

# Towards improving energy- efficiency in office buildings

Case study on the affects of technical optimization and augmented  
user-sophistication

**Pieter C. le Roux**

Center for People and Buildings

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## Research Topic

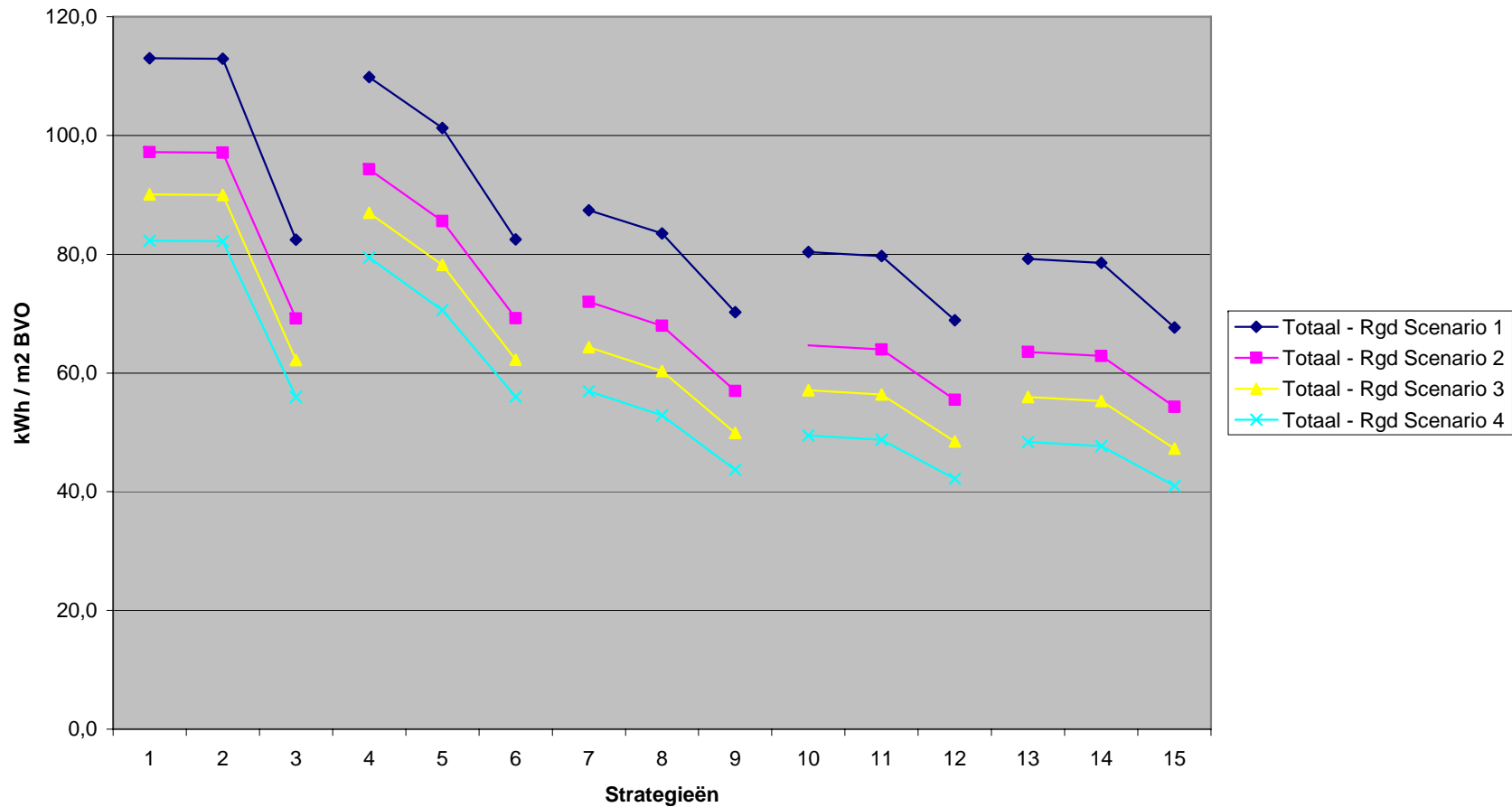
- Need for knowledge regarding the effectiveness of 3 energy savings packages for implementation in existing office buildings:
  - Formulated by the Dutch Government Buildings Agency (DGBA) on the basis of their role as building managers / supply side
  - Packages contain only technical measures
  
- What are the affects of user-sophistication on the energy-efficiency of (existing) office buildings?
  - Suggested an approach in which both technical measures as well as the effects of user-involvement in increasing the energy-efficiency of office buildings could be determined.

