

CHALLENGES FOR ELECTRICITY RATE DESIGN

Engaging the last mile

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5th Annual Workshop on the Economics of Electricity Policy and Markets

Session 3: Electricity Rate Design and Electrification

Ivey Energy Policy and Management Centre

October 20th, 2021

Why rate design matters so much?

- The instrumental efficiency tool
 - to send incentives to end-users to contribute to the maximization of the net social welfare
 - to make long-term “indirect” planning



or



or



or



Challenges for electricity rate design

- Energy prices and decarbonization
- Residual costs allocation: sunk network and policy costs
- Just transition

Energy prices and decarbonization

Rate components

- **Energy**
 - Dynamic energy prices
- **Networks**
 - Forward looking network charges
- **Policy costs**
 - Fixed charges, exit fees and/or “outsourcing”

TexasMonthly

Despite Losing Power for Days, Texans Will Pay Higher Power Bills—Perhaps for Decades to Come

The bankruptcies and staggering electricity charges are beginning to arrive. Could it go from bad to worse?



Castillo loads firewood into her car Wednesday, Feb. 17, 2021, in Dallas. Castillo said the fire would be used to burn wood as her family has been without power since Sunday due to blackouts caused by extreme cold. (AP Photo/LM Orton)

The New York Times

Climate and Environment > | Texas' Power | Climate Pledges | Reversing Trump's Rollbacks

Texas Blackouts Hit Minority Neighborhoods Especially Hard

As the freak winter storm raged, historically marginalized communities were among the first to face power outages, experts say.

EL PAÍS

ECONOMY

The storm 'Filomena' unleashes a political battle for the rise in the price of electricity

The Government alleges that it is a "temporary" rise and promises to open an investigation, while the opposition reproaches it for its double standards to combat energy poverty

Madrid - 09 JAN 2021 - 02:30 CET



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FWDDP

Texas legislators weigh partial and total bans on Griddy-type energy plans

Bills are advancing to help protect Texas residential consumers from outrageous energy bills, but critics say the measures scapegoat providers and skirt real market issues.



Item	Amount
Statement Breakdown	\$1,0785
Wholesale Electricity	\$6903
TDU Delivery Charges	\$1.18
Membership	\$136.04

February 1 - 18, 2021

All-in Rate \$2.00

kWh Used 1,654

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Consumer associations slam Spain's new electricity billing system

The government is seeking to encourage more efficient energy use with a tier-based model, featuring peak, low and average price periods depending on the time of the day



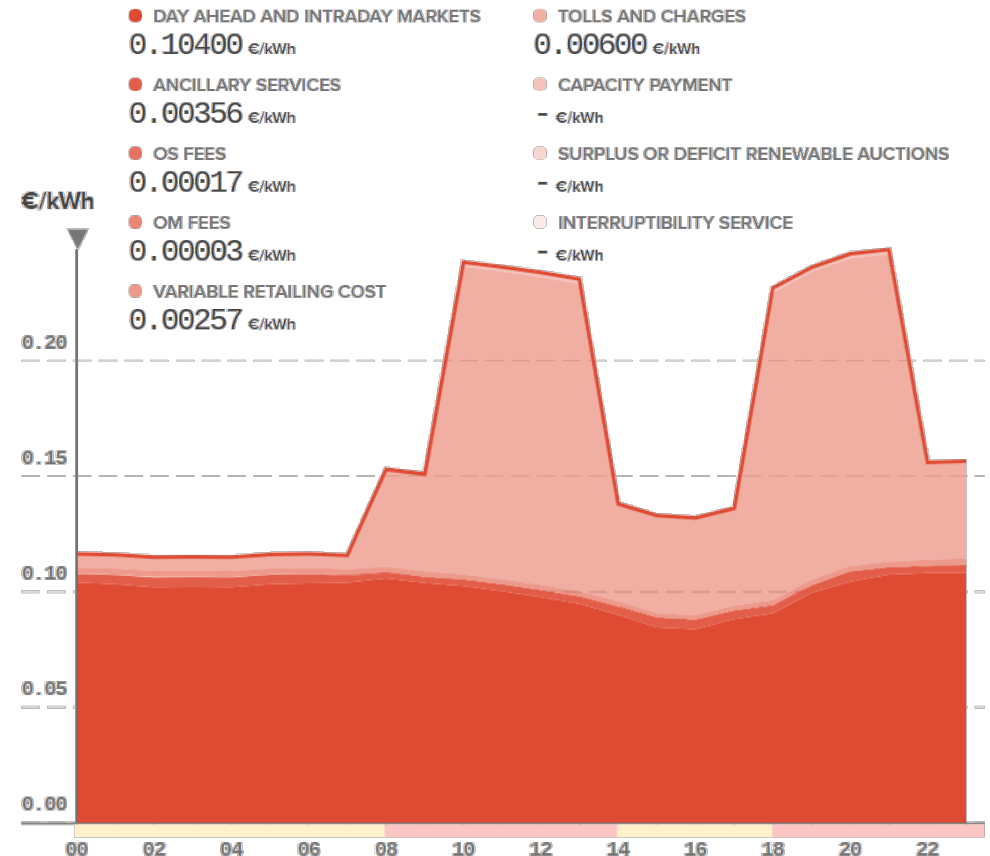
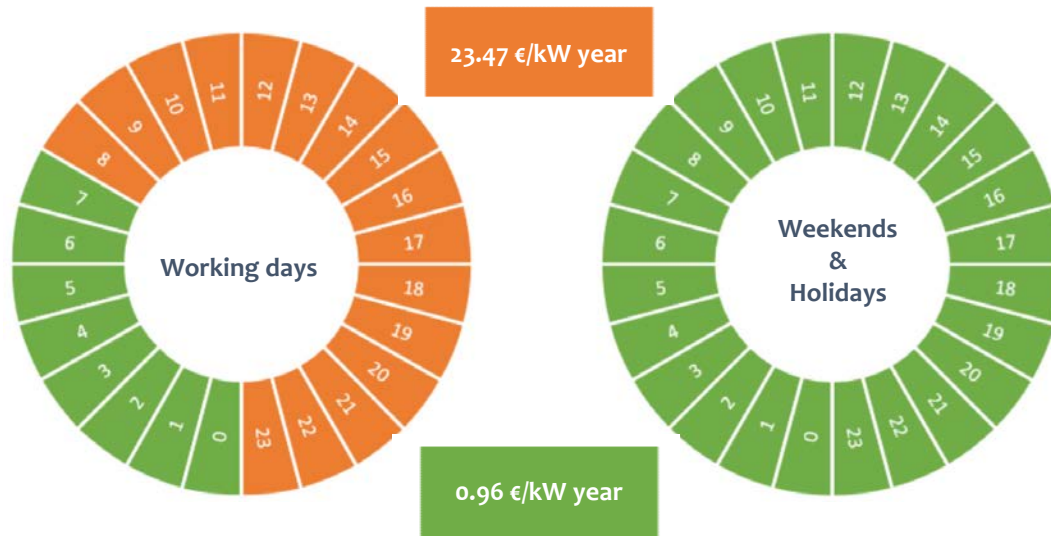
A new electricity billing system is going into effect on June 1. PACO PUENTES / EL PAÍS

