Identifying Key Objectives and Benefits for an Integrated National DSM Programme for SA's Electricity Supply System

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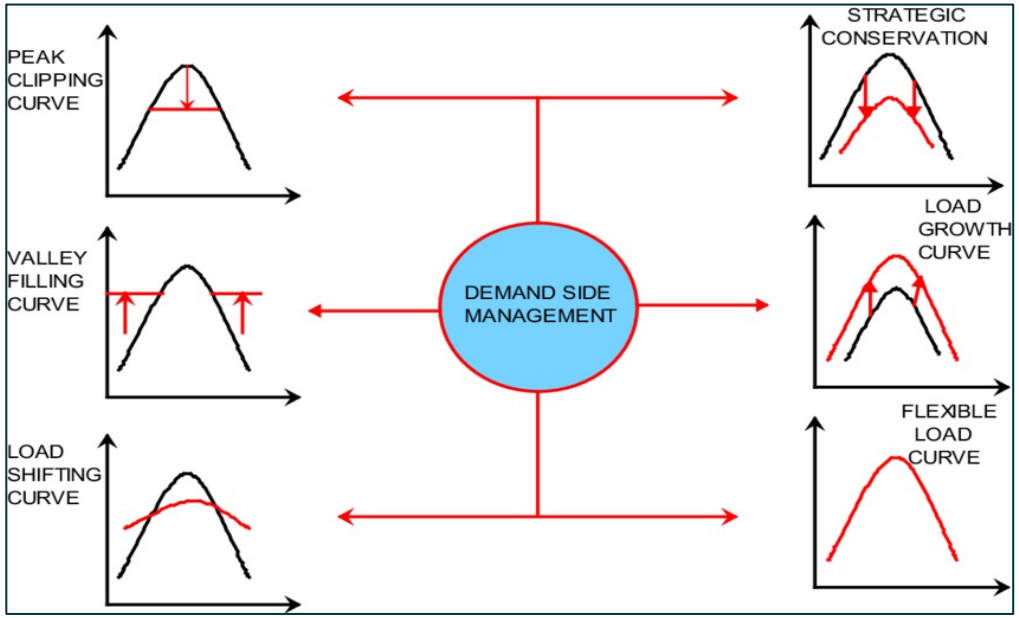
Theo Covary and Stephane de la Rue du Can

Lawrence Berkeley National Laboratory | USAID Energy Efficiency for Development Program

Introduction

- Electricity systems structured towards Gx, TX and Dx – little attention paid to customer side of meter
- Changed during the 1970's oil crisis
  - US introduced legislation IRP (least cost options to meet future demands) 600 utilities, 2 300 programmes (260k GWh) = $14 billion by 1995
  - Europe less intense focus, but a market developed
- Interest waned in the 1990's due to market liberalisation and favourable geopolitics (DSM at odds with market principles)



