

# Disruptive Technology: the case of electricity

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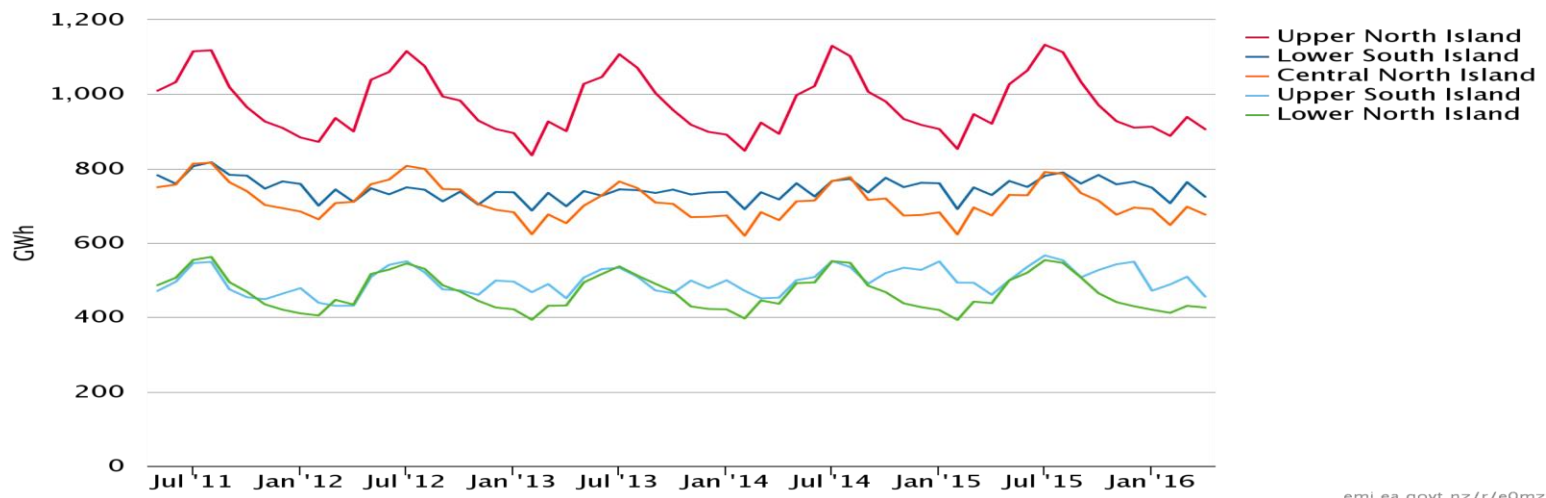
# Developments

- Distributed Generation: solar PV etc. All under intense R&D
- Batteries: provide the option of shifting electricity over space and time: under intense R&D
- Digital devices and communication, and automation of functionality
- Energy cost saving innovations
  - Substitution of DC for AC
  - LED Lighting
- Organisational
  - Smart micro-grids of various forms
  - Effect on the visible auctioneer (system operator functions)

# Is Change Underway?

Economic Growth (Real GDP) 2011-2015: + 12%

## Grid Throughput (Load)



# Current Market Structure and Regulation



Generation

**Oligopoly**  
Competition law



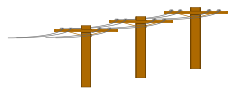
Customers/retail

**Competitive**  
Competition law



Transmission

**Natural monopoly** (National HV Grid)  
Part IV of the Com Act & NZEM Code



Distribution

**Natural monopoly** (Local LV Grid)  
Part IV of the Com Act & NZEM Code

Spot Market  
Operator

**Centralised *visible auctioneer***: NZEM Code & Commerce Act

# To a more Decentralised System

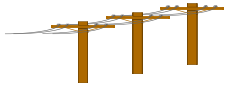
## Current



Generation  
(energy)



