

# Distribution Service Providers (DSP) a transformative energy system institution?

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[Catherine.mitchell@exeter.ac.uk](mailto:Catherine.mitchell@exeter.ac.uk)



New Thinking For Energy



# Overview

- Challenges facing energy system
- Opportunities facing energy system
- IGov ideas about transformative governance
- The importance of institutional governance
- Introduction to DSP
  - The generic model
  - New York REV model
  - CA model

Current Challenges to be met in energy system	Opportunities of Change to be Captured
<ul style="list-style-type: none"> <li>• To transfer from the current energy system to a decarbonised one               <ul style="list-style-type: none"> <li>◦ requires ‘new’ energy system which implies new roles (institutions, utilities, customers, providers, intermediaries, business models, etc), new governance and regulatory environment, new value propositions; speeding up</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• New technologies (supply, demand, ICT) enable a more efficient energy system through greater coordination: utilise infrastructure assets more fully; reduce total infrastructure needs; and reduce costs</li> </ul>
<ul style="list-style-type: none"> <li>• Infrastructure (including ICT) has to be upgraded, and paid for</li> </ul>	<ul style="list-style-type: none"> <li>• Ability to meet customer wishes and develop new business models to do so</li> </ul>
<ul style="list-style-type: none"> <li>• Need to keep prices as low as possible for customers</li> </ul>	<ul style="list-style-type: none"> <li>• New institutional ops to keep prices as low as possible for customers</li> </ul>
<ul style="list-style-type: none"> <li>• Have to keep up with change: decentralisation, rapidly changing technology costs, system economics and operation enabled by ICT, customer and civil society preferences, varying incumbent v new entrant wishes</li> </ul>	<ul style="list-style-type: none"> <li>• Ability to be more resilient to change – whether weather, technologies, customer preferences, policy requirements – and to be more flexible and nimble</li> </ul>
<ul style="list-style-type: none"> <li>• Altering where value currently is in system to where we need it to be to enable innovation</li> </ul>	
<ul style="list-style-type: none"> <li>• Attracting appropriate investment</li> </ul>	

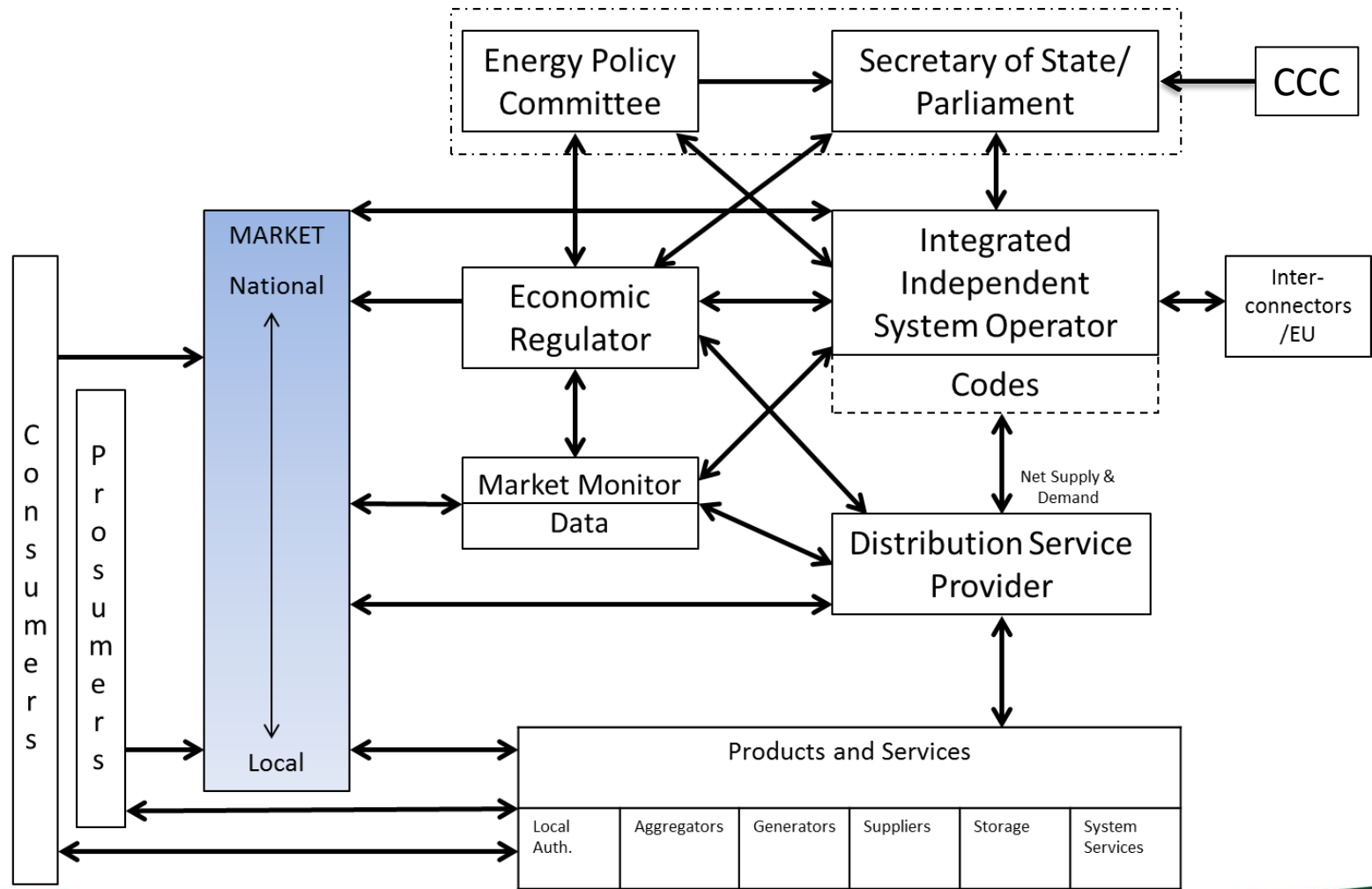
# IGov beginning to have some idea of transformative governance

