

# 21<sup>st</sup> Century Power Partnership

## An Overview and Key Activities

March 2013

# The Global Challenge

Rapidly accelerating sustainable energy access in emerging economies, while rapidly decarbonizing power systems in developed economies.

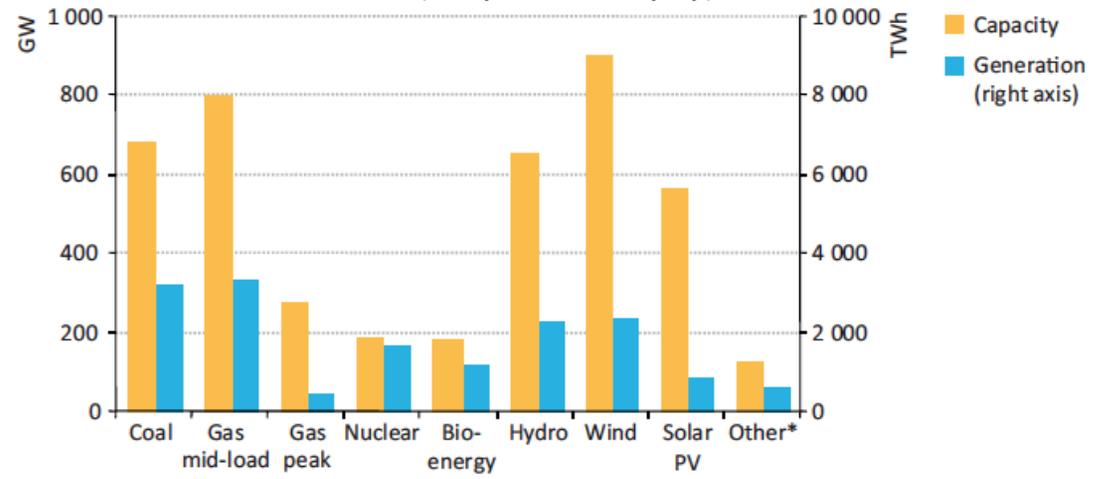
# The Scale of the Challenge

**2012-2035:**

**5,980GW** new capacity.  
**3,804GW** non-OECD.  
**2,087GW** OECD.  
**2,377GW** non-hydro RE.

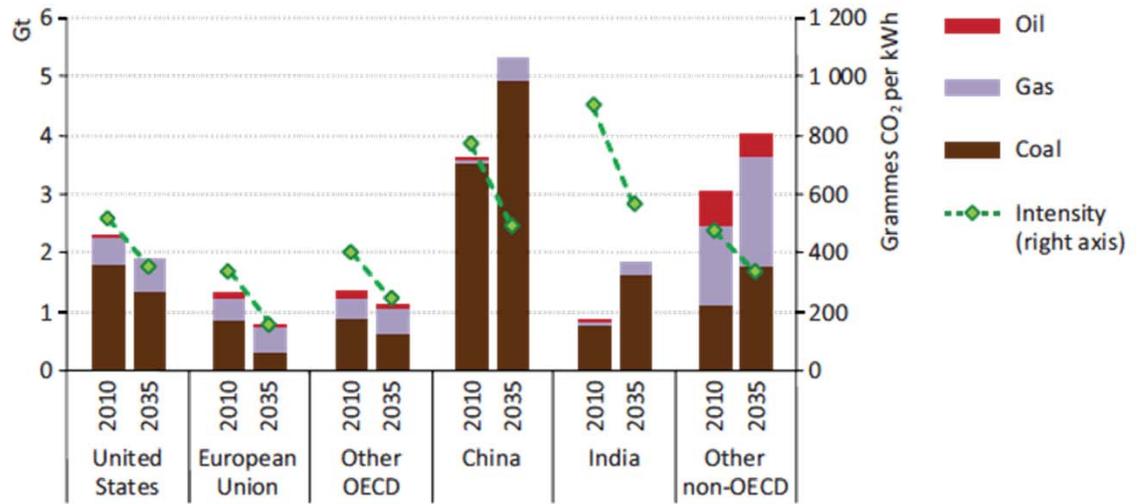
**Massive investment in energy efficiency and low-carbon electricity systems will be required to achieve economic growth while reducing CO2 intensity of energy.**

World Net Incremental Capacity Additions by Type, New Policies Scenario



\* Other includes geothermal, concentrating solar power and marine.

