

## ECO-EFFICIENCY OF ELECTRICITY GENERATION

ENER 5

The eco-efficiency of electricity generation can be assessed by comparing changes in the quantities produced with changes in environmental pressures. These are different depending on the fuels and technologies used: discharges of air pollutants, consumption of cooling water, waste water discharges and waste production (including radioactive waste).

### Eco-efficiency gains

Between 1995 and 2014, electricity generation<sup>1</sup> decoupled from emissions of acidifying substances, ozone precursors and greenhouse gases. This improvement was mainly due to investments in the sector and the evolution of the generation portfolio in Wallonia: the gradual replacement of coal-fired power stations by modern gas-fired plants with better efficiency from the 1990s onwards, the development of small cogeneration units and the expansion of renewable energy from the 2000s onwards. It should be noted that the Tihange nuclear power plant remained the main source of electricity in Wallonia in 2014 with 62% of the electricity produced. However, this share has been falling since 2010.

### CO<sub>2</sub> emissions from biomass combustion

Pollutant emissions into the atmosphere come from the combustion of primary energy sources. However, CO<sub>2</sub> emissions from biomass combustion are not taken into account in the context of the Kyoto Protocol<sup>2</sup> which considers that this biomass is renewed and that the CO<sub>2</sub> emitted is therefore subsequently stored in ecosystems. They were estimated at 1,409 kt CO<sub>2</sub> eq in 2014, a value which increased sixfold in 10 years in line with the development of this sector in Wallonia<sup>3</sup>. The inclusion of these emissions reduces the sector's eco-efficiency gain.

### What about other pressures?

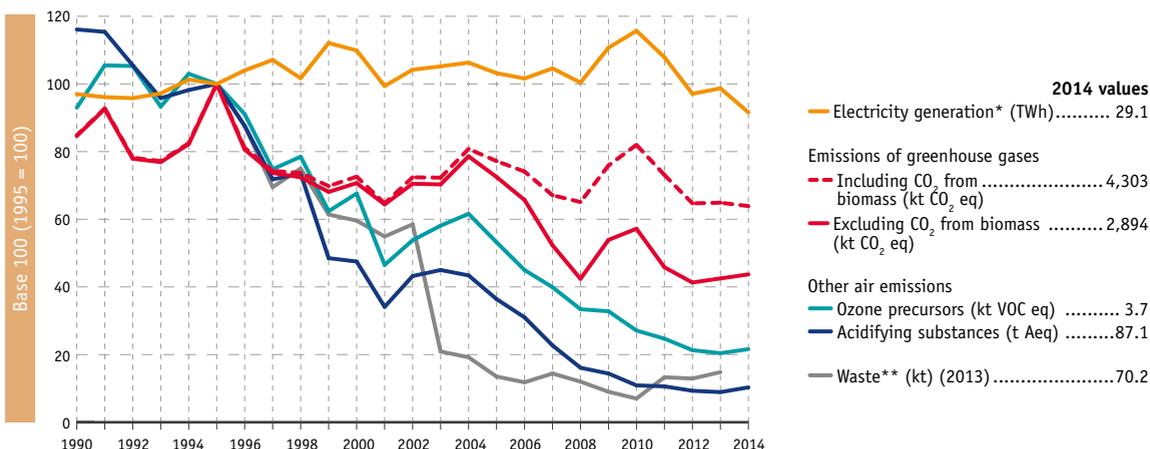
Power plants exert other pressures, such as those related to waste generation and water use. The amount of waste generated<sup>4</sup> decreased from 473 kt in 1995 to 70 kt in 2013. This decrease is mainly due to the gradual phasing-out of coal, which generated large quantities of ash. Power plants also have a substantial need for cooling water. In 2013, about 78% of the volumes withdrawn from surface water were used for cooling Walloon power stations<sup>5</sup>, which can disturb local ecosystems (hot water discharges into water courses).

### Measures leading up to 2022

The Air Climate Energy Plan 2016-2022 (*Plan air climat énergie 2016-2022*)<sup>6</sup> promotes the development of green electricity (the green certificates system, biomass power plants, etc.). It also aims to double the generation of electricity produced from waste. Several measures relate to the adaptation to new modes of electricity production (occasional, decentralised, etc.), in particular by encouraging grid and demand flexibility, or by developing electricity storage solutions.

[1] → Maps 14 & 15 | [2] → AIR 1 | [3] → ENER 4 | [4] Radioactive waste not included (the volume of radioactive waste stored in Belgium and from companies active in electricity production was estimated at more than 12,000 m<sup>3</sup> in 2015) | [5] → RES 2 | [6] → AIR Focus 3

Fig. ENER 5-1 Eco-efficiency of the electricity generation sector in Wallonia



\* Including renewables and pumping  
\*\* Radioactive waste not included

SOERW 2017 – Sources: SPW - AwAC (reporting in February and June 2016, provisional 2014 data); SPW - DGO4 - DEBD; SPW - DGO3 - DEE (Integrated Environmental Survey)