

Thermal power ready for fresh challenges

Thermal power has a vital role to play in the post-COP21 landscape of the European power sector, says **Patrick Clerens**

The Paris Agreement, with its long-term target to limit the global temperature rise to well below 2°C compared to pre-industrial levels, has set a clear path for future investments in low-carbon technologies and will strengthen the European Union's efforts to reduce carbon emissions. By the end of 2016, the European Commission will release a set of legislative proposals to further increase the share of renewable energy sources in the EU and to redesign the European electricity market in order to develop a secure, sustainable and competitive energy system. Efforts should now be focused on delivering cost-effective solutions to reconcile the EU's objectives on climate change, energy and growth.

Thermal power is part of the solution to ensure a secure, reliable and affordable electricity supply in Europe. Suppliers of efficient, state-of-the-art thermal power generation technologies are ready to play their part in tackling these challenges.

Setting the direction

Partly driven by this regulatory framework, Europe's electricity system and energy mix are experiencing rapid and significant changes, including the increasing penetration of intermittent energy sources.

Between 1990 and 2012, the relative importance of intermittent renewables in the EU more than doubled, from 12 per cent to 25 per cent (with wind going from 0.03 per cent to 6.2 per cent and solar from 0.0005 per cent to 2.2 per cent). This increase led to a reduced use of conventional energy sources and nuclear power for electricity generation.

As the share of intermittent renewable power generation continues to grow, the role of thermal power generation becomes increasingly important since it complements

the intermittent nature of renewables with dispatchable and flexible backup generation.

Thermal power has long been the backbone of the electricity generation market, providing the necessary balancing and backup services whenever intermittent renewables cannot cover the in-time energy demand. A comparison of different decarbonization scenarios in 2030 (by, amongst others, Greenpeace, the European Climate Foundation and the European Commission) shows that thermal power will continue to play a prominent role within the energy mix – the predicted proportion of thermal power generation (including biomass) in 2030 will range from 34.1 per cent to 53.3 per cent, despite – or because of – the increasing deployment of intermittent renewables.

European excellence

Changes in the energy system require technological adaptations to ensure the optimal contribution of thermal power generation in the future. Over the last two decades, energy efficiency has substantially increased, both on the consumption side – reducing the demand – and on the generation side – increasing the production with less energy input. On the generation side, thermal power technologies have embraced these trends and have made huge improvements to become increasingly flexible, clean and efficient.

Retrofitting/replacing thermal power plants with state-of-the-art technologies has proven beneficial in terms of efficiency increases and emissions abatements.

Retrofits by EPPSA members show up to 31 per cent in fuel savings and CO₂ emission reductions. When taking into account the various cost savings, this was done at a negative avoidance cost of almost €20 (\$23)



per tonne of CO₂ (i.e., €20 profit per tonne of CO₂ not emitted).

Considering the predicted proportion of thermal power generation in 2030, retrofitting/ refurbishing aging, less efficient and more polluting power plants with state-of-the-art technologies is of paramount importance.

Innovative solutions are also emerging that integrate intermittent renewables directly in thermal power generation systems. One example of this is concentrated solar power (CSP), where concentrated sun rays generate superheated steam, which feeds into a steam turbine to produce electricity.

New developments have increased the dispatchability of solar-based thermal power generation by dissociating steam production from solar energy absorption, for example through energy storage.

Power plants can also be designed for fuel flexibility, for example by running on a mix of 1 per cent to 100 per cent biomass. Sustainably harvested biomass is CO₂-neutral, meaning that any primary fuel replaced by it is reducing the CO₂ emission per kWh produced.

Existing thermal power plants, with relatively lower operational costs, need little to no modification to use biomass, making it highly cost-effective to produce electricity

The European Union - Setting the direction

The EU has set ambitious climate and energy targets for 2020 and 2030

Targets	2020	2030	2050
EU policy	The 2020 climate and energy package, so-called "20-20-20"	The 2030 framework for climate and energy policies	Roadmap for moving to a low-carbon economy in 2050
Reduction in EU GHG emissions	20%	> 40%	80 - 95%
Raising the share of EU energy consumption produced from RES	20%	> 27%	n.n.
Improvement in the EU's energy efficiency	20%	> 27%	n.n.
Level of commitment	Binding with national targets	EU-wide binding target. No national defined targets yet from EU level	Indicative political aim

Table 1: Targets of the European framework for climate and energy policies for 2020, 2030 and first discussions for 2050

from biomass. Increasing the use of biomass increases the flexibility of power generation, the security of energy supply, and reduces the dependence on fossil fuel imports, while maintaining an affordable energy supply.

