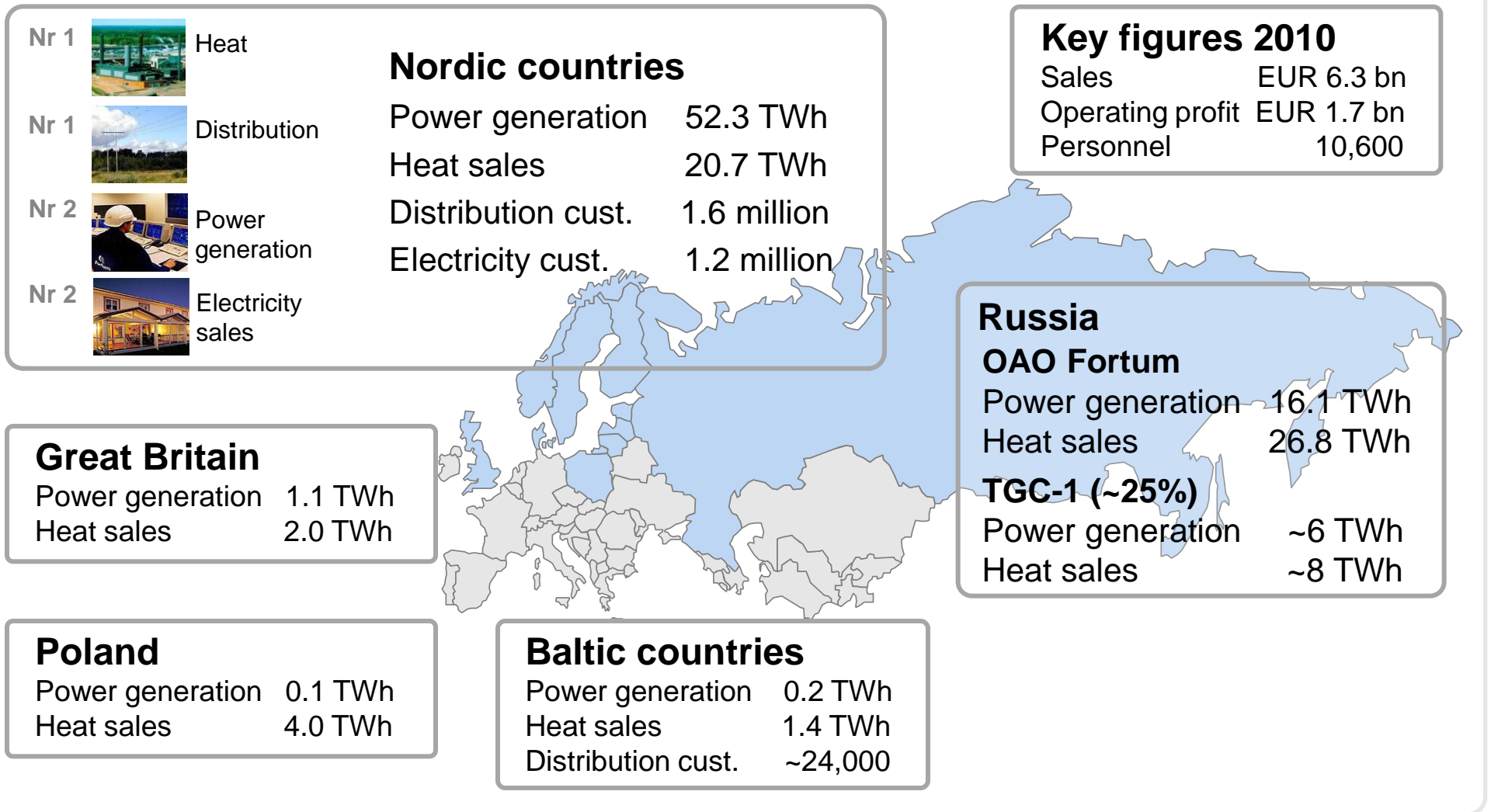




Markkinoiden kehitys sähkön- ja lämmöntuottajan näkökulmasta

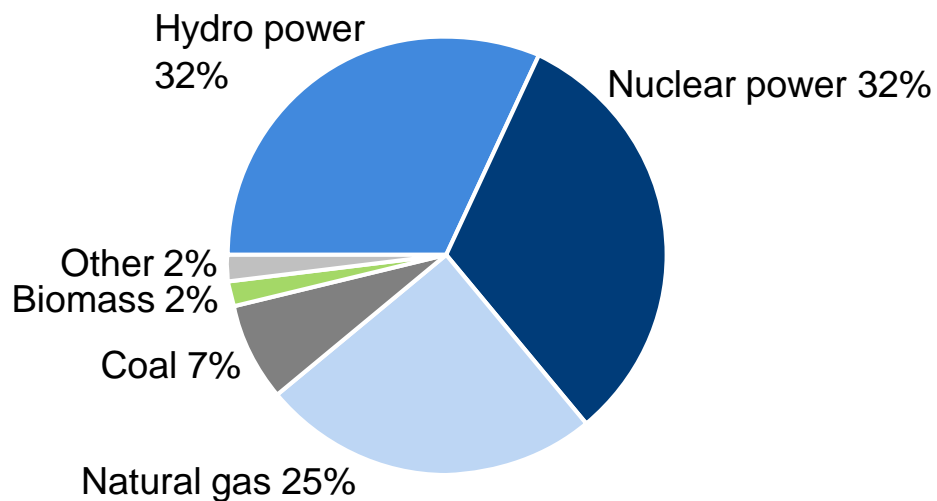
Kalle Ahlstedt
Johtaja, Strategiakehitys
Fortum Corporation

Fortum's geographical presence today



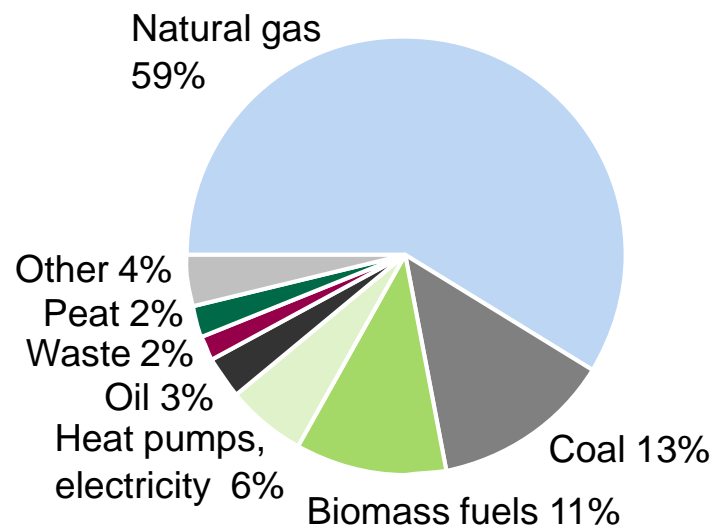
Fortum's power and heat production by source

Fortum's power generation in 2010



Total generation 69.8 TWh
(Generation capacity 14,113 MW)

