



# Energy transitions: a view from institutions

Green Transition in Latin America, Harnessing regional integration and industrial policy to build the economies of the future

8-9 April 2024

UNCTAD-BNDES

*Dr Jose Maria Valenzuela*

Institute for Science Innovation and Society

University of Oxford

# Institute for Science Innovation and Society



Low emission  
electricity



Marine carbon  
removal



Urban carbon  
removal

# Dealing with new and old problems

☰ FINANCIAL TIMES myFT

Renewable energy [+ Add to myFT](#)

## National Grid 'throttling' battery storage development with underuse

UK's largest battery storage fund says electricity system is not taking advantage of crucial technology that can cut emissions

☰ FINANCIAL TIMES myFT

Brazilian economy [+ Add to myFT](#)

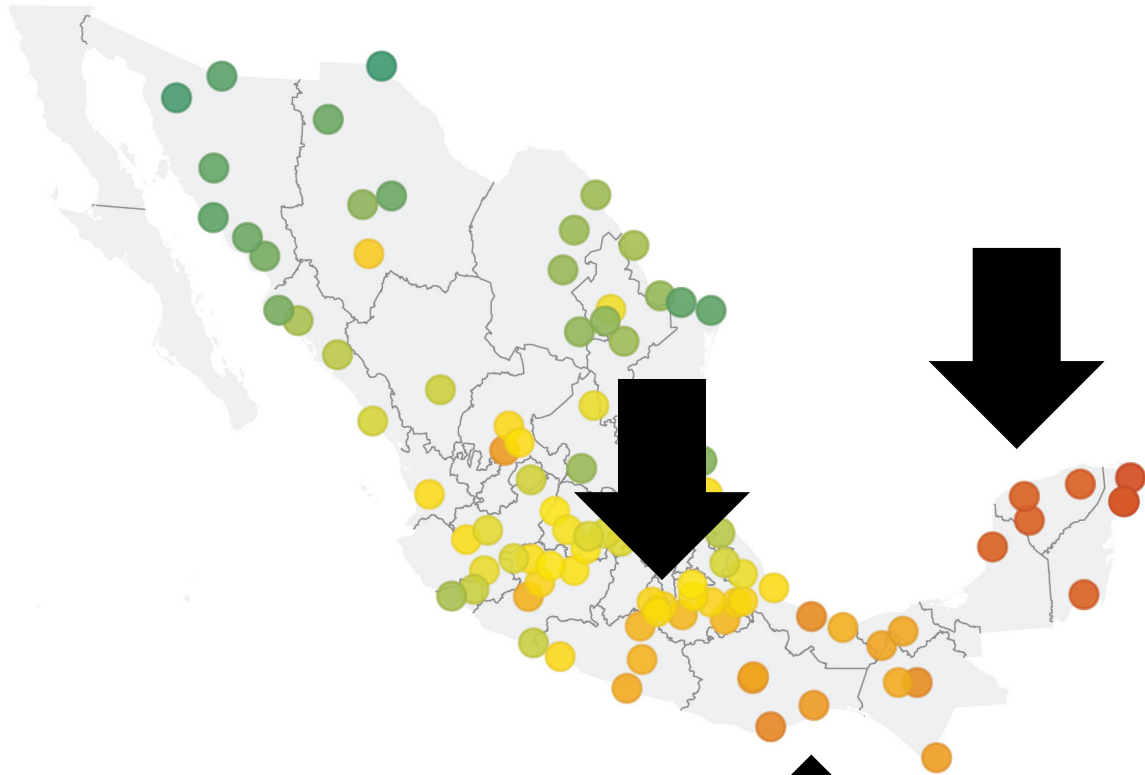
## Blackouts spark fears of grid 'collapse' in Brazil's biggest city

Power outages in São Paulo reflect chronic underinvestment in country's infrastructure

# Mexico, transmission grids and the price system

MAP 1

## Average Wholesale Electricity Prices per Load Zone (MXN/MWh)



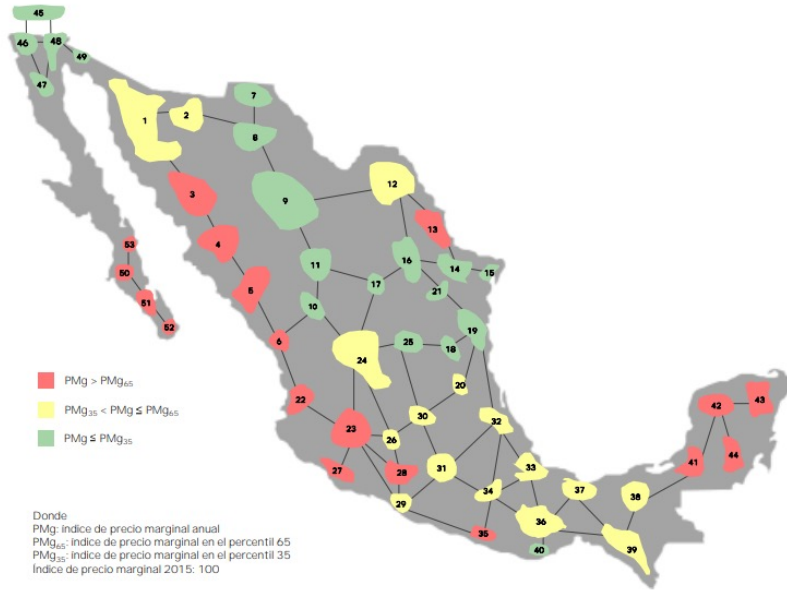
Note: Load Zones indicate areas from which average prices from nearby distribution nodes are aggregated. Data as of June 2023. Source: "Precios Marginales Locales MTR" [Local Marginal MTR Prices], Precios de Energía y Servicios Conexos MTR [Energy Prices and Related Services MTR], National Center for Energy Control (CENACE), June 2023, <https://www.cenace.gob.mx/Paginas/SIM/Reportes/PreEnerServConMTR.aspx>.