- There has (arguably) been very few transformative energy policies / governance since 1970's:
  - RE and CHP policies in Denmark in response to oil crises in 1970s
  - PURPA Act in CA in 1970's again in response to oil crises
  - FITs in Germany in 1990/1;
  - Nuclear phase out in Germany?
  - NEM and / or DSR in some US States?
- Leading to structural, dynamic change which better meets policy goals and society's preferences

# And what characterises those transformative measures....

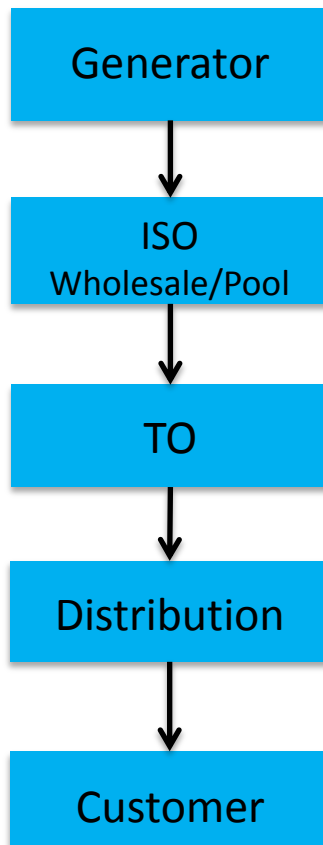
- The decision-makers understood the energy system challenges they were dealing with at the time, then
  - Knowingly dealt with the current challenges
  - Enabled more choice for customers (all types) / new entrants, and thereby gave them more influence
  - Overcoming inertia
  - Kept up with technological and social change and preferences
  - Assessed cost/benefits in ways beyond straight CBA
  - **Enabled the means to capture the new opportunities ie provided value or removed barriers**

# Importance of Institutional Framework – eg GB – IGov argues it deals with challenges; enables opportunities to be captured; and fits with transformative characteristics and has DSP in there

