RE Transition:

The Future of Renewable Energy Policy

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BRIEF PROFILE:

Toby Couture is Founder and Director of E3 Analytics, an international renewable energy consultancy based in Berlin that focuses on renewable energy markets, policy, and finance. He has worked with over forty countries around the world on the economic, financial, and policy aspects of renewable energy development, including in Asia, the Pacific region, the Middle East, Africa, and the Americas.

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Outline

1. The Evolution of RE Policy

2. Three Key Pillars of Future Power Systems

3. Concluding Remarks

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Short Summary

- RE policy has historically been about bridging the cost gap between RE and conventional technologies

- But now, RE technologies like solar PV and onshore wind are increasingly out-competing fossil and nuclear technologies in tenders around the world

- Is it time for RE policy to call it a day?

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Short Summary

- Not quite

- A range of factors including low wholesale market prices, excess generation capacity, having to compete against amortized plants, incomplete (or non-existent) pricing of externalities, the inertia associated with incumbent utilities and the existing asset base, as well as the inherent capital intensity of RE generation make it unlikely that RE policies can be phased out completely

- Also, all RE technologies are at different points along the cost curve, and may still require tailored policy approaches (e.g. offshore wind, CSP, wave, tidal, etc.)

Disclaimer:

"Making predictions is difficult, especially about the future."

- Danish Proverb

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1: The Evolution of RE Policy

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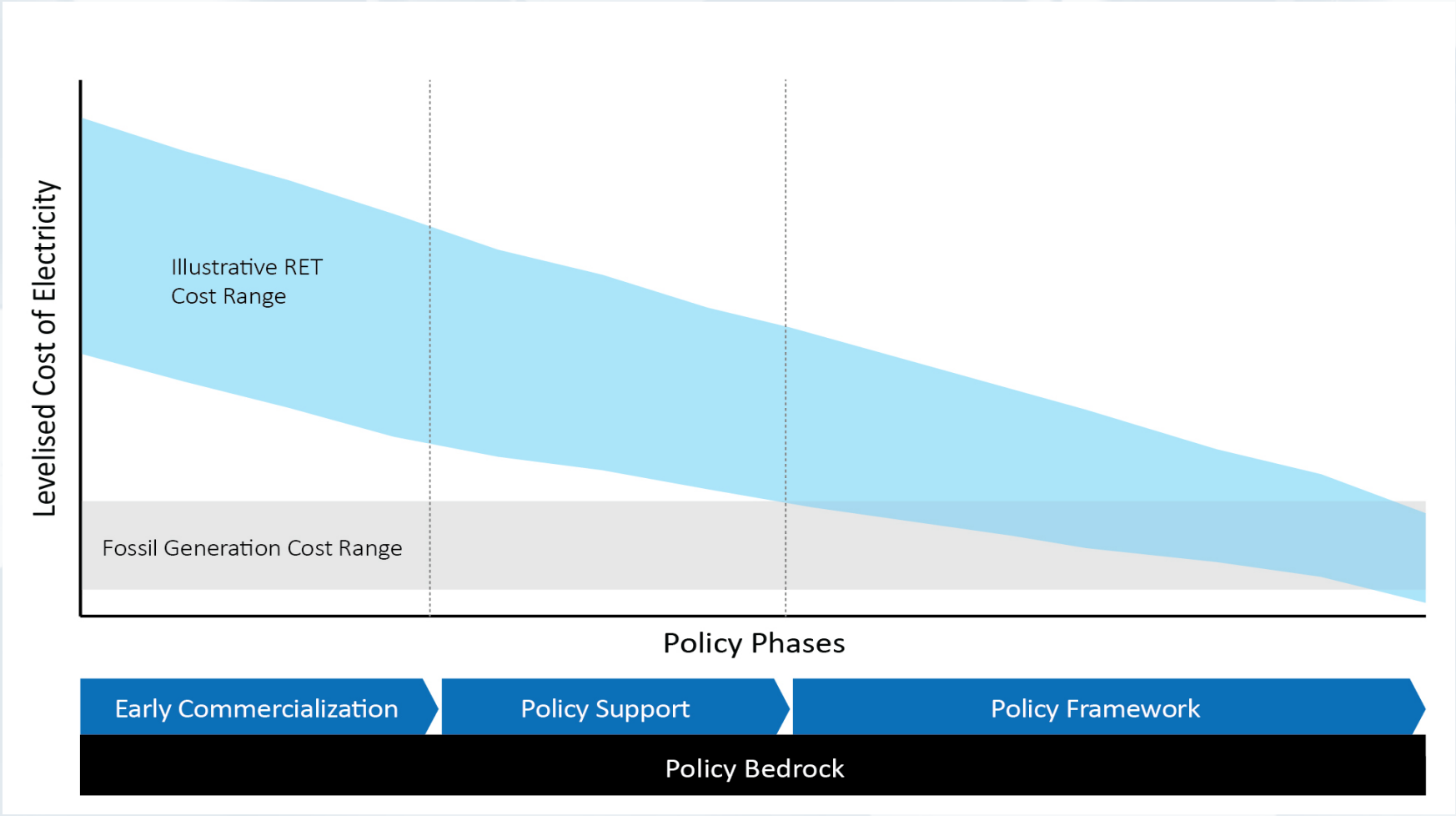
Policy evolution driven by cost evolution