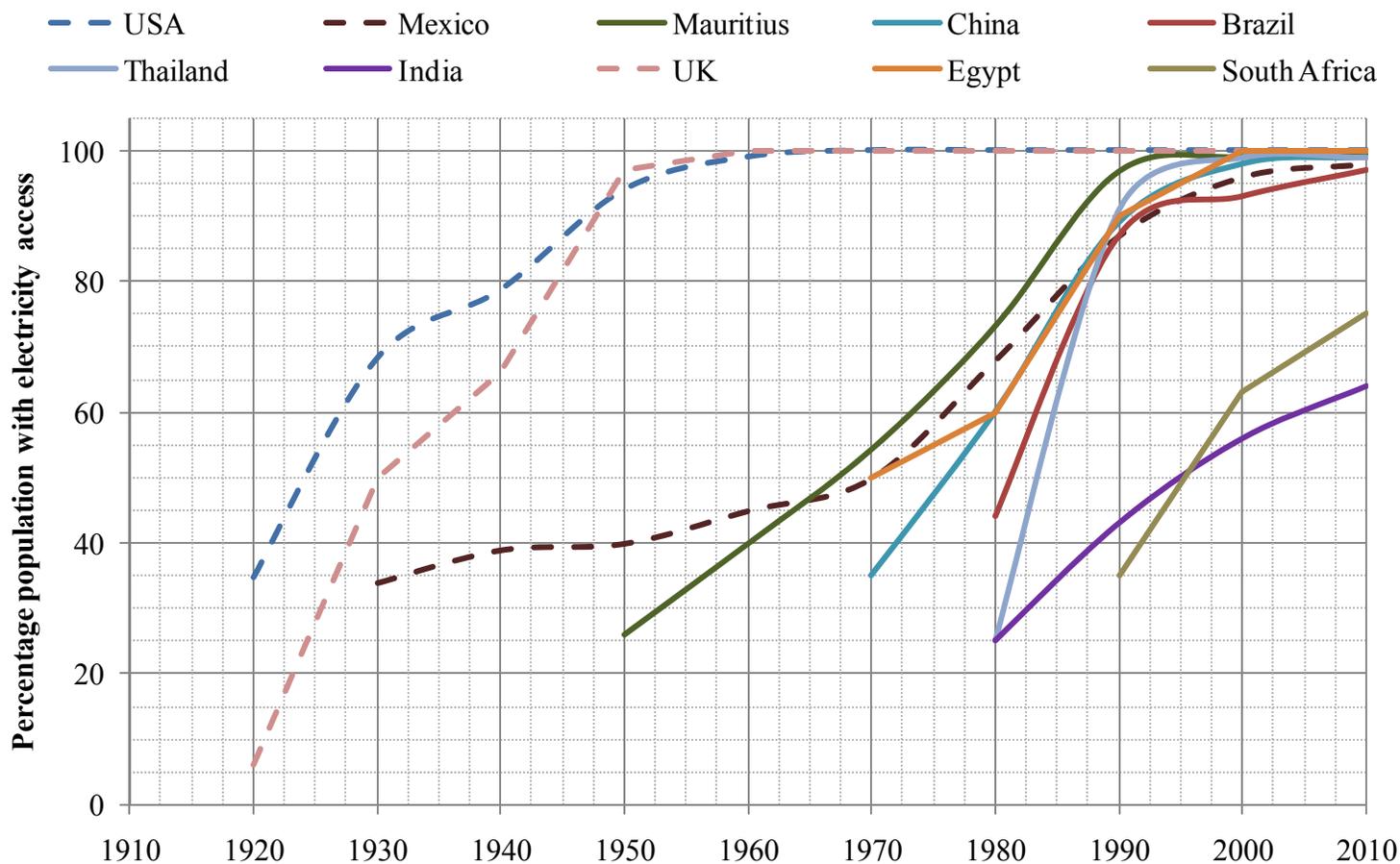
Emissions (Gt) and Emissions Intensity, New Policies Scenario



IEA WEO 2012 New Policies Scenario

# The Scale of the Challenge

## Achieving Energy Access



Pachauri, S. et al. 2011

# The Role of Emerging Economies

Cumulative power system investment 2012-2035 is estimated at USD 16.9 trillion.

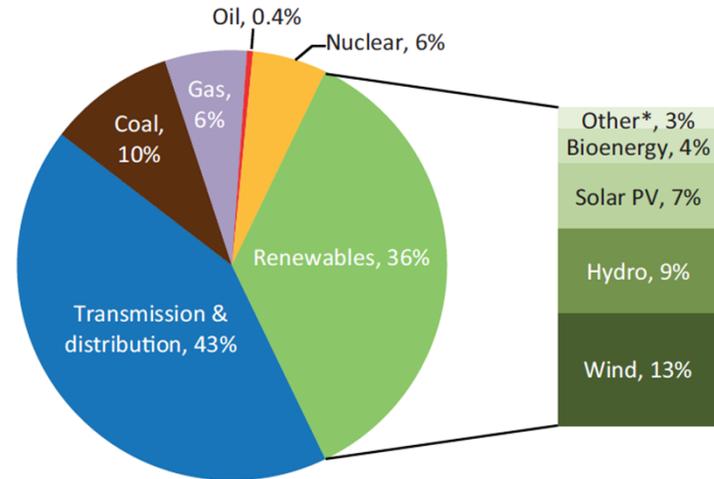
43% T&D, 57% new generation, 36% of which is renewables.

**Non-OECD countries account for 60% of cumulative investment, and more than 64% of cumulative T&D investment.**

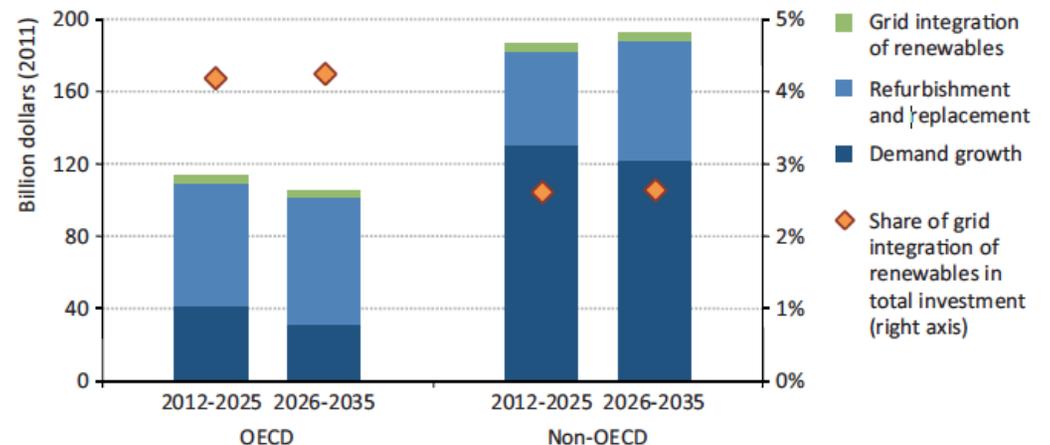
**T&D investment in non-OECD countries projected at ~USD 180 billion annually.**