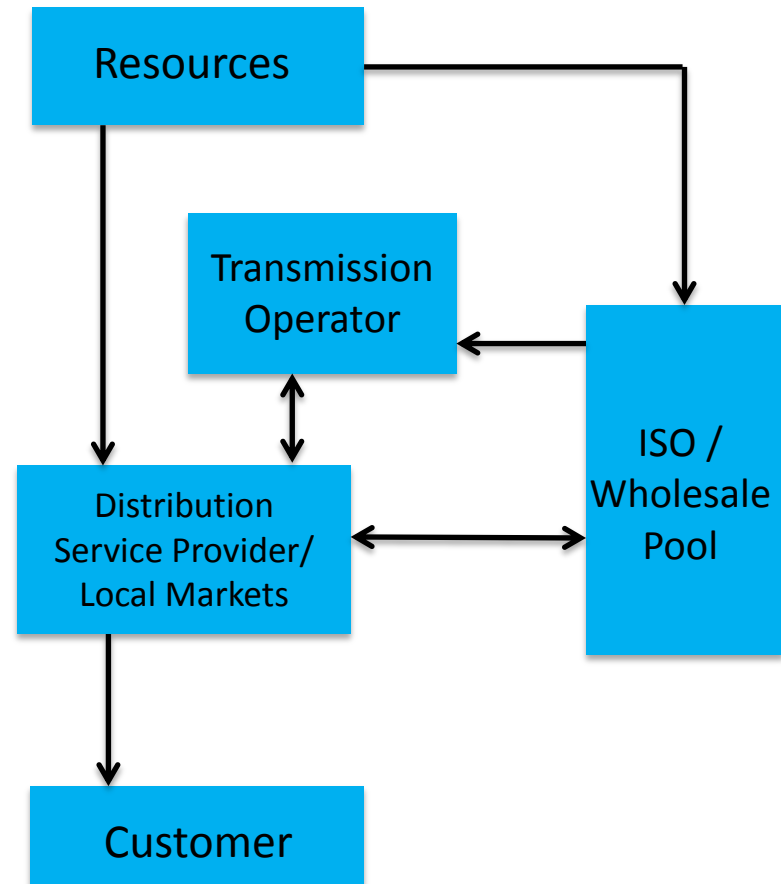


# At a high level – a DSP alters institutional architecture and adds a new value proposition

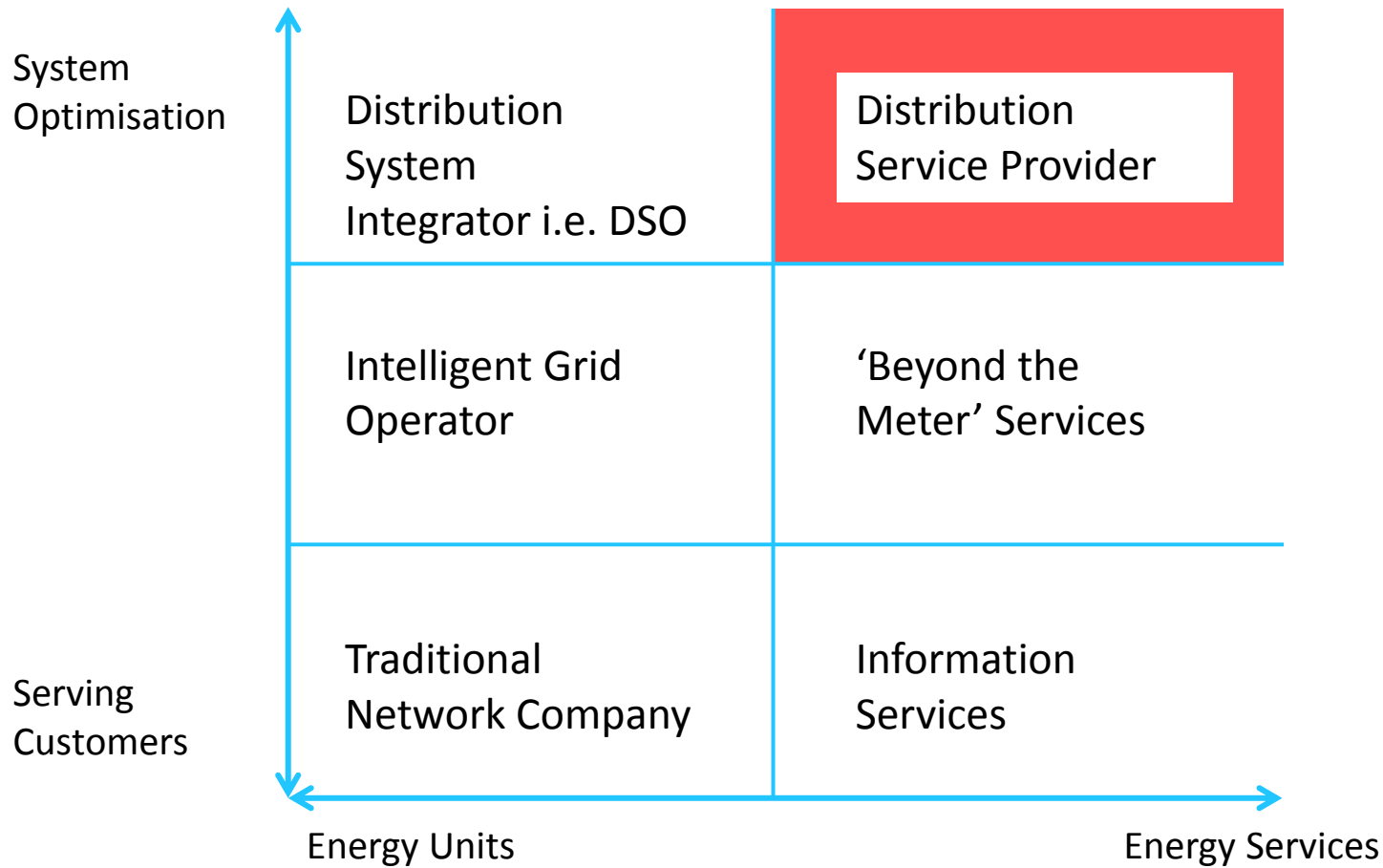
## Traditional



## NY REV



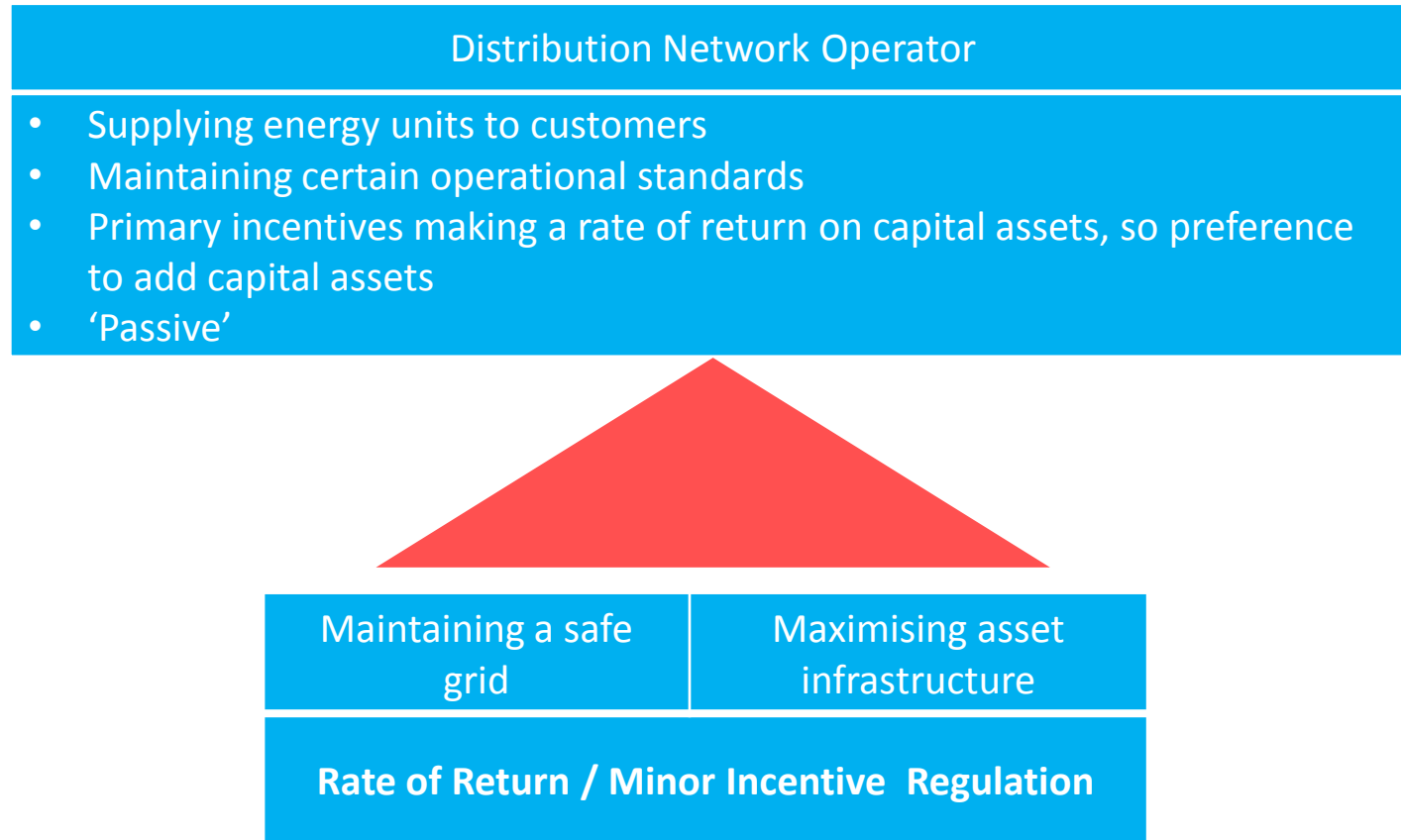
# DSP provides both energy and system services, unlike DSO. Enables and balances local supply and demand of DER.