CSIS | AMERICAS PROGRAM

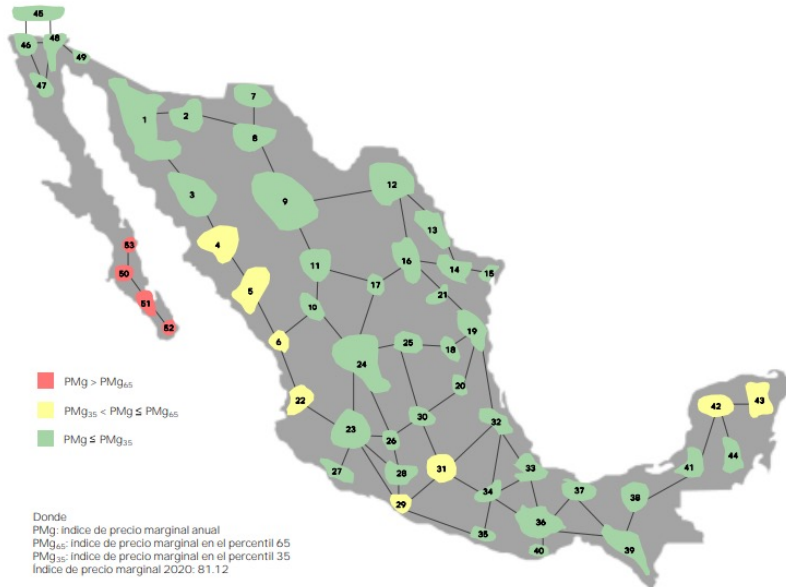
Present prices as political history

MAPA 5.3.3. DISTRIBUCIÓN DE PRECIOS MARGINALES ESTIMADOS POR REGIÓN DE TRANSMISIÓN  
(Índice Base 2015)

2015



2020

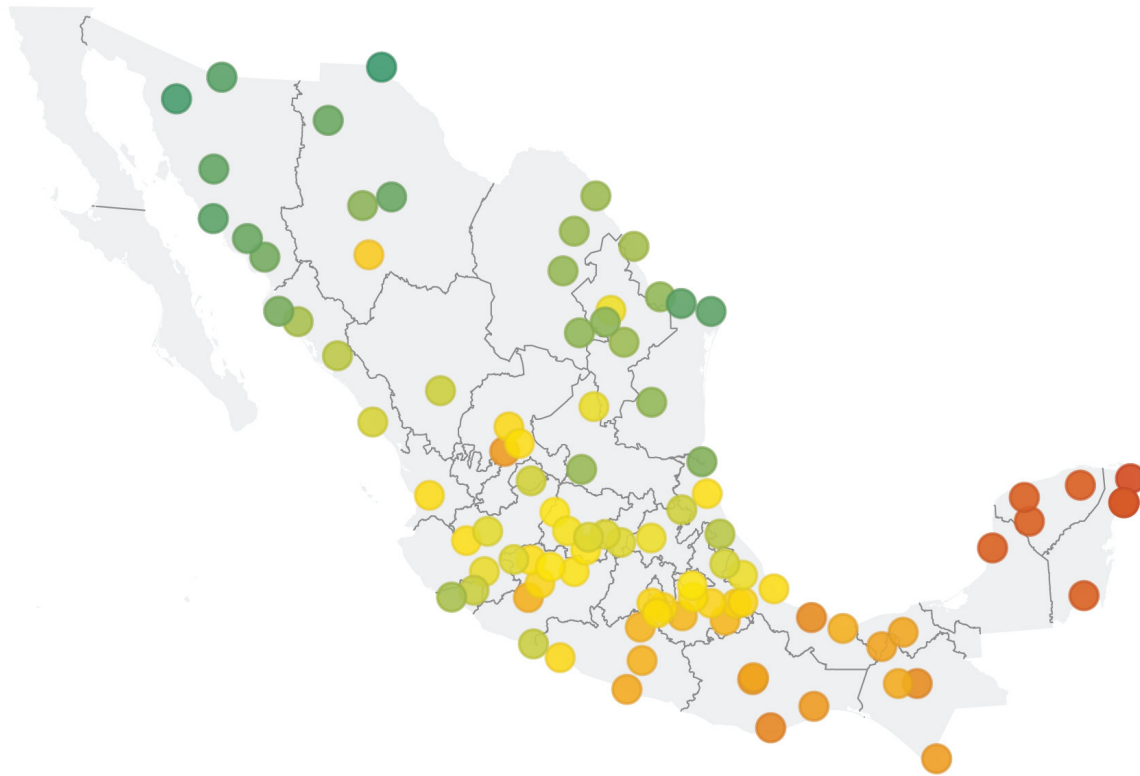


Nota: Precios marginales estimados expresados en base 2015 (ver Anexos Tabla 5.3.1).

