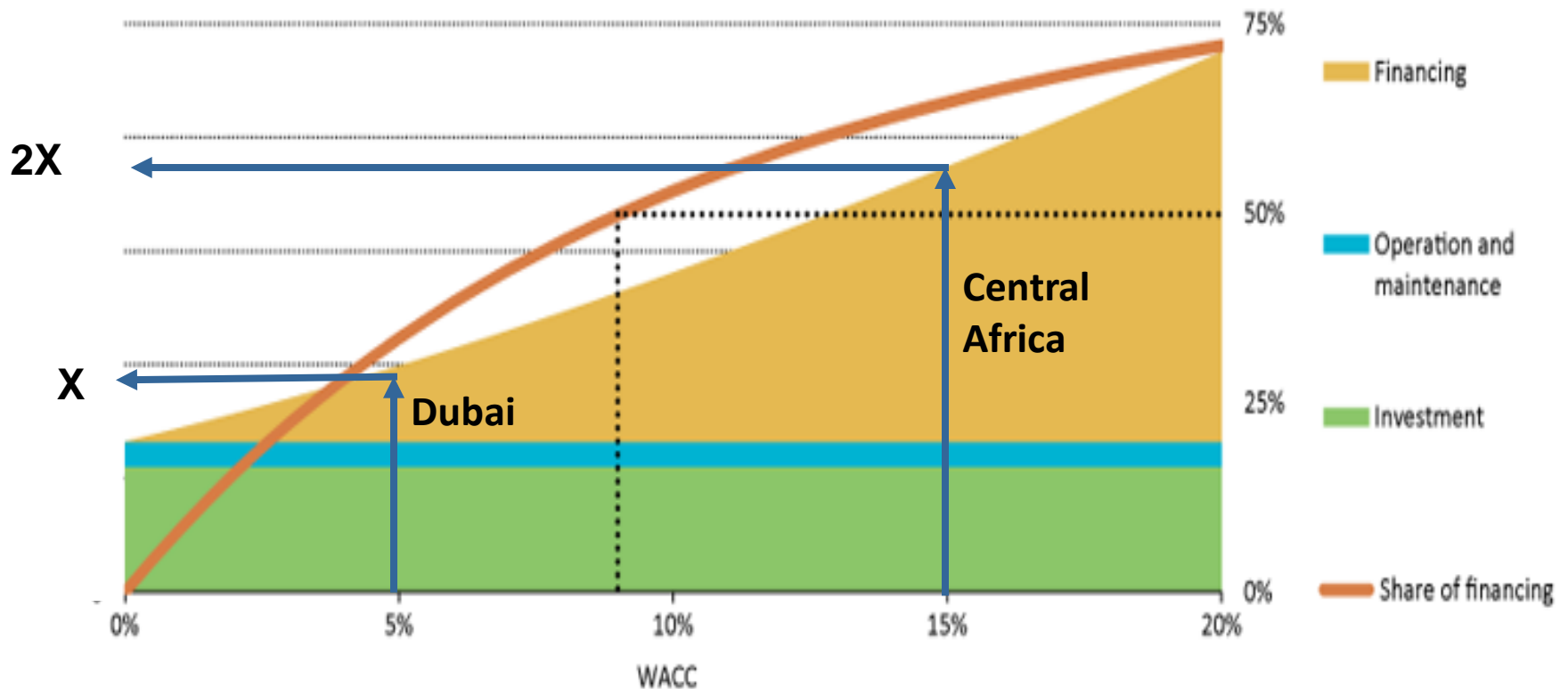
Typical onshore wind levelised costs of electricity generation (2006-2020)



Great difference in generation costs persist due to different system prices and cost of financing