DSM focused on load management

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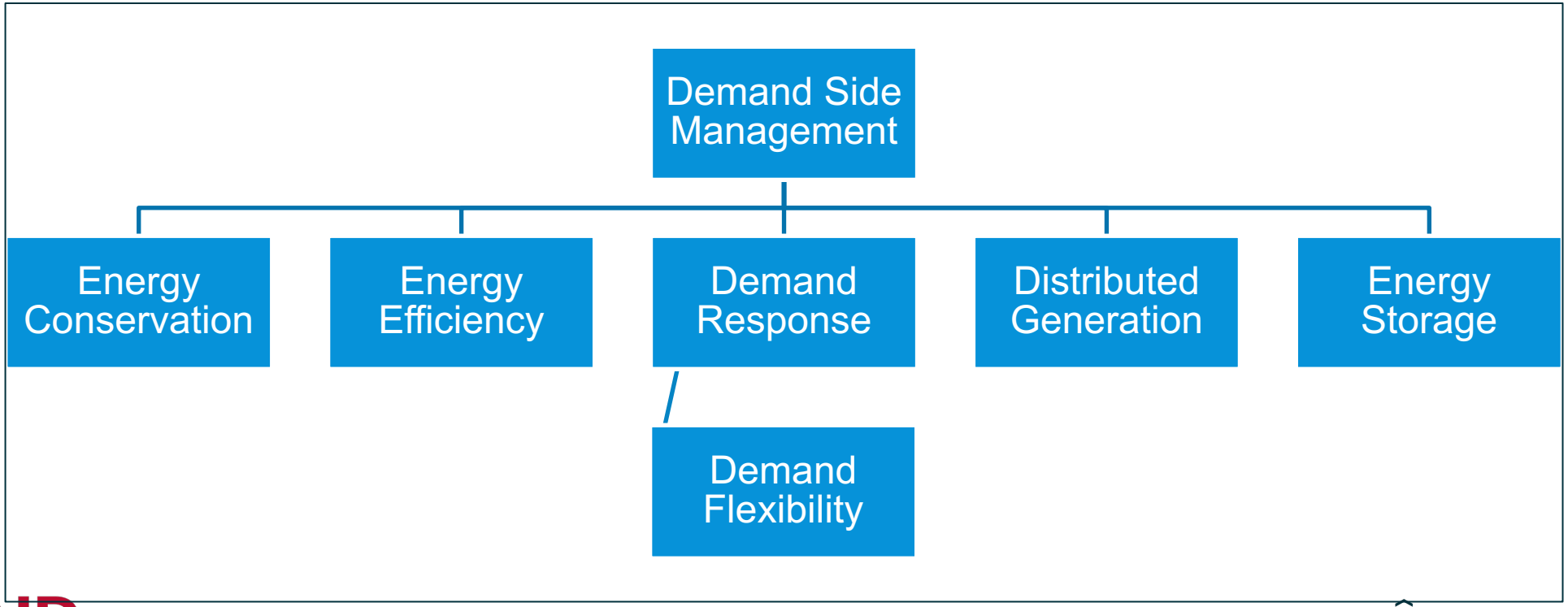
Evolution of DSM

- The multiple benefits of DSM (beyond energy and GHG reductions) is now acknowledged - energy security, poverty, DG, smart grids, RE variability, peak generation, deferring infrastructure (Gx, Tx, Dx), and climate change



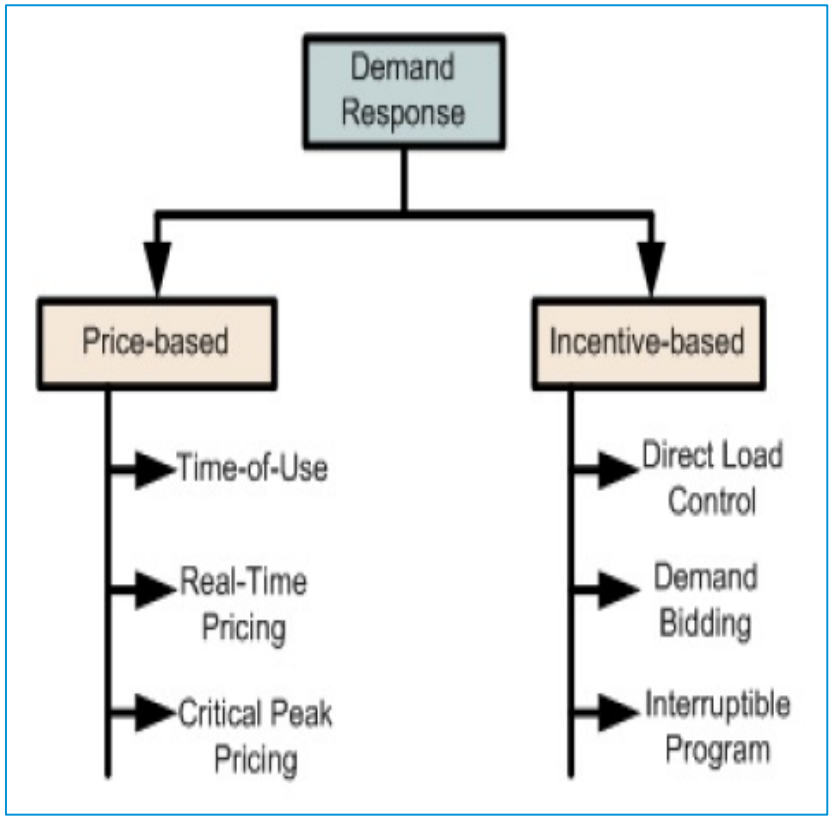
Energy Efficiency

EE = The persistent and maintained reduction in energy consumption required to provide a fixed level of service (Satchwell et al., 2020). Prominent EE examples include:

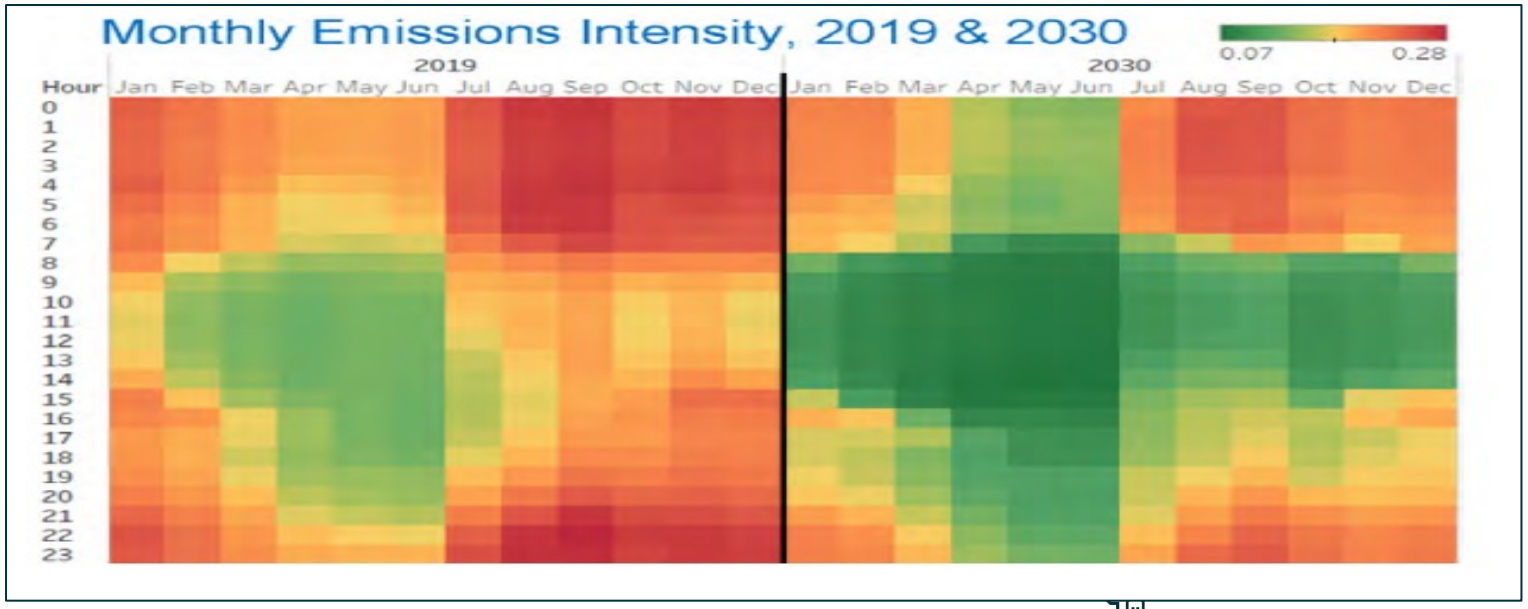
- Standards and Labelling (S&L) Programmes
- Discounts and Free Distribution of EE Technology
- Building Codes and Energy Performance Certificates
- Developing an Energy Services Company (ESCO) Market
- Strengthening Institutional Capacity
- Supportive Policy and Regulatory Frameworks
- Tax and Other Incentives
- Communication and Awareness

Demand Response and Flexibility

DR = Engages consumers to reduce or shift demand during peak periods in response to tariffs or other incentives, to curb system load and avoid capital investments &/or expensive peaking power. Can reduce peak demand in US by 10%.



Utilities (without regulatory obligations) targeted DR (↑ profits) with no EE. This is changing, as above, and because VRE is *reshaping the role and economic value of EE and DR, especially when the grid's carbon output is highest.*



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DSM Utility Policy and Business Models

The traditional utility business model is based on a volumetric approach, where kWh charges recover fixed costs AND operational expenses. This is simple for consumers to understand; aligns with the (incorrect) assumption that the consumer only pays for what they use; and if required, allows large users to subsidize the system costs of smaller (poorer) users