Fuente: Elaborado por SENER.

The promise of equity through markets

MAP 1  
**Average Wholesale Electricity Prices per Load Zone  
(MXN/MWh)**



Note: Load Zones indicate areas from which average prices from nearby distribution nodes are aggregated. Data as of June 2023.  
Source: "Precios Marginales Locales MTR" [Local Marginal MTR Prices], Precios de Energía y Servicios Conexos MTR [Energy Prices and Related Services MTR], National Center for Energy Control (CENACE), June 2023, <https://www.cenace.gob.mx/Paginas/SIM/Reportes/PreEnerServConMTR.aspx>.

CSIS | AMERICAS PROGRAM

Source: IEA 2023. Latin America Energy Outlook Interactive Map



Present prices as political history

Where do we define the point at where state-  
industry proactive infrastructure choices are  
made



Chile, future renewable, present prices



- 2019 in the middle of the social unrest
- Conservative Government under Political siege decided to lower consumer tariff
- In an extreme liberalised electricity sector
- Lower down tariff by displacing earning to the future, when the cost of generation is coming down from renewable energy contracts.

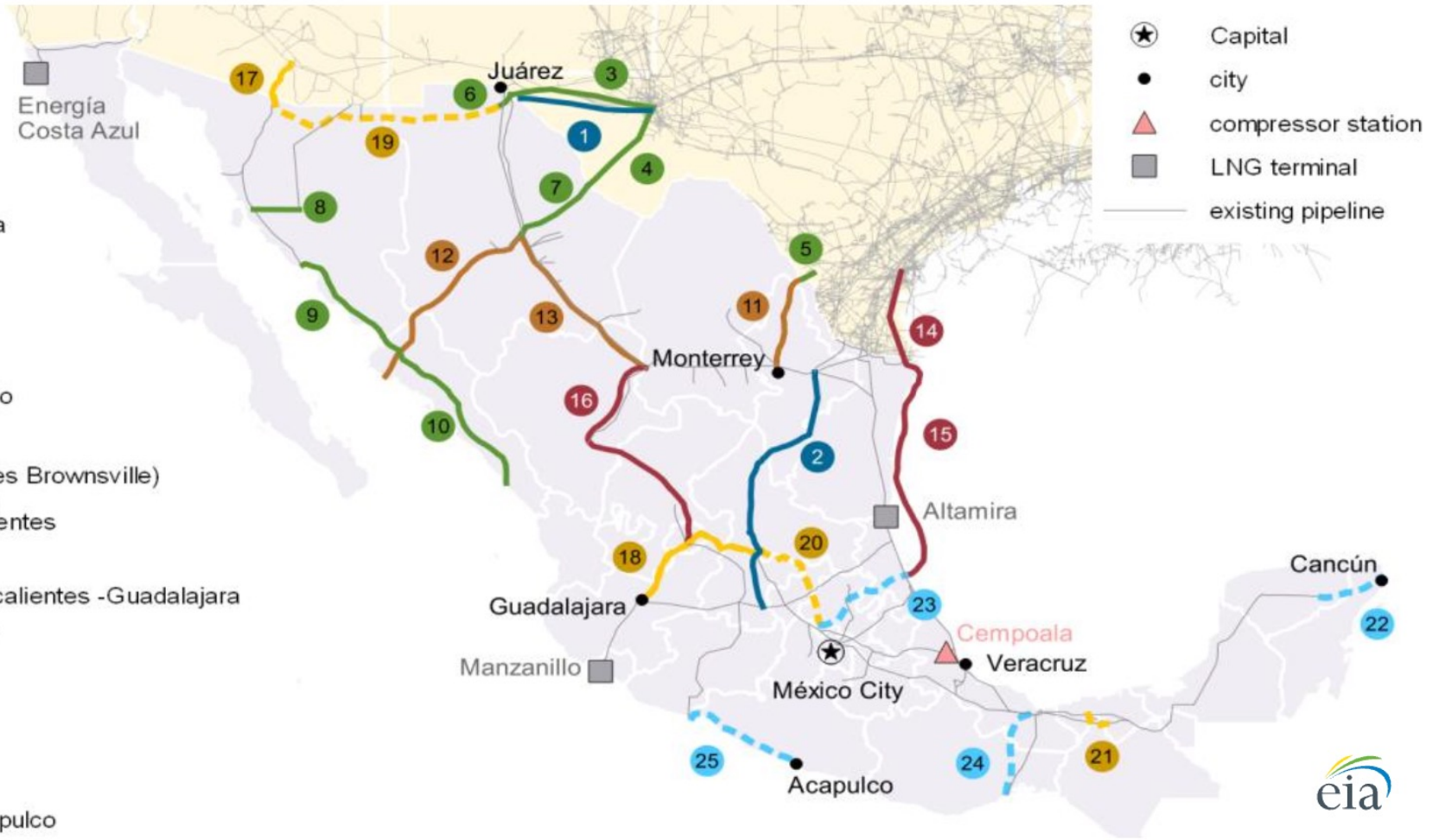
Social unrest and the collapsing of time in the electricity tariff

What are national and transnational opportunities to shift economic savings from the future to the present?