Financing costs can dominate

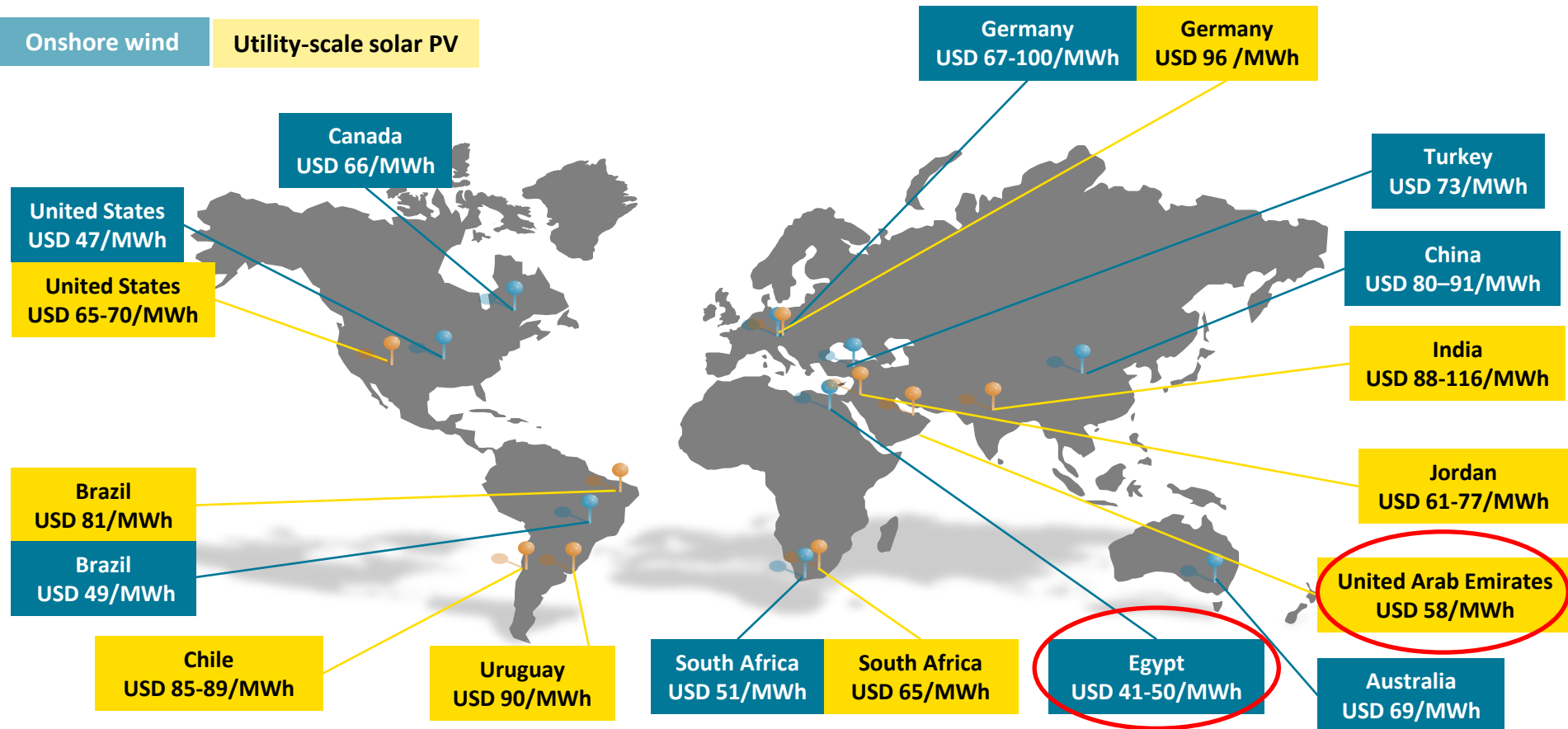
Impact of cost of capital on the levelised generation cost of solar PV
(assuming same system price and solar irradiation)



*Market and regulatory risks can increase weighted average cost of capital
and undermine competitiveness of PV and Wind power*