New rate formats

Dynamic prices + TOU demand charge

- Spain 2021-... (June 1, 2021 onwards)

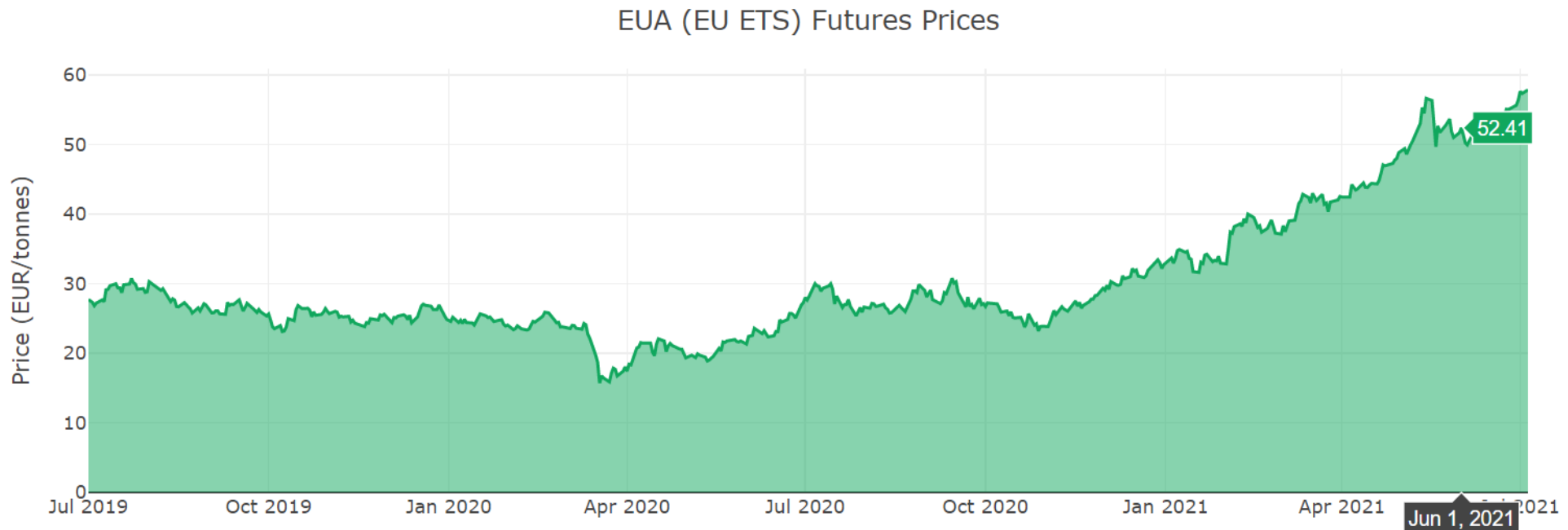
June 1, 2021



New rate formats

Socio-political perception

- End user misinformation and political pressure



<https://ember-climate.org/>

New rate formats

Socio-political perception

- End user misinformation and political pressure



Javier Durán

@tortondo

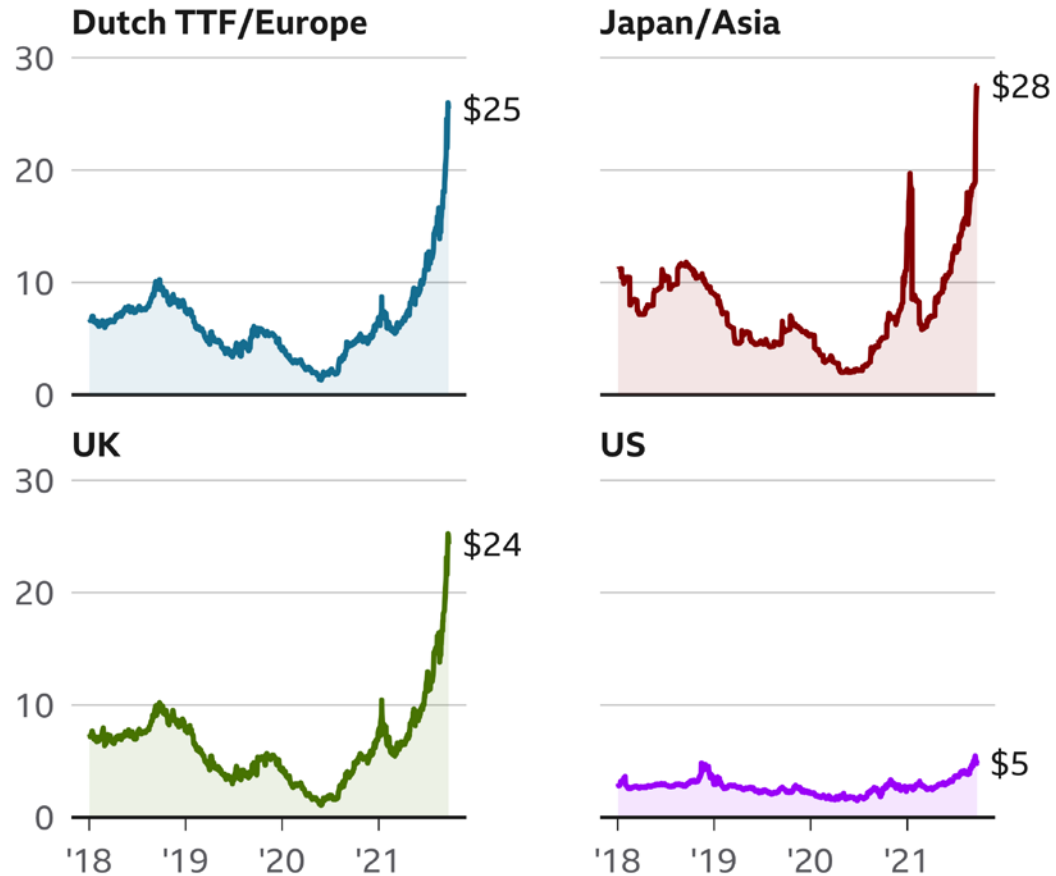
- Han: Let's jump to the speed of light
- Luke: Han, wait for 1am, it is cheaper!