# International interconnection

Natural gas pipelines

- 2016 completed
  - 1. Roadrunner I & II
  - 2. Los Ramones II
- 2017 completed
  - 3. Comanache Trail
  - 4. Trans-Pecos
  - 5. Nueva Era
  - 6. San Isidro -Samalayuca
  - 7. Ojinaga -El Encino
  - 8. Ramal Hermosillo
  - 9. Guaymas - El Oro
  - 10. El Oro-Mazatlán
- 2018 completed
  - 11. Nueva Era
  - 12. El Encino -Topolobampo
  - 13. El Encino -La Laguna
- 2019 completed
  - 14. Valley Crossing (Nueces Brownsville)
  - 15. Sur de Texas - Tuxpan
  - 16. La Laguna - Aguascalientes
- 2020 completed
  - 17. Sierrita Expansion
  - 18. Villa de Reyes -Aguascalientes -Guadalajara
- 2020-21 under construction
  - 19. Samalayuca-Sásabe
  - 20. Tula -Villa de Reyes
  - 21. Cuxtal I
- 2022+ In service
  - 22. Cuxtal II
  - 23. Tuxpan - Tula
  - 24. Jáltipan-Salina Cruz
  - 25. Lázaro Cárdenas -Acapulco



Source: U.S. Energy Information Administration, Comisión Nacional de Hidrocarburos, Mexico

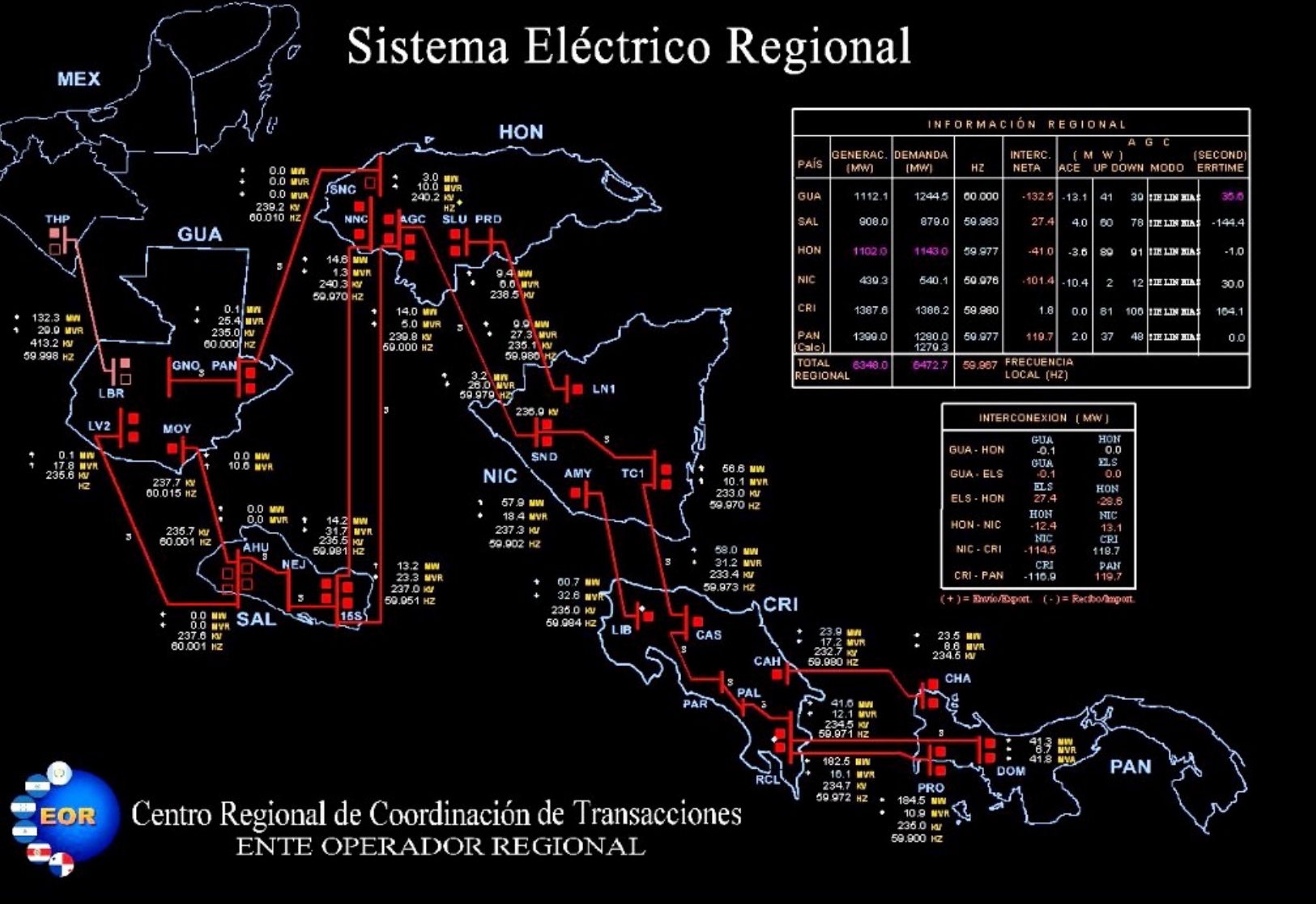
**Mexico's natural gas import infrastructure**