Fortum's heat production in 2010

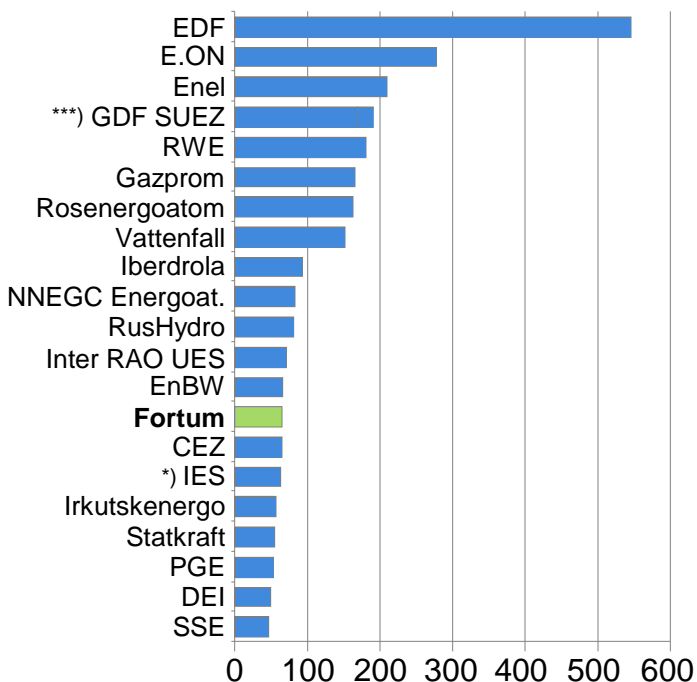


Total production 52.1 TWh
(Production capacity 24,494 MW)

Fortum mid-sized European power generation player; Global #4 in heat

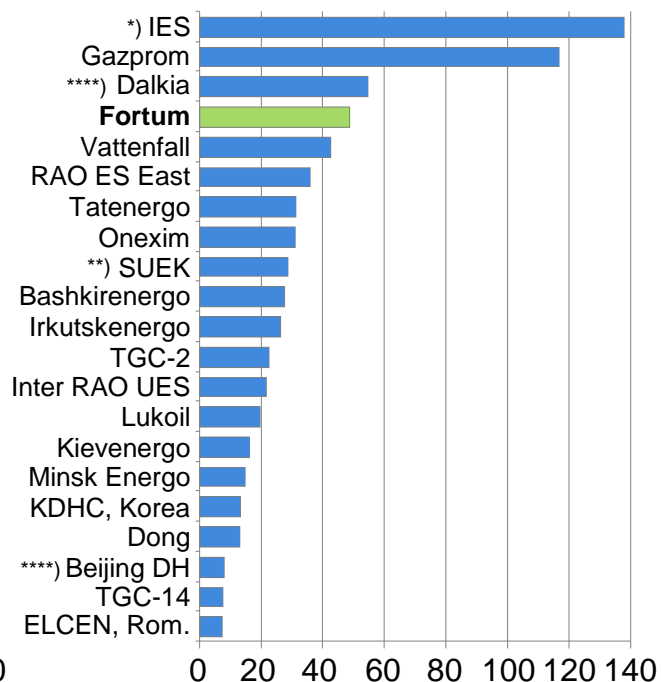
Power generation

Largest producers in Europe and Russia, 2009
TWh



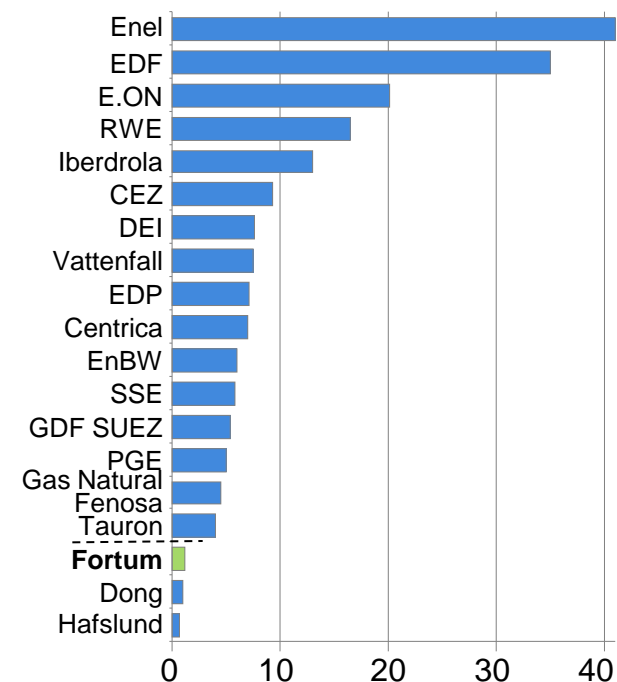
Heat production

Largest global producers, 2009
TWh



Customers

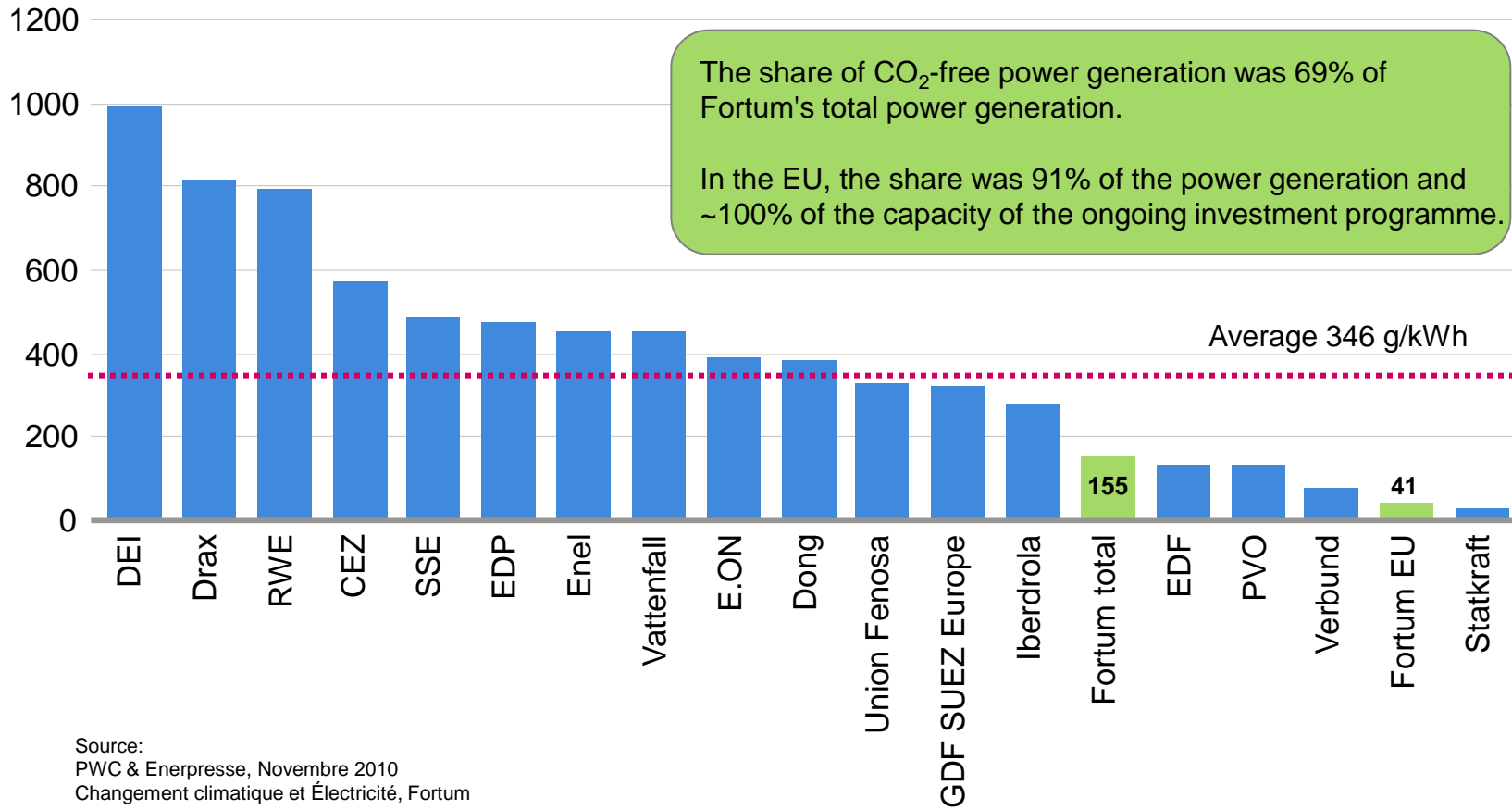
Electricity customers in EU, 2009
millions