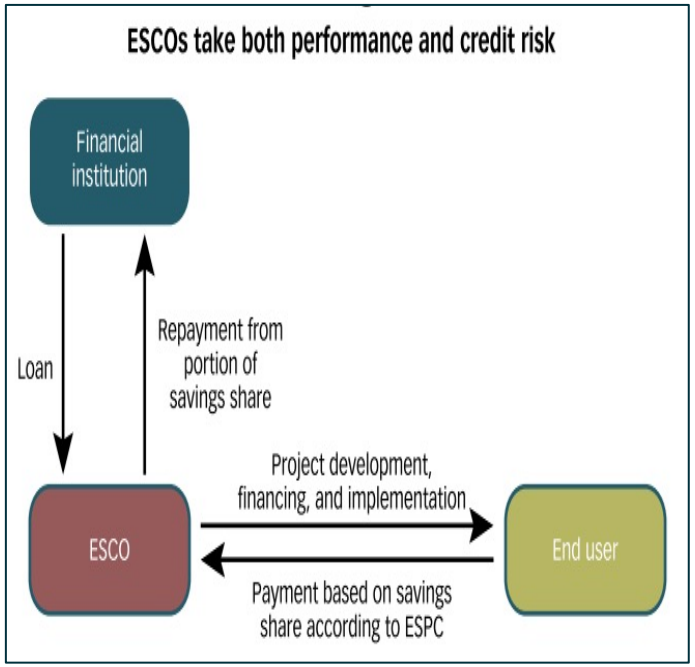
The tariff is set above the marginal cost and profits increase with sales volume, creating a misalignment between the business interest and national agendas of EE and conservation. DSM programmes also cost. Jointly, they create a disincentive which must be addressed to reach full savings potential

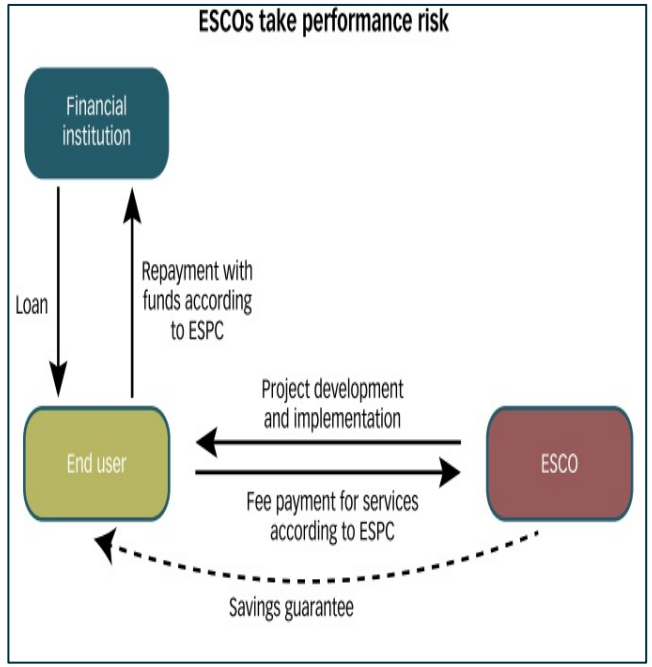
Four options exist

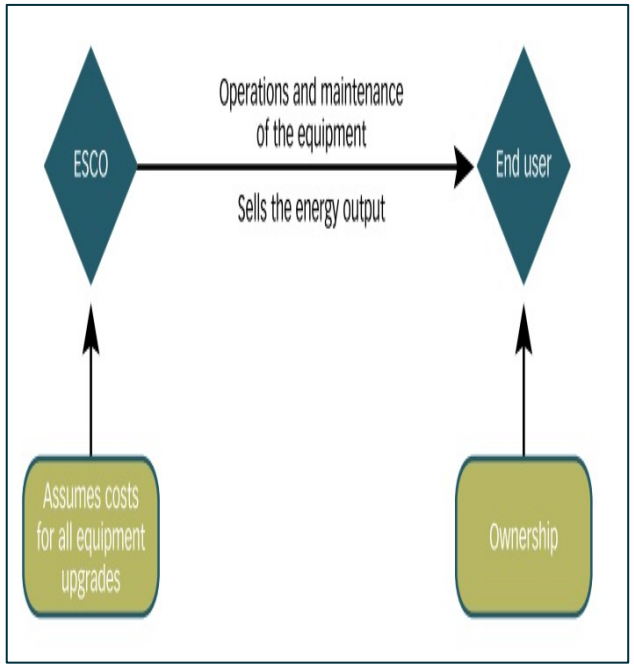
1. Revenue Decoupling severs the link between profits from sales by ensuring the utility can collect an allowed level of revenue each year to eliminate the effect of increased adoption of EE – most effective in state owned or highly regulated utilities. RD must be managed to avoid consequences such as equity