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Overarching Framework for Understanding RE Policy

1. **Early Commercialization Phase**: RD&D support, cash grants, pilot projects: → goal is to demonstrate/evaluate viability, while improving technological performance

2. **Policy Support Phase**: feed-in tariffs, premiums, certificate markets, tax incentives, auctions, net metering: → goal is to bridge the cost gap with conventional alternatives while creating a better foothold in the market for RE technologies

3. **Policy Framework Phase**: away from explicit "support" or subsidies and toward creating an overall enabling environment that supports sustained scale-up: → goal is to maintain **bankability**, while enhancing system **flexibility**

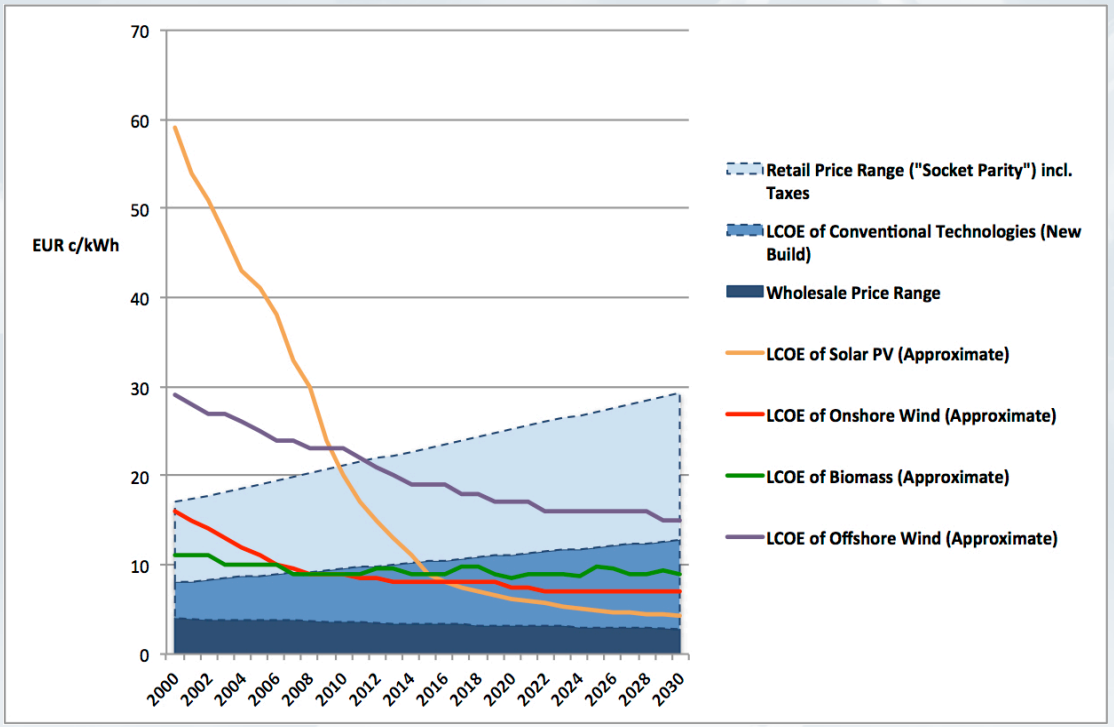
Understanding Cost-Competitiveness Three Benchmarks:

1. Competitiveness with the **Retail Price** benchmark (aka. "grid parity", "socket parity")

2. Competitiveness with the **LCOE of Conventional Alternatives**

3. Competitiveness with **Wholesale Market Prices** (or utility avoided costs)

Illustrative



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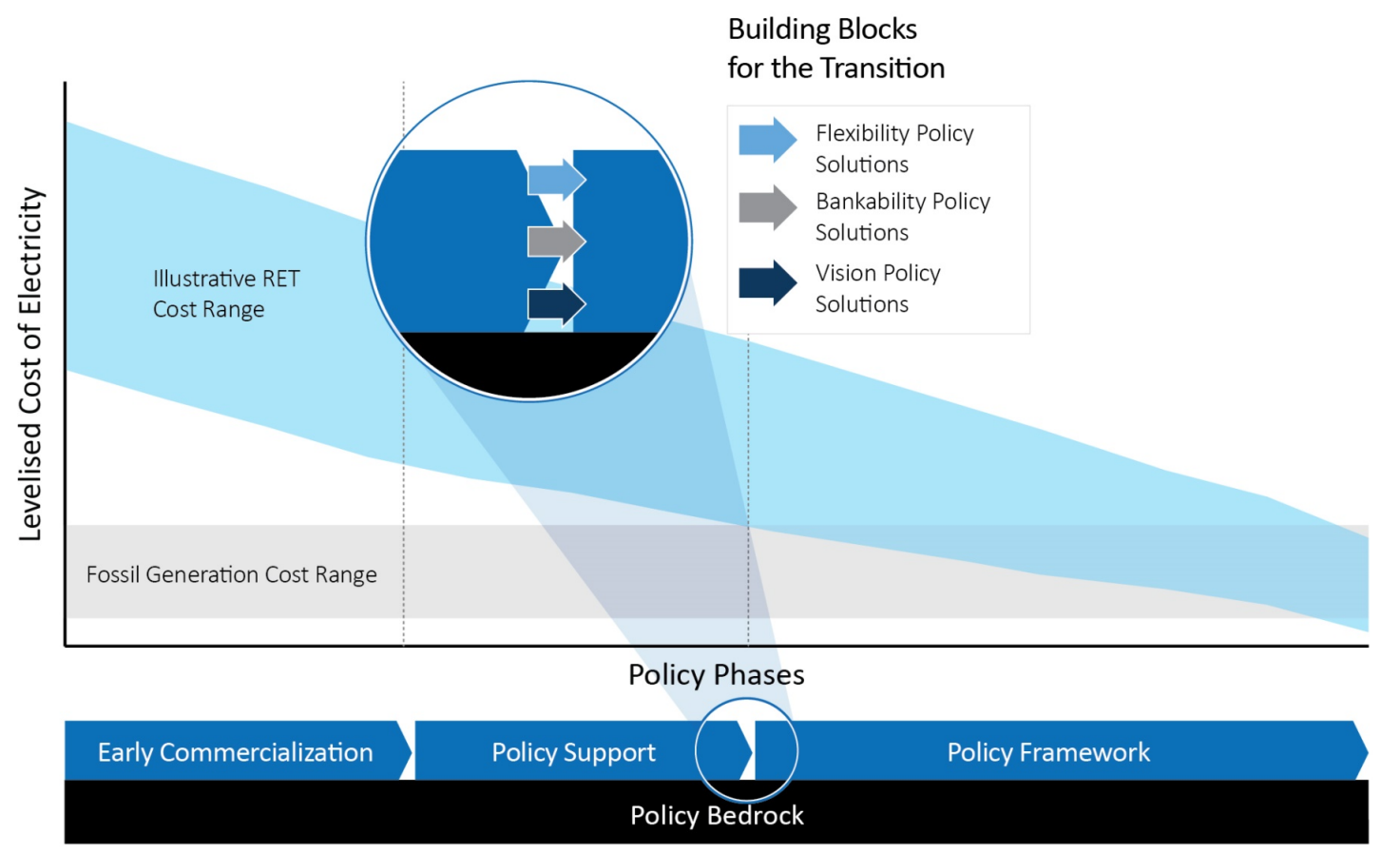
Focus of the report is on what happens when RE technologies surpass LCOE cost-competitiveness



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New Concept: the "Policy Bedrock"

Refers to the underlying regulatory and permitting-related elements that make investment in new electricity generation possible:

- Open grid access rules
- Clear project permitting, siting and interconnection procedures
- Environmental performance standards
- Technical standards
- Clear land access regime
- Continued RD&D and innovation-related funding
- Etc.