* incl. TGC-5, TGC-6, TGC-7, TGC-9, ** incl. TGC-12, TGC-13. *** incl. International Power
Source Company information, Fortum analyses, 2009 figures pro forma, **** 2007

Fortum's carbon exposure among the lowest in Europe

g CO₂/kWh electricity, 2009



Note:

Fortum's specific emission of the power generation in 2010 in the EU were 84 g/kWh and in total 189 g/kWh, 86 % (91 %) emission free in EU and 66 % (69 %) emission free overall. Figures for all other companies include only European generation.



Global megatrends influence the utilities sector



Strategic issues for the utilities industry

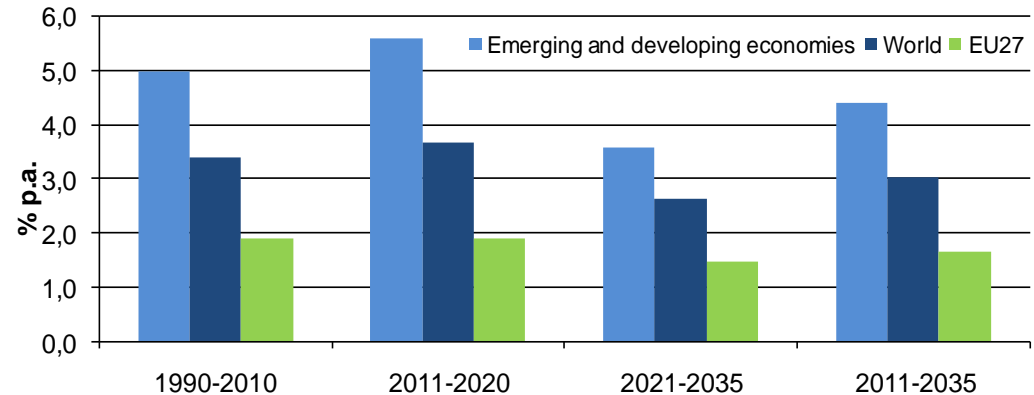
- Economic development
- Climate change response
- Power and heat demand and supply
- Energy system structure
- Market liberalization and integration
- Business models and competition

On the global arena, Europe seems to have challenging economic outlook

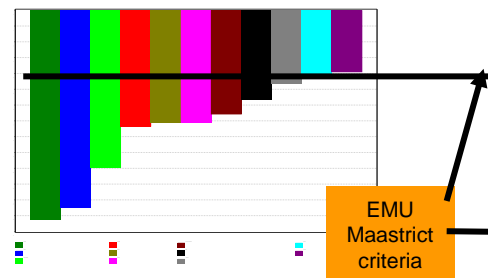
- Estimates on growth to 2035 vary
 - EU27 + 1.6% annually
 - Emerging and developing economies + 4.4%
 - World globally + 3%
 - Developing nations will be responsible for 2/3 of growth by 2035

- Outlook for Europe less optimistic - EZ crises, ageing population, public sector finances, industries relocation to emerging markets ...

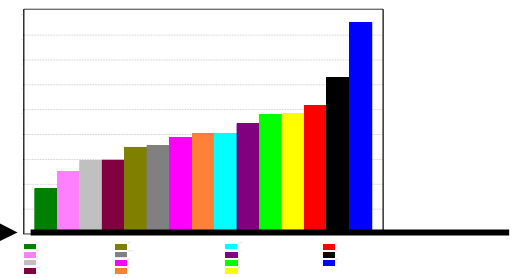
Annual average growth rates, % p.a.



