



# Power System Governance and the Role of the EU

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## Setting the scale



<b>2016</b>	<b>USA</b>	<b>EU-28</b>	<b>GER</b>
<b>People (Mio)</b>	<b>323</b>	<b>512</b>	<b>83</b>
<b>GDP (\$bn PPP)</b>	<b>18,624</b>	<b>20,255</b>	<b>4,030</b>
<b>Electricity consumption (TWh)</b>	<b>3,902</b>	<b>2,786</b>	<b>517</b>
<b>1000 \$ PPP / head</b>	<b>57.7</b>	<b>39.6</b>	<b>48.6</b>
<b>TWh / head</b>	<b>12,080</b>	<b>5,441</b>	<b>6,229</b>
<b>TWh / Mio\$ PPP</b>	<b>210</b>	<b>138</b>	<b>128</b>

Source: adelphi, based on data from U.S. EIA, U.S.Census Bureau, Eurostat, World Bank Group

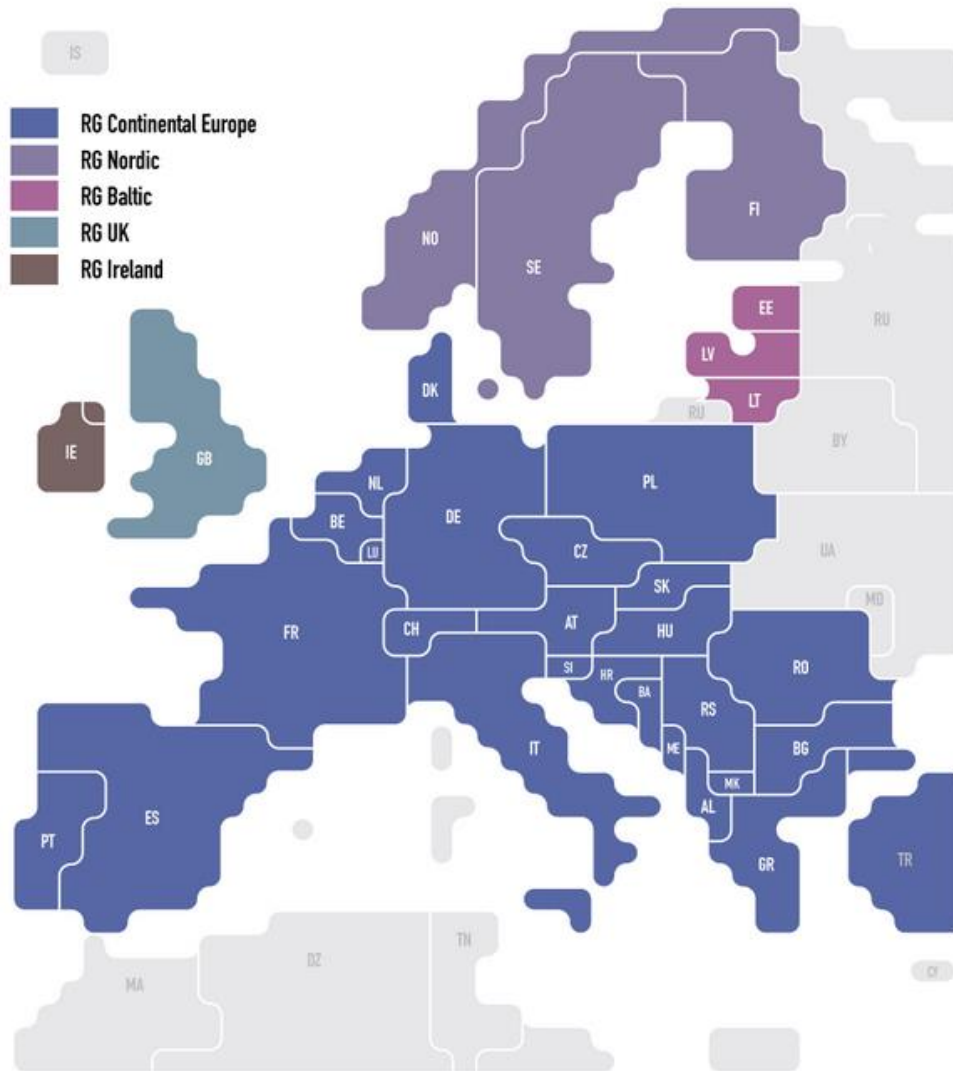
# Is the EU electrically more integrated than the USA?