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2: Three Key Pillars of Future Power Systems

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Key Pillars

BANKABILITY	FLEXIBILITY	LONG-TERM VISION
Maintain the **bankability of new investments** in renewable energy technologies	Enhance the overall **flexibility of the power system**, specifically in order to adapt to growing shares of variable renewables	Establish a long-term **vision for a clean, sustainable power sector**

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What is Bankability?

A project is deemed bankable when it can provide a sufficiently attractive risk-adjusted return to justify investment based on prevailing economic, policy, and market conditions.

Different investor types have different return expectations, as well as risk tolerances (banks, private equity, corporates, individuals and cooperatives, etc.)

→ **To ensure flourishing RE market development** (high social acceptance, broad political support, competitively priced capital) **broad participation from a wide range of different investor types is key**

Bankability in Liberalized Markets

In many **liberalized electricity markets** today, virtually no technologies are financeable solely via the spot market:

- Low wholesale market prices;
- Excess generation capacity; flat or negative demand
- Low carbon prices
- Inconsistent policies; limited investment certainty

Bankability is being maintained primarily by volume-restricted tenders linked to long-term PPAs, floating premiums (e.g. EU), or via bilateral and synthetic PPAs signed directly with public or private offtakers (sometimes combined with tax incentives, e.g. U.S.)

Options for Liberalized Markets

The challenges of maintaining bankability in liberalized markets are significant (cannibalization effects, "missing money" problem, etc.). Options include:

1. New contractual arrangements: synthetic PPAs, more bilateral contracts, partial offtaker agreements, more hedging instruments, aggregators, new business models

2. New revenue streams: ancillary services markets, carbon revenues, locational pricing, as well as floating premiums to compensate for low market prices

Or, a more fundamental redesign of the market

Bankability in Single-Buyer Markets

In **single-buyer markets**, bankability is being maintained largely by long-term PPAs signed with a single offtaker (either a private or a government-backed utility)

Bankability therefore relies critically on the overall **creditworthiness** of the offtaker, its ability to service its debts, as well as its ability to cover its costs by raising rates or improving efficiencies

- Curtailment rules, regulatory risk, as well as the surrounding political and economic risks are critical

Options for Single-Buyer Markets

- Broader institutional and financial **de-risking** likely to remain necessary in many if not most cases

- **Credit guarantees** on the loans and/or **government guarantees** on the PPAs may also remain necessary (e.g. South Africa)

- **PPA design may change**, however, to incentivize more flexibility (e.g. from dispatchable renewables), or the provision of ancillary services (e.g. reactive power, rapid ramping capabilities)

- **Binding RE targets** likely to become increasingly important to drive the transformation of the power mix in single-buyer markets; incumbents often too slow to adapt to current realities

