

Event:  
Date:  
Place:

**ENERGY in BUILDINGS 2017**  
Saturday October 21, 2017  
Athens, Hellas



<b>#</b>	<b>Paula van den Brom</b>	
Title:	PhD Candidate at Delft University of Technology, Delft, the Netherlands	
email:	P.I.vandenBrom@tudelft.nl	•
Presentation title:	<b>Dynamic versus Steady State Building Simulations – Preliminary Analysis of an Energy Performance Gap analysis</b>	
<p>Previous research has shown that the Dutch Energy labelling calculation method does not result in a realistic reflection of the actual energy consumption. It shows that 'energy-efficient' houses consume more energy than calculated and 'energy-inefficient' houses consume less energy than calculated. The difference between actual and theoretical energy consumption is called the Energy Performance Gap. This gap is a problem because the theoretical energy consumption is not only used to inform potential house buyers and renters about the energy efficiency of a house, but also by policy makers to determine energy saving policies and targets. Because of the Energy Performance Gap these saving targets are often not met. Therefore, a more accurate energy prediction method could help policy makers to set more realistic goals. Many researchers assume that the Energy Performance gap is caused by occupant behavior. The used calculation methods can also be a cause of these discrepancies. Therefore, this research compares the results of simplified steady state models with dynamic simulation models. As a basis for this study we simulated a sample of a large database that contains building characteristics data for 1.4 million social houses in the Netherlands. The theoretical energy consumption is calculated based on the Dutch energy labelling system method and with the use of validated dynamic simulation software (EnergyPlus). To define if the simplified calculation method is a cause of the energy performance gap both calculation methods are compared with actual energy consumption from Dutch Statistics. This paper shows the preliminary results. The comparison shows that the dynamic calculation method has an overprediction for houses with a low energy label (A-C) while the steady state method shows an underprediction. The differences between the energy labels of the dynamic method are closer to the actual energy consumption than the steady state model, which means that expected savings will be better projected with the dynamic method compared to the simple steady state method. The regression analysis indicates that the calculation method has an influence on the energy performance gap, but also other factors play a role. This comparison is only conducted on a small part of the building stock; further research will conduct the simulations on all 1.4 million houses available, and should focus on a more detailed comparison with the actual energy consumption and it will further investigate with the use of a sensitivity analysis.</p>		

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After finishing my master degree in Building Physics from the Technical University of Delft I worked as an MEP consultant in Rotterdam, mainly focusing on the mechanical and plumbing installations of schools, dwellings and office buildings. Currently I am working on my PhD research where I focus on the possible explanations of the Energy Performance Gap and specifically on the influence of the occupant onto this gap. I also work on several national and international research projects focusing on Energy and the Built Environment.