General government budget balance at end of 2010, % of GDP

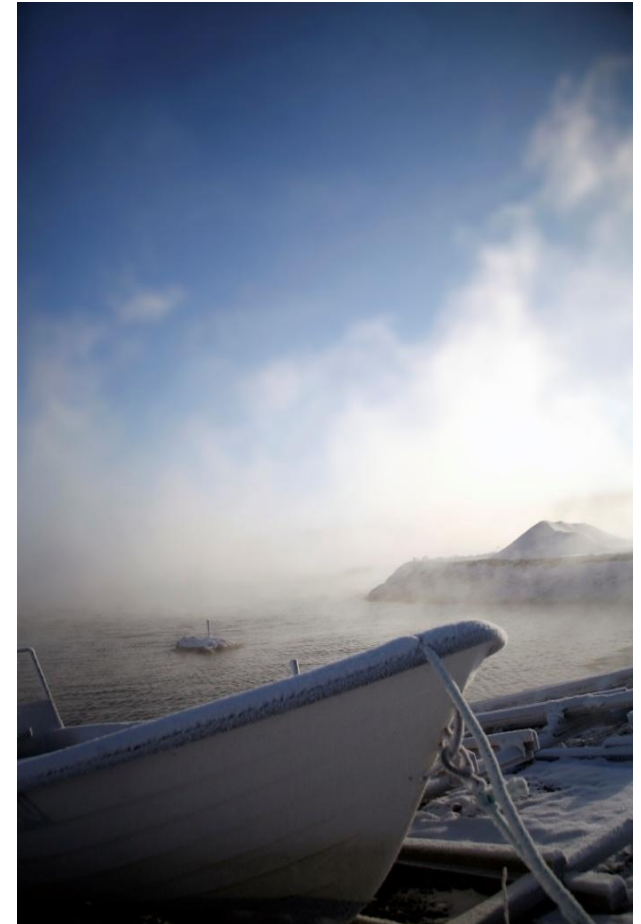


Gross government debt estimated at end of 2011, % of GDP



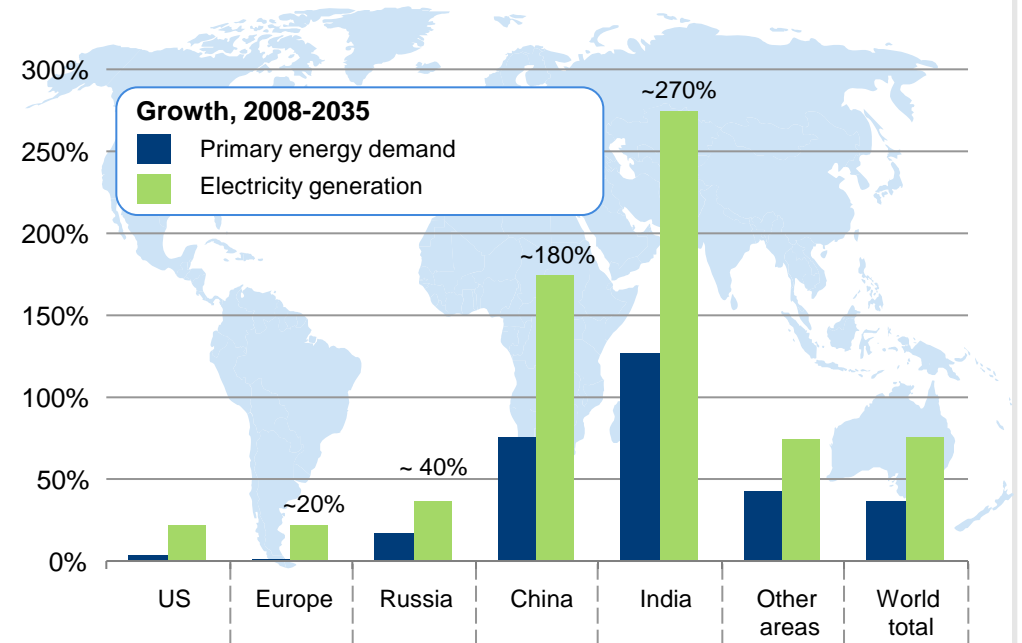
Climate issue will continue to drive policy making, but no global solution or price for CO₂

- Global warming expected to stay at 3-4 C based on voluntary pledges
 - No global emission reduction deal foreseen that would limit warming to 2 C
 - In electricity generation, biggest relative growth estimated in renewables but in absolute terms coal and gas grow still most
- CO₂ free production increasingly rewarded in the OECD countries
- The next step is the COP17 in South Africa in November-December 2011. Progress during 2011 has been slow and currently no breakthrough is seen before the expiry of the Kyoto protocol.



The role of electricity grows – bulk of new demand takes place in emerging markets

- Growing global energy demand will be increasingly fulfilled by electricity in the future
- Substantial demand growth in the emerging markets
- Capacity retirements and moderate demand growth in the EU
- Globally, 5 700 GW of new capacity needed by 2035



Capacity changes, 2010-2035 (GW)

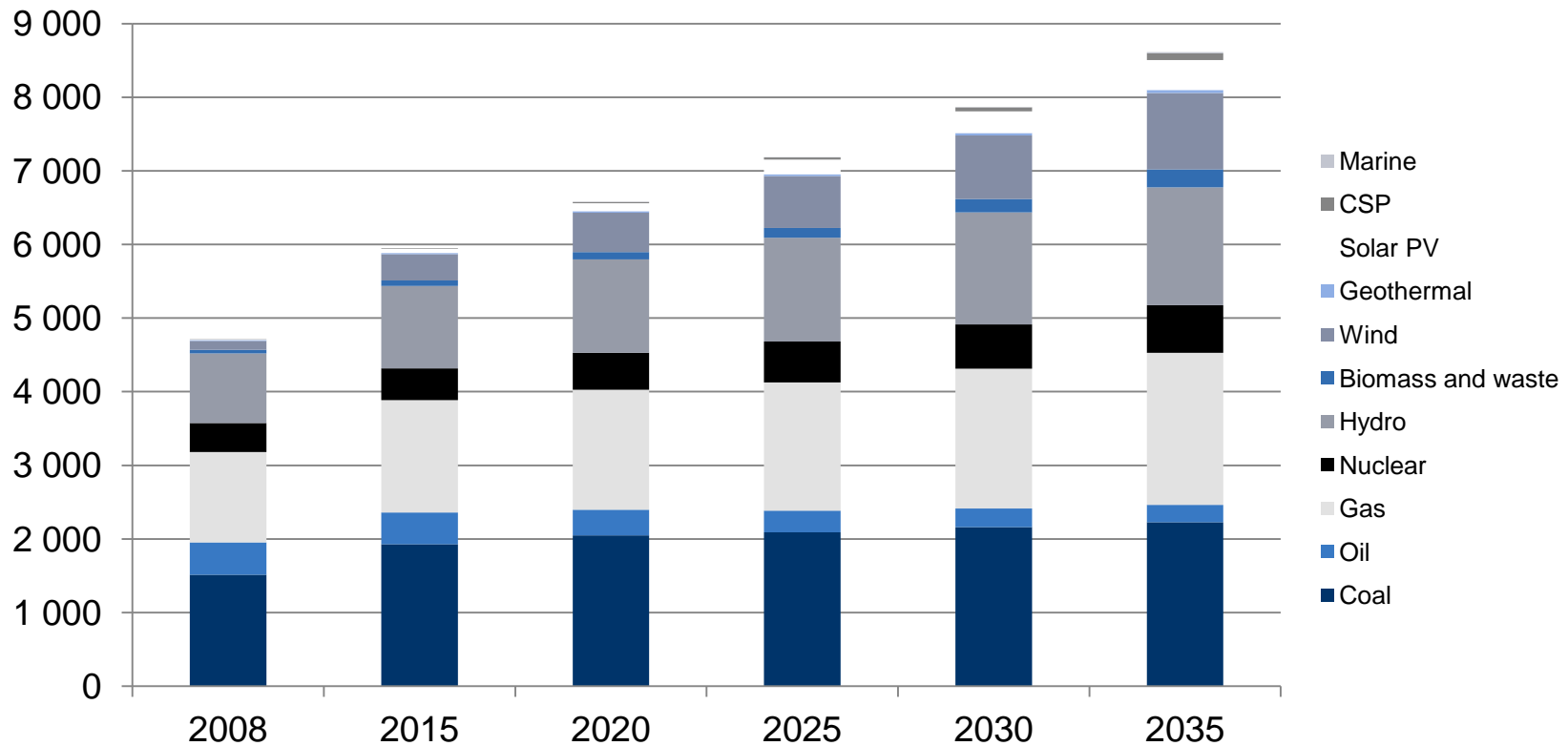
Retiring capacity	531	506	156	180	80	527	1980
New capacity, total ⁽¹⁾	842	835	229	1533	628	1606	5673

1) Total new capacity needed for increasing demand and retiring capacity replacements

Source: IEA WEO 2010 (New policies scenario)

