

## University of Groningen

### Household metabolism in Groningen

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## Summary

This report is the Dutch national report of the second work package of the ToolSust project. ToolSust, *the involvement of stakeholders to develop and implement Tools for Sustainable households in the city of tomorrow*, has been developed within the fifth framework program of the EU, as a part of Energy, Environment and Sustainable Development: *Key action 4: City of Tomorrow and Cultural Heritage*, 4.1.2 Improving the Quality of Urban Life.

In this second phase of the ToolSust project, the concept of household metabolism is applied to enhance the understanding of the environmental impacts of household consumption in the city of Groningen. The results are presented in this report. We express the household metabolism in terms of total energy requirements, including the direct and indirect energy requirement. To calculate the energy requirement of households, we make use of the Energy Analysis Program, EAP, developed at IVEM. Energy intensities of consumer goods, calculated with EAP, were combined with expenditure data to determine the total energy requirements of different types of households.

The results show that the energy requirements of households can differ considerably. On average the annual energy requirement of households in the Netherlands is 257 GJ, in the province of Groningen 219 GJ and in the city of Groningen 186 GJ. These differences can largely be explained by differences in household size, because the annual energy requirement per person are practically the same (112, 111 and 111 GJ respectively). The share of indirect energy requirement is almost half of the total energy requirement, ranging from 50% for the city to 44% for the province, and therefore needs to be taken into account by policymakers.

We also find large variations in energy requirements of different household types, related to housing situation, household size and income. These differences can be explained mainly by the income variable, because the other characteristics are strongly related to income. In general, we see that households with high total expenditures spend a smaller share of their money on direct energy. On the other hand, the importance of the categories recreation, transport and motor fuel are rising with income. The variations in energy requirements of different household types suggest opportunities for less energy demanding spending patterns. Households with high incomes have more possibilities to reduce their energy requirements, especially for the indirect categories, than low-income households. It is therefore important to offer individual consumers specific advice about more energy efficient consumption patterns.