

# NEW BENCHMARK METHODOLOGY ENERGY CONSUMPTION FOR OFFICES IN THE NETHERLANDS

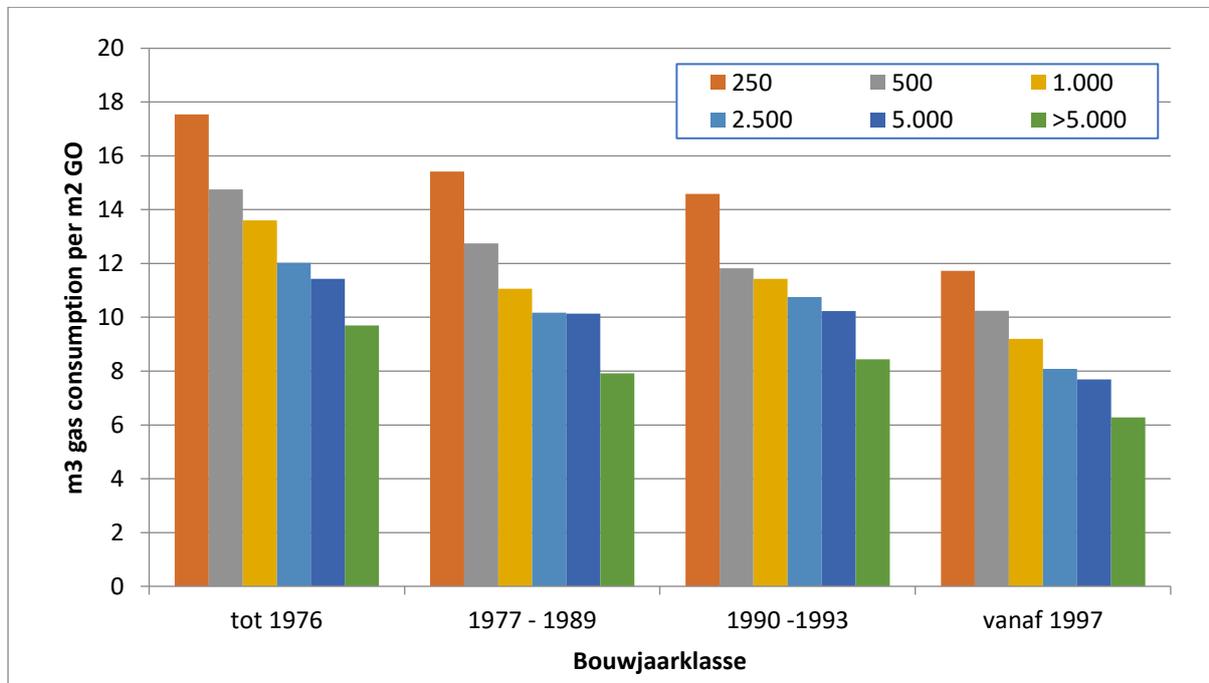
Based on the actual gas and electricity consumption of 13,000 offices, influenced by size, year of construction, energy label, location, and occupancy rate.

In this study, a "new" benchmark methodology for offices has been developed. The benchmark shows how well energetically speaking a random office is doing compared to comparable offices. Is the gas consumption higher, and if so, how much higher? The addition of "new" refers to the fact that a number of years ago ECN had already developed a methodology. This new method includes additional parameters, such as the effect of the occupancy rate, and makes a distinction according to the labelled and non-labelled stock. However, the report comprises more than just the benchmark; it also compares the energy consumption calculated by the labelling method with the actual energy consumption, compares the current energy intensities with previously found intensities and searches for trends that can be used to explain (differences found in) intensities. The total Dutch report can be found [here](#). In this attachment [TNO-2019-P11713\_UKsummary.pdf] the English story behind the analyses is explained with four figures for the gas consumption. The electricity consumption follows a similar approach.

1. For 13.000 'real offices' we have analyzed the gas- and electricity intensities (energy consumption per square meter of floor area), depending on (combinations of), year of construction, energy label and total office size in m<sup>2</sup> of heated floor area (in Dutch abbreviated