The share of renewable energy is to increase – lead times are however long

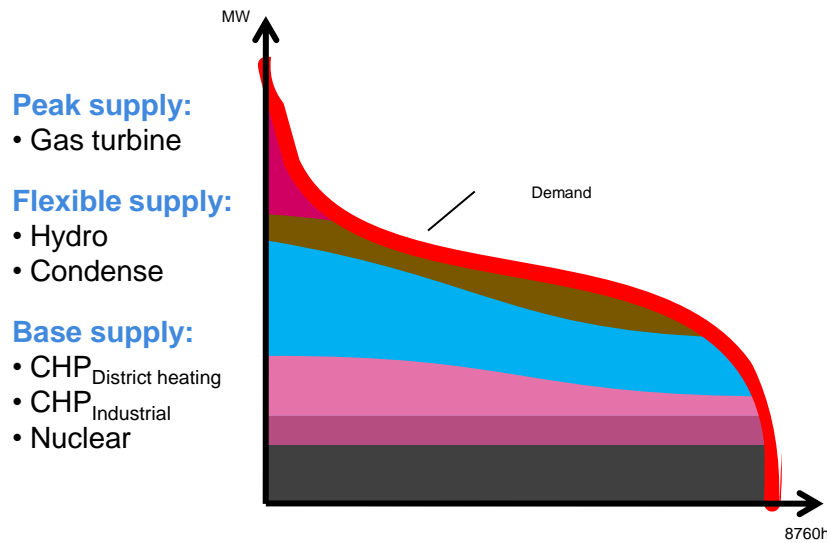
Generation capacity,
World (GW)



The system calls for more flexible capacity when the share of wind and solar power increases

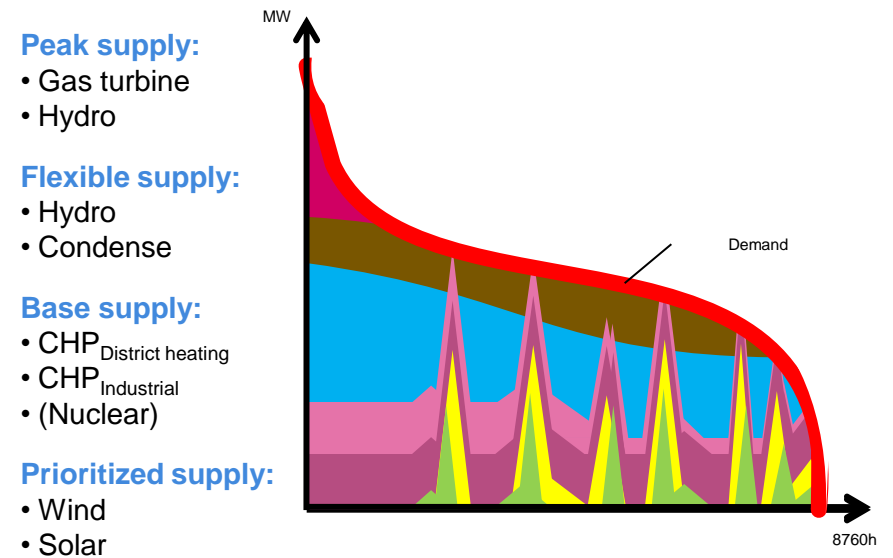
"Old normal"

- The need for flexible production follows initially the total consumption



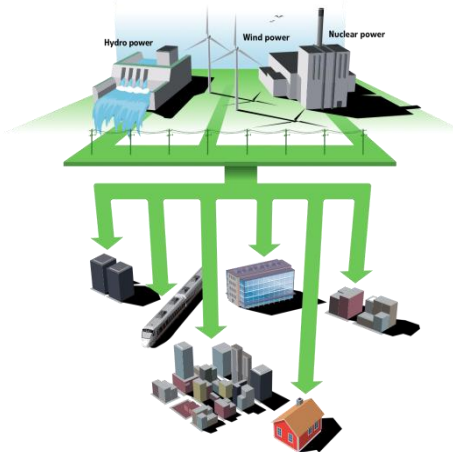
"New normal"

- Need for flexible production **not** directly following consumption
- Relative need for flexible capacity increases



Increased renewable energy drives also for smarter grids and demand side management

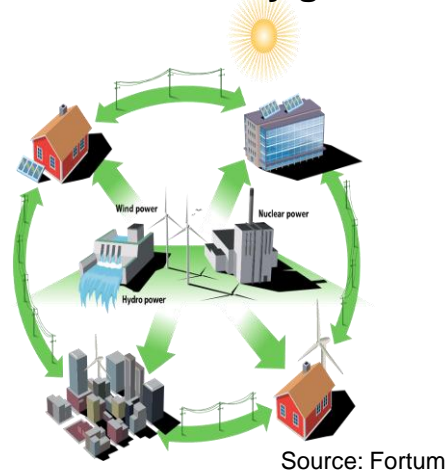
Traditional electricity grids



Source: Fortum

- Centralised power production
- Energy flows in one direction
- Production adapts to usage
- Power production based on historical experience
- Limited opportunities to connect new power production

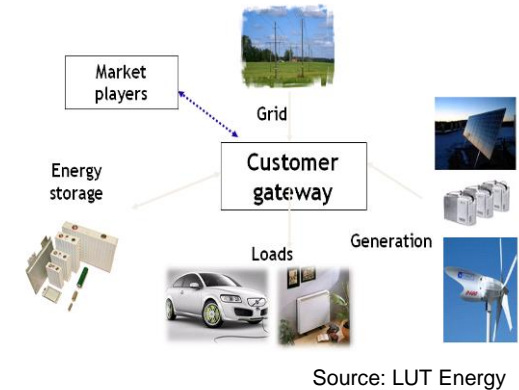
Future electricity grids



Source: Fortum

- Centralised and dispersed power production
- The share of non-adjustable renewable power production increases
- Production based on real time data