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- Physically
- And from a regulatory / policy point of view

# Continental Europe synchronous power system



> 500 Million people

28 countries (19 of which in the EU)

Strong DC interconnections CE <-> Nordic

DC Connections also with UK => IRL, Baltic, East

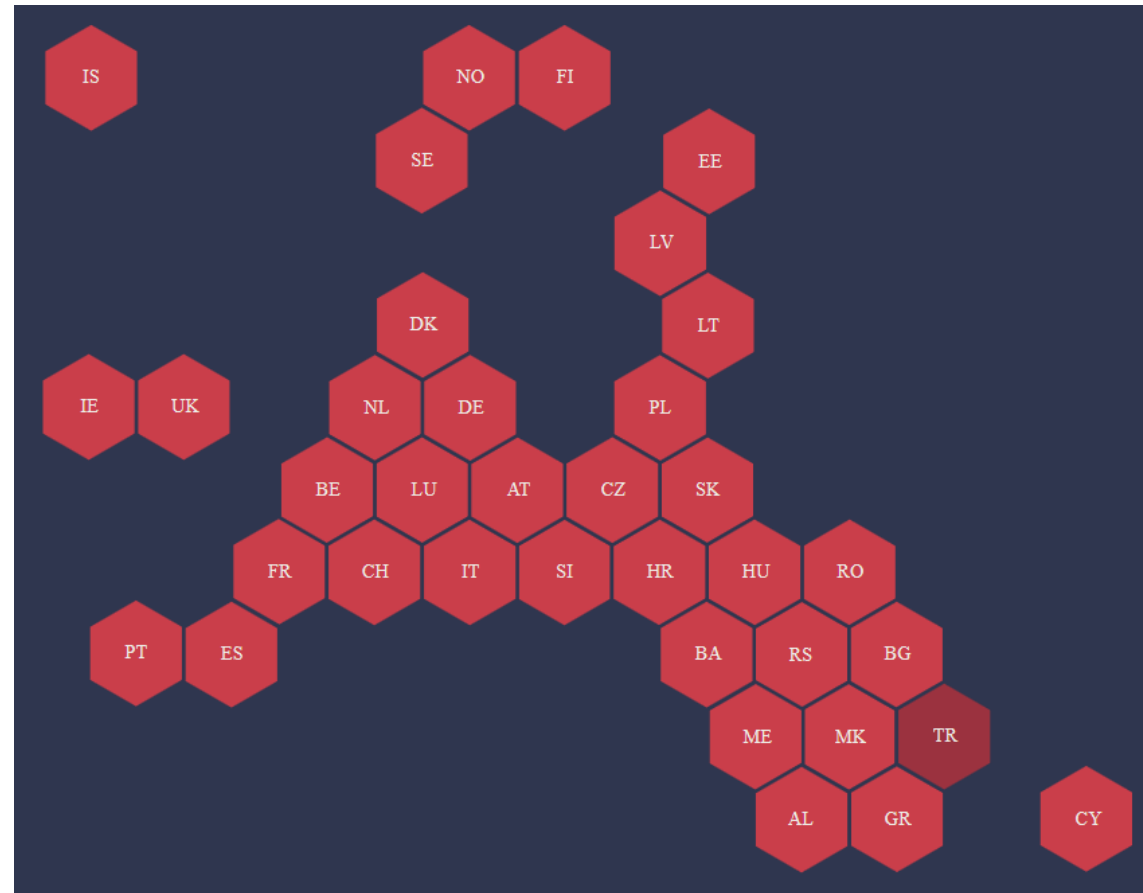
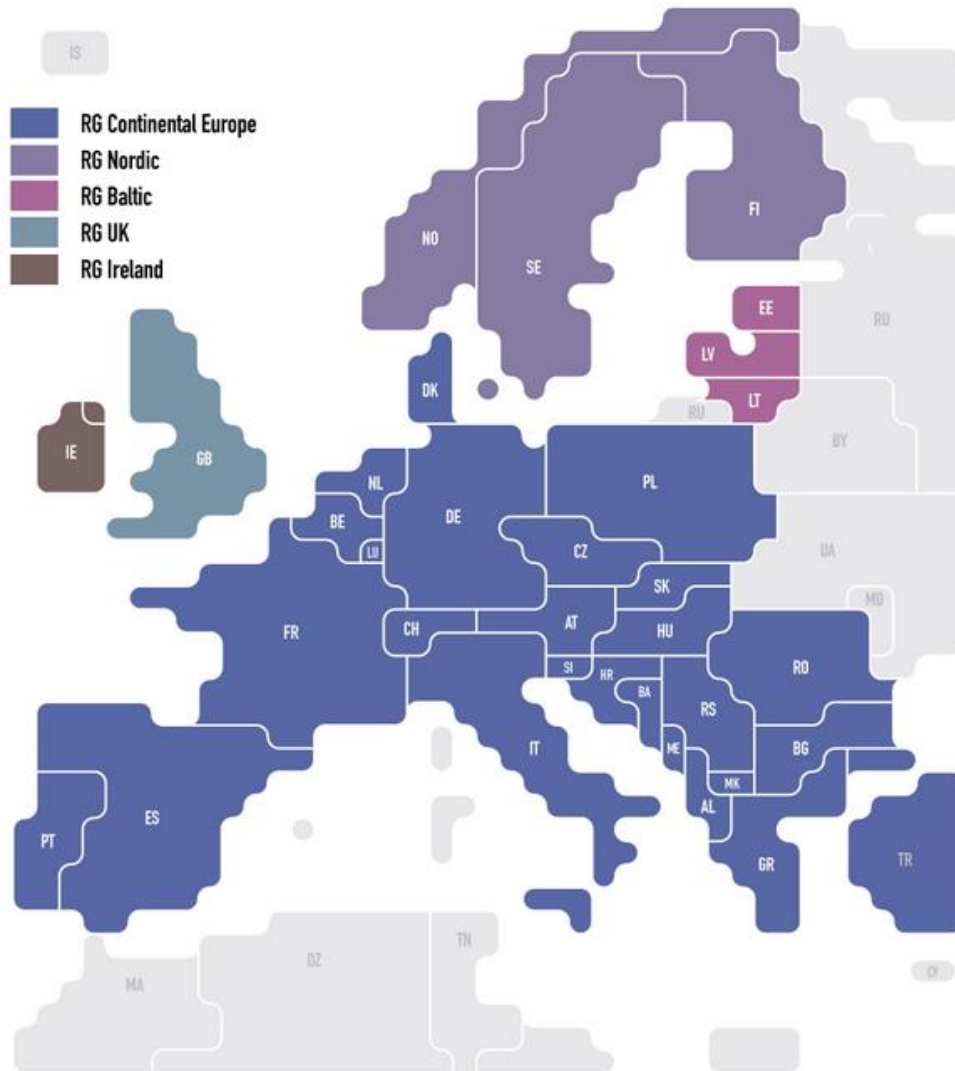
Partly weak internal (especially: cross border) connections => bottlenecks