**HOW CAN POLICY MAKERS ENSURE THESE INVESTMENTS ARE MADE QUICKLY AND COST-EFFECTIVELY?**

**Cumulative investment, \$16.9 trillion**



**Average annual T&D investment**



IEA WEO 2012 New Policies Scenario

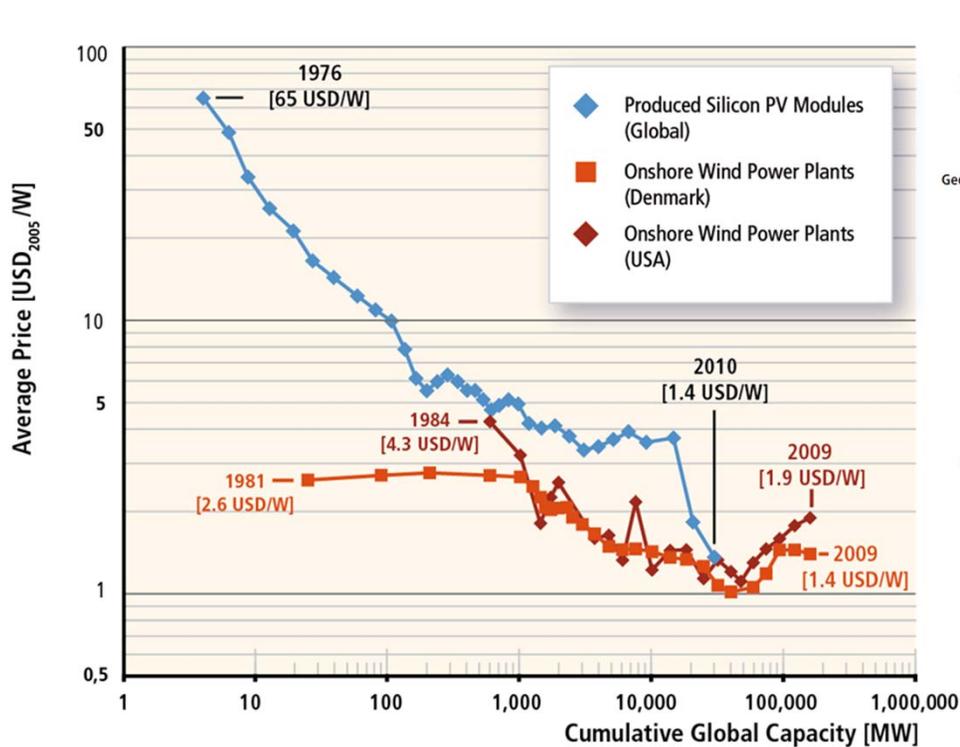
## 8 macro trends reshaping power system evolution:

1. **Renewable energy costs have come down quickly**, and variable supply is becoming a larger share of total generation.
2. **Distributed generation is growing**, and increasing frequency of extreme weather events is motivating an emphasis on power system resilience.
3. **Deep end-use efficiency opportunities** across all sectors are creating new business opportunities and challenging the need for continued investments in generation capacity.
4. **Demand response** is becoming a viable flexibility for grid operators, making it easier to integrate variable generation and avoid building new supply.
5. **Information technology advances** are resulting in new abilities for sensing, communication, and networked control of the power system.
6. **Increased electrification of the transportation sector** will open new opportunities and pose new challenges for grid operators.
7. **Utility business models are under stress**, as demand levels off in industrialized nations, and emerging economies seek to dramatically accelerate network investment.
8. **New roles have emerged for power system optimizers** at every scale – from the building to the city to the national and international.

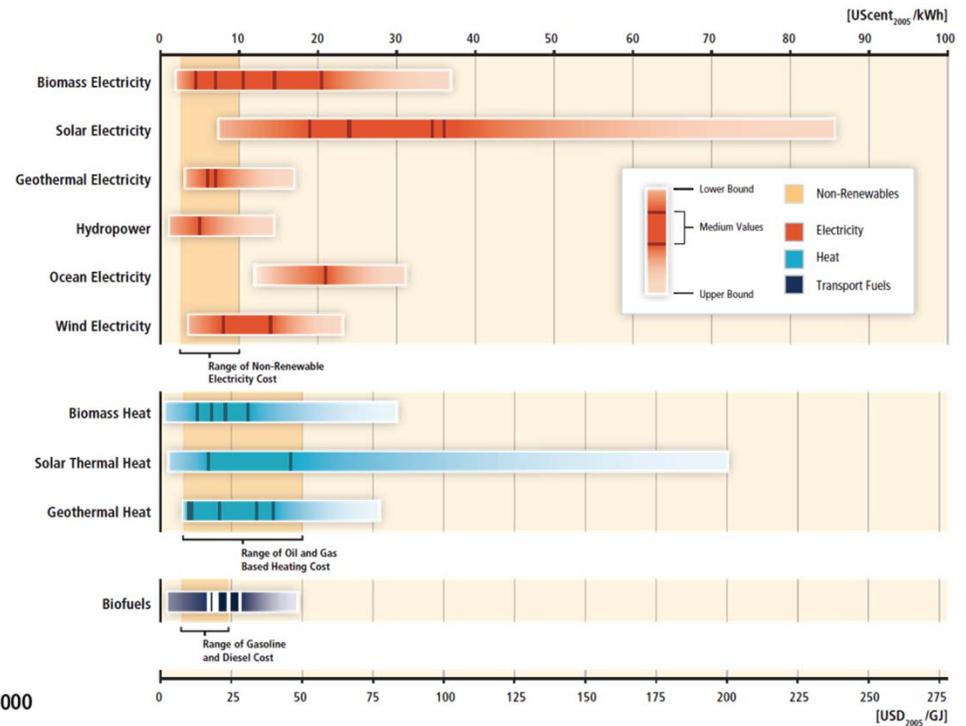
## **The concrete benefits of power system transformation hold the most value to policy makers and the public:**