Source: Adapted from CSIRO and Energy Networks Association 2015, Electricity Network Transformation Roadmap: Interim Program Report



# How is a traditional distribution network utility regulated?



Source: Adapted from CSIRO and Energy Networks Association 2015, Electricity Network Transformation Roadmap: Interim Program Report

# How would a generic Distribution Service Provider be regulated?

## Distribution Service Provider

- Integrating all types of DER via increased system and energy efficiency
- Enabling customers to provide and be paid for services to D-grid
- Facilitating services between 3<sup>rd</sup> party providers and customers
- Reveal value
- Becoming 'active'

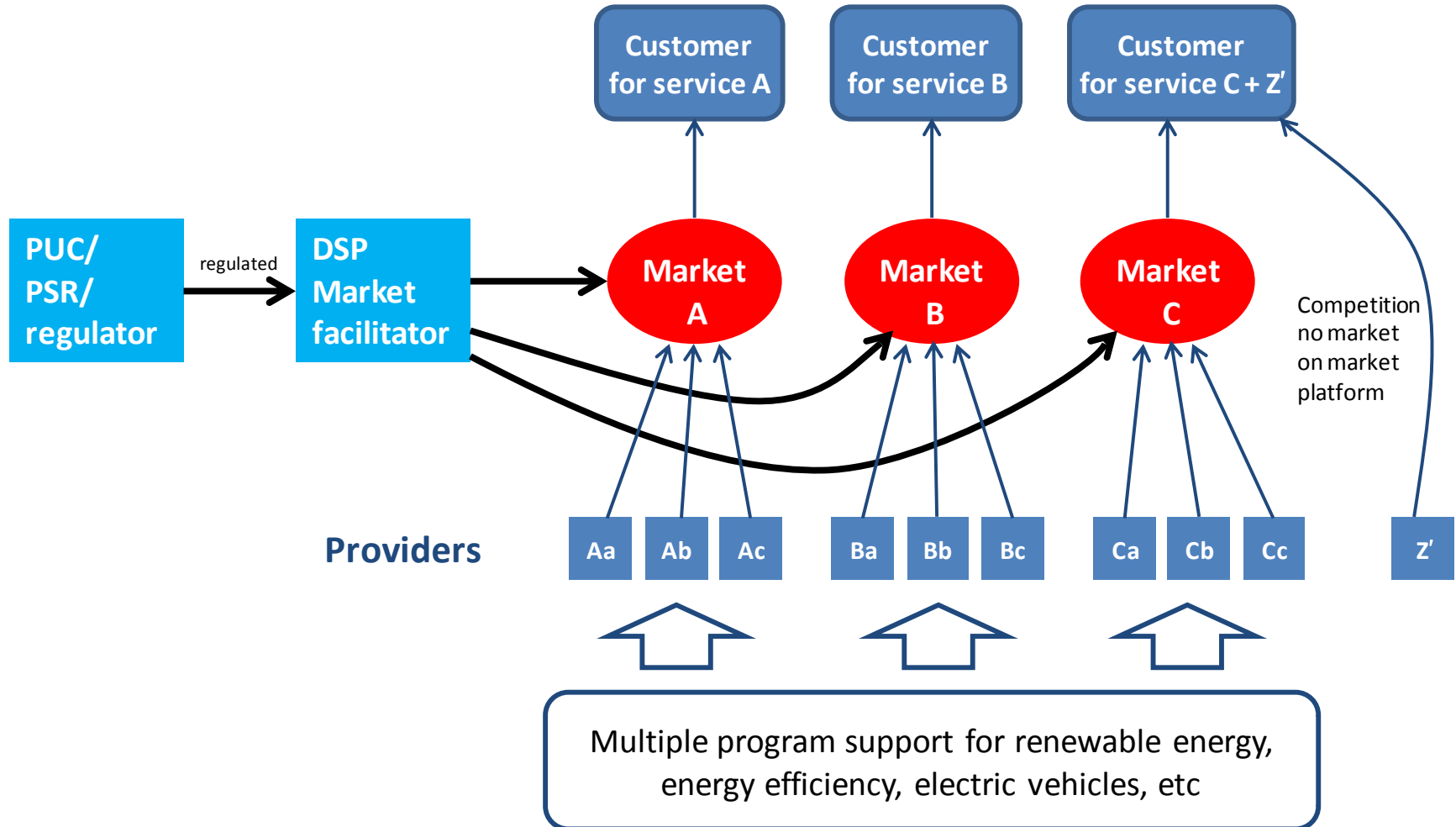


Maintaining a safe & resilient grid	Increasing system efficiency	Optimising infrastructure	Support/enable public policies	Enabling highly reliable & resilient energy services	Bring forward cost-effective ways of achieving outcomes	Provide transparent data
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Higher proportion of Performance Based Regulation to Revenue