Strong regulatory integration within EU + Norway, partly Switzerland

Technical cooperation also with further non-EU countries, EU-subregions

# CE synchronous system

# ENTSO-E countries





EU goals, and thus EU own policies & jurisdiction:

- Internal electricity and gas markets (in general: “internal market”)
- Ensuring security of energy supply
- Promote efficiency, renewables (in general climate /environm. policies)
- Promote interconnection of energy networks

However, each Member State has the right to determine:

- Conditions for exploiting its energy sources
  - Its choice between energy sources
  - General structure of its energy supply
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# Key steps of EU electricity regulation integration

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- Origins: vertically (state owned) integrated monopolies
- From the 1950s: EC role on coal & nuclear (technical collaboration, single buyer for nuclear fuels, nuclear safety rules, coal internal market)
- 1996/2003/2009: 1<sup>st</sup>/2<sup>nd</sup>/3<sup>rd</sup> internal electricity market (IEM) directives (gradual liberalisation of wholesale & retail, unbundling and roles of TSOs/DSOs, establishment of independent NRA, ACER, ENTSO-E, TYNDP, 3<sup>rd</sup> party access, mandate to establish EU grid codes)
- 2001 1<sup>st</sup> Renewables Dir.; 2002 Buildings Dir.; 2003 Biofuels Dir.; 2005: EU GHG Emission Trading Scheme; 2006 Energy Services Dir.;
- 2009 energy & climate package: 2020 targets for GHG, RES, efficiency
- Ongoing revision with 2030 targets: > 1.000 pages of legislative text

# European TSOs very different from ISOs/RTOs in the US

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- Unbundling requirements (3 models since 2009)
- The TSOs own and operate the physical assets (transmission grid)
- They also act as system operator, and are key player in grid planning
- TSOs do not operate wholesale electricity markets (but they do procure balancing energy on a market base)
- All European TSOs are (by EU law) organized in ENTSO-E
- TSOs may earn (regulated) profit. Their tariffs are regulated by NRAs (in Germany: BNetzA) organized EU-wide in ACER and CEER
- TSOs may be public or privately owned
- TSOs are subject to (increasingly strict) transparency requirements





- EU MS have right to choose energy mix => strongly varying renewable support schemes
- Since the 1990s, (German) opponents appealed to EU internal market principles (state aid) against renewable support schemes
- European Court of Justice's sentence created delicate equilibrium
- Recently, the EU Commission could effectively force MS to abandon politically set feed-in premiums and move to market based instruments (auctions or tradable certificate schemes)