## Research Methods

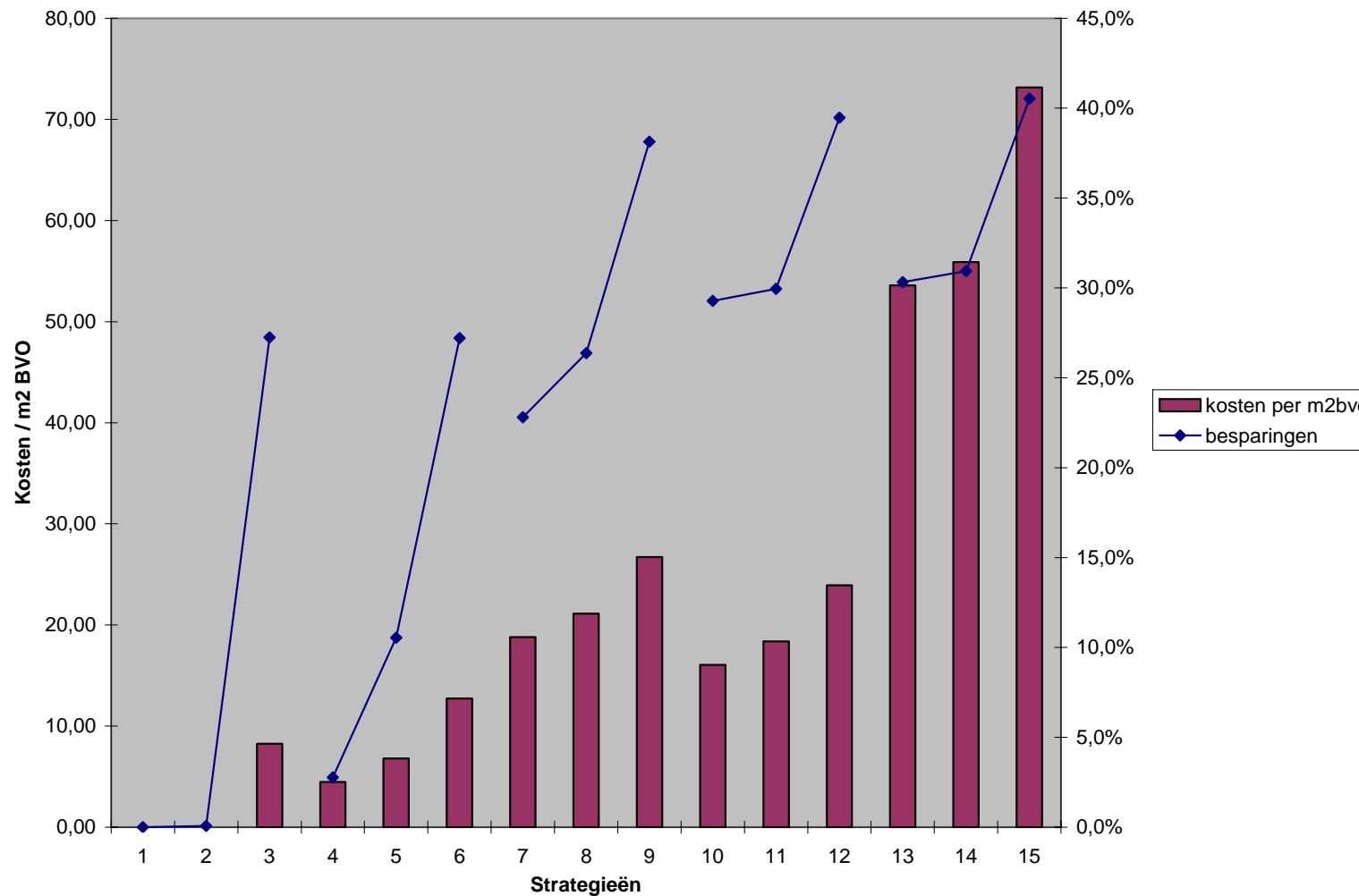
- Information on the energy consumption of 19 existing buildings for the period 1989-1995 and 2005-2007:
  - Occupied by the Dutch Tax and Customs Authority
- Primary research method:
  - Application of the EBOB (Energy Efficient Behavior in Office Buildings) model
    - 18 strategies for Technical Measures and Influence of User-behavior in which the 3 energy saving packages were incorporated
- Secondary research method:
  - PARAP Lifecycle costing model
    - Calculating the additional cost implications of the various EBOB strategies on the basis of simulating a

# Research Results (1): Strategies

Energiegebruik in kWh per m2 BVO



# Research Results (2): Additional Costs



# Suggestions: Future Research Agenda

- On the ambition to improve the energy-efficiency of existing buildings:
  - Relevance of the symbiotic relation between:
    - Technical measures and building management and control systems and personnel
    - Technical measures and user-involvement
    - The level of sophistication of user-involvement

What are the affects of these measures on subsequent:

- ➡ (i) Building performance in terms of energy consumption?
- ➡ (ii) Building performance in terms of user-satisfaction?