Source: Adapted from CSIRO and Energy Networks Association 2015, Electricity Network Transformation Roadmap: Interim Program Report

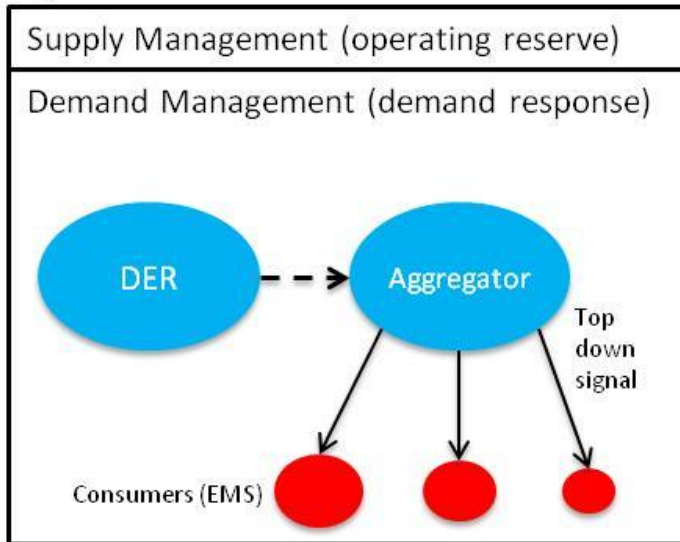
# What is the generic DSP model?



# Practice versus Theory – what does a DSP allow that is valuable? bottom-up, coordinated operational efficiency

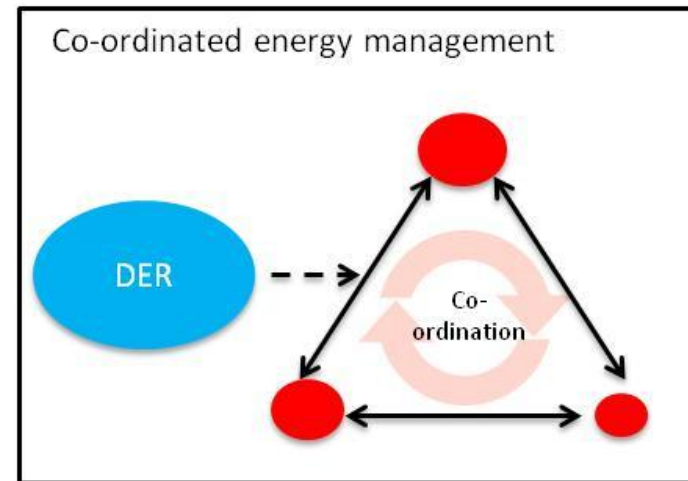
Supply-side

Demand-side



## Demand Management from supply-side

- Actors do not communicate
  - No control feedback
- Cluster of single actor best effort
- Limited control ability



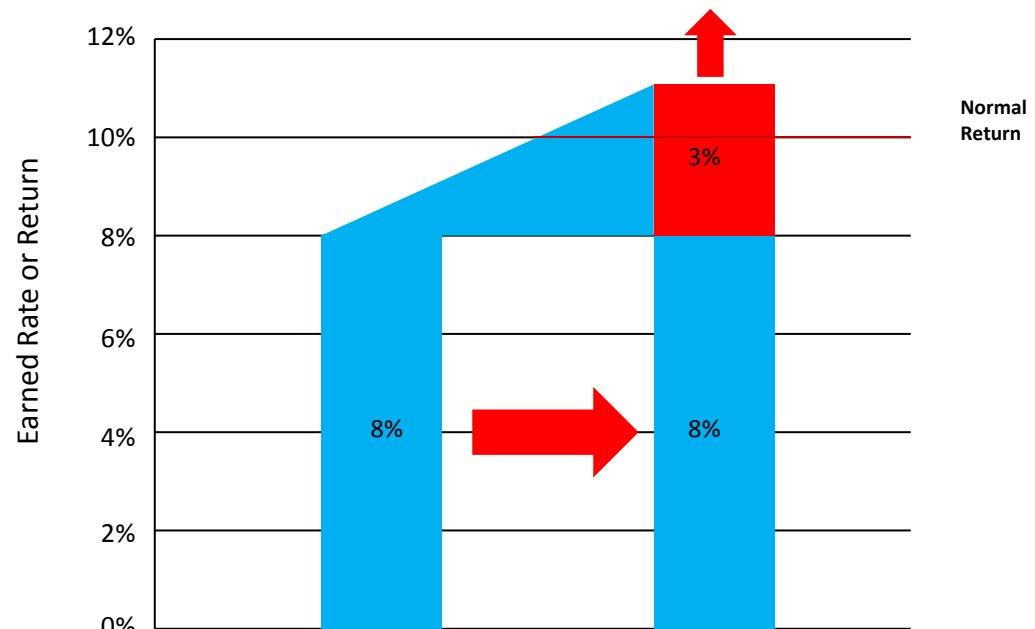
## Demand Management from demand-side

- Actors communicate to coordinate
  - control feedback
- Community best effort
- Higher control ability

# The value idea: the DSP could make a higher return if it met PBR goals but overall energy system cost to customers would be lower with increased services