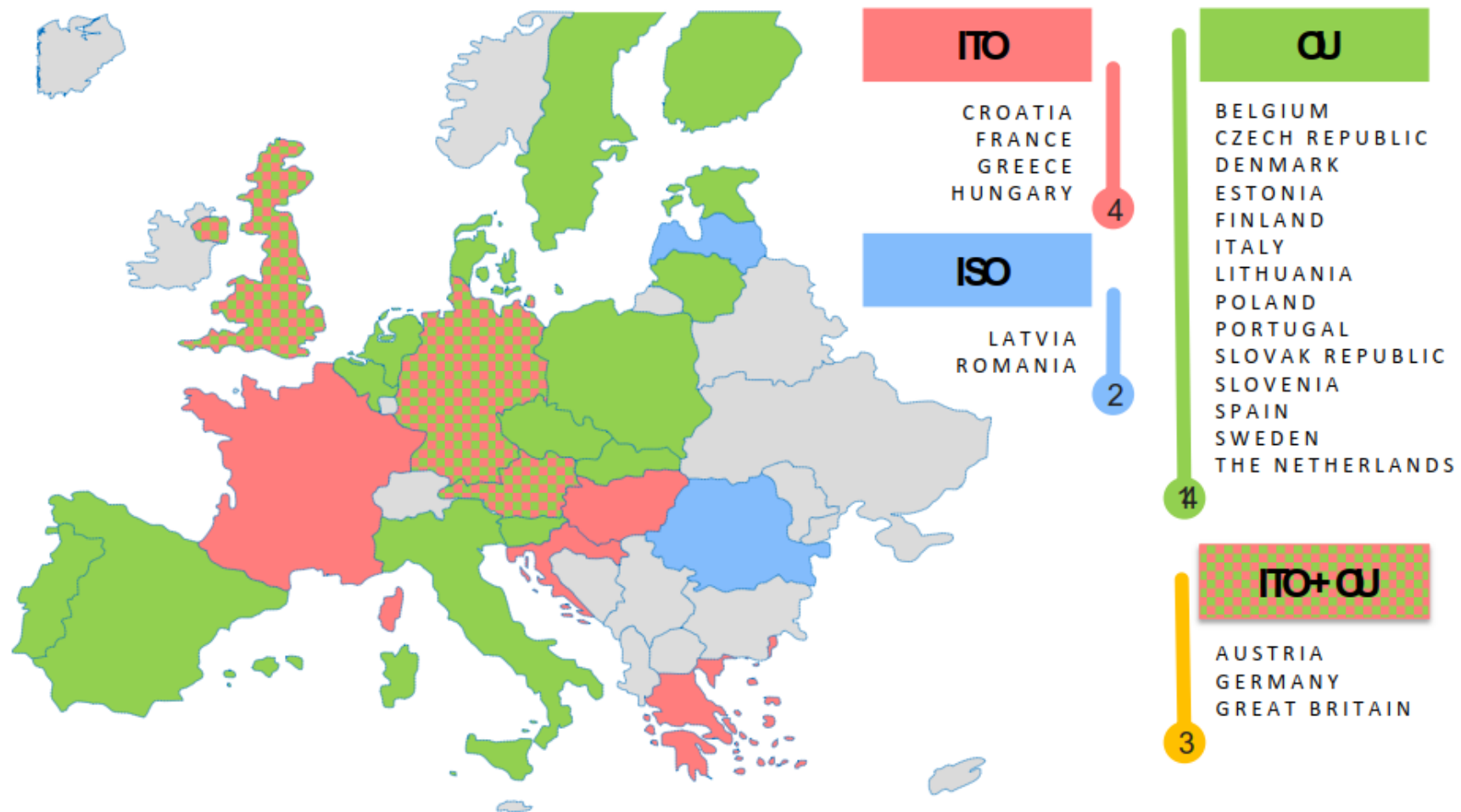
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# Back-Up Slides

# Ownership unbundling prevailing in the EU



## Unbundling models in the European overview – electricity



# Institutional settings



	<b>Germany</b>	<b>EU</b>
Legislative	Bundestag, Bundesrat (Parliament, Federal Council)	EU Council, EU Parliament (EU Commission: initiative)
Executive	Federal Government	EU Commission (partly)
Judiciary top	Bundesverfassungsgericht Fed. Constitutional Court	European Court of Justice
Energy Regulator	Bundesnetzagentur (Fed. Network Agency)	ACER (supranational) CEER (coordination NRAs)
TSOs	50hertz, amprion, Tennet, Transnet	ENTSO-E (network of 43 TSO from 36 countries)

# Thank you for your attention

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