

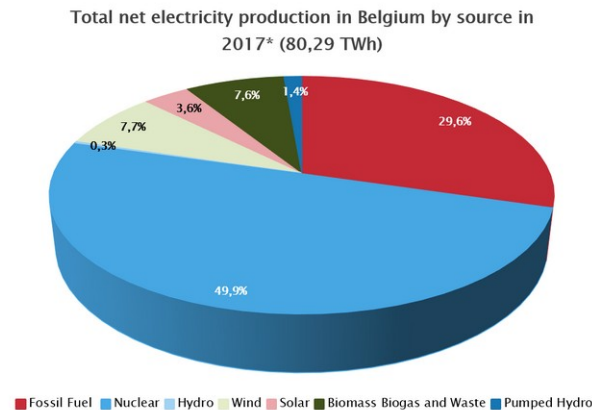
# Paris Agreement and Energy Pact

## An Inconvenient Calculation Note

The Paris Agreement, signed by most major countries, requires States to reduce their CO<sub>2</sub> emissions.

By looking for the main sources of CO<sub>2</sub> emissions, I find several sectors (electricity production, transport, housing, etc.) and I look at the first sector, i.e. electricity production.

On the website: <https://www.febeg.be/fr/statistiques-electricite> of the Belgian Federation of Electricity and Gas, I read :



I find the data I collect in the following table:

### Net electricity production in Belgium

	<u>Year 2017</u> %	<u>Year 2017</u> TWh
Nuclear	49,9	40,06
Fossil Fuel (mainly gas)	29,6	23,77
Biomass, biogaz & waste	7,6	6,1
Wind	7,7	6,18
Solar	3,6	2,89
Pumped Hydro	1,4	1,12
Hydro	0,2	0,16
Total =	<b>100</b>	<b>80,29</b>

I then go to the IPCC website to find out how many grams of CO<sub>2</sub> are emitted per kWh by the different sources of electricity production; I find them on page 7 of 28 of the online report on

[https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc\\_wg3\\_ar5\\_annex-iii.pdf](https://www.ipcc.ch/site/assets/uploads/2018/02/ipcc_wg3_ar5_annex-iii.pdf)

As 1 g of CO<sub>2</sub>/kWh = 1 kilotonne of CO<sub>2</sub> per TWh, I can then make up the following table:

	kt CO <sub>2</sub> /TWh	TWh	kt of CO <sub>2</sub>
Nuclear	12	40,06	481
Fossil Fuel (mainly gas)	490	23,77	11647
Biomass, biogaz & waste	230	6,1	1403
Wind	11,5	6,18	71
Solar	41	2,89	118
Pumped Hydro	24	1,12	27
Hydro	24	0,16	4
Total =		<b>80,29</b>	<b>13751</b>

Therefore in 2017, Belgium emitted 13,751,000 tonnes of CO<sub>2</sub> to produce its electricity.

In this total, the main contributor is gas, with 11,647,000 tonnes of CO<sub>2</sub>, or 85% of all CO<sub>2</sub> emitted for electricity production.

To reduce the amount of CO<sub>2</sub> emitted by Belgium, what do you think it is doing?

Without risk of error, reduce the share of gas in the energy mix.

No, we're going to shut down the nuclear power stations. And replace them with what? By renewables.

In principle, because as renewables are intermittent, to avoid blackouts, we will start by installing 9 (nine) new gas-fired power plants, with a total installed capacity of 3.6 GW.

By running them with the same load factor as the nuclear power they replace (about 85 to 90%), i.e. about 7670 h/year, they will produce  $7,670 * 3.6 = 27,613$  GWh = 27.6 TWh, i.e.  $27.6 * 490 = 13,530,321$  tonnes of CO<sub>2</sub>, which will be added to the 11,647,000 tonnes of CO<sub>2</sub> emitted by existing gas power plants.

And that's not all: since these nine new gas-fired power plants will only produce 27.6 TWh and the nuclear power stations that produced 40.06 TWh will have been shut down, we will have to find  $40.06 - 27.6 = 12.47$  TWh to be produced by additional renewables.

What happens to the above table?

	g/kWh = kt/TWh	TWh	kt of CO <sub>2</sub>
Nuclear	12	0	0
Existing gas-fired power stations	490	23,77	11647
New gas-fired power stations	490	27,6	13530
Existing Renewables	99	16,45	1623
Added Renewables	99	12,46	1229
Total =		<b>80,28</b>	<b>28030</b>

**Result :**

- We shut down the nuclear power stations.
- 9 new gas-fired power plants are being installed
- The number of wind turbines, photovoltaic panels and biomass plants is increased by 75%.
- **CO<sub>2</sub> emissions are doubled.**

Who spoke about the Paris Agreement and global warming?

Yes, I know, it is not only electricity production; we will also ask citizens to save on their heating and their consumption of diesel and gasoline.

And if they do not want to make these savings, we will raise the prices of fuel, gas, fuel oil and electricity.

And we'll order a few thousands yellow vests to allow them to go down in the streets !

Jacques MARLOT  
Retired civil Engineer  
[marlot@voo.be](mailto:marlot@voo.be)

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