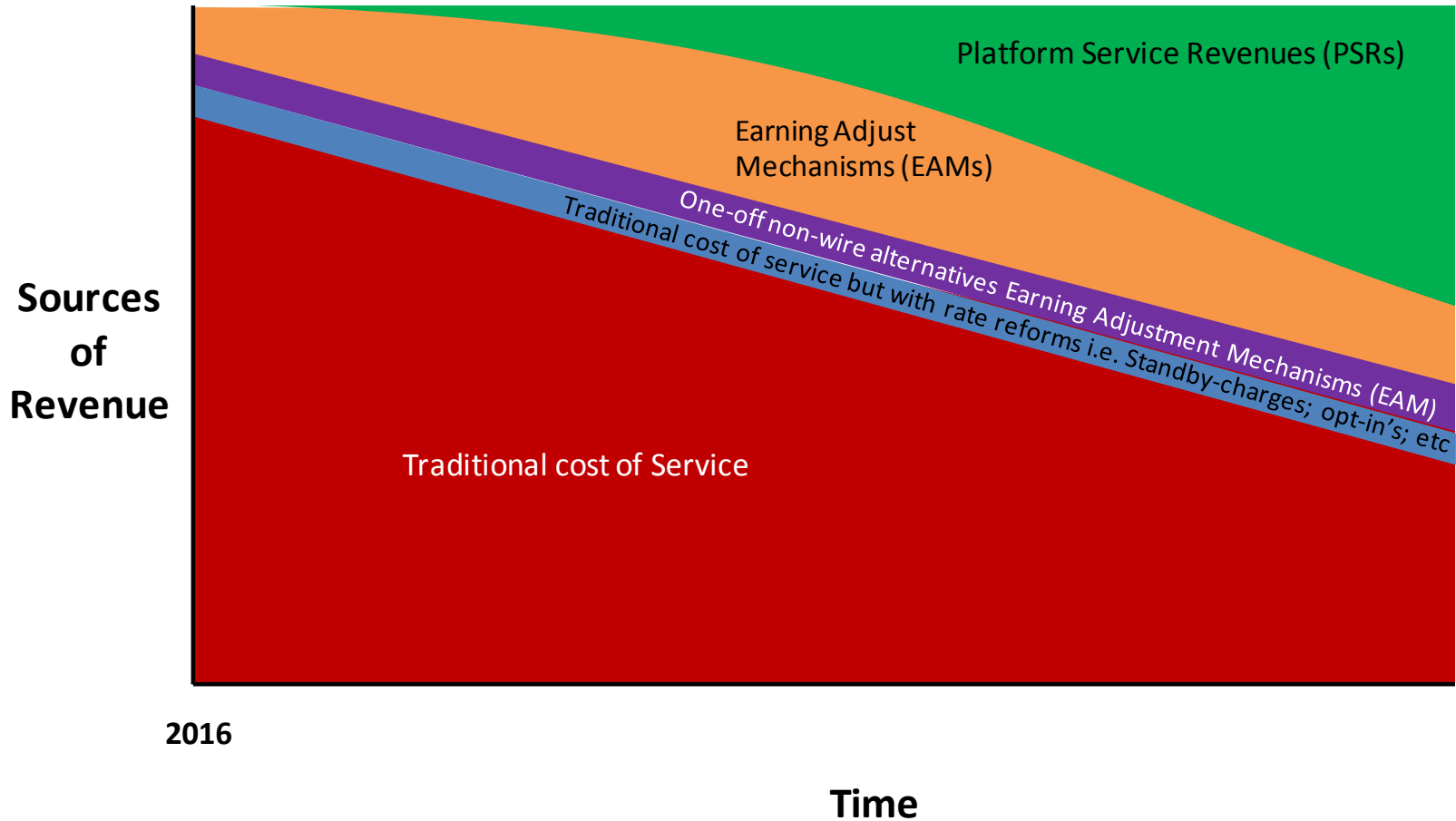
- A zero-based approach
  - Before performance is considered, utility earns X % based on rate base
    - You can also start at normal return and go up and down
- Normally allowed return consistent with compliance-based performance
- Higher return available for increasing, exemplary level of measured performance via PBR

Incorporating a Performance Component into the Rate of Return



Source: Richard Sedano: [Power Sector Transformation: The Case of New York REV, 2015](#)

# Sources of Utility Revenue within NY REV



# FYI Earnings Adjusted Mechanisms (p53)

Staff Prioritised Outcomes	Staff Implementation issues
Peak reduction: oriented toward near-term system savings and development of DER resources;	Existing rate incentive measures should be retained but should be reviewed for their continued usefulness;
☑ Energy efficiency: oriented toward integrating efficiency with demand reduction and increasing the total amount of efficiency activity;	New EAMs should be positive-only in direction, with the exception of customer engagement and interconnection, which should be symmetrical;
☑ Customer Engagement: oriented toward near-term activities to educate and engage customers and provide access to data;	Positive-only EAMs in the longer term should be tied to a bill impact metric;
☑ Affordability: oriented toward promotion of low-income customer participation in DER, and toward reduction in terminations and arrearages; and	EAMs may be oriented toward outcomes that utilities can influence and need not be confined to activities over which utilities have direct control;
☑ Interconnection: oriented toward increasing the speed and affordability of interconnection of distributed generation.	Most EAMs should be on a multi-year basis rather than annual, to allow time to develop desired outcomes;
	EAMs should be compensated or charged via accounts that are reconciled in rate cases;
	All utilities should have EAMs for the same categories, while details may vary among utilities; and
<b>NB EAMs are intended to be near-term requirements to enable distribution level markets to function; and a bridge until a more market-orientated time</b>	☑ Total size of revenues at stake need to be determined on a case by case basis.