Modern thermal power plants are also prepared for carbon capture and storage. CCS and usage technologies (CCSU) have a huge potential for CO₂ abatement for both the industrial and power generation sectors. When combined with biomass, CCSU can allow going CO₂-negative. Efforts are now needed to demonstrate CCS on a large scale. Failure to do so would be very costly and make it difficult or even impossible to reach the EU's climate targets.

Global standards

Thermal power contributes significantly to the European economy in terms of employment, taxes and growth. A study by German engineering association the VDMA shows that, in Germany alone, around 36,000 jobs

depend on a continued active role of the thermal power plant suppliers' industry – an industry with a turnover of around €6 billion on the global stage.

European Commission President Jean-Claude Juncker has said: "My first priority as Commission President will be to strengthen Europe's competitiveness and to stimulate investment for the purpose of job creation". This commitment should translate into a balanced regulatory framework, ensuring fair competition in the global economy and allowing thermal power to contribute to a greener economy and society.

Setting global standards with these state-of-the-art EU technologies is necessary to ensure worldwide shared efforts, CO₂ abatements and a level playing field. In this context, the support and collaboration from European and international authorities is key. Increasing investments in research, development and demonstration are necessary to drive EU competitiveness and ensure an affordable,

low-emission power supply. Favouring support and availability of financing options to certain technologies over others may foster lower overall efficiency and poorer emissions rates due to up-front capital cost differences between subcritical and high-efficiency low emission technologies, resulting in more CO₂ emitted and non-EU technologies prevailing.

The COP21 targets and the upcoming EU Winter Package will result in further national efforts to reduce CO₂ emissions, creating new challenges for the European energy production system. Despite – or perhaps because of – these changes, thermal power is set to have a prominent role in the energy mix of tomorrow. EPPSA supports the deployment of renewable energy sources and underlines that thermal power generation technologies can provide the necessary flexibility and dispatchability to ensure a stable and cost-effective electricity supply in Europe.

EPPSA members look forward to working constructively with EU institutions and stakeholders to address these challenges, and to ensure that the added value of the European Thermal Power Technology is recognized in a fair and balanced legislative framework, supporting the move to a low-carbon Europe.

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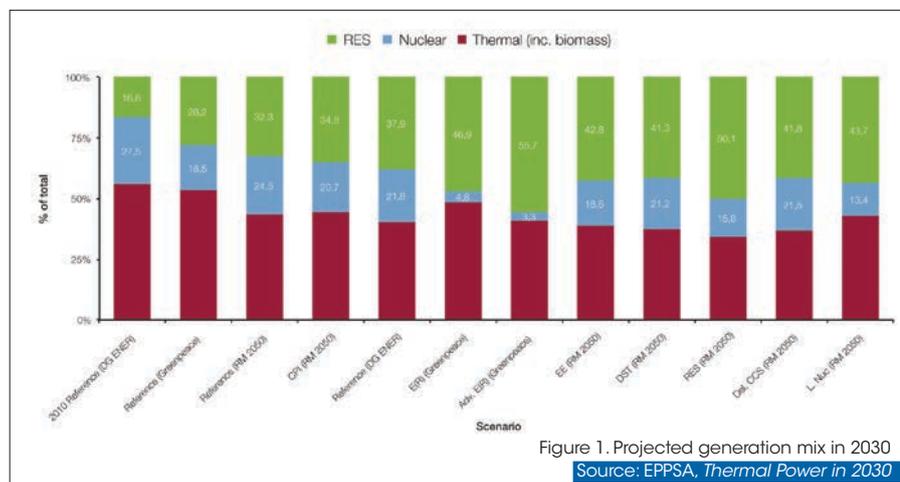


Figure 1. Projected generation mix in 2030
Source: EPPSA, *Thermal Power in 2030*

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