2. Enhancing Flexibility

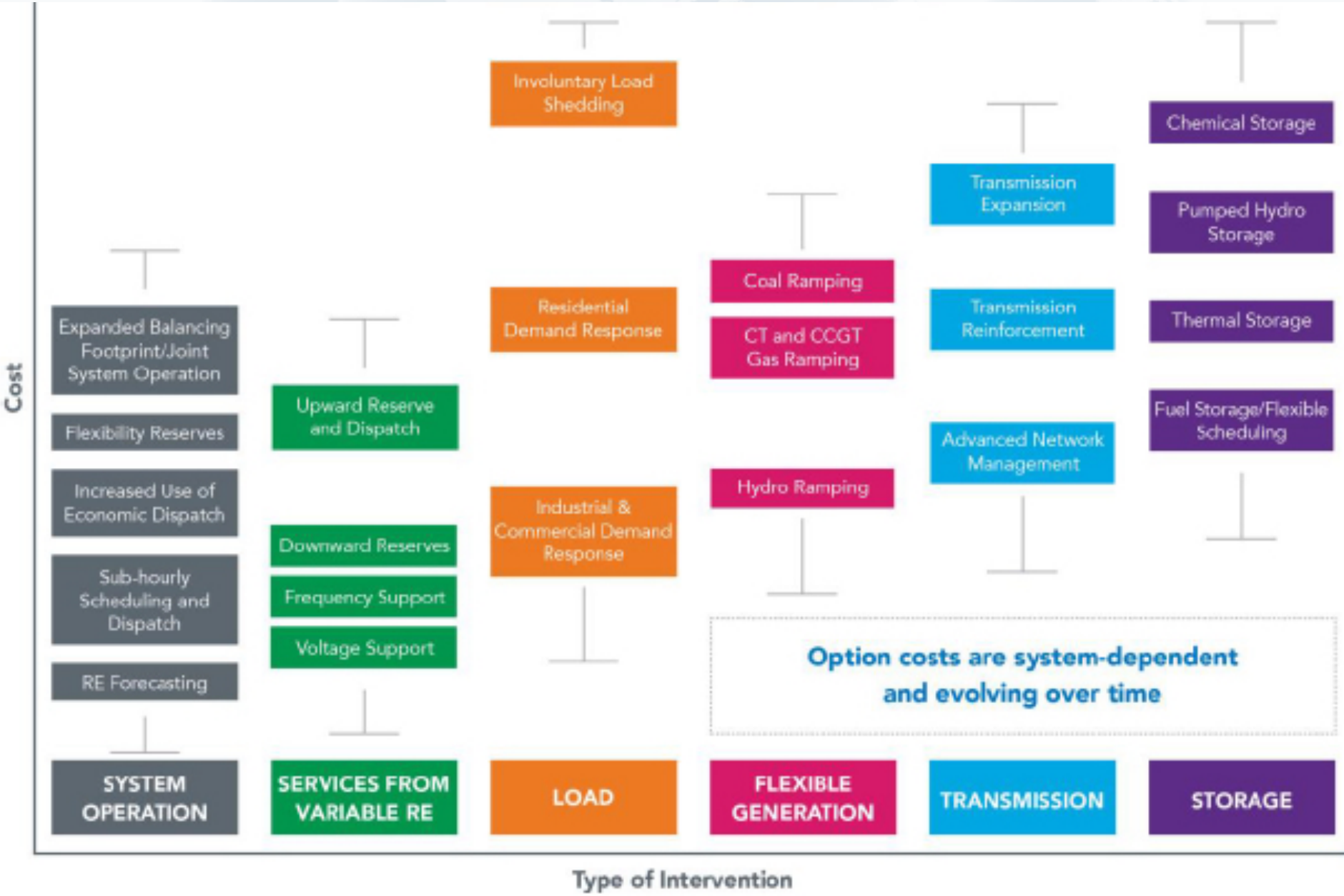
- As the share of variable RE technologies like solar PV and wind power increase, the need for flexibility grows

- Since most jurisdictions do not have abundant flexible RE resources (e.g. large hydro), most jurisdictions will need to massively increase the flexibility both of supply, and of demand

- In many cases, this will likely involve phasing out (or adapting) inflexible baseload generation

- Report focuses on the kinds of flexibility that can be provided by RE technologies

