



# Energy transitions in emerging economies: recommendations for incentivising demand response in Chile

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# Presentation outline

- Demand response in EMDC, study objectives and methods
- Demand response policy in Chile, France, and Great Britain
- Lessons, policy recommendations, and concluding remarks

DR deployment in EMDEs is at a very early stage, but the literature suggests that DR deployment is feasible, cost effective, and improves energy access

**Reviews of existing DR initiatives** in China (Li 2016, Li 2022, Chen 2021, Tahir 2020) and in Brazil, Bangladesh, India and South Africa (Paterakis, 2017)

**Estimates of DR potential** in Brazil (Dranka, 2020) and Gujarat, India (Khana, 2022)

**Modelling and DR experiments:** Impact of a combined model with rice and explicit DR in Free Town, Sierra Leone (Conteh, 2020); impact of distributed sensor networks in a residential area in Nicaragua (Ponce 2016), acceptability of price DR programme among upper income households in urban residential area in India (Srivastava, 2021)

**Policy analysis:** analysis of DSM policy in Germany and Chile (Valdes, 2019); the potential role of aggregators in Colombian electricity markets (Daniela 2022)

The objective was to identify policy initiatives that can incentivize DR in Chile.

- Chile plans to become carbon neutral by 2050
- Share of VRE in generation matrix projected to grow to 65% by 2050
- Coal is due to be phased out by 2040
- DR is formally allowed to participate in ancillary markets

Image is from IEA Energy policies beyond IEA countries, Chile 2018



Methods: comparative policy analysis focused on DR policy goals, targets, and instruments

**Key features of the energy sector**

<b>Country (population in million)</b>	Chile (20)	France (65m)	UK (68m)
<b>Installed Capacity (GW)</b>	31	139	76.6
<b>Annual electricity demand (tWh)</b>	74.6	768	334
<b>Maximum demand (GW)</b>	11	88.4	48
<b>Energy use per capita (kWh)</b>	23,710	40,489	29,641
<b>VRE by 2050 (projections)</b>	45-65%	50-75%	38-88%
<b>DR access to electricity markets</b>	AM	AM, CM, day and intraday	AM, CM, DNO

# DR policy in Chile, France, and Britain

DR policy goals, targets and policy instruments

# DR policy goals and targets

## **Chile**

By 2050 - residential, public, and commercial sectors achieve their full distributed generation and load management potential (National Energy Plan 2016)

Demand-side resources to become active participants in the electricity market, as providers of balancing services (Flexibility strategy 2019)

## **France**

DR target: 6.5 GW by 2028

The I & C sector is expected to contribute 5 GW

The residential sector 1.5 GW

## **UK**

To create conditions for different sources of flexibility to compete on equal terms - source

Targets: I&C sector, residential sector; Distribution network operators

Chile has taken several initiatives that can enable the deployment of DR

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Creation of an ancillary market in 2017 in which aggregated DR is allowed to participate and DR providers can participate directly or via third parties

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Smart meter roll out programme for the regulated sector – started in 2017 and cancelled in 2020

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Mandatory reporting of energy consumption for energy intensive companies – Chile's Energy Efficiency Law 2021

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Net Billing law – enables electricity users with RE capacity of up to 300 kw to sell their energy surplus directly to the distribution company instead of through the wholesale market



France's main policy has been to adapt its electricity markets to enable DR participation

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<b>Balancing /ancillary services</b>	Tenders and auctions for reserves, interruptible load, and balancing mechanism
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<b>Wholesale</b>	Day-ahead and intra-day markets
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<b>Capacity market</b>	Obligation on retailers to evidence capacity to meet consumer demand & DR certificates
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<b>Other markets</b>	DR tenders: Annually organised tenders; Non- fossil fuel auctions held 4 years before delivery
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In addition to changes to market design, the UK has also promoted innovation and stakeholder participation

### **Changes to market design**

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**Balancing /ancillary services**      Tenders and auctions for reserves, interruptible load, and balancing mechanism

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**Capacity market**      Annual tenders held 1- and 4-years before delivery

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**Other markets**      DNO markets – tenders and flexibility platforms

### **Innovation, stakeholders, smart meter deployment**

- Linking attribution of DNO licenses to the obligation to procure flexibility
- Harmonisation of DNO and ESO rules for DR participation
- Equal treatment of capital and operational expense for DNOs
- Power responsive
- Smart meter deployment

Discussion and concluding  
remarks

# Lessons from France and the UK

<b>Goals</b>	To increase DR capacity; enable and facilitate DR participation in electricity markets
<b>Targets</b>	I&C sector, residential sector
<b>Instruments</b>	
Enabling	Minimum bid, technical and information requirements, aggregators
Facilitating	Ring fenced opportunities; allowing independent aggregation; widening access; stacking of revenue

# Policy recommendations for Chile

First, to identify the potential value of DR for the country's energy system, and the DR potential of the regulated and free sectors.

Second, to consider improving and widening the opportunities for DR participation in electricity markets.

Third, to explore forms of supporting Independent Aggregators

# Conclusions

## **Limitations**

- Impact of individual DR policies on DR deployment;
- Comparison of DR volumes

## **Further research**

- Identify and quantify the policy outcomes of different policy mixes and their interaction with contextual factors
- Explore conclusions in relation to other emerging economies with comparable energy targets

# Thank You

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