Energy Prices

Gas prices have spiked around the world

Price in \$ per mmBtu by trading point

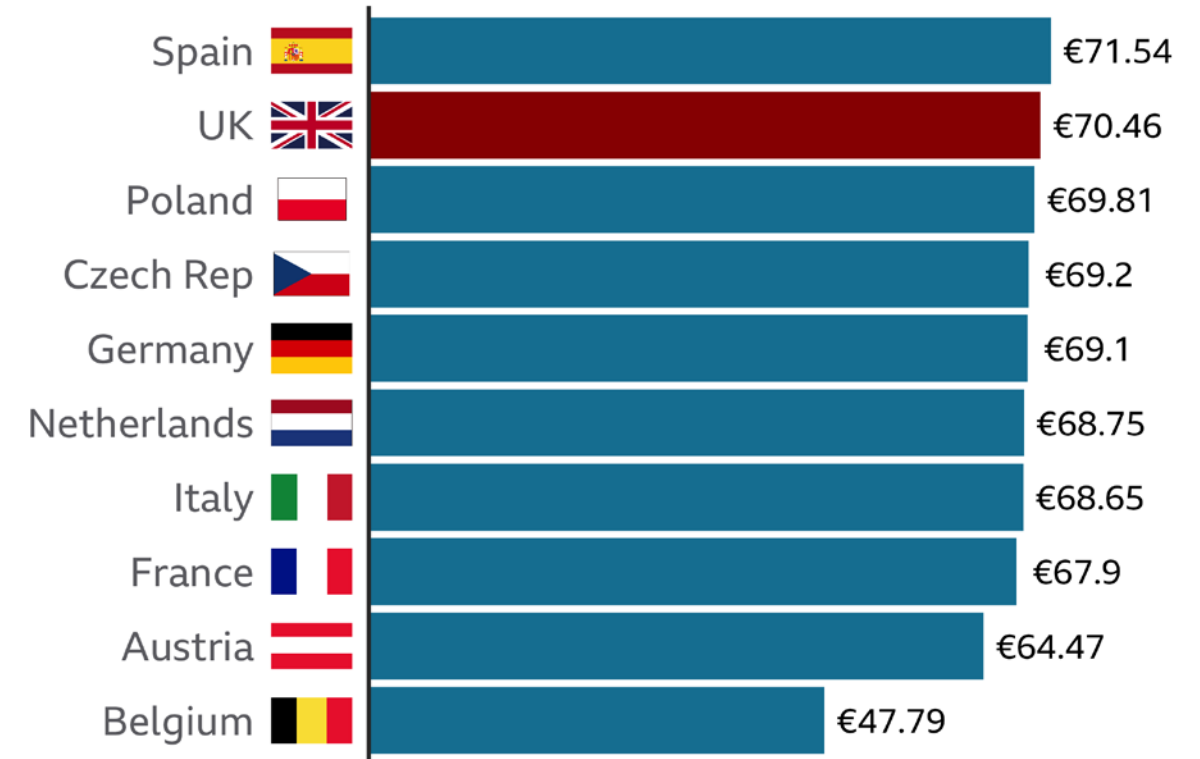


Source: Bloomberg



Natural gas wholesale prices across Europe

Selected trading hubs, euros per megawatt-hour

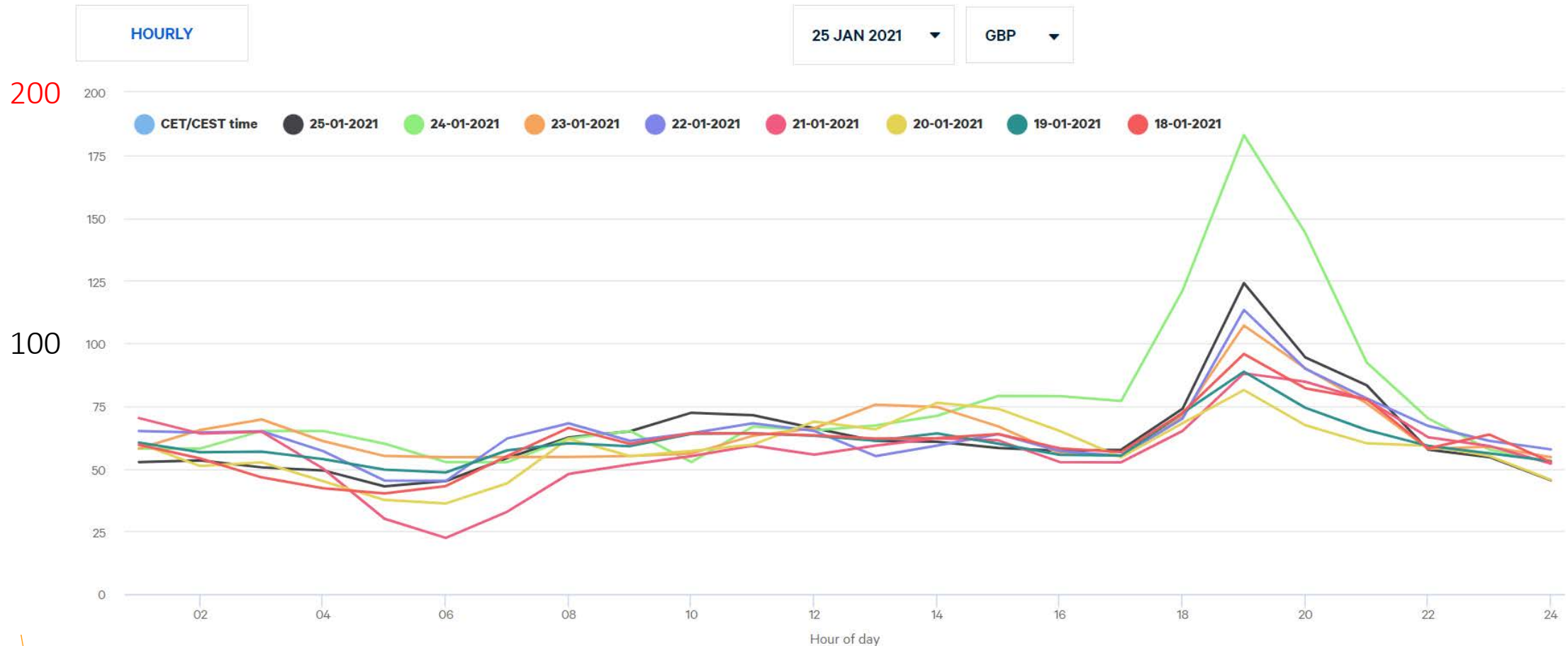