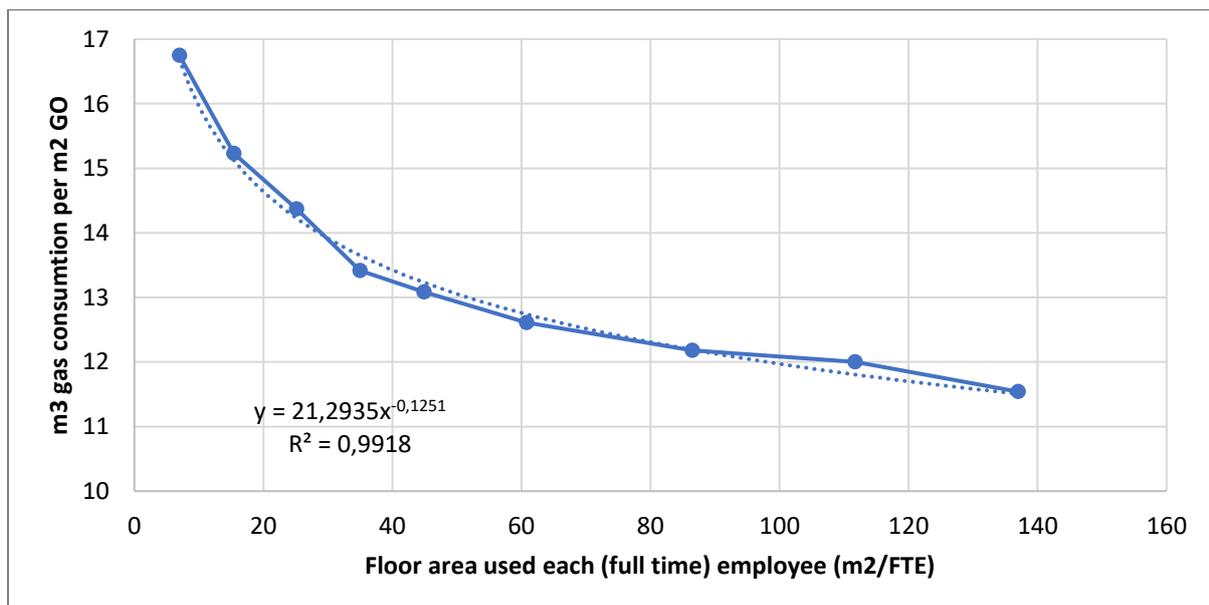
with 'GO'). The below graph shows the gas intensity depending on year of construction and office size.

**Figure 1 in the report:** Gas consumption per m<sup>2</sup> office floor area, depending on office size and year of construction. The size classes in the legend indicate the top of a class, so "1000" is the class "500 to 1000 m<sup>2</sup>."



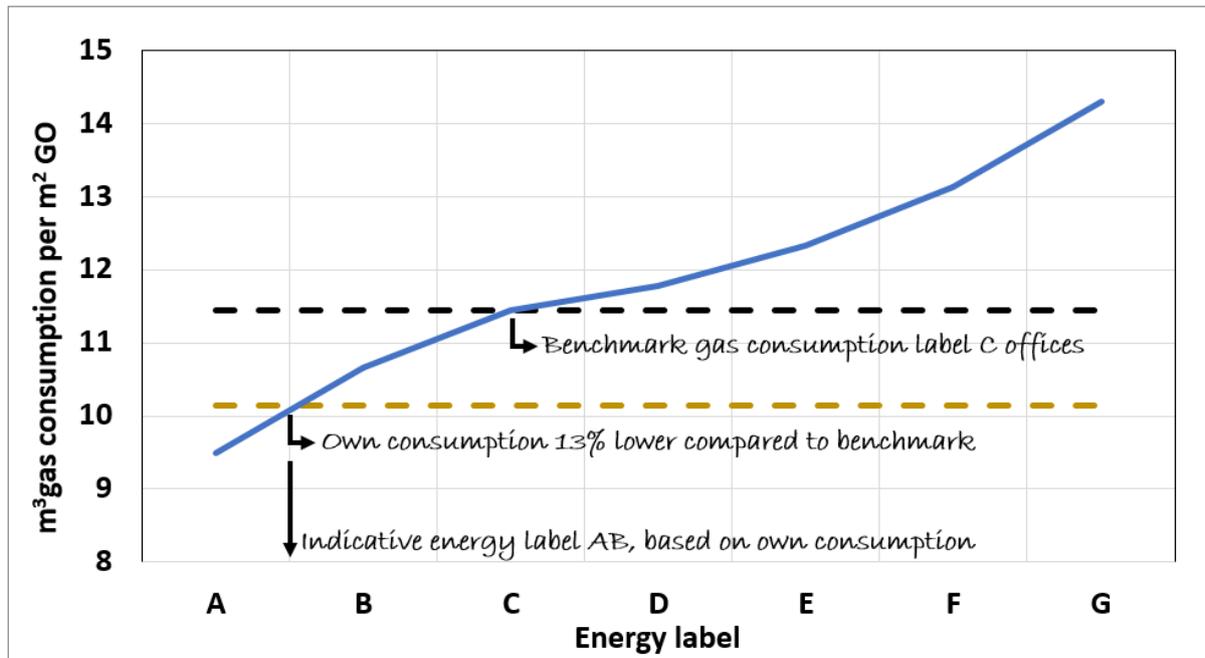
- When the number of employees is known, the previous gas consumption can be corrected towards a more accurate intensity, using the below dependency. There is relatively a stronger effect for the electricity consumption.