Future customers

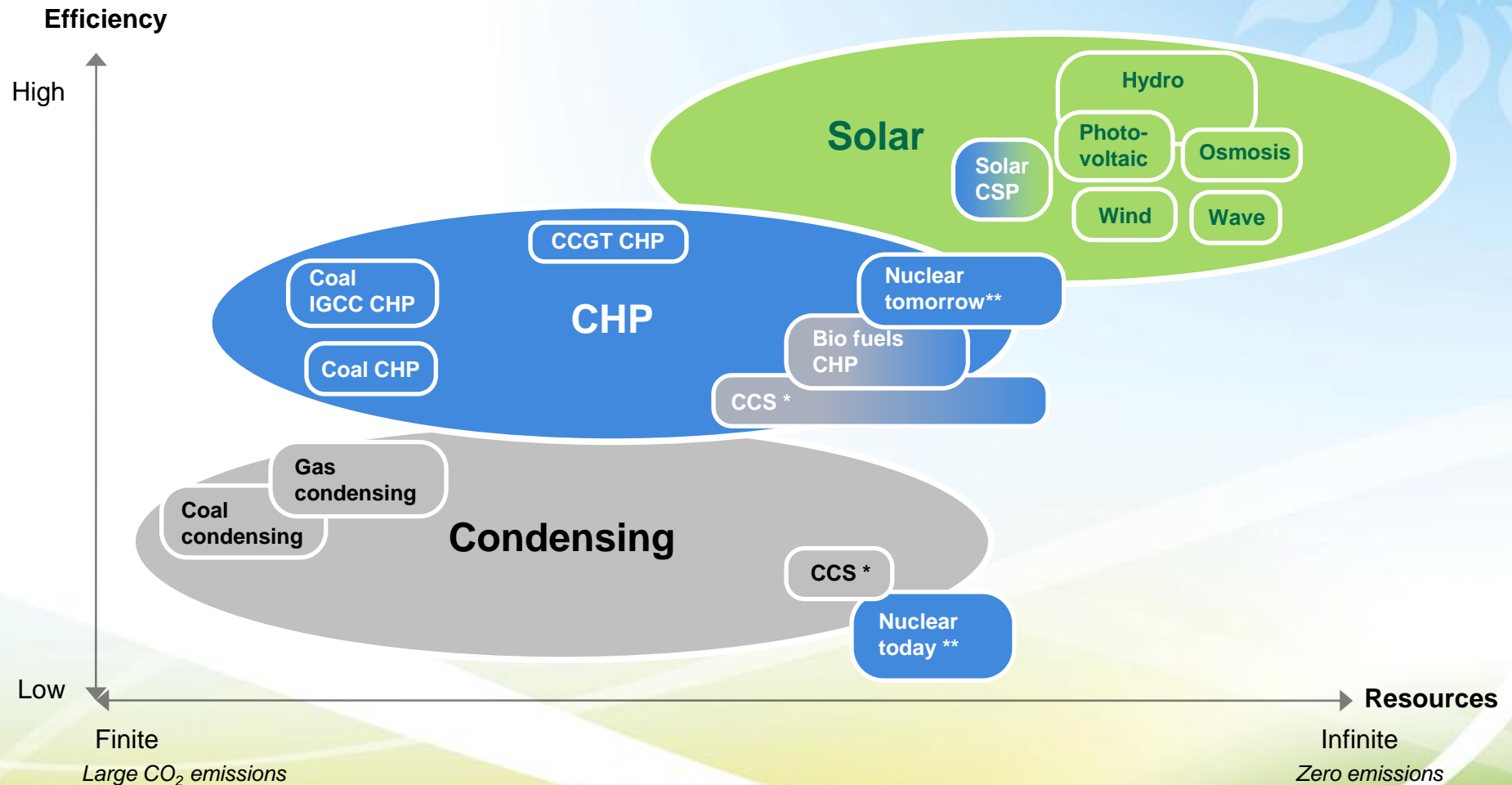


Source: LUT Energy

- Consumers become producers
- Energy flows in both directions
- Intelligent customer gateway enables buying and selling

Source: Fortum

Solar Economy – Future energy system framework



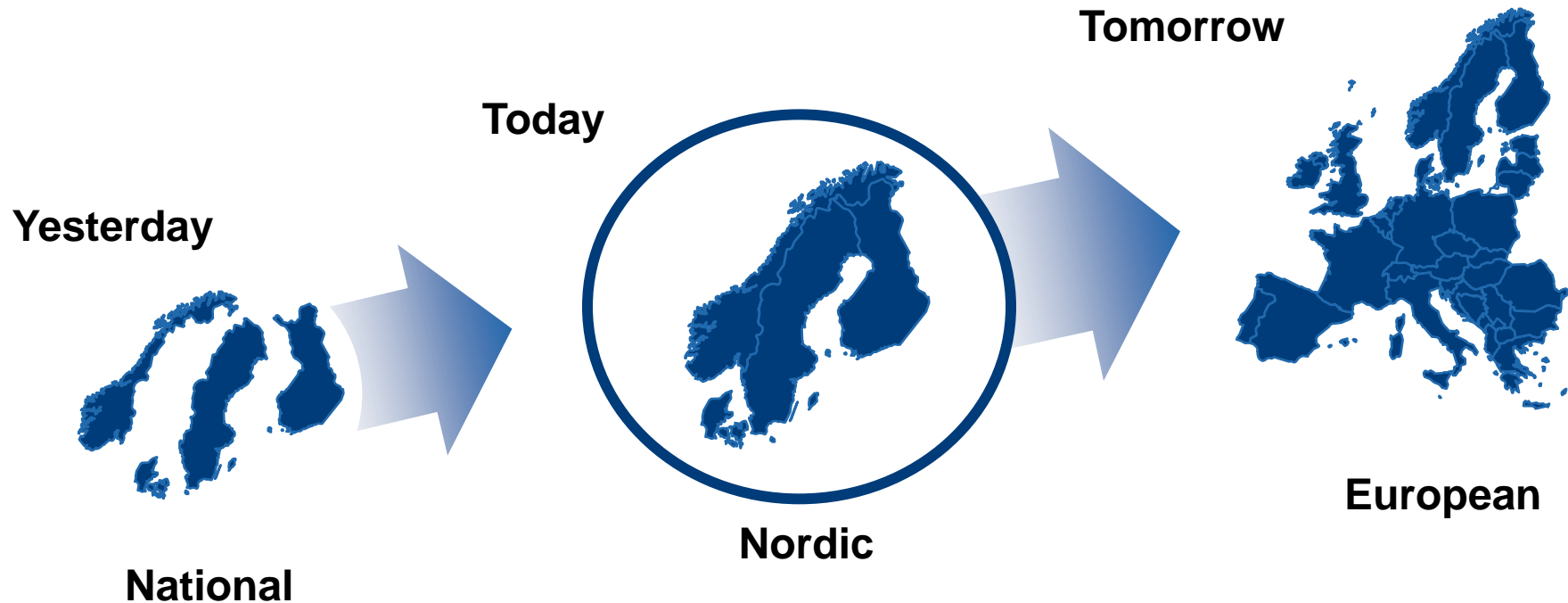
* CCS decreases plant output (energy efficiency), while at the same time reducing CO₂ emissions dramatically.

If applied to bio-CHP, "negative" emissions = removing CO₂ from the atmosphere

** Extremely low utilization (<5%) of uranium energy content in LWR with final deposition of spent fuel.

However, huge improvement potential both with CHP mode and Generation IV (breeder) technologies

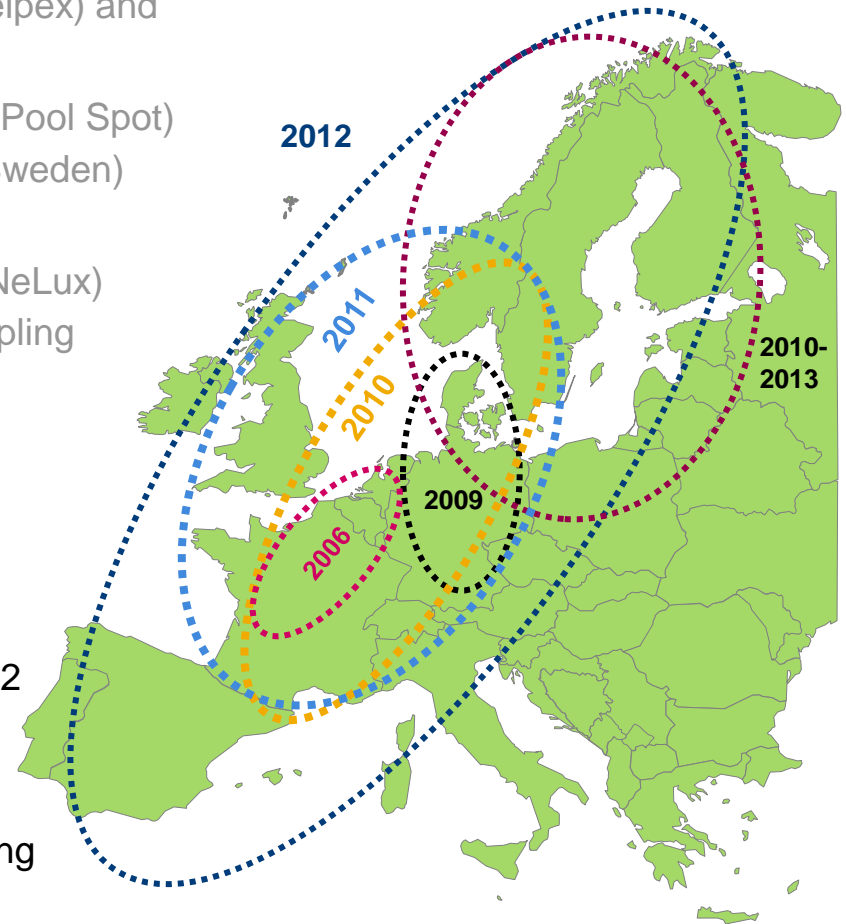
Integrated and liberalized internal power market is still to deliver the highest economic efficiency