Transmission



Distribution &  
meters

Retail

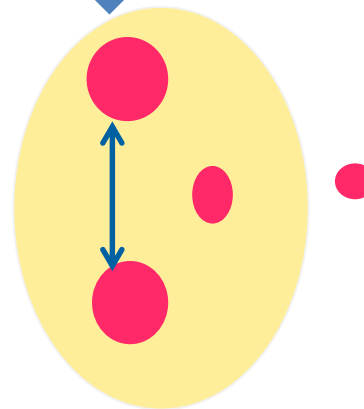


Customers

## Emerging

Energy

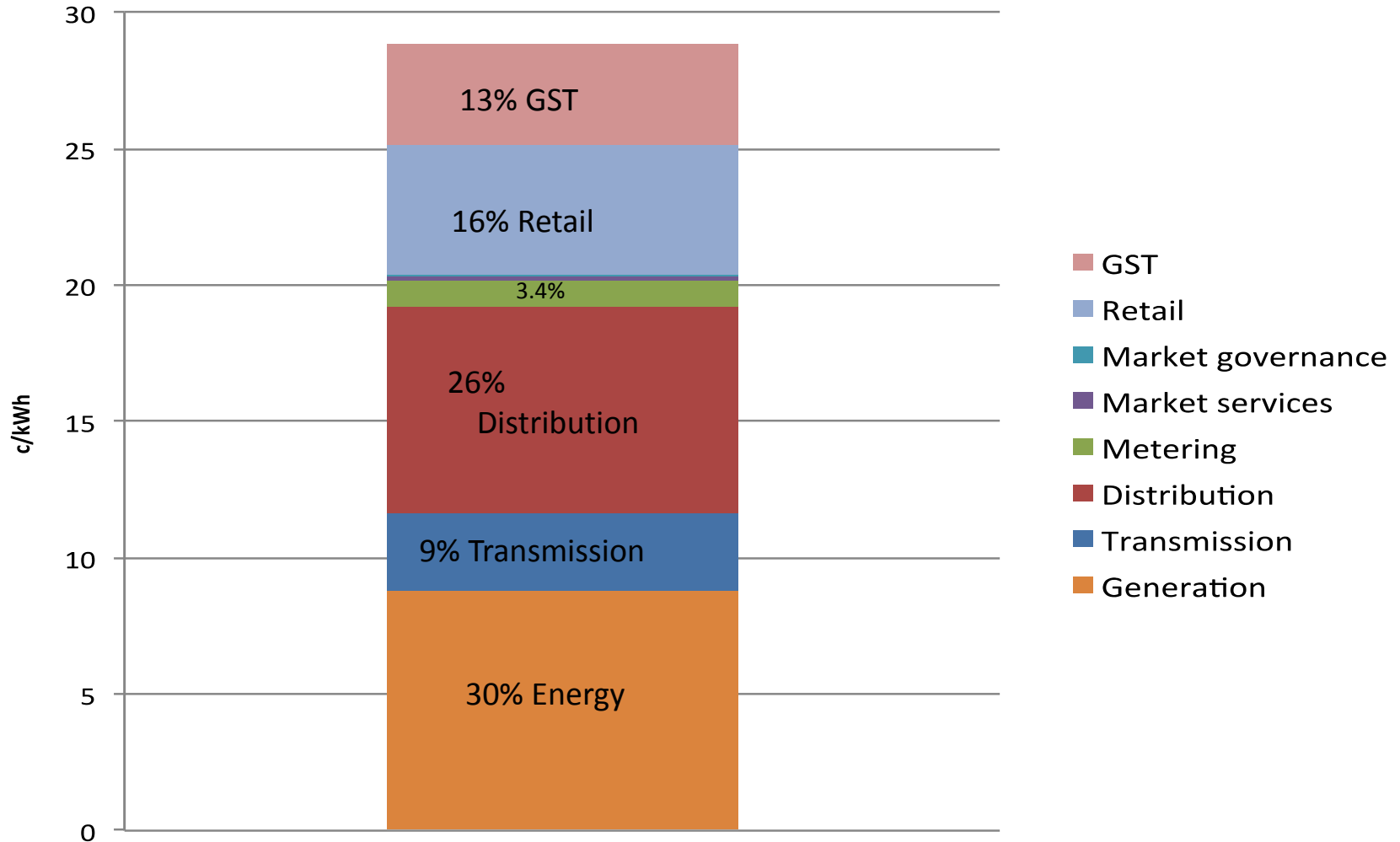
Information &  
Management



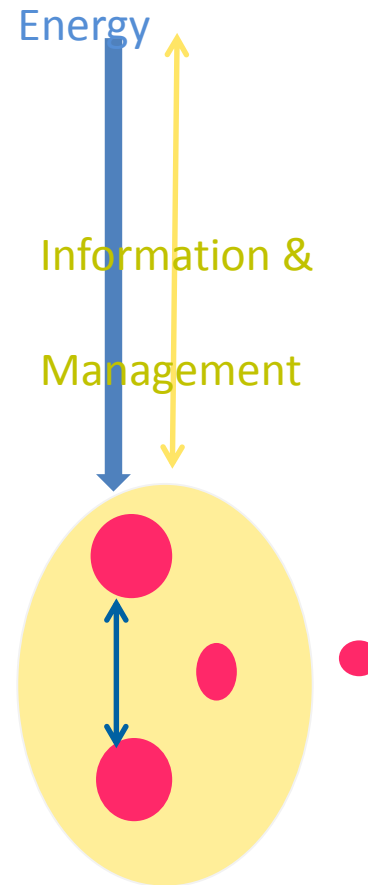
Micro grids ● as small  
as households and as  
large as districts?

# Incentive for Change:

## Typical Household Bill (EA 2016)



# Discussion



Micro grids ● as small as households and as large as districts?

# Some Sources

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