

# What is the nature of hospitals?

The functional organization and specification of a hospital is an important determinant for the energy consumption,  
IHE April 2012

RD project 2010 – 2013

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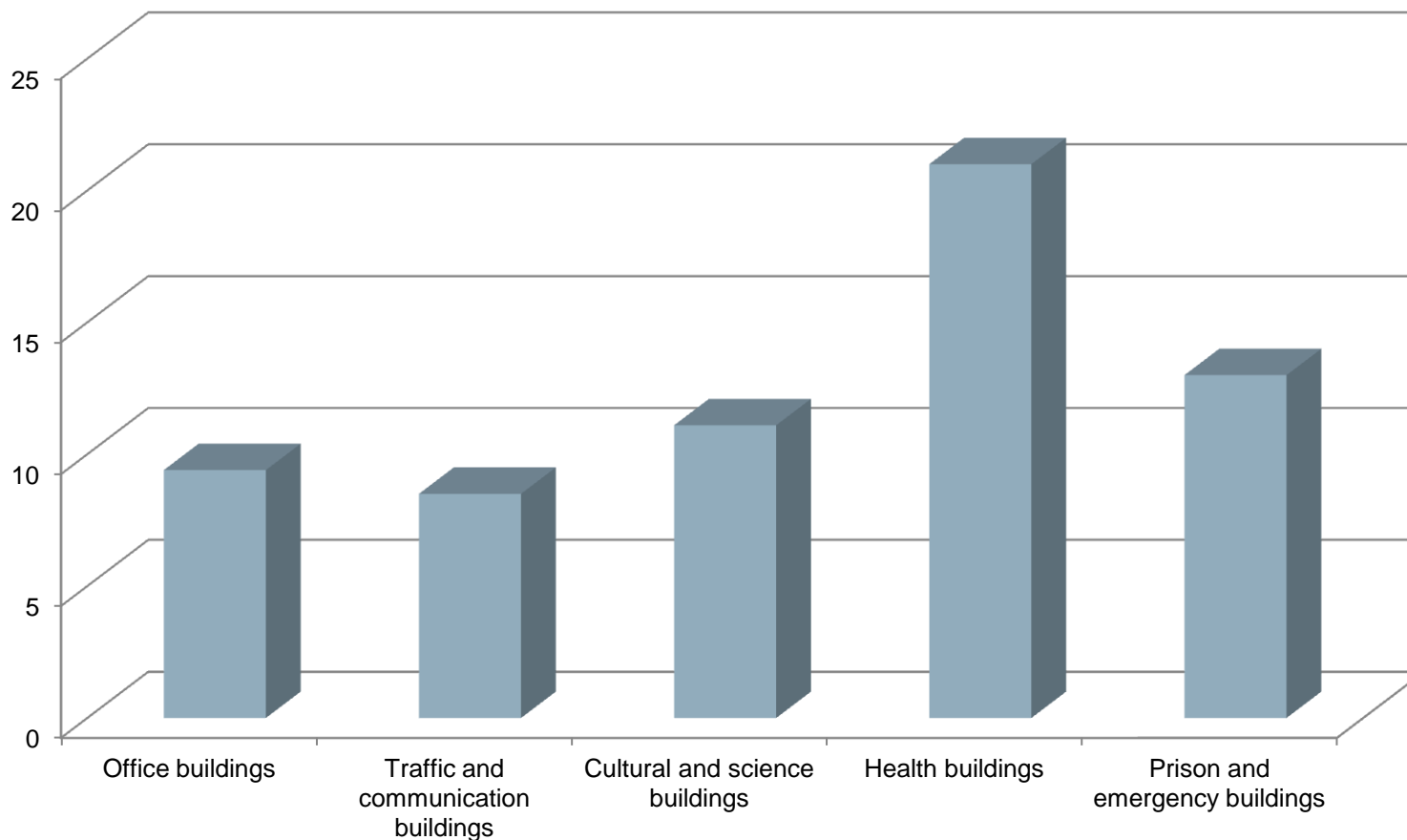
- A hospital is not one building, one entity, it is a town
- It has dwelling areas, industrial areas, university areas, office areas, main streets and allies.
- The different parts are living different lives. Some work office hours and some through the whole week, night and day.
- It has heat producing areas and areas that need to be heated.
- Patients need often higher temperatures than staff.
- Many small devices use energy in stand by modes.
- Larger devices are not manufactured as energy efficient.
- The effects of technical solutions as to clean room and security are mostly not tested. The solutions are not evidence based.

