Policy Opportunities to Incentivize Innovation for Renewable Energy

Regional Consultation on Achieving SDGs through Sector-focused STI Policies

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Outline

- Renewable energy a critical component of 21st Century sustainable development
- 2. ESCAP's online policy research tools
- 3. Why governments support innovation in RE and beyond
- 4. Understanding the framework for innovation in the RE sector
- 5. How policies can drive RE innovation
- 6. Interactive discussion





Image: Abengoa Solar

We need more renewable energy

- a transformative technology to address the challenges of the 21st Century
- Climate change CO₂ levels highest in 800,000 years
- Approaching or exceeding several "planetary boundaries"
- Increasing population and energy demand
- Energy poverty in many regions
- Energy security concerns from the interplay of energy and geopolitics
- Chronic urban air pollution

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Image courtesy NASA



ESCAP's ASIA PACIFIC ENERGY PORTAL

Interactive data and policy information asiapacificenergy.org

Policy database in the Portal

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Policy Matrix

- Use the policy matrix for an immediate glimpse on policy content.
- Slide timeline to see policy development.
- Switch between the Policy Matrix, Policy Search and Policy Timeline function in one click.

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Innovation - an indispensable tool in sustaining the rise of renewables

- Today's innovative RE technologies wind, solar PV, energy storage
- Prediction is challenging, perhaps in the next 10 30 years?
 - Renewable hydrogen
 - Offshore wind
 - □ PERC solar PV cells
 - Seaweed as renewable fuel and food
- Innovation is key to realizing these opportunities





Image: Seaweed Energy Solutions AS

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Five reasons why should governments take a role in supporting RE innovation



- 1. Public good outcomes from greater use of RE sustainability, climate change mitigation, clean air, energy security...
- 2. Enhance competitiveness and create jobs from more innovation-based industries.
- 3. Address market failures and create value.
- 4. Bridge the innovation cycle "valley of death".
- 5. RE innovation can be easily integrated into ongoing government programs and expenditure
 - □ tenders for power procurement, infrastructure,
 - PPPs,
 - industry grants,
 - social welfare.

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The "valley of death"

Figure 1: Stages of Innovation (Illustrative)



Image courtesy World Economic Forum

MATURITY

Not always a "better lightbulb" -Innovation examples in Renewable Energy



Process

Robotic PV manufacturing Wind turbine preventative maintenance technology

Product

Tesla Powerwall PERC solar cells GE Haliade X 12MW wind turbine

Organizational

Contracting/sourcing Partnerships, mergers, acquisitions Tax strategies Green bonds, yieldcos

Market

Hybrid wind/PV bidding Firming contracts Blockchain transactions

Actors in the renewable energy innovation ecosystem

Government policy interventions must recognize the role of all the stakeholders in the ecosystem and tap into their capacity for change



Policy interventions – choosing the "right tool"

Technology Push

- R&D funding
- Demonstration and pilot projects
- Commercialization funding
- Venture capital

Market Pull

- Feed-in tariffs
- Tax credits
- Reverse auctions
- Renewable portfolio standards with certificate trading
- Emissions trading schemes

Policy frameworks require both – but what is the right balance?







Policy interventions – choosing the "right tool" (cont'd)

- Balance of both "push" and "pull" policies needed
- Each can complement each other to bridge the "valley of death"
- Can we offer the "three L's" in new policies long, loud and legal?
- Some considerations:
 - Strategic advantages, endowments, scale and size of each economy
 - □ How to avoid "picking winners" in allocating R&D funding?
 - The right mix of complementary policies to support RE innovation policy - skills and training, finance, technical standards or unhelpful fossil fuel subsidies?

Useful Case Studies

- Germany's EEG (2000 present)
 - □ Feed-in tariffs for RE technologies
 - Build scale in market, trigger learning curve cost decline
 - □ Industry invested in product, process and organisational innovation
- Reverse auctions India, Australia, China, South Africa, Dubai, Mexico, Peru etc.
 - □ Increased competition
 - Price discovery
 - Promotes broader based innovation through output specification
- Australia's Clean Energy Bill (2012-14)
 - □ Cap and trade emissions trading scheme
 - Stimulates innovation in lowering emissions from energy sector through market signals
 - Taps into competition among market players

In closing: innovation has come a long way!



Jacob's 2.5 Kw wind turbine USA, circa 1940



Thank You Questions?