Source: Bloomberg. Last update: 23 September 15:00 BST



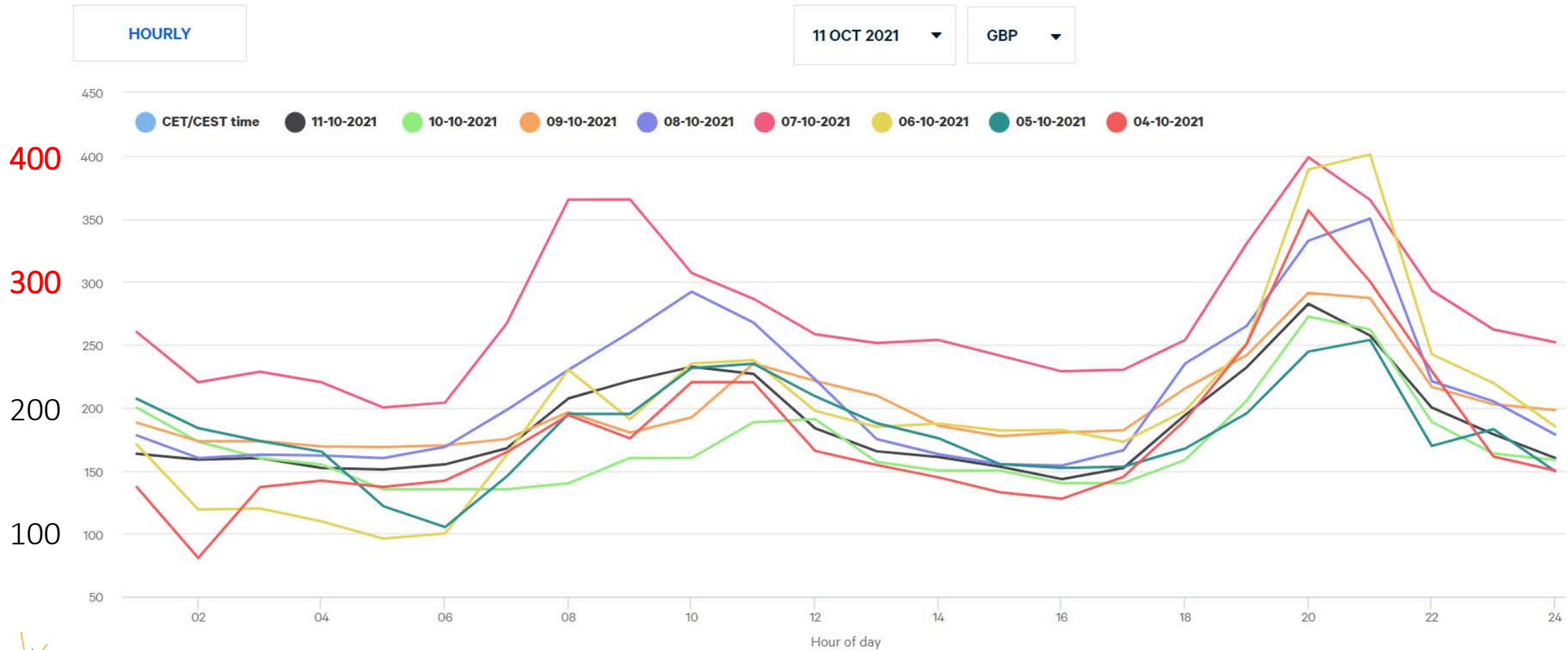
Energy Prices

- N2EX Day Ahead Auction Prices (NordPool UK)



Energy Prices

- N2EX Day Ahead Auction Prices (NordPool UK)



Energy Prices

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Gas crisis leaves Europe searching for solutions