Evidence of lower costs on the horizon

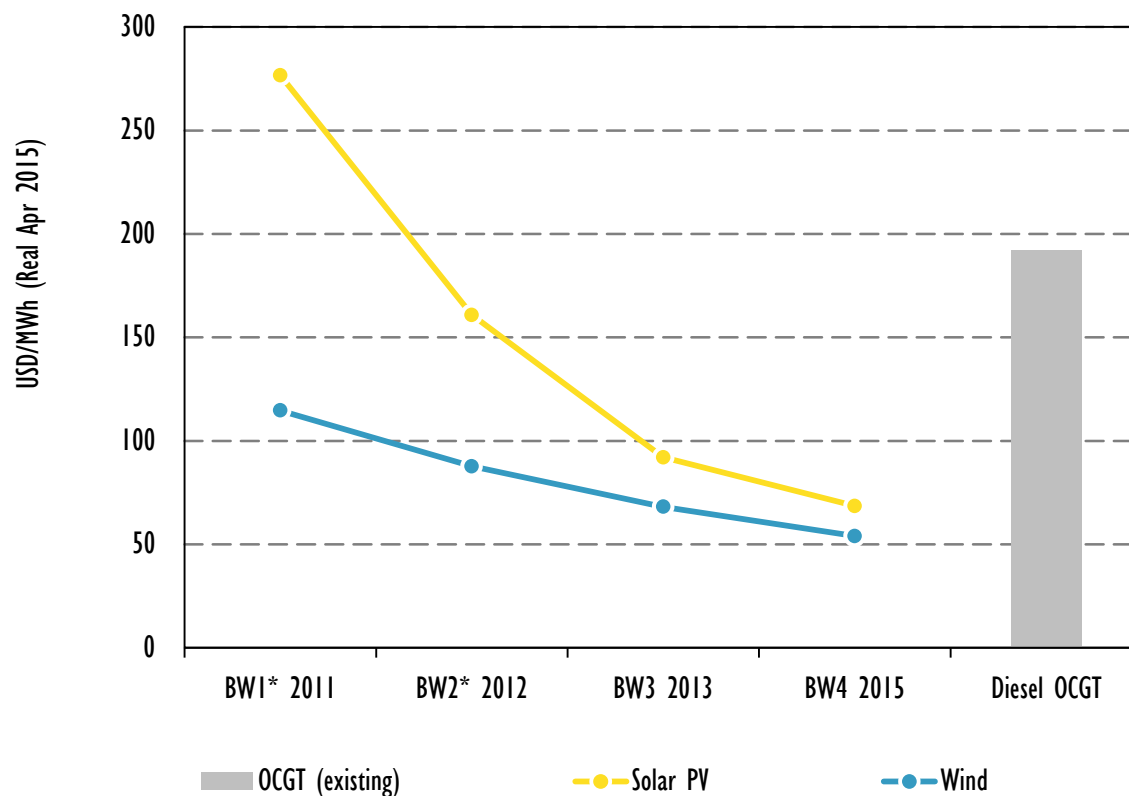
Recent announced long-term contract prices for new renewable power



This map is without prejudice to the status or sovereignty over any territory, to the delimitation of international frontiers and boundaries and to the name of any territory, city or area

A combination of price competition, long-term contracts, good resources and financial de-risking measures is creating deployment opportunities in newer markets and at lower costs