Flexibility Options

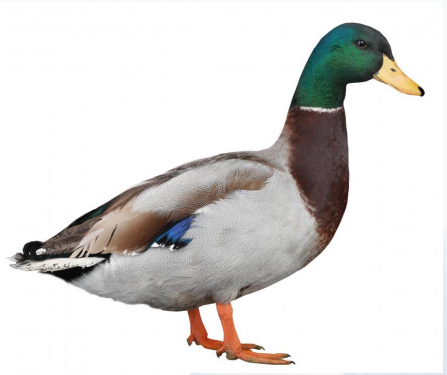


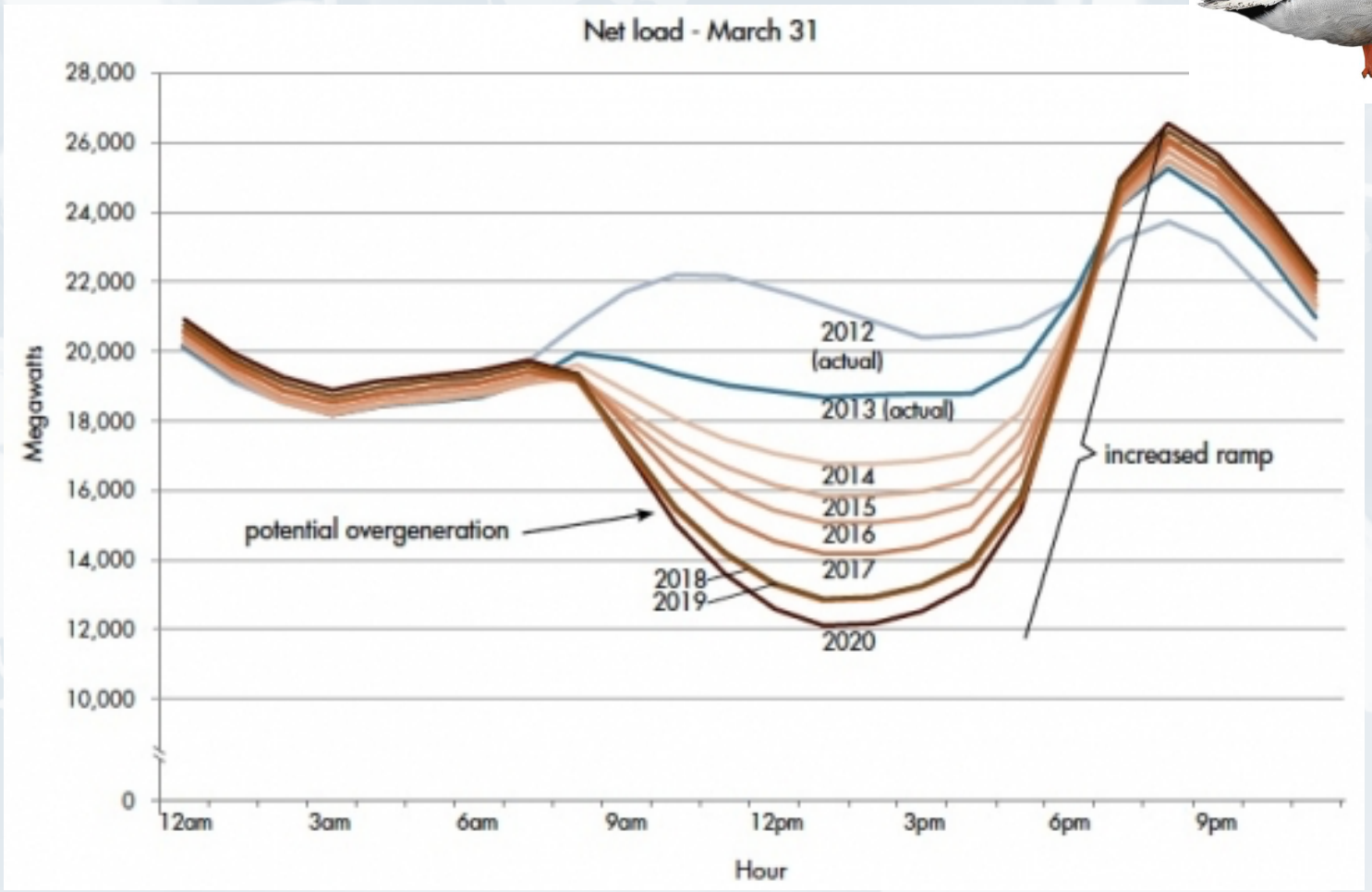
2. Enhancing Flexibility

1. **Physical sources of flexibility**: size and strength of the transmission system, characteristics of generation fleet, the availability of demand side flexibility options, etc.

2. **Institutional sources of flexibility**: refers to the underlying institutional mechanisms used to ***harness*** (or increase) the available flexibility in the system: e.g. rules, incentives, and regulations governing the provision or procurement of flexibility

Why flexibility matters (part 1)