🕒 24 September | 💬 Comments

Soaring prices pose problems for EU climate campaign

Italy's €3bn protection package

Spain acts to curb record energy bills

Coal is king in Poland but gas is important

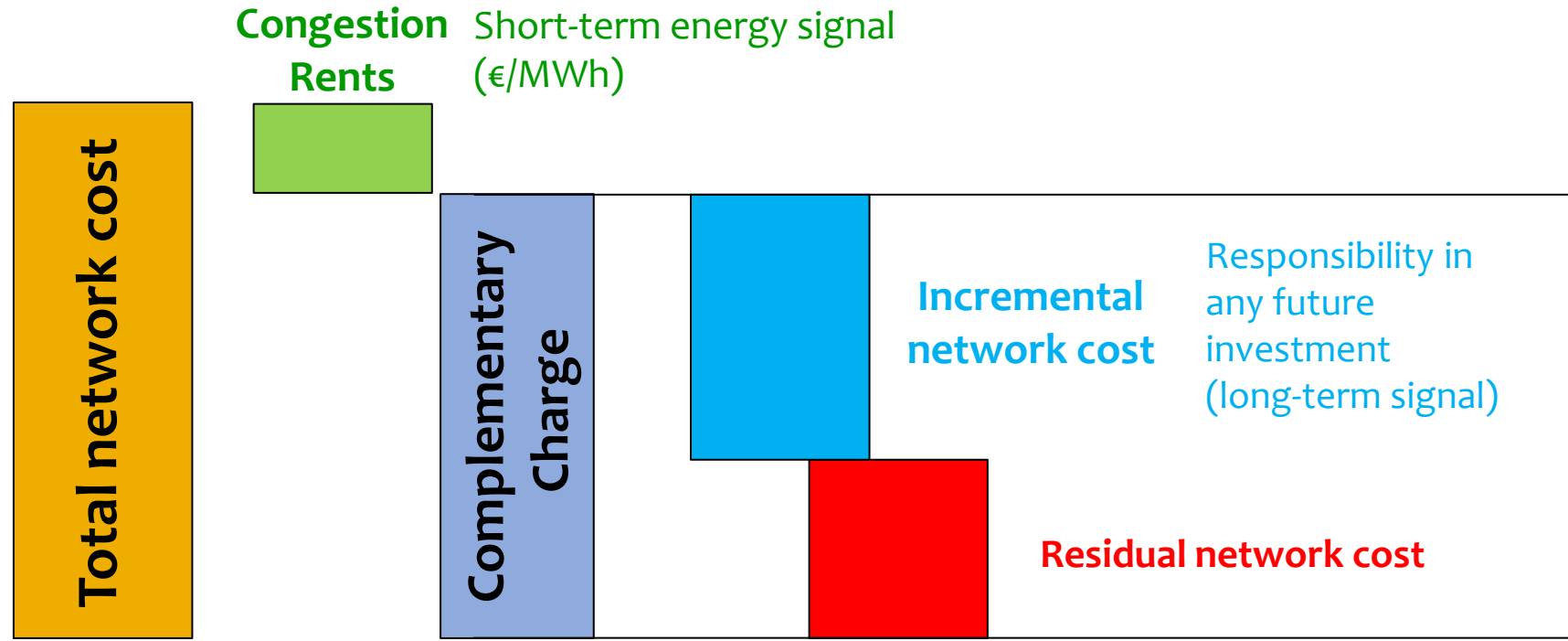
Norwegians don't use gas but are increasing exports

