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Regulatory Reflections

ESMAP Conference on the Integration of Variable RE into Power Grids – By Ronald Chauke – 21 October 2014

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Legislative Landscape

- **1998 Energy White Paper**
  - ✓ Diversification on energy supply options
- **Electricity Regulation Act of 2006**
  - ✓ **Section 34(1) -** The Minister may, in consultation with the Regulator-

(a) determine that new generation capacity is needed to ensure the continued uninterrupted supply of electricity;

(e) require that new generation capacity must-

(i) be established through a tendering procedure which is fair, equitable, transparent, competitive and cost-effective;

(ii)provide for private sector participation.

Legislative Landscape (Cont...)

- **New Generation Regulations I & II**

  The objectives of these regulations include the regulation of entry by a buyer and an independent power producer (IPP) into a power purchase agreement (PPA); the facilitation of fair treatment and the non-discrimination between IPP generators and the buyer

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Legislative Landscape (Cont...)

- Section 16(1) of ERA mandates NERSA to approve prices, charges and tariffs that enable an efficient licensee to recover full costs of its licensed activities including a reasonable margin or return.

Legislative Landscape (Cont...)

- Electricity Regulation Act 2006
  - ✓ 4(a)(iv) – The Regulator must "*Issue rules designed to implement the national government's electricity policy framework, the IRP and this Act*" .

Legislative Landscape (Cont...)

- Electricity Pricing Policy (Notice 1398 of 2008) -
  - ✓ NERSA may approve a framework to expedite the determination and approval of prices from supply options;
  - ✓ … “renewables could be introduced at a price premium relative to non-renewables, subject to approval by NERSA”.

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Regulatory instruments

- Revised Grid Code Requirements for Wind Energy Facilities connected to the Dx and Tx systems in SA, version 5.4 (approved by NERSA Board on 11th July 2012);
- Grid Code for Renewable Energy Power Plants (RPPs) connected to the Electricity Transmission or Distribution System in South Africa (Version 2.6) - approved by NERSA Board during November 2012); and
- Drafting of Dispatch Rules underway

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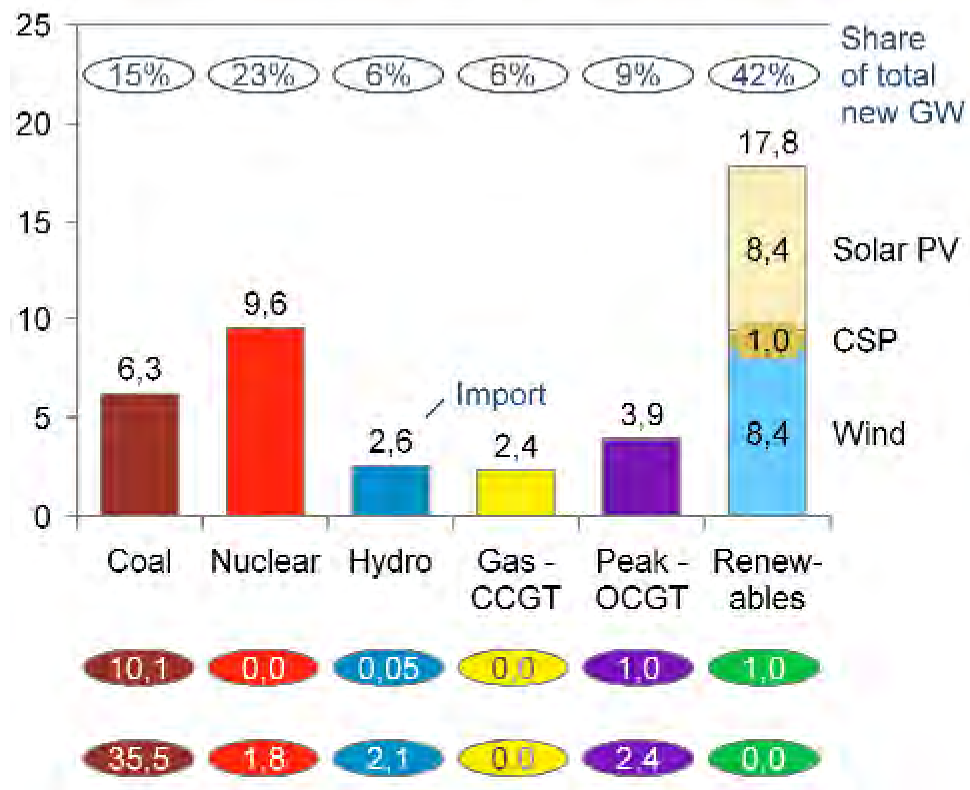
Policy Direction