1. Rapid expansion of access to clean, affordable energy.
2. Efficient use of constrained resources, including fuel and water.
3. Dramatic de-carbonization of power systems in industrialized countries.
4. Improved health due to reductions in particulate pollution from the power sector.
5. Reduced geopolitical tension from competition for conventional energy commodities.
6. Reduced price volatility of energy.
7. Greater resilience in the face of power system outages and extreme weather events.
8. More rapidly expanding opportunities for innovation and value creation in the power sector than at any time since the beginning of the 20<sup>th</sup> century.

## Steady Wind and Solar Cost Reductions



## RE Technologies are Becoming More Competitive



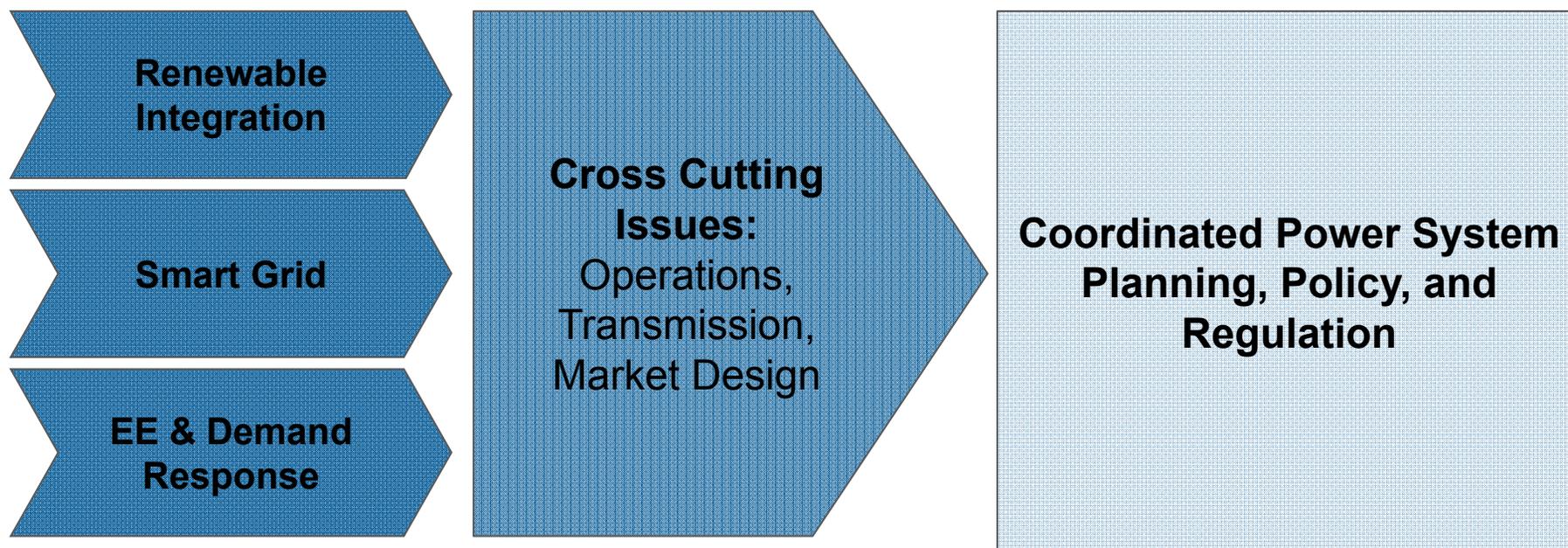
## Barriers to Power System Transformation: *Policy and Regulatory*

- **Distortive subsidies** – IEA estimates \$523 billion in annual fossil fuel subsidies globally (2011), distorting market incentives for energy efficiency and renewable energy sources.
- **Externalities** – Health, environmental, and climate costs are rarely reflected fossil fuel prices.
- **Policy complexity and uncertainty** – Fiscal challenges dominate policy discussions; maintaining clear and consistent policy incentives is often difficult.
- **Lack of coordination** – Increasing dynamism and interdependency requires coordinated legal, market, and institutional ecosystems.