# FYI Scorecards May Become EAMs p93-96

Staff recommended metrics	Commissioner comments
System utilization and efficiency: this would encompass load factor, T&D system utilization, fuel diversity, and overall system heat rate;	More collaborative work needed
DER penetration: this would focus on the penetration of distributed generation, dynamic load management, and energy efficiency as a percentage of total utility load;	Think about affordability
Time-of-use rate efficacy: this would measure the rate of adoption of opt-in TOU rates, and the ability of customers to reduce their bills via these rates;	Maybe carbon an EAM but work through CES
Market-based revenues: this would track the amount, and sources, of utility revenues from platform and value-added services, to reflect the degree of market uptake and the success of utilities in adjusting their business models;	Add resilience as a metric
Carbon reduction: this would track the market penetration of carbon-free sources as a percentage of total load within each utility's service territory;	These metrics likely to become EAMs in future once data available
Conversion of fossil-fueled end uses: this would track the adoption rates of electric vehicles and conversion of combustion appliances to high-efficiency electric appliances;	
Customer satisfaction: this would utilize existing indices that measure customer satisfaction, complaint response time, escalated complaint response time, and pending cases; and	
Customer enhancement: this would be a broader index encompassing the affordability metric, customer engagement in markets, customer satisfaction, and HEFPA compliance rates.	



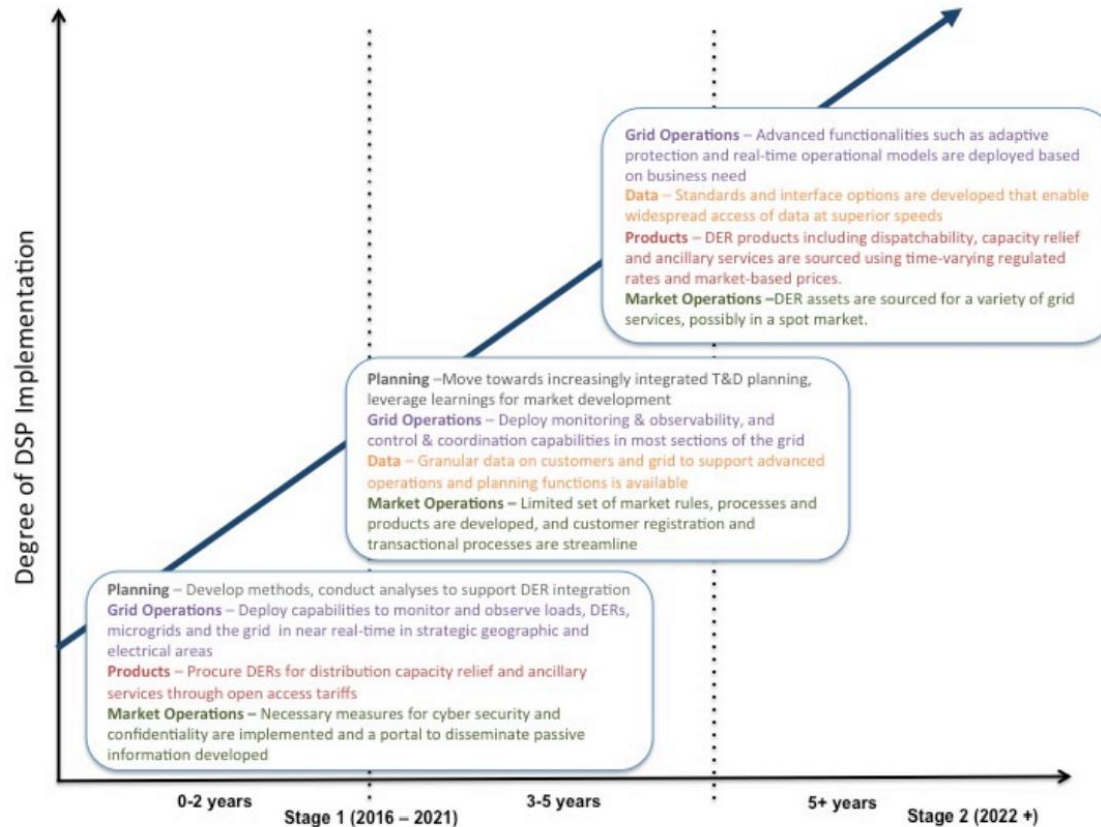
# FYI Rate Design Reform

Types of customers	Customer granularity to be developed	Rate design principles to guide reforms
Traditional consumers	Temporal	Cost causation
Active consumers	Locational	Encourage outcomes
Prosumers	Attribute	Policy transparency
		Decision-making
		Fair value
		Customer-orientation
		Stability
		Access
		Gradualism
<p>NB Consumers who rent their homes, reside in multi-family or mixed-use facilities, and/or do not have individual metering may lack either an economic incentive or practical access to manage their energy usage by investing in DER</p>		

# Example, NY REV Timelines

MDPT Working Group  
and Stages

Ingoing Assessment Regarding Market Scope



# CA - More than Smart

<http://authors.library.caltech.edu/48575/1/More-Than-Smart-Report-by-GTLG-and-Caltech.pdf>

[Smart-Report-by-GTLG-and-Caltech.pdf](http://authors.library.caltech.edu/48575/1/More-Than-Smart-Report-by-GTLG-and-Caltech.pdf)