- The Department of Energy promulgated a 20 year Electricity Generation Plan, viz. the Integrated Resource Plan (IRP) – outlining the future energy mix.

- As per the IRP2010-2030 – it is envisaged that contributions per each source will be:
  - ✓ coal = 46%;
  - ✓ renewable energy = 26%;
  - ✓ nuclear = 13%;
  - ✓ open cycle gas turbines 8%;
  - ✓ pumped storage 3%; and
  - ✓ combined cycle gas turbines 3%.

IRP2010 RBS – Re allocations



NERSA
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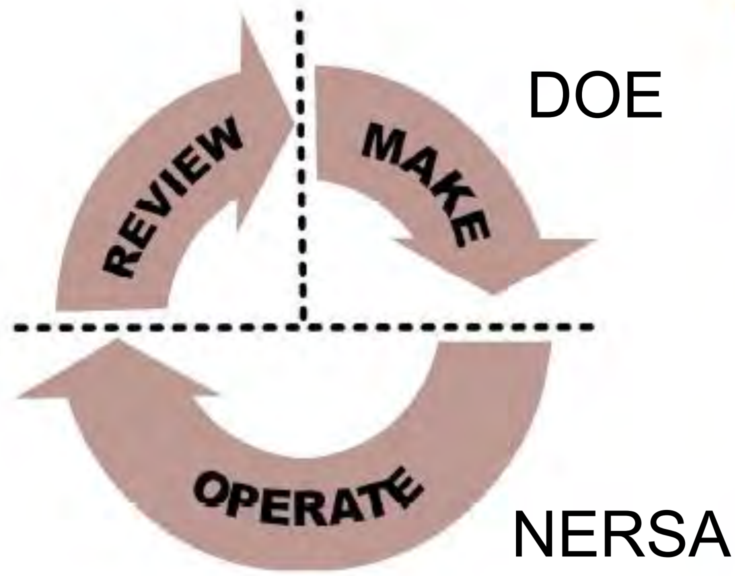
Role of the Energy Regulator in Context

Process Flow:

- **Make Regulation**– In South Africa context, it is the prerogative of Policy makers
- **Operate** – administering and enforcing regulation is the mandate assigned to the Energy Regulator (NERSA)
- **Review** – assessing regulatory impact and effecting any adjustments required (DOE/NERSA).



Role of the Regulator

- Licence and Register Generators, Distributors (including Municipalities), Traders and Importers and Exporters
- Regulate Prices and tariffs
- Monitor Compliance with Licence conditions
- Issue rules designed to implement the national government's Electricity Policy Framework, the Integrated Resource Plan and the ERA
- Establish and manage monitoring and information systems
- Enforce performance and compliance
- Mediate disputes
- Undertake investigations

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Role of the Regulator (Cont…)

- Policy implementation
- Issue Licences with conditions that are responsive to industry developments – Codes, standards, etc.
- Compliance monitoring and enforcement
- Market Rules – incl. Third party access
- Set Tariffs – incl. Methodologies
- Cost Recovery Mechanisms
- Renewable Feed-In Tariffs
- Dispute resolution
- Dispatch Rules
- Quality of Supply.

Role of the Regulator (Cont…)

- Keep abreast with the realities associated with the evolution of the Integrated Power System (IPS).
- Monitor the pace of the deployment of variable renewable energy (VRE) sources and IPS' technical and operational implications.
- Anticipate issues that may arise in the future, and extrapolate regulatory lessons from other countries, especially the high penetrations of VRE case studies.
- Acknowledge the fact that based on international experience, there is not a '*one-size-fits-all approach*' to the regulation of VRE.