## **Barriers to Power System Transformation: *Innovation, Support, and Investment***

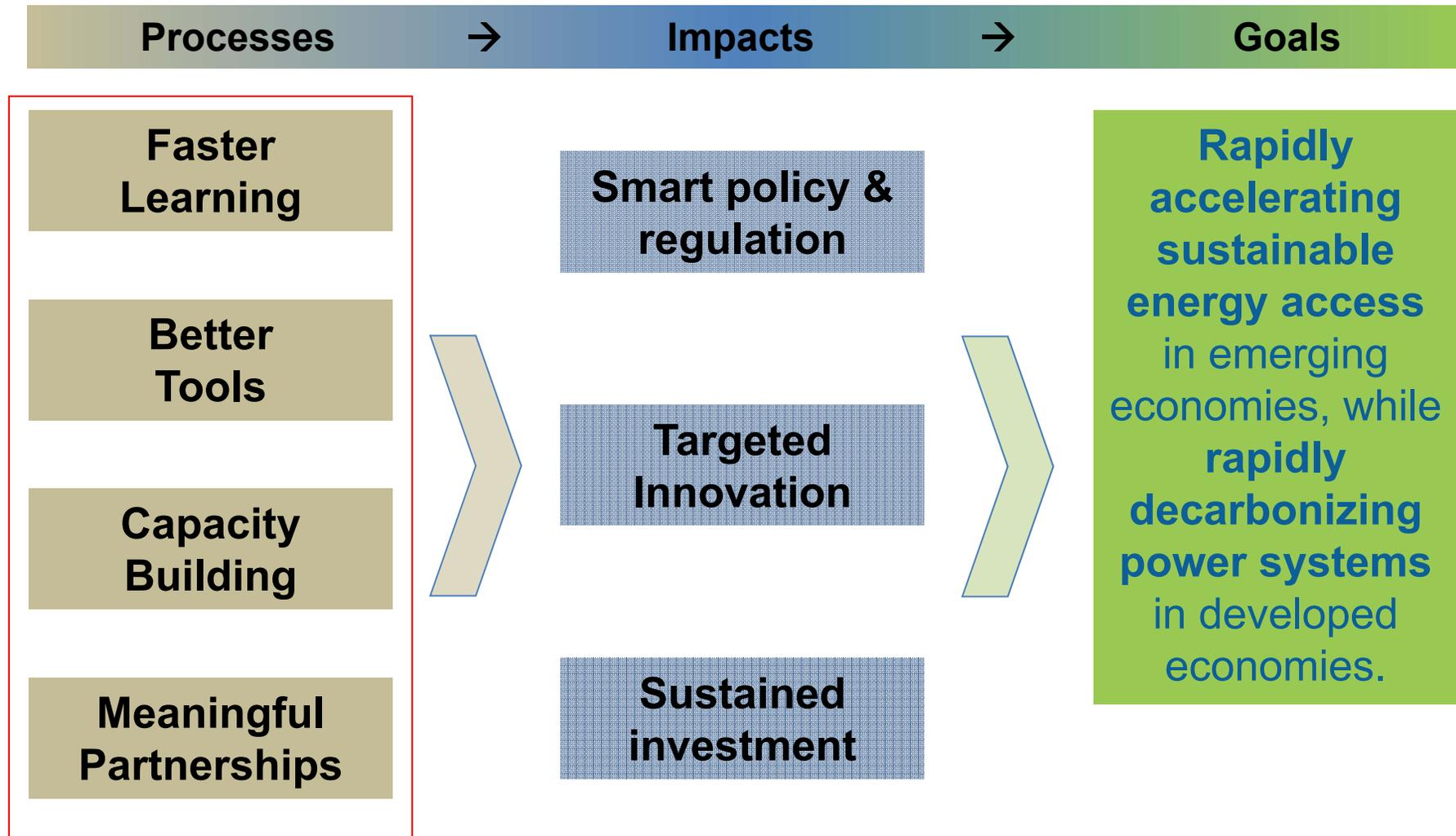
- **Experience** – Cumulative experience in operating 21<sup>st</sup> century power systems is growing rapidly, but still limited. 20<sup>th</sup> century power systems have a 100-year head-start.
- **Diversity** – There is no one-size-fits-all solution. Countries need to determine the most appropriate combination of approaches.
- **Attracting Investment** – Solutions must meet the stringent technical and economic validation requirements of global finance, insurance, and project development communities.
- **Gaining public support** – The public may not understand or support actions necessary, especially insofar as public expenditure is involved.

## Barriers to Power System Transformation: *Comprehensive Planning*



**There is an urgent need to advance comprehensive power system policy frameworks.**

# Pathways to Power System Transformation



**KEY AREA OF FOCUS**

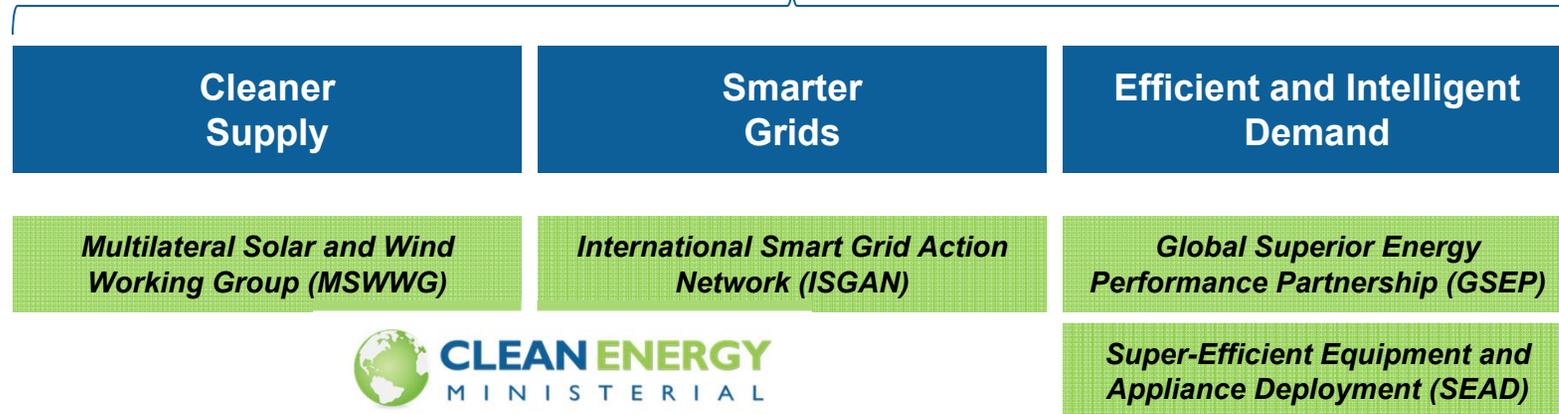
## The 21<sup>st</sup> Century Power Partnership

**Accelerating the transition to clean, efficient, reliable and cost-effective power systems.**

The 21CPP is a multilateral effort of the Clean Energy Ministerial (CEM) and serves as a platform for international efforts to advance integrated policy, regulatory, financial, and technical solutions for the deployment of renewable energy in combination with large-scale energy efficiency and smart grid solutions.