## 2. The size of a small Norwegian town

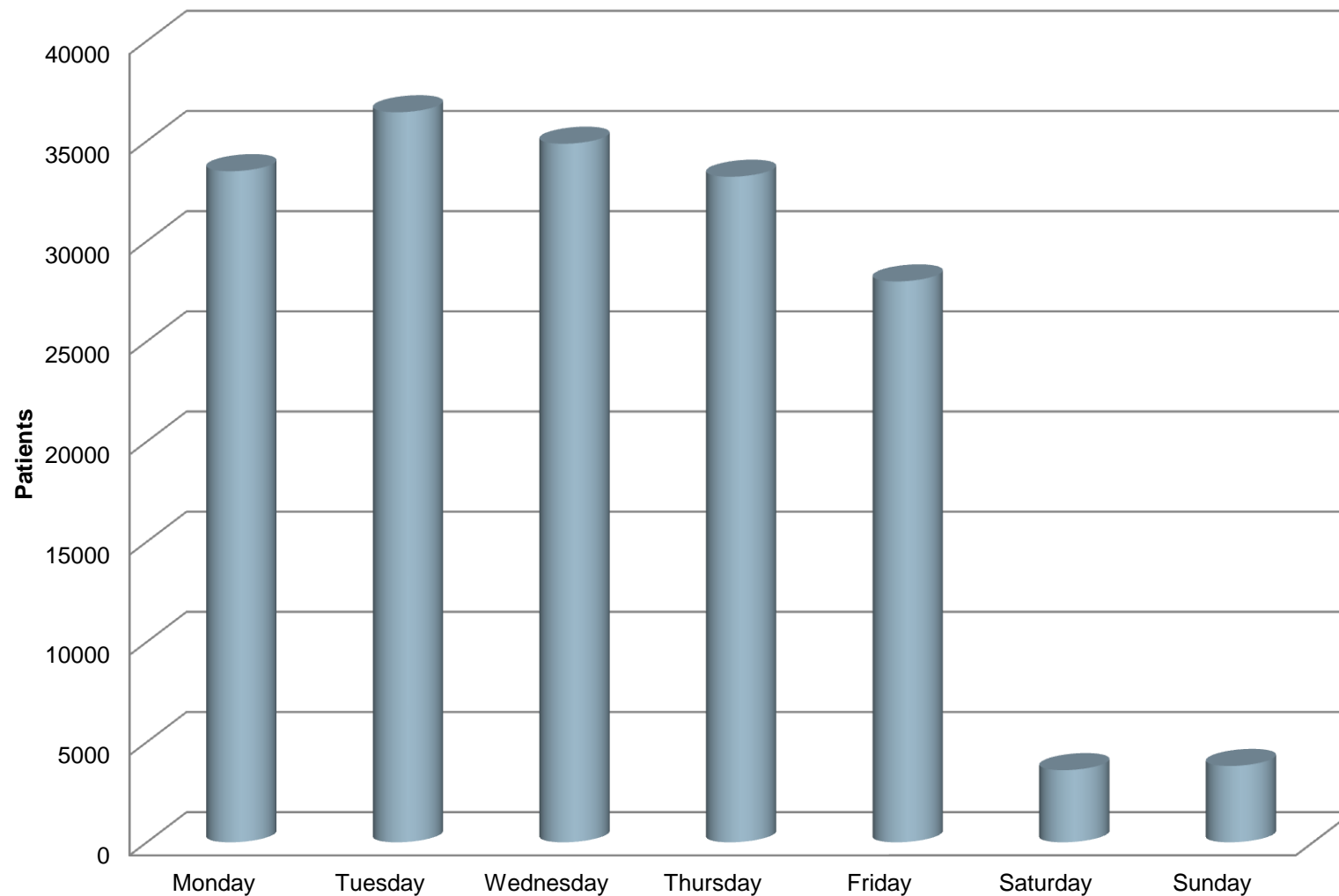