The REIPPP programme - a remarkable example



**Bid windows of the Renewable energy Independent Power Producer Procurement programme*

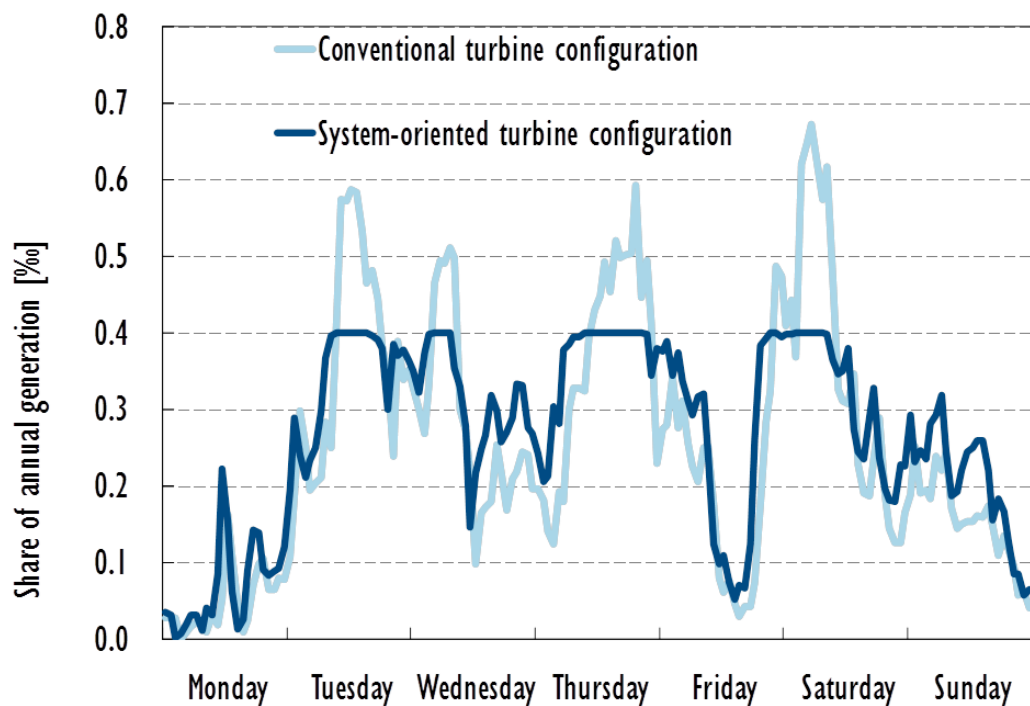
Competitive auctions for long-term power purchase agreements combine with good resources to deliver low prices in just few years

More wind and solar will require more flexibility

**1) Foster
System-friendly
RE**

**2) Better
market design
& operation**

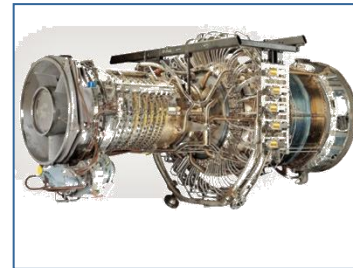
**3) Increase flexibility of
other power system
components**