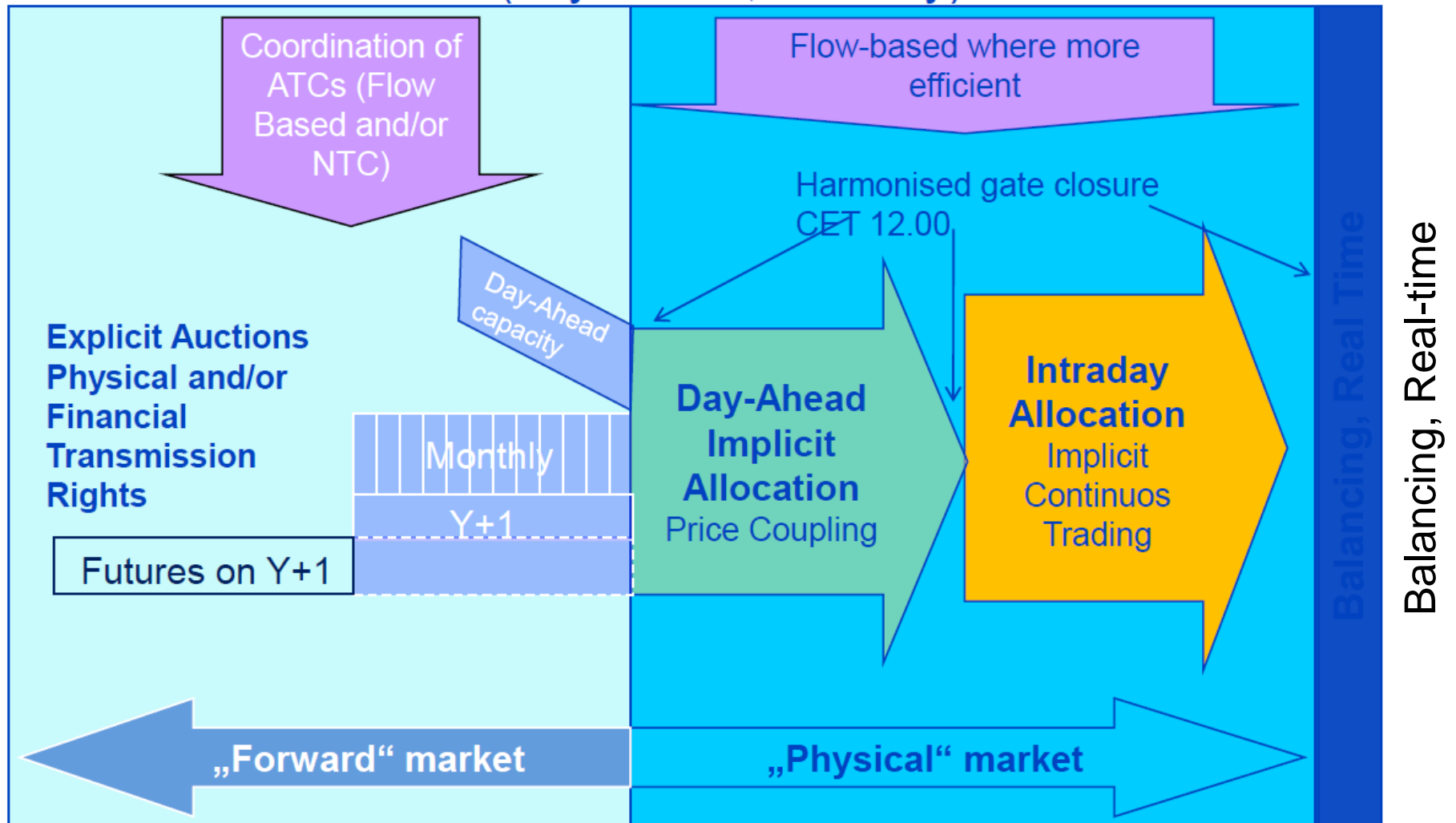
- Wider market area - more competition - increased service level
- Increased utilisation of existing power production capacity
- Increased security of supply and less volatile price development
- Environmental targets reached in a most efficient way (CO₂, renewables etc.)

Development towards an internal market proceeding – e.g. market coupling and...

- Market coupling between Netherlands (APX), Belgium (Belpex) and France (Powernext) since 2006
- Market coupling Germany (EPEX Spot) – Denmark (Nord Pool Spot) started in November 2009 with Baltic Cable (Germany – Sweden) included in May 2010
- Market coupling for Central Western Europe (DE, FR, BeNeLux) started in November 2010 combined with a continued coupling mechanism with Nord Pool Spot
- NorNed cable (NO-NL) included in January 2011
- Poland coupled with Nord Pool Spot in December 2010
- UK coupling started through BritNed cable in April 2011
- The TSOs and power exchanges are developing a single market coupling for the whole western Europe by end-2012
- Estonian price area in Nord Pool Spot since April 2010 with full integration of the Baltic States during 2011–2013
- EU's European Target Model for cross-border power trading sets 2014 as deadline for an EU-wide market coupling