**Politics of deep integration**



Politics of deep integration

# Sistema Eléctrico Regional



PAÍS	GENERAC. (MW)	DEMANDA (MW)	HZ	INTERC. NETA	A G C				(SECOND) ERRTIME
					( M W ) ACE	UP	DOWN	MODD	
GUA	1112.1	1244.5	60.000	-132.5	-13.1	41	30	THE LIN HIAS	30.6
SAL	908.0	879.0	59.983	27.4	4.0	60	78	THE LIN HIAS	-144.4
HON	1102.0	1143.0	59.977	-41.0	-3.6	89	91	THE LIN HIAS	-1.0
NIC	430.3	540.1	50.976	-101.4	-10.4	2	12	THE LIN HIAS	30.0
CRI	1387.6	1386.2	59.980	1.8	0.0	81	100	THE LIN HIAS	164.1
PAN	1399.0	1280.0	59.977	119.7	2.0	37	48	THE LIN HIAS	0.0
TOTAL REGIONAL	8348.0	8472.7	59.987	FRECUENCIA LOCAL (HZ)					

INTERCONEXION ( MW )			
GUA - HON	GUA	HON	
	-0.1		0.0
GUA - ELS	GUA	ELS	
	-0.1		0.0
ELS - HON	ELS	HON	
	27.4		-28.6
HON - NIC	HON	NIC	
	-12.4		13.1
NIC - CRI	NIC	CRI	
	-114.5		118.7
CRI - PAN	CRI	PAN	
	-116.9		119.7

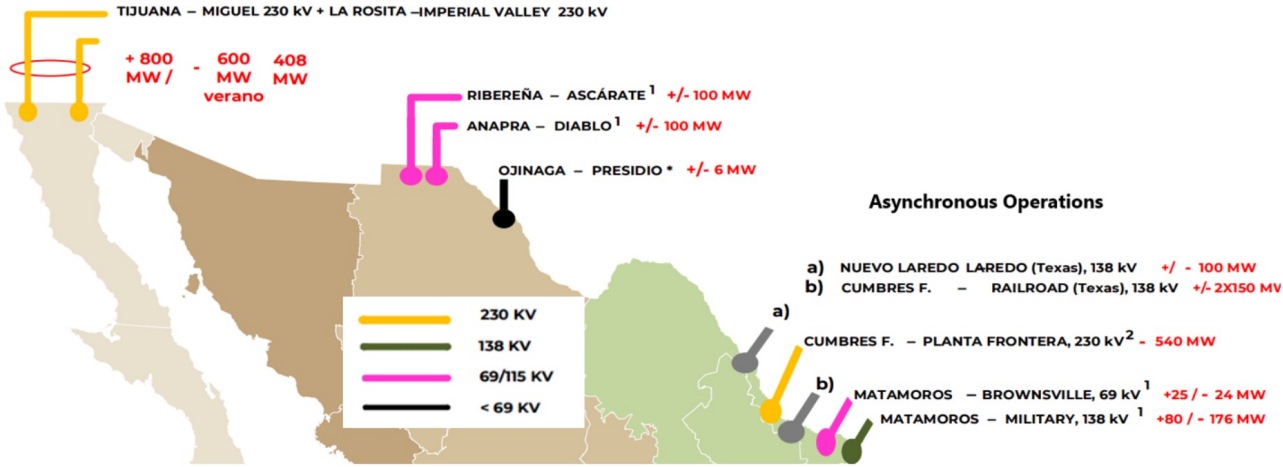
(+) = Export/Export. (-) = Recibo/Import.

- Trade has reached up to 10% for most countries
- Renewable energy between 40 and 99%
- But consumption still modest between 500 and 2,500kWh/c
- 1,800km from Guatemala to Panama (2010-2014) [distance Madrid-Berlin]