Grids



Generation



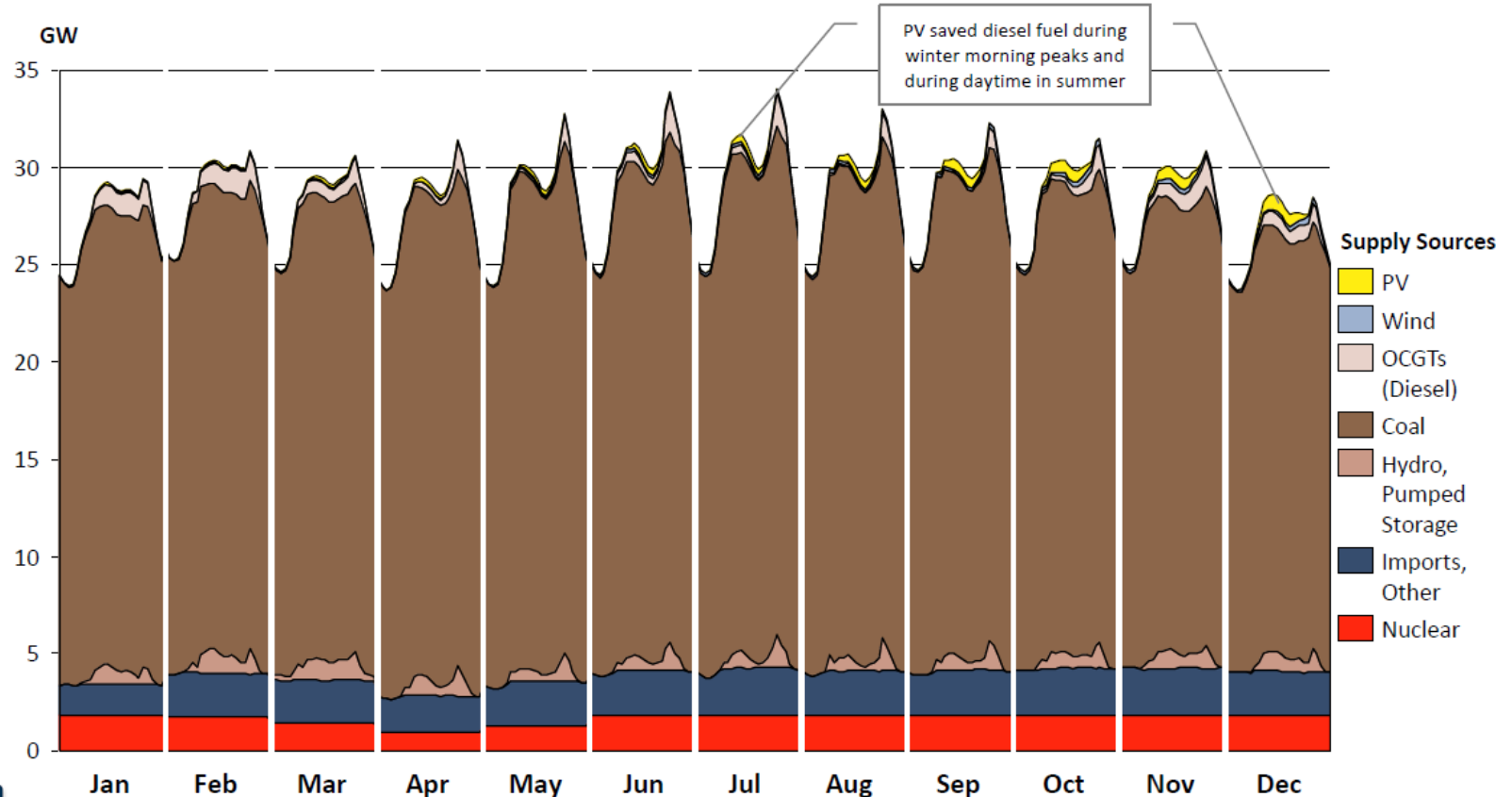
Storage



Demand Side



The value of wind and solar in RSA



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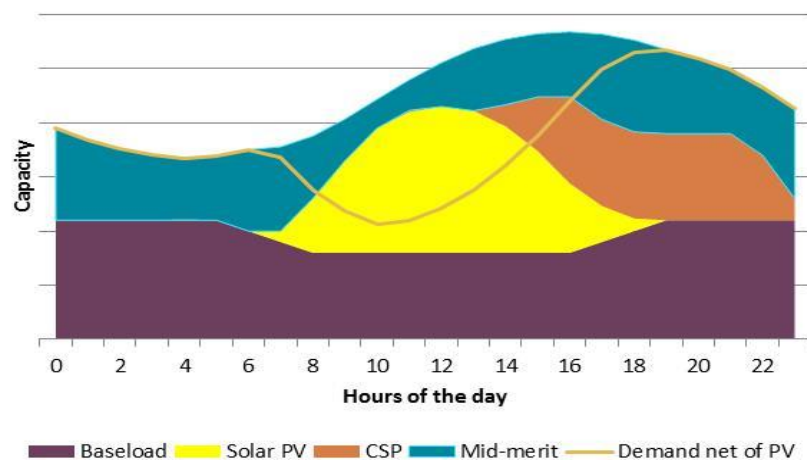
Note: Design as per Fraunhofer ISE
Sources: Eskom; CSIR Energy Centre analysis