Residual costs allocation: sunk network and policy costs

Complementary charges: network tariffs

Forward looking network charges

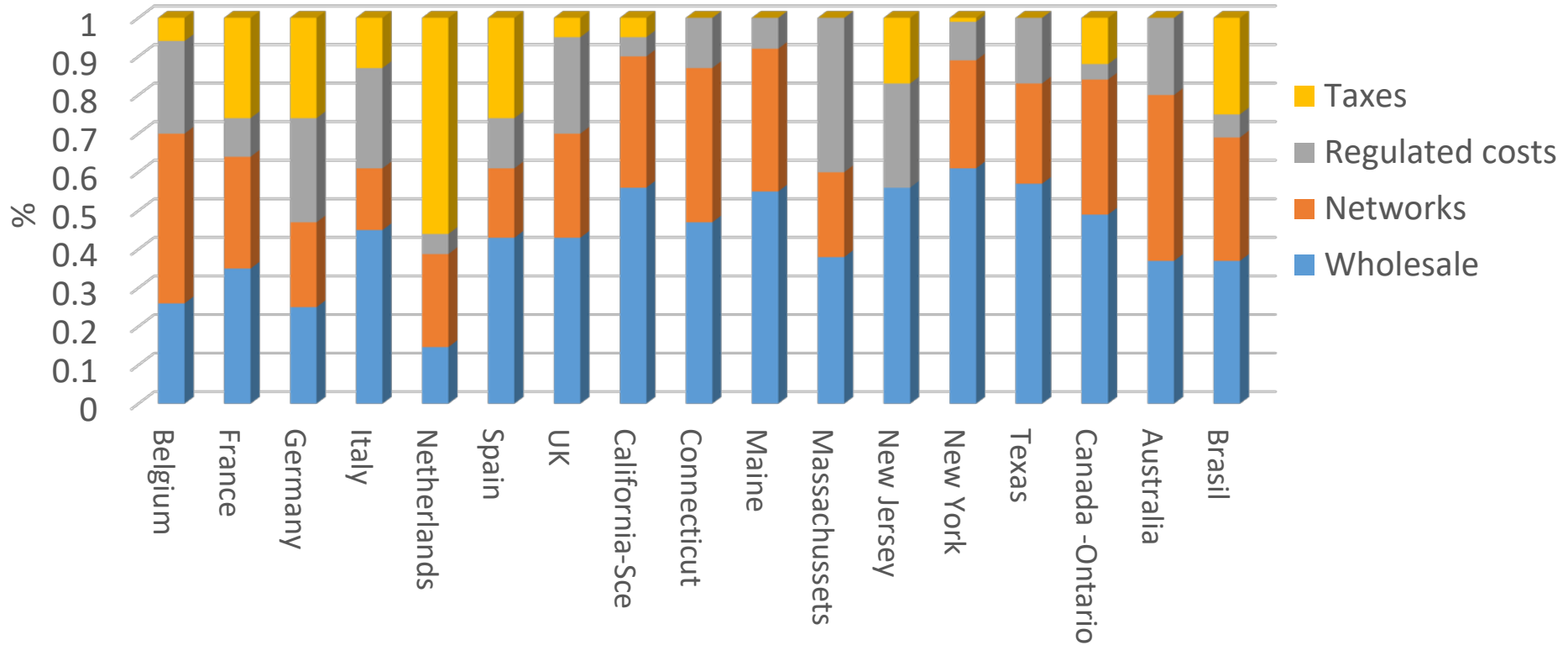
- Forward-looking signals do not guarantee full cost recovery