 Centro Regional de Coordinación de Transacciones  
ENTE OPERADOR REGIONAL

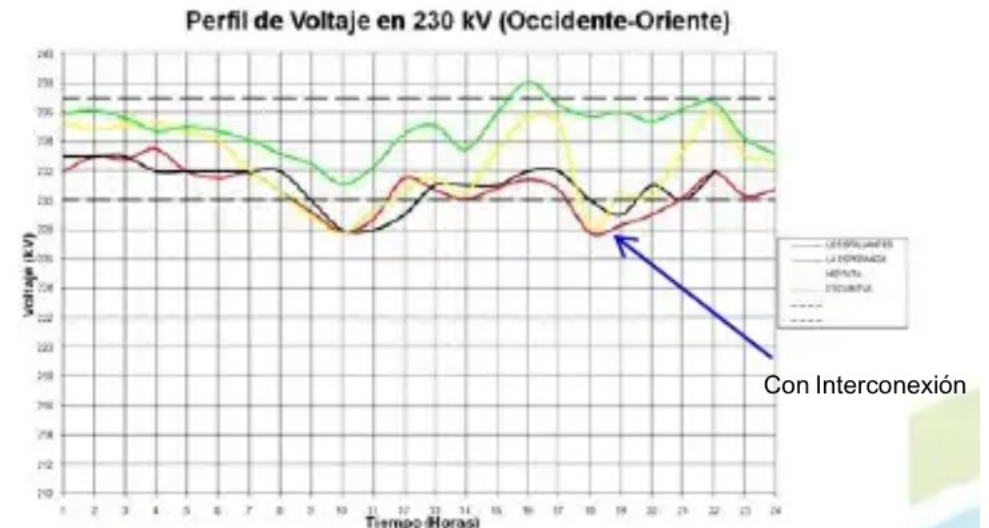
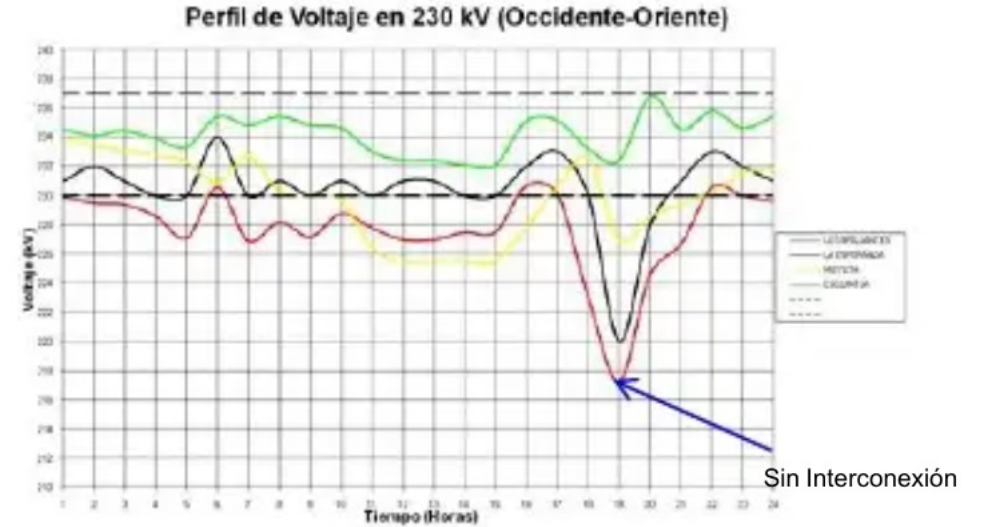
Politics of deep integration

# MEXICO-TEXAS



- 1.5 / 1.9 GW (~2% of capacity)
- RE energy project dedicated exclusively to California.
- History of collapse in California and Texas.

# MEXICO-GUATEMALA



The politics of cleavage



How do make sure that integration projects  
accelerate both productive development and  
decarbonization?

# New Actors of State Capacity



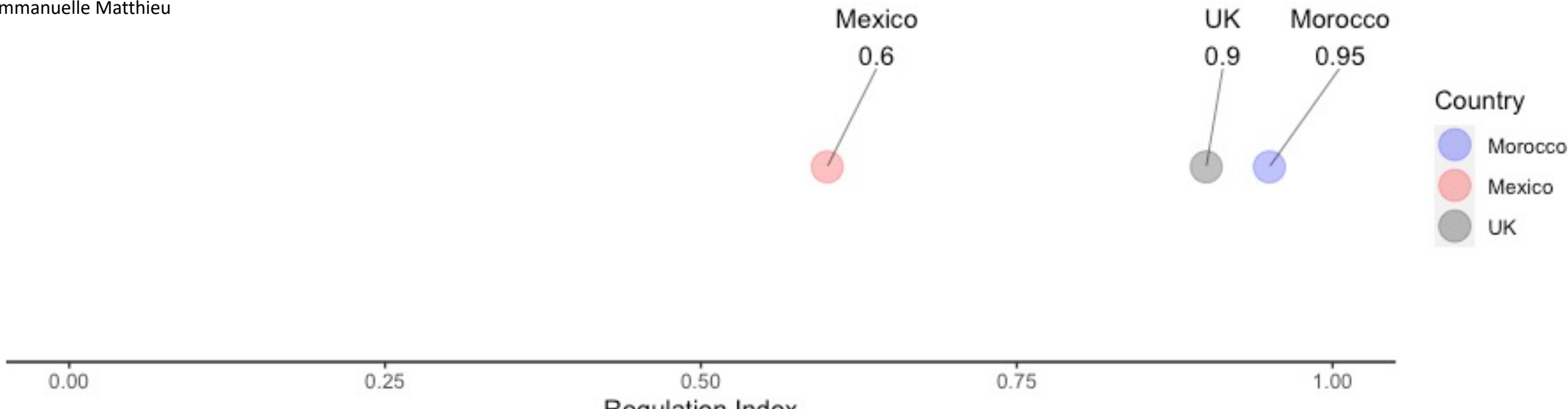
# The importance of the SO

		Ownership			
		Pubic		Private	
Location of system operator	Integrated	<p>①</p> <p><i>Mexico</i> <i>Pre-reform</i></p>	<p>①</p> <p><i>Chile</i> <i>Pre-reform</i></p>	<p>①</p> <p><i>UK</i> <i>Pre-reform</i></p>	
	Transmission			<p>②</p> <p><i>Chile</i> <i>Liberalization</i></p>	<p>②</p> <p><i>UK</i> <i>Liberalization</i></p>
	Independent	<p>②</p> <p><i>Mexico</i> <i>Reform</i></p>	<p>③</p> <p><i>Chile Reforms</i> <i>(2016)</i></p>	<p>④</p> <p><i>Future Systems</i> <i>Operator</i></p>	<p>③</p> <p><i>UK License</i> <i>change (2017)</i></p>