# The 21<sup>st</sup> Century Power Partnership

## Integrated Approaches to Power System Transformation

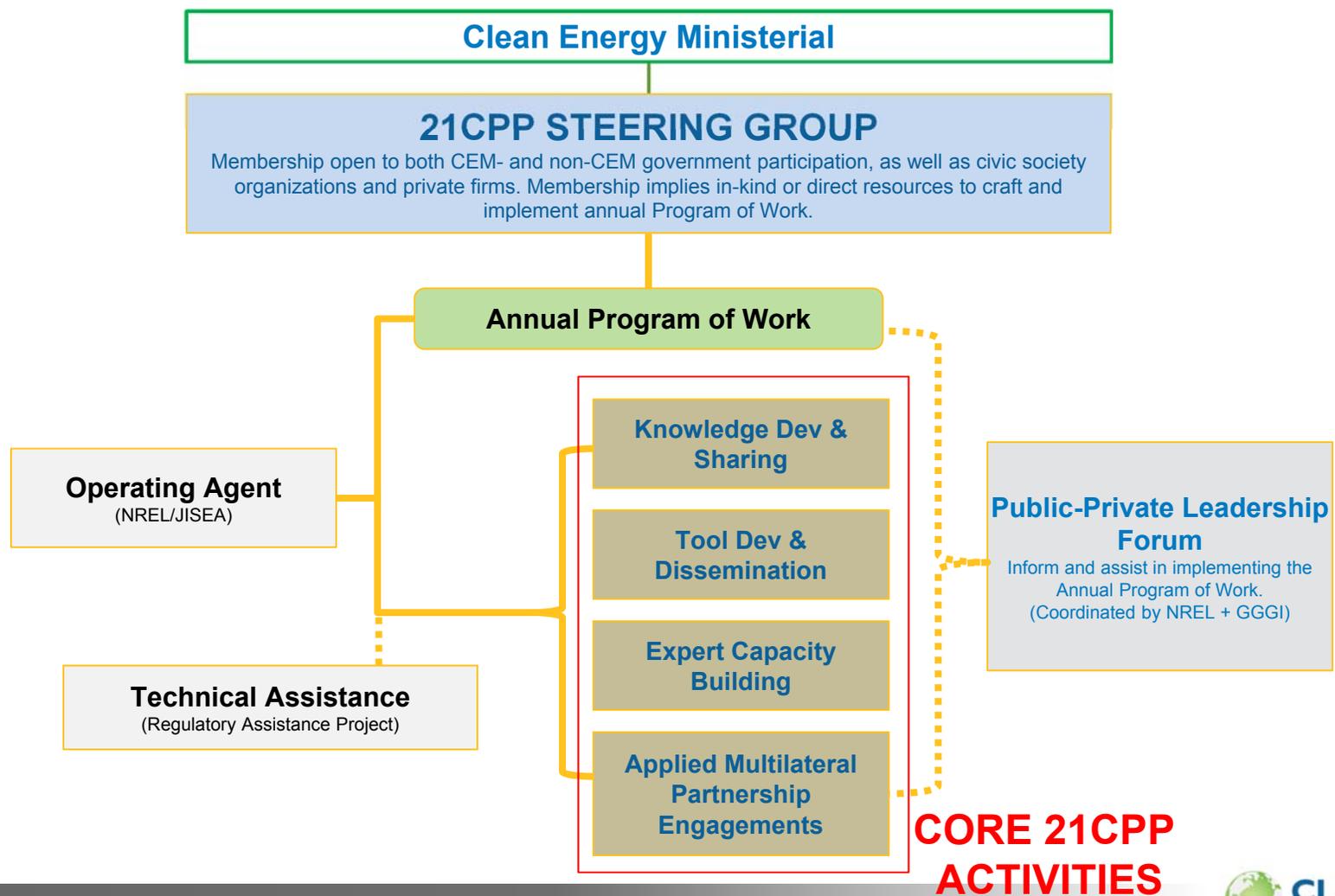


The Partnership aims to synthesize lessons learned from various Clean Energy Ministerial initiatives, and advance integrated policy development through four areas of activity:

<b>Faster Learning</b>	<b>Developing and sharing knowledge</b> on key topics related to power system transformation.
<b>Better Tools</b>	<b>Strengthening and disseminating technical tools</b> to accelerate policy and regulatory analysis.
<b>Capacity Building</b>	<b>Bolstering the capacity of experts</b> to advance the policies, programs, and practices.
<b>Meaningful Partnerships</b>	<b>Establishing applied multilateral partnership engagements</b> to leverage knowledge, tools, and capacity.

# 21CPP Organization and Activities

The 21CPP is guided by a multilateral steering group, in consultation with a Public-Private advisory board, and collaborates in the development of an annual program of work.