Residual costs

Policy (subsidies, legacy,...) costs

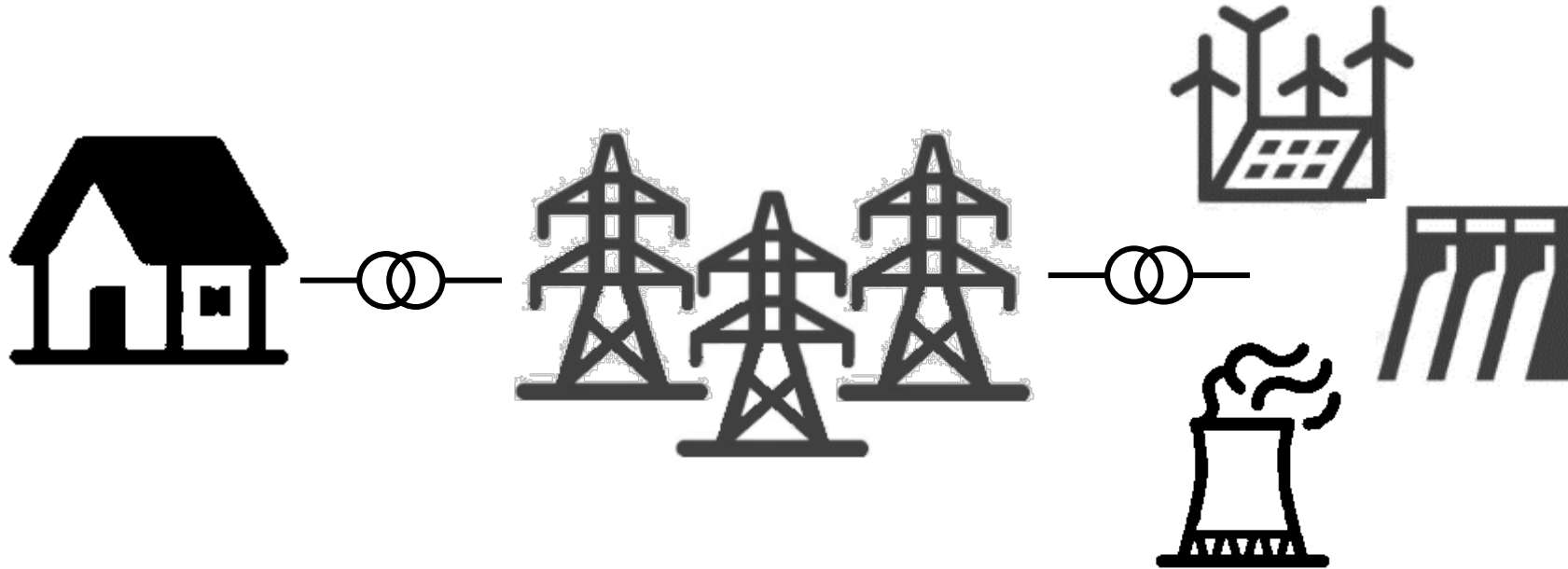
- In many jurisdictions, “policy costs” and taxes play a larger role



Long-term demand elasticity

Grid defection or cessation

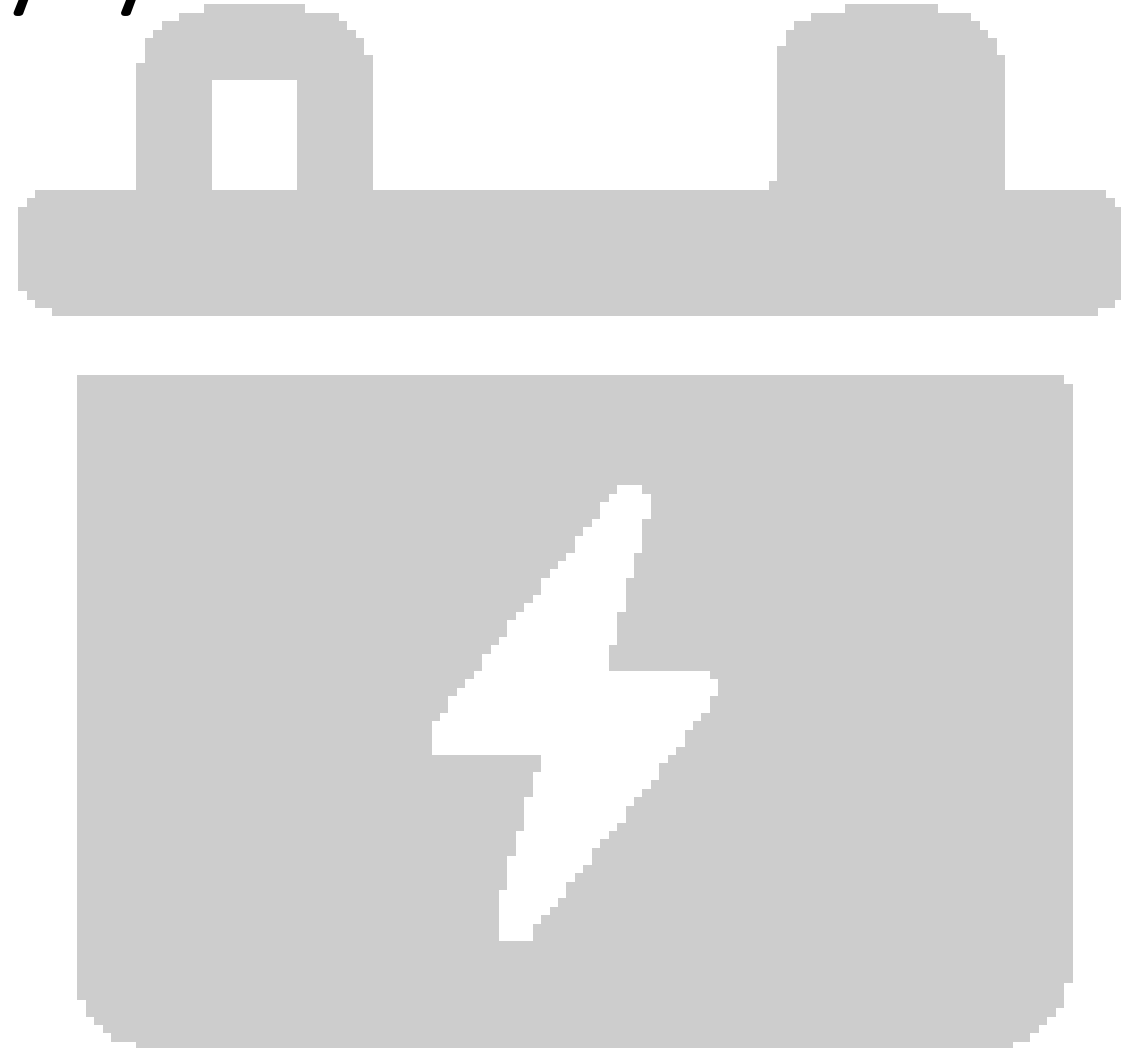
- Electric power system



Long-term demand elasticity



Grid defection or cessation

- Electric power battery system



Efficient allocation of costs

Fixed charges controversy

- Reduction of incentives for energy efficiency and distributed generation and inefficient increase in consumptions 
- Infringement of the equity principle (low-usage and low-income customers) 