	RD	No RD
Service provider revenue requirement (based on expenses, taxes etc)	115 000 000	
Sales forecast (kWh)	1 000 000 000	
Actual sales	990 000 000	
Tariff (cents/kWh)	0.1154	0.1166
Decoupling allowance	-	0.0012
Actual revenue	114 230 769	115 384 615

2. Capacity market utilization – an existing DR mechanism allowing generators and some consumers to supply power or reduce demand for a fee. Under this version, permanent reductions over the lifetime of new EE measures to provide a determined capacity in a given period
3. Utility obligations require utilities to meet a specified EE outcome, without prescribing the mechanisms or measures to be used. This encourages the most cost-effective way to achieve policy goals. Obligations are funded through energy tariffs and paid for by consumers as part of their energy bills
4. ESCOs 1) Shared savings; 2) Guaranteed savings; and 3) Supply contracting







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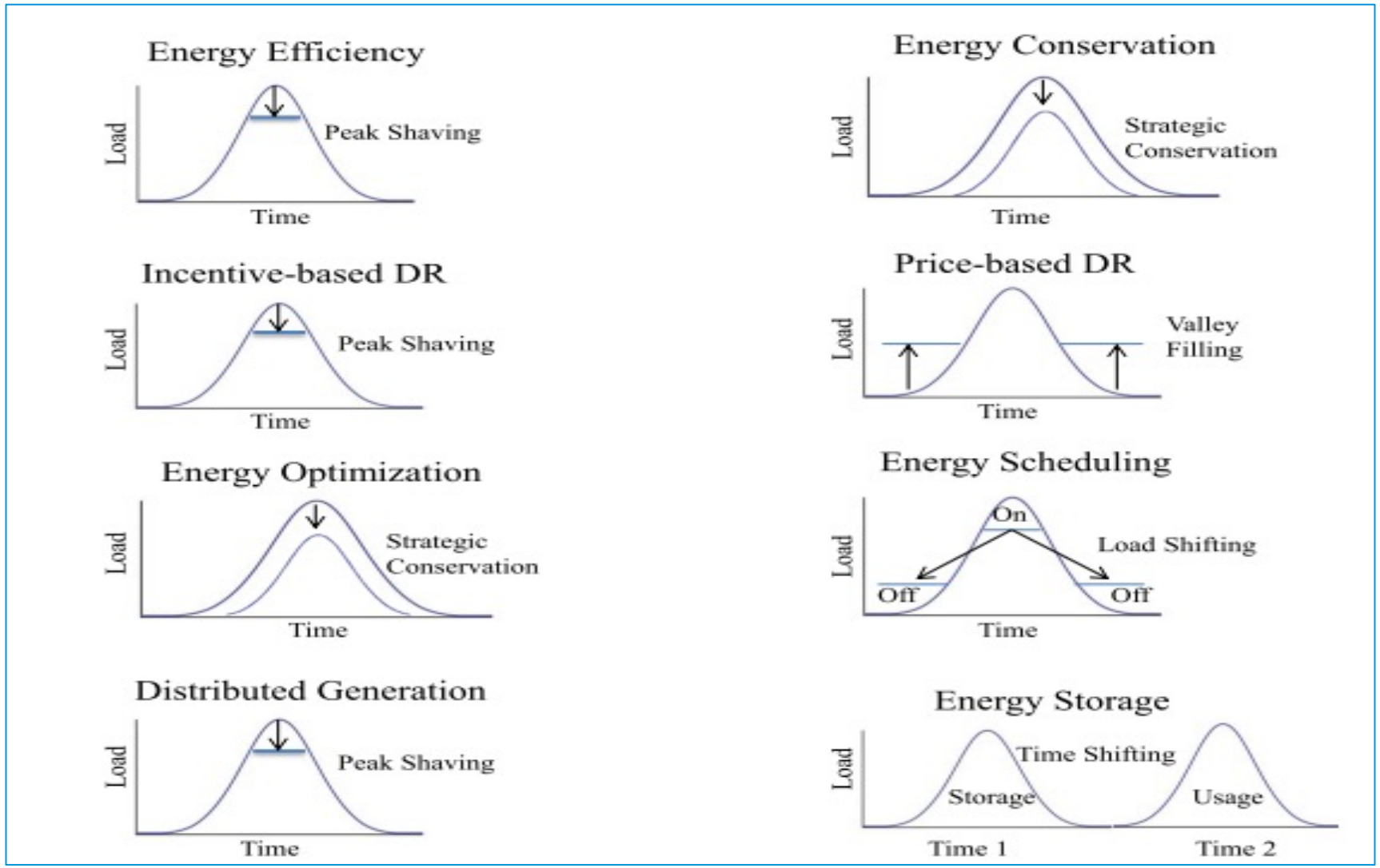
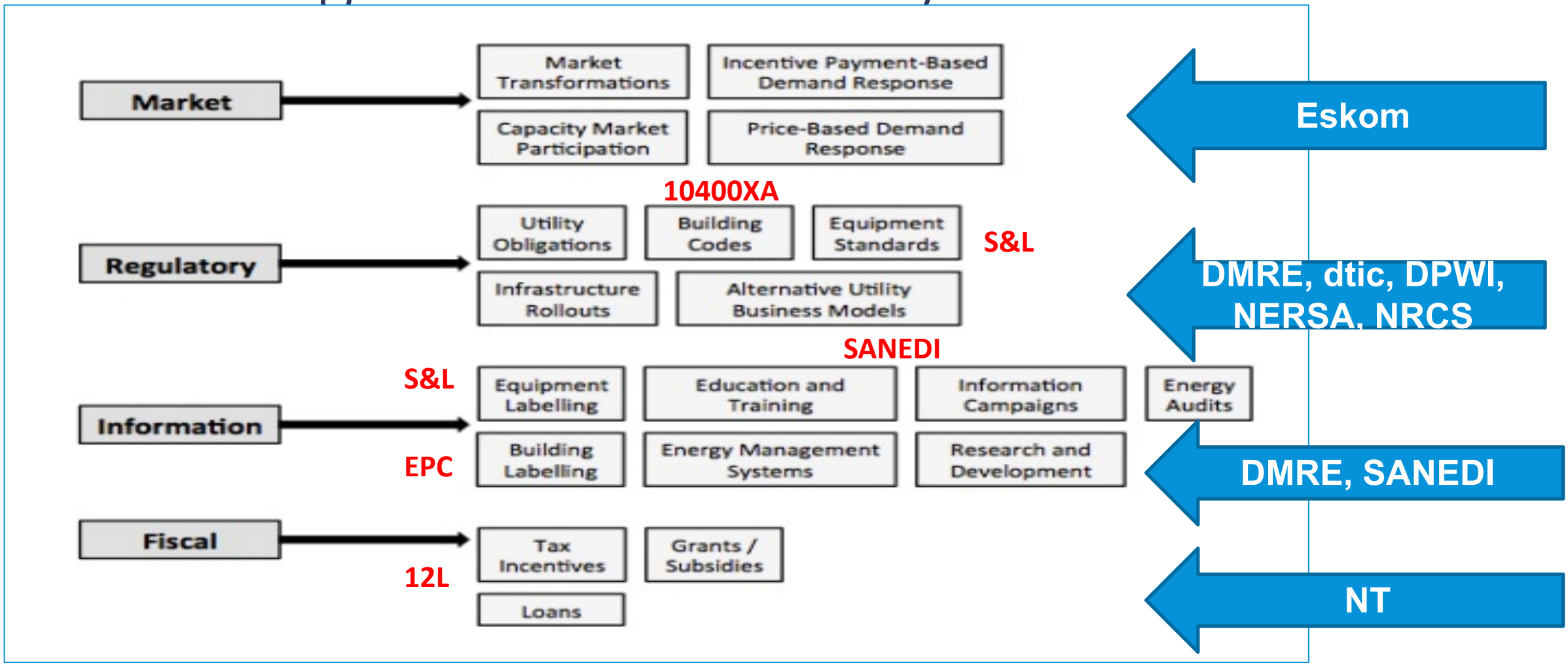
Expanded DSM and Load Shapes



Main Categories of DSM Policy



Conclusion

Next chapters

1. South Africa's ESI, Eskom's IDM programme and its decline
2. Case Studies
    1. India
    2. USA
3. Recommendations and Findings, which considers
    1. Policy framework
    2. Resources required (physical and financial)
    3. Proposed actions and next steps

Thank You

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