Actor	UK	Mexico	Morocco
Ministry	0.77	0.70	0.35
Regulatory Agency	0.28	0.33	-
System Operator	0.46	0.50	-
Grid Company	0.31	-	0.68
Supply Company(ies)	-	0.28	-
Generation Company(ies)	0.38	0.22	0.13
Renewable Energy Agency	-	-	0.77

# Governance of renewable energy auctions

Source: Work in Progress with Emmanuelle Matthieu





ELSEVIER

Contents lists available at [ScienceDirect](#)

## Energy Research & Social Science

journal homepage: [www.elsevier.com/locate/erss](http://www.elsevier.com/locate/erss)



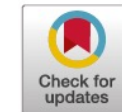
Original research article

### In plain sight: The rise of state coordination and fall of liberalised markets in the United Kingdom power sector

Jose Maria Valenzuela<sup>a,\*</sup>, John Rhys<sup>b</sup>

<sup>a</sup> *Institute for Science, Innovation and Society, University of Oxford, United Kingdom*

<sup>b</sup> *Oxford Martin School, University of Oxford, United Kingdom*



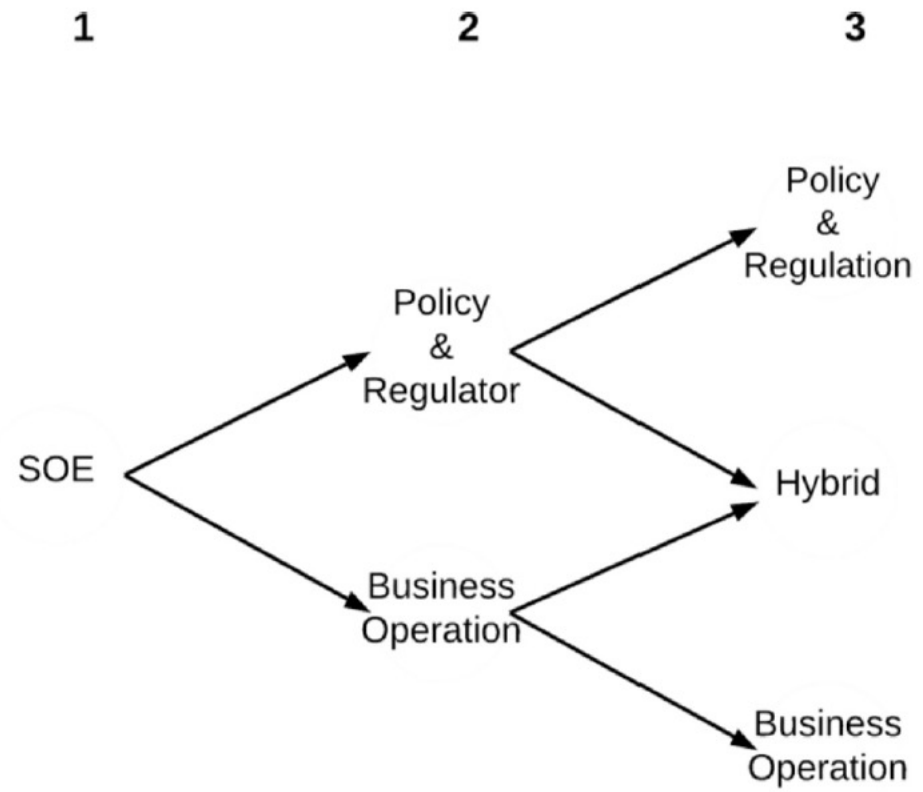
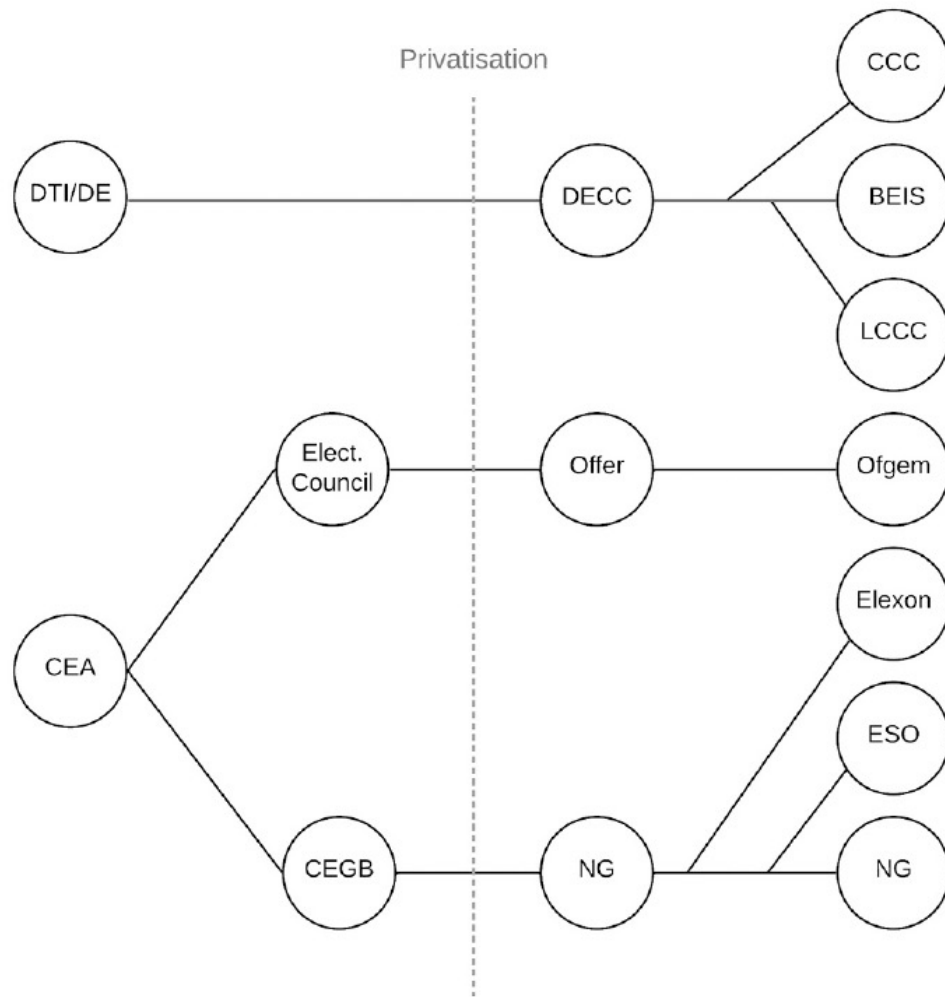