Long-term elasticity and grid defection and disconnection

Recovering unassignable residual costs

- Thresholds based on stand-alone system costs
- Prior to risk to disconnection
 - Uneven fixed charges
 - Equity balance
 - Backwards-looking marginal costs
- In face of risk of disconnection
 - Exit fees
 - Real-estate taxes
 - State budget

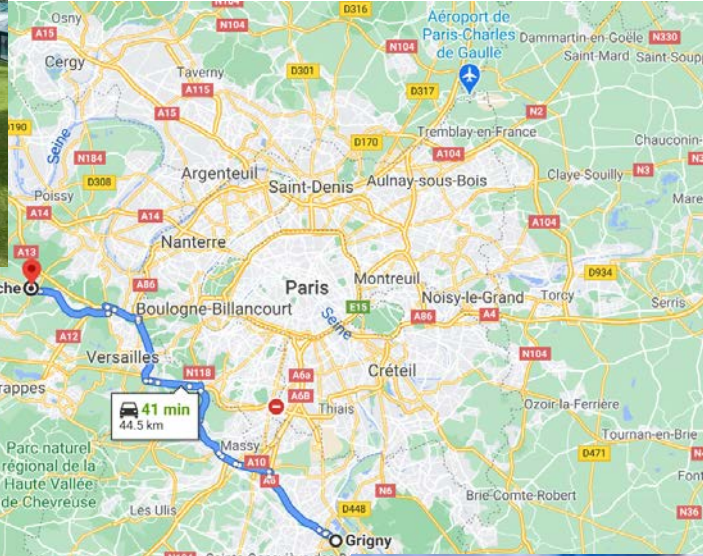
C. Batlle, P. Mastropietro, P. Rodilla, 2020. Redesigning residual cost allocation in electricity tariffs: a proposal to balance efficiency, equity and cost recovery. Renewable Energy. Vol. 155, pp. 257 - 266.

Just energy transition

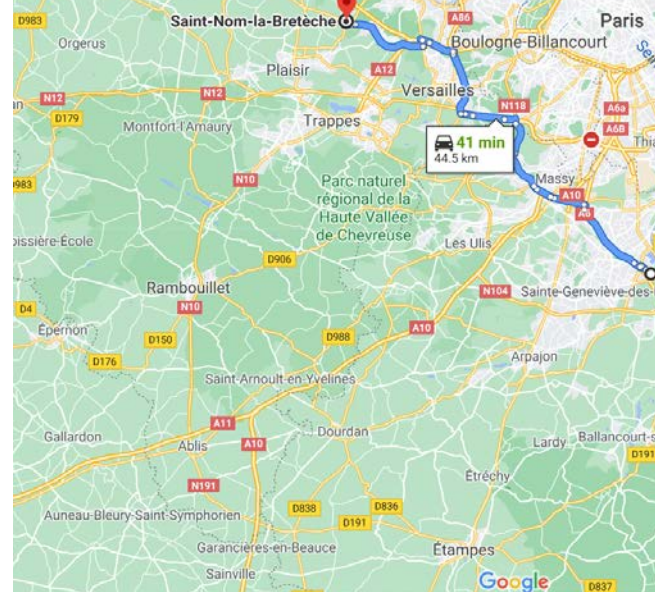
Just energy transition



Saint-Nom-la-Bretèche
Île-de-France



Grigny
Essone



Pictures from maps.google.com/ and www.thelocal.fr/

Just energy transition

TESLA Independence
Power Everything

Powerwall reduces your reliance on the grid by storing your solar energy for use when the sun isn't shining. Use Powerwall alone or combine it with other Tesla products to save money, reduce your carbon footprint and prepare your home for power outages.

Home

Car

Powerwall

Grid

Outage

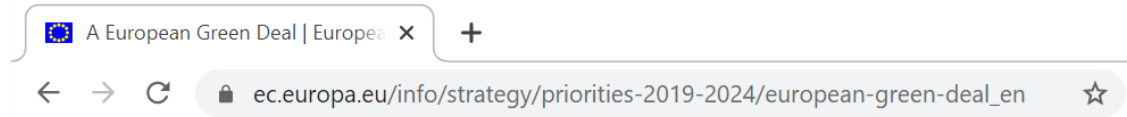
Use your stored energy anytime to power your home

At night when the sun isn't shining

Or when the power is out during an outage

Recharge when the sun rises, or the grid turns back on

Just energy transition



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A European Green Deal

Striving to be the first climate-neutral continent



Climate change and environmental degradation are an existential threat to Europe and the world. To overcome these challenges, Europe needs a new growth strategy that will transform the Union into a modern, resource-efficient and competitive economy, where

- there are no net emissions of greenhouse gases by 2050
- economic growth is decoupled from resource use
- no person and no place is left behind

The European Green Deal is our plan to **make the EU's economy sustainable**. We can do this by turning climate and environmental challenges into opportunities, and making the transition just and inclusive for all.

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