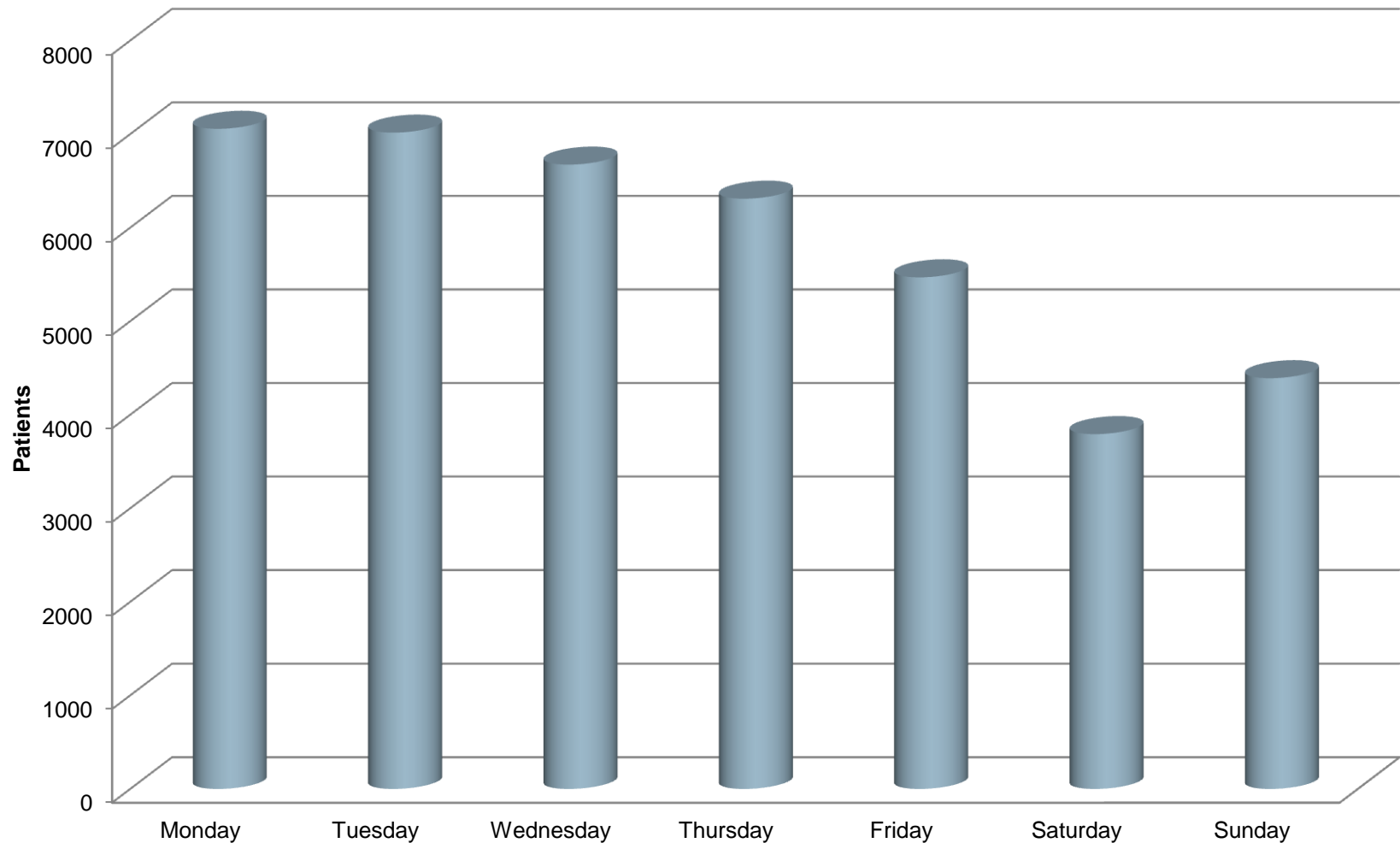
## Hours used by public buildings per 24 hours, Statistics Norway 2008