***There is still room for wind, PV and STE to save costly diesel fuel
but also coal use with low capacity factor***

PV and STE can be combined

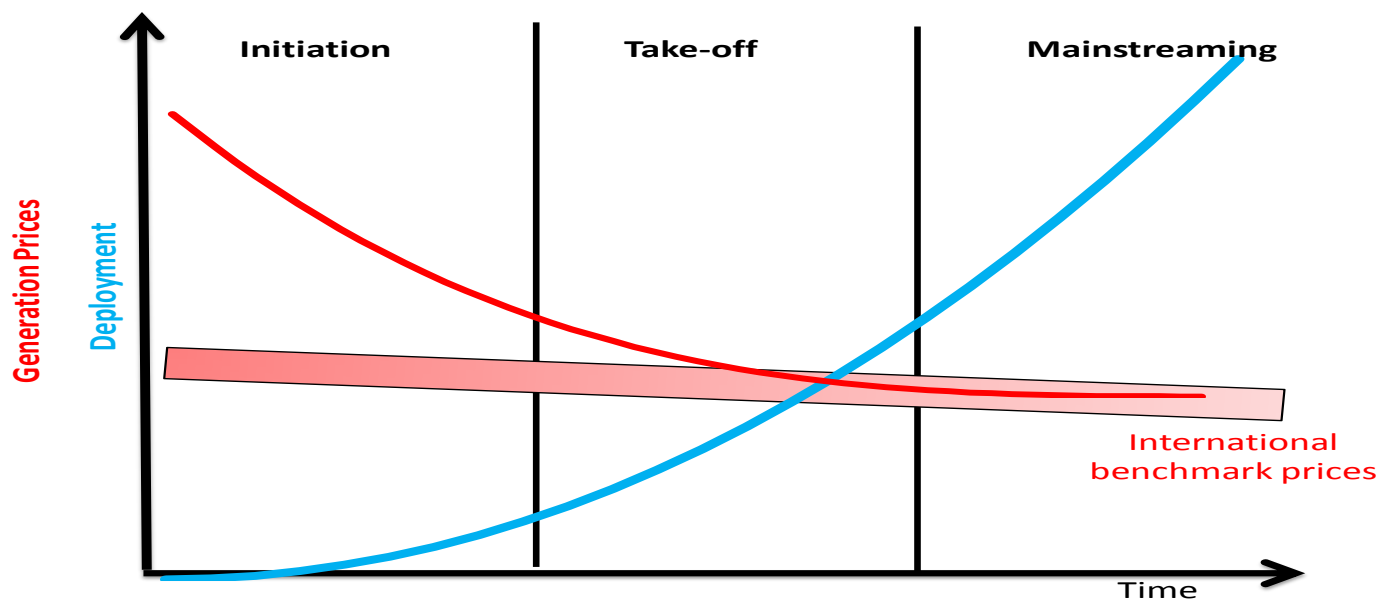


Lesedi and Jasper PV plants in operation since 2014. Redstone CSP plant with storage (rendered) to be commissioned in 2018. Thermal storage allows generation in later afternoons early evenings at peak times



Figurative power mix in 24 hours

Policy priorities change over time



Key Objective	Critical Mass	Reduce Costs	System Integration
Policy Priorities	Clear regulatory framework	Cost convergence with international benchmarks	Develop flexible energy system
	Secure financial support	Introduce competition	Market reform

Policy implications: Enabling environment is crucial

before 2013

Providing financial support

Cost reduction through

- Technology development
- Scale up
- Learning



Main Policy

Cost reduction

2014-2020

Enabling policy and market framework which allows low cost financing and generation

Cost reduction through

- Technology **innovation**
- Financial **innovation**
- New markets with best resources

Key Characteristics

- **Competition**
- **Predictable long-term income stream**
- **Short-term market value signals**
- **Portfolio development**
- **Energy System Integration**