# Core 21CPP Resources & Capabilities

## Leveraging synergies across CEM Initiatives:



**Multilateral Solar and Wind Working Group**



**International Smart Grid Action Network**



**Super-Efficient Equipment and Appliance Deployment**



**Global Superior Energy Performance Partnership**



**Clean Energy Solutions Center**

## Networking External Resources:

**Global affiliate network of technical and policy experts**

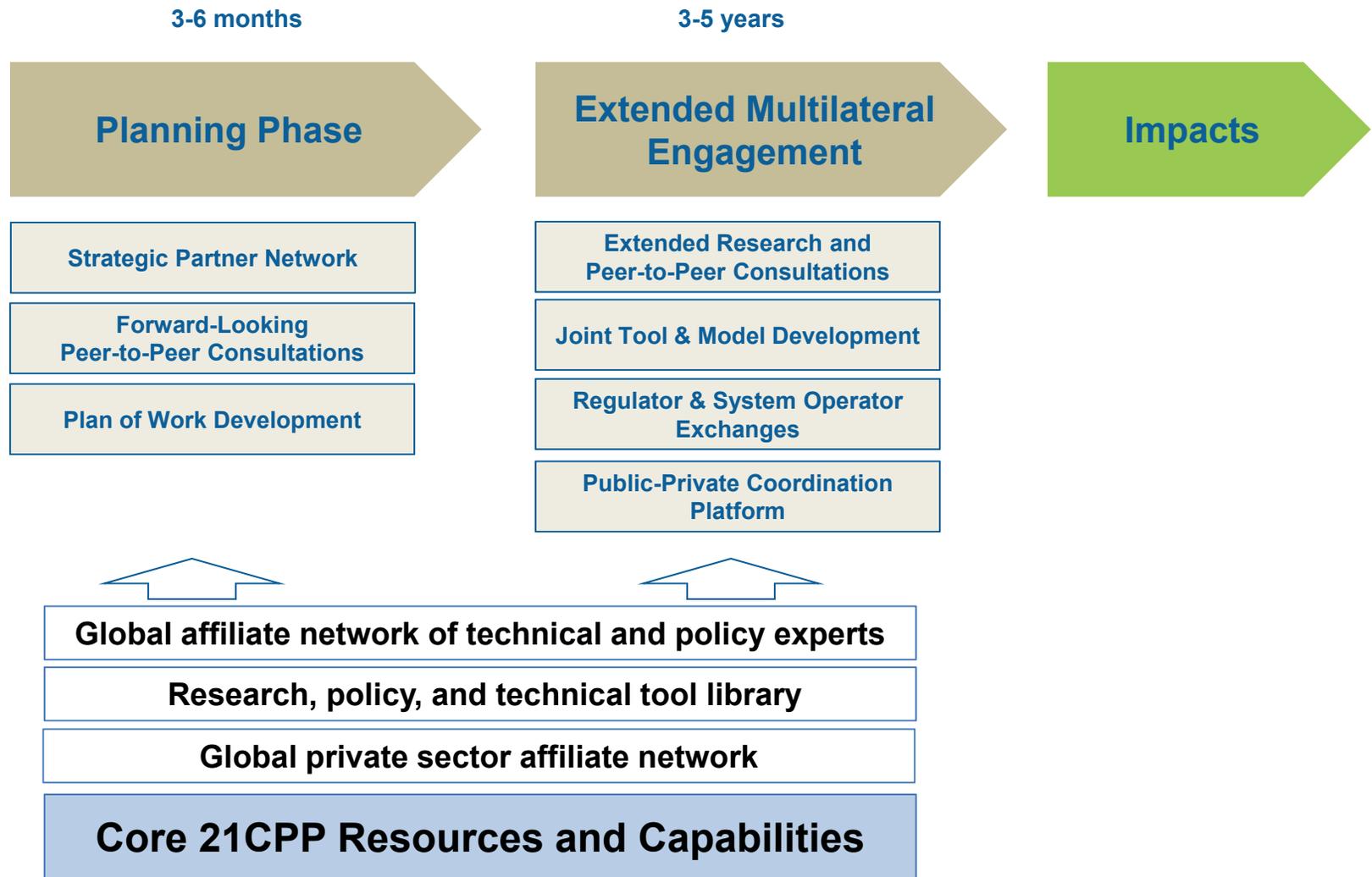
**Global private sector affiliate network**

**Research, policy, and technical tool library**

# Indicative 21CPP Activities

Developing and Sharing Knowledge	Strengthening and Disseminating Tools	Bolstering the Capacity of Experts	Applied Multilateral Engagements
<ul style="list-style-type: none"> <li>• Review of policies and market design elements</li> <li>• Case studies of energy-sector transformation strategies</li> <li>• Review of challenges and best practices</li> <li>• Review of RE, EE, and smart grid integration methodologies</li> </ul>	<ul style="list-style-type: none"> <li>• Cost-benefit analysis tools</li> <li>• Modeling efforts focused on capacity-constrained grids</li> <li>• Enhanced resource forecasting, demand response, and variable renewable control tools.</li> </ul>	<ul style="list-style-type: none"> <li>• Grid operator exchanges to share case studies</li> <li>• Multi-stakeholder regulatory exchanges, focusing on utility-sector and consumer issues</li> <li>• Financial sector exchanges to examine critical factors in promoting investment</li> </ul>	<ul style="list-style-type: none"> <li>• Multi-year, multi-lateral consultations</li> <li>• Leverage global team of experts to support national and subnational policy and regulatory developments.</li> <li>• Provide ongoing, tailored decision support</li> </ul>

# Indicative Applied Multilateral Engagement



## Current Range of Initial Consultations

### **Reports and Workshops on Evolving Approaches to Grid Management and Market Operations for Integrating Variable Renewable Energy**