Fig. 1. Institutional evolution in the electricity industry.



**Fig. 3.** Analytical description of the institutional evolution in the UK.  
CEA: Central Electricity Authority; CEGB: Central Electricity Generating Board;  
DTI: Department of Trade and Industry; DE: Department of Energy; DECC:  
 Department of Energy and Climate Change; CCC: Climate Change Committee;  
BEIS: Department of Business, Energy and Industrial Strategy; Low Carbon  
 Contract Company; Offer: Office of Electricity Regulation; Ofgem: Office of Gas  
 and Electricity Markets; NG: National Grid; ESO: Electricity System Operator;  
FSO: Future System Operator; NG: National Grid.

Low Carbon Contract Company

Elexon

Energy System Operator / Future Systems Operator



# Dealing with new and old problems

☰ FINANCIAL TIMES myFT

Renewable energy [+ Add to myFT](#)

## National Grid 'throttling' battery storage development with underuse

UK's largest battery storage fund says electricity system is not taking advantage of crucial technology that can cut emissions

☰ FINANCIAL TIMES myFT

Brazilian economy [+ Add to myFT](#)

## Blackouts spark fears of grid 'collapse' in Brazil's biggest city

Power outages in São Paulo reflect chronic underinvestment in country's infrastructure

Dimension	Re-regulation	State coordination
<b>Role of the state</b>	Assertive regulators steer private operators	State agencies take operational decisions
<b>Governance tools</b>	Differentiate regulation across market segments	Public mission agencies are in charge
<b>Political objective</b>	Efficient capital allocation and acceptable retail prices	Lowering capital cost and de-risking investment
<b>UK Instruments</b>	<ul style="list-style-type: none"> <li>• Price Control</li> <li>• Regulated asset-based remuneration</li> <li>• Segmentation of markets (ie. REMA)</li> </ul>	<ul style="list-style-type: none"> <li>• CfD area planning</li> <li>• Future Energy Scenarios</li> <li>• Offshore Coordination mechanisms</li> </ul>
<b>UK actors</b>	BEIS; Ofgem	BEIS; SO, LCCC, Crown Estates



ELSEVIER



Original research article

In plain sight: The rise of state coordination and fall of liberalised markets in the United Kingdom power sector

Jose Maria Valenzuela<sup>a,\*</sup>, John Rhys<sup>b</sup>

<sup>a</sup> Institute for Science, Innovation and Society, University of Oxford, United Kingdom

<sup>b</sup> Oxford Martin School, University of Oxford, United Kingdom



# Table 1

## Structural reform and de-risking governance.

Principle	Structural reform governance	De-risking governance
Price	Deregulate and eliminate subsidies	Subsidies to avoid consumer backlash
Profit	Privatisation or corporatisation of the SOE	Political control of SOE
Competition	Enforced competition and limits to market power through regulation	Limit market power ex-ante and protect investors from competition

Liberalisation as derisking the politics of redistribution

World Development Perspectives 31 (2023) 100527



ELSEVIER

Contents lists available at ScienceDirect

World Development Perspectives

journal homepage: [www.sciencedirect.com/journal/world-development-perspectives](http://www.sciencedirect.com/journal/world-development-perspectives)



State ownership in liberal economic governance? De-risking private investment in the electricity sector in Mexico

Jose Maria Valenzuela <sup>1</sup>

*Institute for Science, Innovation and Society, University of Oxford, 64 Banbury Road, Oxford OX2 6PN, United Kingdom*

What unused institutional capacities can  
repower?

Thank you.

[jose.valenzuela@insis.ox.ac.uk](mailto:jose.valenzuela@insis.ox.ac.uk)

Twitter: [@josemaria\\_mx](https://twitter.com/josemaria_mx)