Role of the Regulator (Cont…)

- Keep abreast with the many variables that shape the issues that arise in any given context, especially power system characteristics, geographic and spatial availability of VRE resources, institutional organization of the power system, public policy goals and the political economy of power system issues.

Role of the Regulator

- Industry protocols that ensure smooth integration of renewables (incl. wind) in the form of standards such as IEC 61400-21, IEE519-1992 – hence, revisiting these regulations/standards from time to time based on the experience gained from the previous regulatory frameworks can help improve the quality of power, e.g. from the wind energy conversion system (WECS).
- Revenue allowances to utilities and IPPs to invest in capital expenditure for smart technologies (including grids, monitoring equipments that could pre-detect faults and power quality on the network, etc.).

Trade offs vs Balancing Act

- Security of Supply
  - Sufficient electricity to meet demand
- Environment
  - Climate change mitigation
- Economic Efficiency and Cost
  - Infrastructure development
  - Globally competitive electricity supply chain are key drivers of macro-economic development.

Categories of VRE Regulation

VRE Generation	Grid Infrastructure
Resource Adequacy	Flexibility

VRE Regulation

- **Facilitating New VRE Generation** – via mechanisms such as setting cost reflective tariffs, grid codes and interconnections. New VRE generation is typically driven by policy or economic factors. These regulatory functions can strongly influence the pace of new VRE deployment.
- **Ensuring Adequate Grid Infrastructure** – transmission development plans and system integration/third party access. Network user charges can significantly alter VRE project economics and can be designed to advance policy goals. Regulators shape the grid investment landscape, via cost allocation and cost recovery.

VRE Regulation (Cont…)

- **Ensuring Short term security of supply (flexibility)** – encourage power system flexibility of which is key in the integration of VRE into power systems, especially as levels of deployment grow. Demand response initiatives and performance characteristics/validation and compensation mechanisms.
- Significant penetration of VRE brings increased variability and uncertainty to power system operations. Regulators play a crucial role in employing strategies that ensure system flexibility in a cost-efficient manner, such as encouraging the integration of forecasting into system operations and encouraging investment in flexible demand and supply side resources.

VRE Regulation (Cont…)

Regulatory priorities evolve and issues become interdependent as shares of VRE increase. For example:

- In early stages (normally less than 5% of annual penetration) regulatory concerns typically center on the establishment of mechanisms for procuring new RE generation and defining interconnection standards. Complex system integration issues are of a lower priority at these stages.

VRE Regulation (Cont…)

- In intermediate stages (typically between 5%-20% VRE penetration) regulatory concerns increasingly center on the interactions between VRE and existing systems, such as how to achieve cost-efficient planning for grid expansion, how to identify VRE integration needs and evaluate costs, and how to allocate various charges to specific parties/actors.

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VRE Regulation (Cont…)

- In advanced stages (as VRE generation surpasses 20% of annual generation) regulatory concerns increasingly focus on the evolution of the entire power system, such as significant changes to institutional arrangements, grid infrastructure, conventional generation assets, demand elasticity and interactions with neighbouring systems, which can complicate regulatory initiatives.

VRE Regulation (Cont…)

- **Ensuring Long-term security of supply (resource adequacy)** – incorporating of VRE into resource planning and managing potential impacts on the economics of other resources in the system. Investment incentives and business model evolution for conventional thermal generators, and risk allocation between generators and load.

VRE Regulation (Cont…)

- Given the diversity of power systems globally, and the interdependency between regulatory options and system context, establishing universally applicable rules for regulation of VRE is not feasible.

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VRE Regulation (Cont…)

- While these unique technical characteristics are important for regulators to understand that their aggregate impact varies widely and is a function of the unique interactions between the VRE generation profile and the specific power system as well as the market and regulatory context. A 15% penetration of VRE power (measured as a percentage of annual generation) may be easily integrated in one power system while causing significant challenges in another, depending upon a range of factors including resource distribution, market rules, system size, grid reliability, level of interconnection and system operation protocol.

Thank you!!!