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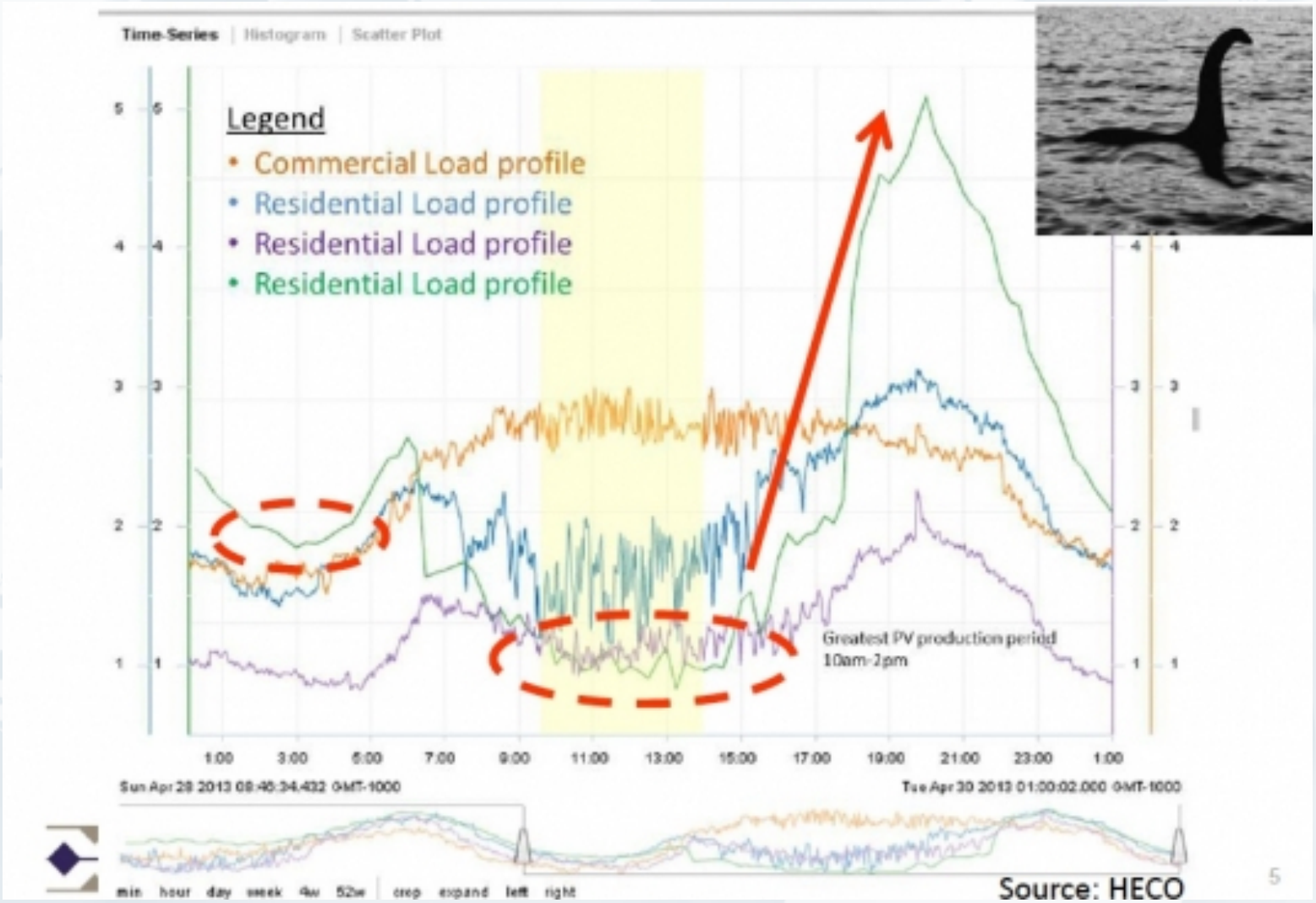
Why flexibility matters (part 2)