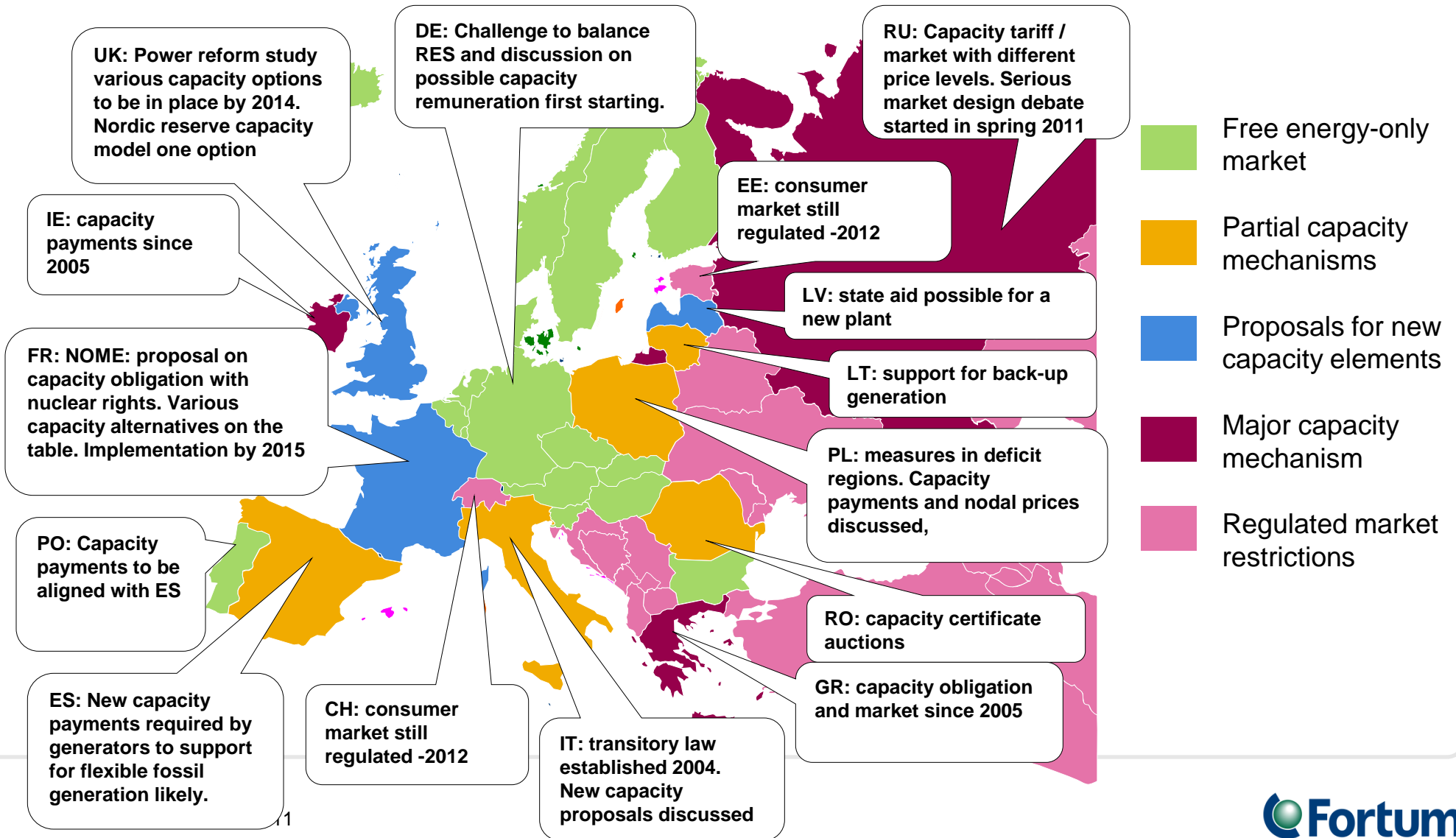


...European Target Model for cross-border power trade

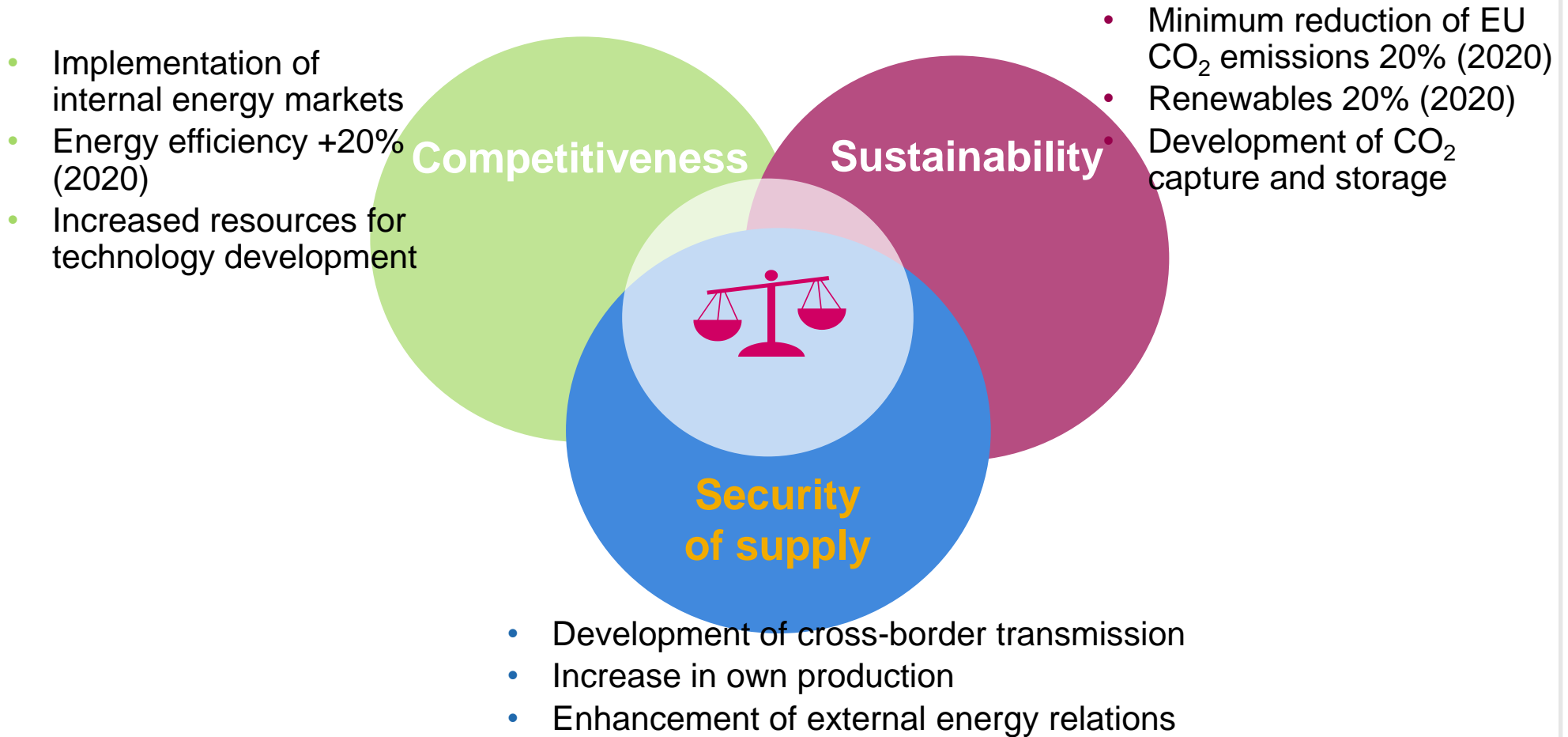


Source: Fingrid

However some country specific market model discussions are also ongoing...



...rising clouds for meeting EU energy policy objectives triangle in balance



Conclusions

- Solar Economy – future energy system framework
 - Responds to climate change and resource efficiency challenges as well as leads to higher degree of supply security in many regions
 - Electricity production is mostly based on emission free nearly infinite energy sources - smarter grids and demand side management are also important part of solar economy
 - Transfer from Carnot world to solar economy will take time – nuclear and CHP will be needed during the transition period
- EU internal power market – implementation still to be completed
 - Integrated and liberalized internal market is to deliver the highest economic efficiency for developing European power sector forward
 - Slowing economic performance in EU will likely decrease the space for fiscal support for energy and advance the increasing role of private capital in energy sector
- Policy/regulatory framework – call for harmonization and consistency
 - National energy policies with country specific support initiatives challenge the optimal functioning of the EU internal power market – market-based harmonization is needed
 - In order to secure necessary investments to European energy sector, consistent and forward looking policy/regulatory framework is needed