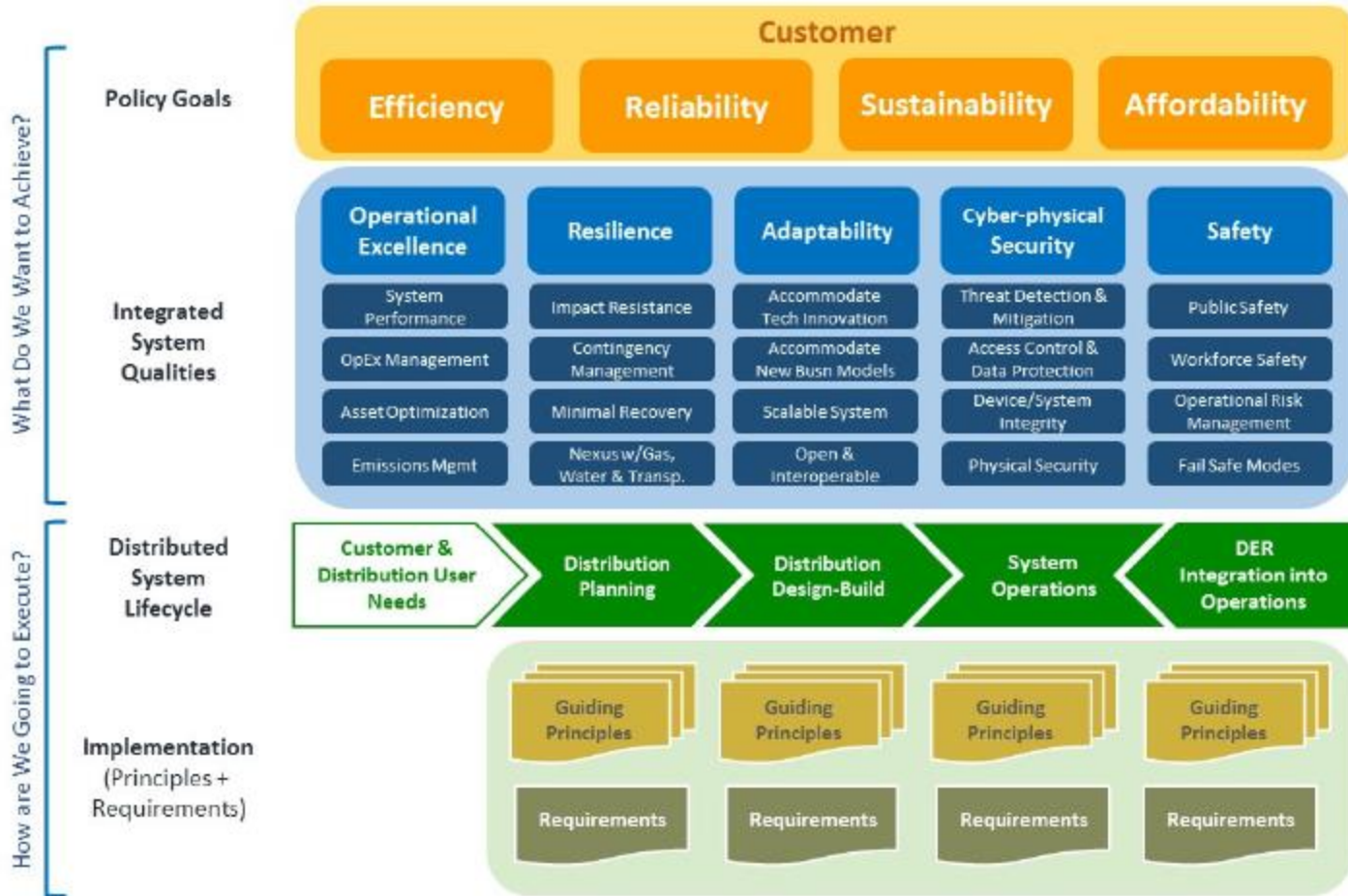


Figure 1: Integrated Grid Framework

# NY and CA more similar than not – big question is which will work best?

California	New York
Clean Energy and Pollution Reduction Act of 2015 ( <a href="#">SB 350</a> ) – with GHG reduction goals ie 50% RE by 2030; 80% CO2 reduction by 2050	<a href="#">NYS Energy Plan (SEP)</a> , and Clean Energy Standard (CES) with GHG reduction goals ie 50% RE by 2030; 80% CO2 reduction by 2050
Has a Utility Distributed Resource Plan (DRP) <a href="#">AB327</a>	Has a Distribution Service Provider Platform implementation plan <a href="#">MDPT</a>
See <a href="http://energy.gov/sites/prod/files/2015/04/f21/05-Mar2015EAC-GridMod-DeMartini.pdf">http://energy.gov/sites/prod/files/2015/04/f21/05-Mar2015EAC-GridMod-DeMartini.pdf</a>	See the REV <a href="#">Homepage</a>
Multiple administrated programs ie for RE, EE etc	Multiple administrated programs ie for RE, EE etc
Hybrid philosophy of regulation and markets – where regulators place control, ultimately, on utilities to get things done	Pro-market philosophy for energy system despite almost all revenue regulated currently with limited role for 3 <sup>rd</sup> parties and PBR. But intention is to move to transactive PBR and greater proportion of PBR within EAMs

# Conclusion

- All regulatory frameworks of markets and networks are social constructs
- Both CA and NY are a combination of markets, networks and institutionalised/regulated support schemes
  - And I think this is right
    - it is the balance between markets and regulation which is the central difference between them
  - I do not support a regulatory construct which is mainly market focused with limited to no institutionalised/ regulated support schemes
  - In principle, I prefer the idea of a regulated framework which is constructed to directly encourage 3<sup>rd</sup> party providers / dynamic innovation rather than one that places the responsibility of doing that on the distribution company
  - BUT key goal has to be decarbonisation, and so if development of PBR and transactive markets is too slow then the more regulated approach may be preferable.