**Figure 2 in the report:** Influence of occupancy rate on the gas consumption (N=7592)



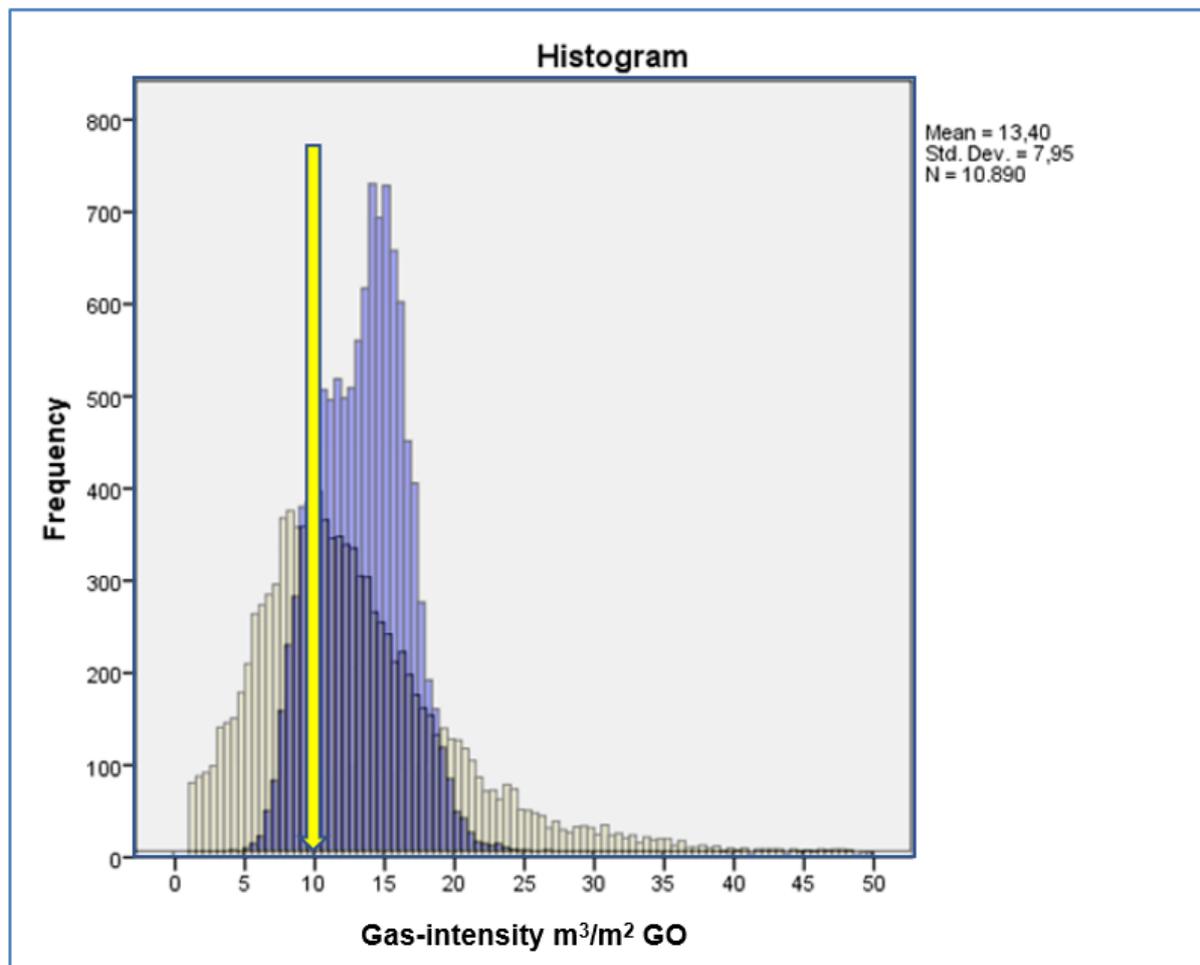
- With this information, the gas consumption of a random office can be assessed as being 'higher or lower compared to the average consumption of comparable offices'. As well, based on the actual energy consumption, an 'indicative energy label' can be given. The below figure illustrates this and can be made with an Excel that has been provided as an attachment to the report.

Figure in the summary of the report: Comparing own gas consumption with the average of comparable offices.



- This benchmark data can be used as well to estimate the energy consumptions of e.g. all offices in the Netherlands, based on size, etc. This often is applied in modelling the energy consumption and calculating the related energy reduction potential. Although this will result in an accurate *total* gas consumption (which has been tested), it will strongly underestimate the possible energy reduction when renovating the total office stock to e.g. energy label C (indicative the yellow arrow below). Reason: this calculation is based on the *average* gas consumption (blue histogram below) and lacks the effect of the *actual spread* (green histogram below), which includes e.g. poorly adjusted heating devices. Off course the report provides a solution for this.

Figure 3 in the report: Histogram actual and indicative gas intensity (N=10.890)



For more information please contact:

Drs. ing. J.M. (Jeffrey) Sipma  
Researcher energy and climate  
Energy use, Fuels & Markets

T +31 (0)88 866 27 38  
M +31 (0)61 183 94 83  
E [jeffrey.sipma@tno.nl](mailto:jeffrey.sipma@tno.nl)