GEOGRAPHIC SCOPE: INDIA



### **Large-scale Grid Integration Of PV In Low- And Medium-Voltage Networks**

GEOGRAPHIC SCOPE: CHINA



### **Report and Workshops for State-Level Policy Makers on Energy Efficiency Evolving Approaches**

GEOGRAPHIC SCOPE: SOUTH AFRICA

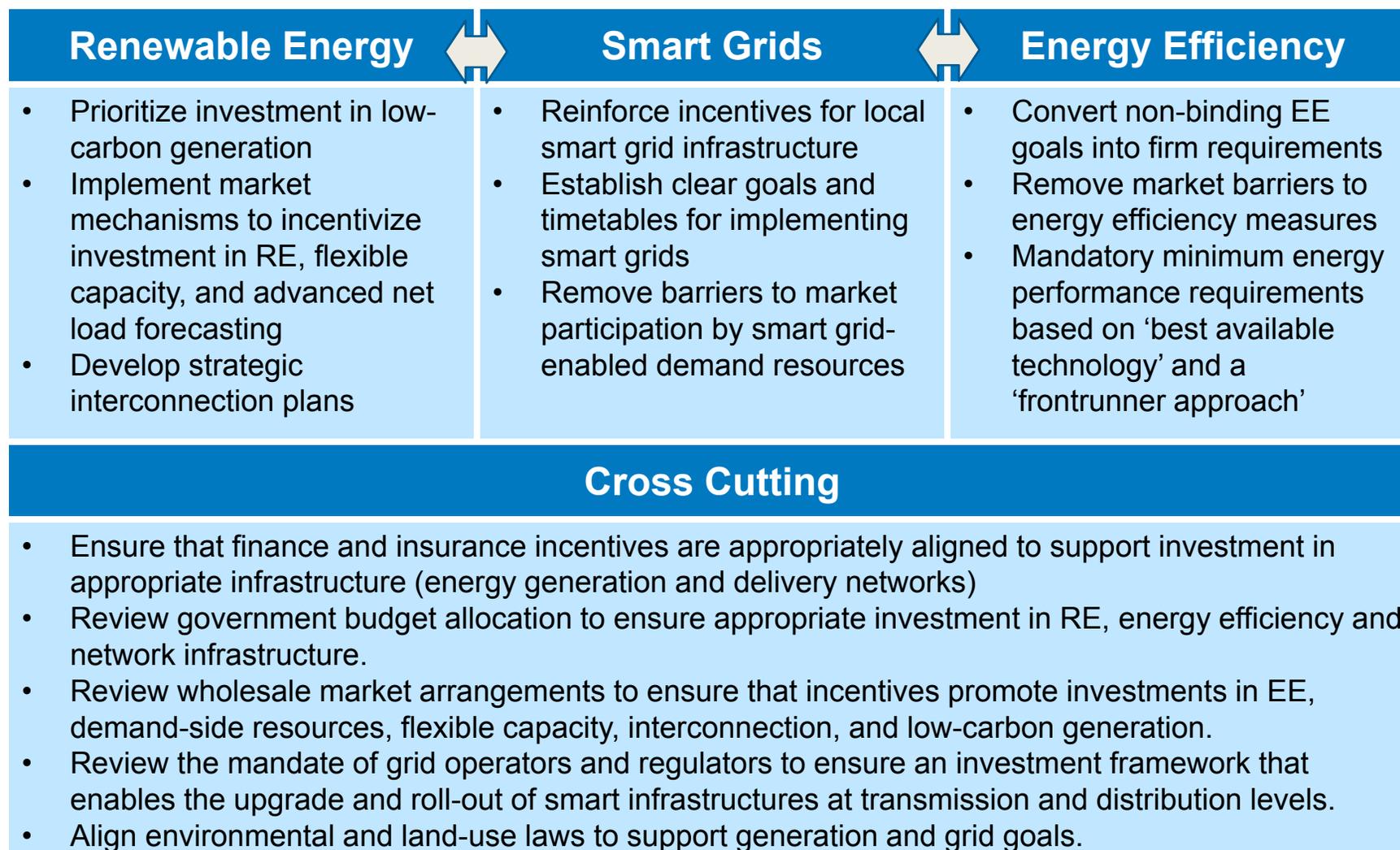


### **Multilateral Knowledge Exchanges on Reliability and Non-Technical Losses**

GEOGRAPHIC SCOPE: UNDER DEVELOPMENT



# Charting a path to Integrated Policy Frameworks



## Potential Areas for Collaboration: Core Resources & Capabilities

### 1. **Strengthening the 21CPP Global Affiliate and Private Sector Networks**

The growing diversity of international experience and expertise will enrich the research, tools, and expert assistance available to key decision makers in emerging economies.

### 2. **Implementing a Coordinated Programme of Work**

The network of affiliate organizations will engage in development of the annual 21CPP work plan as a means to coordinate resources and leadership on critical power sector topics.

### 3. **Establishing a 21CPP Research, Policy, and Technical Tool Library**

Organizing resources will accelerate the use of best practices in power sector policy making. The 21CPP library offerings will include power market design legislation, tariff-setting proceedings, energy efficiency legislation, smart grid regulatory proceedings, grid interconnection plans, and demand response technical specifications.

## Potential Areas for Collaboration: *Applied Multilateral Engagements*

### **1. *Extending Partnership to New Countries***

Opportunities to partner are always welcome.

### **2. *Joint Development and Enhancement of Analytical Tools***

In conjunction with private-sector partners, the Partnership aims to identify and address needs for new tools (or for enhancements to existing tools) commonly used for analysis, planning, and management in the electricity sector.

### **3. *Innovating Policies to Support Novel, Viable Power System Business Models***

Opportunities for existing businesses and new entrepreneurs will be significantly enabled (or possibly constrained) by local and regional policy regimes.

Understanding policy regimes that support and accelerate the transition to clean, smart, efficient, affordable, and reliable electricity will help inform decisions that enable innovative solutions (and in some cases disruptive innovations).