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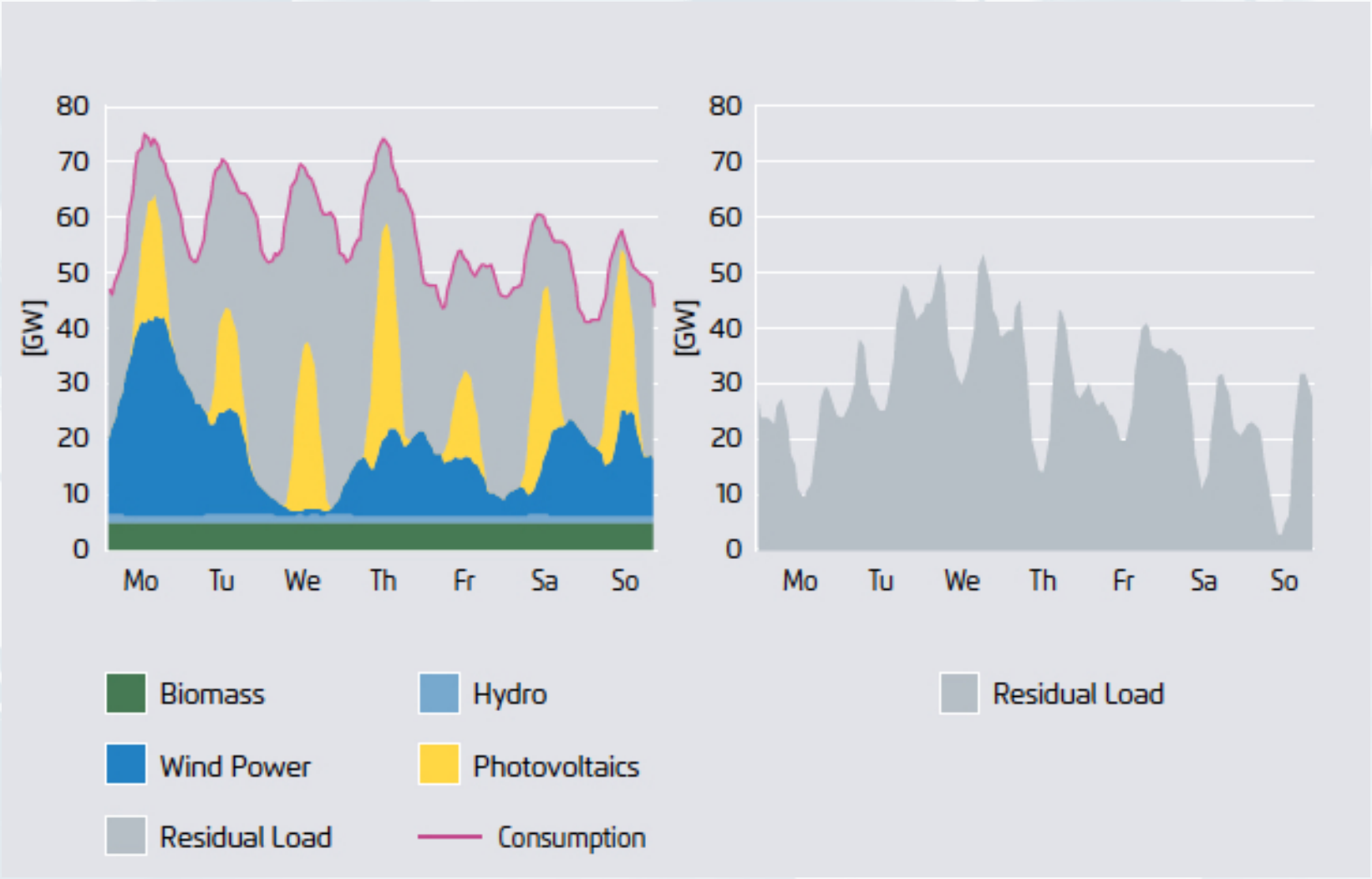
Source: http://www.greentechmedia.com/articles/read/hawaiis-solar-grid-landscape-and-the-nessie-curve

The need for flexibility is growing

Model of Germany's Power System Profile: Summer 2022



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Source: Agora Energiewende 2015
http://www.agora-energiewende.de/fileadmin/Projekte/2015/Understanding_the_EW/Agora_Understanding_the_Energiewende.pdf

3. Establishing a Clear Long-term Vision

- Since generation assets have long lives, investors and other stakeholders typically take a long-term view of power system investments

- Establishing a long-term vision of the future of the power system can help reduce investment risks and send a clear signal to investors, manufacturers, etc.

- Long-term clarity is also critical for achieving climate and other related goals

3. Establishing a Clear Long-term Vision

The report outlines four (4) main policy categories that fall under a "long-term vision":

1. Setting binding **RE targets**

2. **Phasing-out** non-renewable technologies (fossil and nuclear)

3. Implementing credible **carbon pricing**

4. Formulating emission standards or **environmental performance standards for new and existing plants**

3: Concluding Remarks

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Concluding Remarks

- The transition to a sustainable, low carbon power system will be faster and easier if finance is available ***at scale*** and at reasonable rates, both for generation, as well as for flexibility related investments

- Neither monopolized, single-buyer, nor liberalized electricity markets will be able to sustain the scale of investments required without policies that foster **bankability, flexibility**, as well as long-term **certainty**

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In other words:

There's still a lot of work to do!

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Report:

RE-TRANSITION: Transitioning to Policy Frameworks for Cost-Competitive Renewables

http://iea-retd.org/?smd_process_download=1&download_id=6063

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Thank you!

Questions?

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