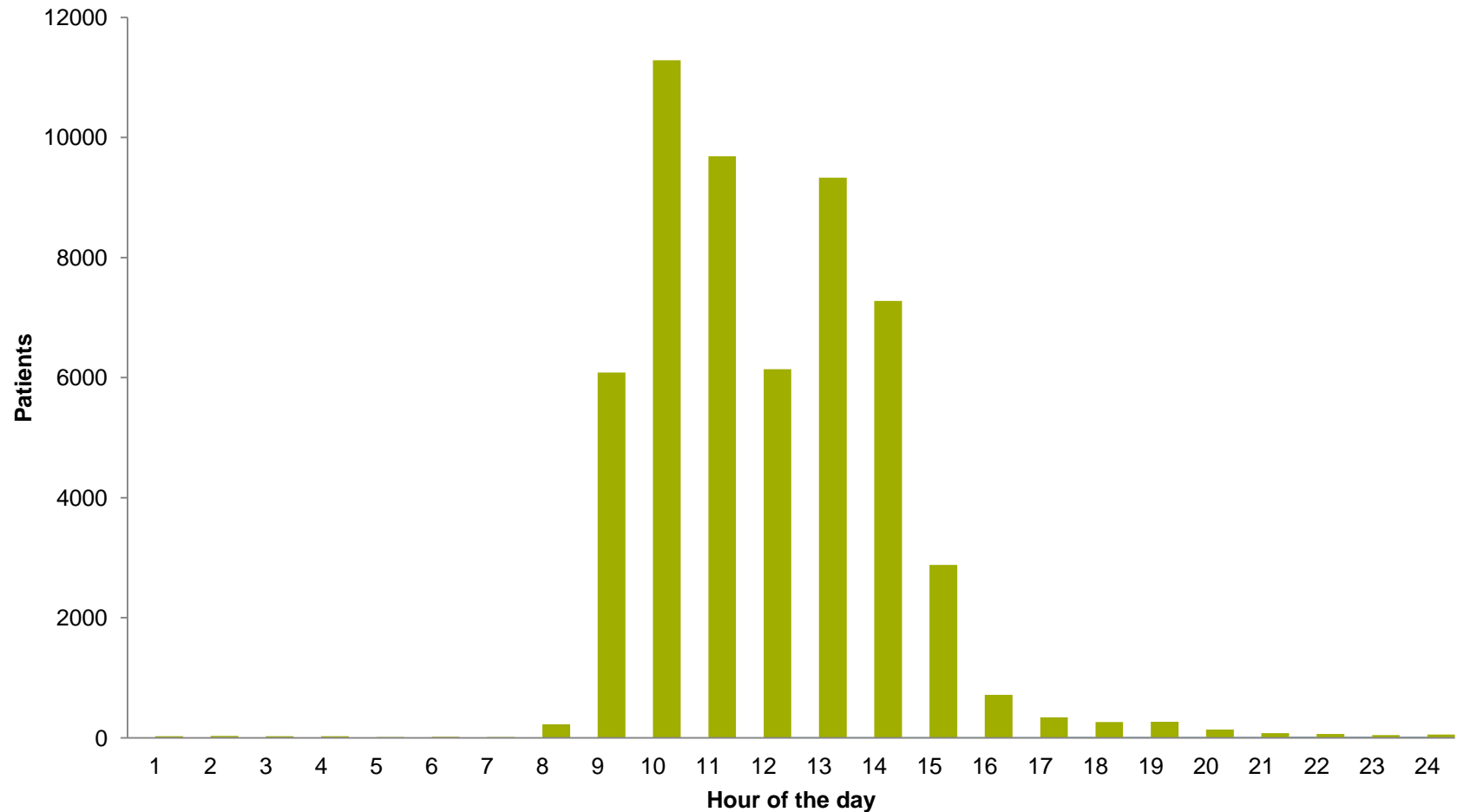
## Out-patients in hospital A after day treated, 2010



## In-patients in hospital A during the week, arriving day, 2010

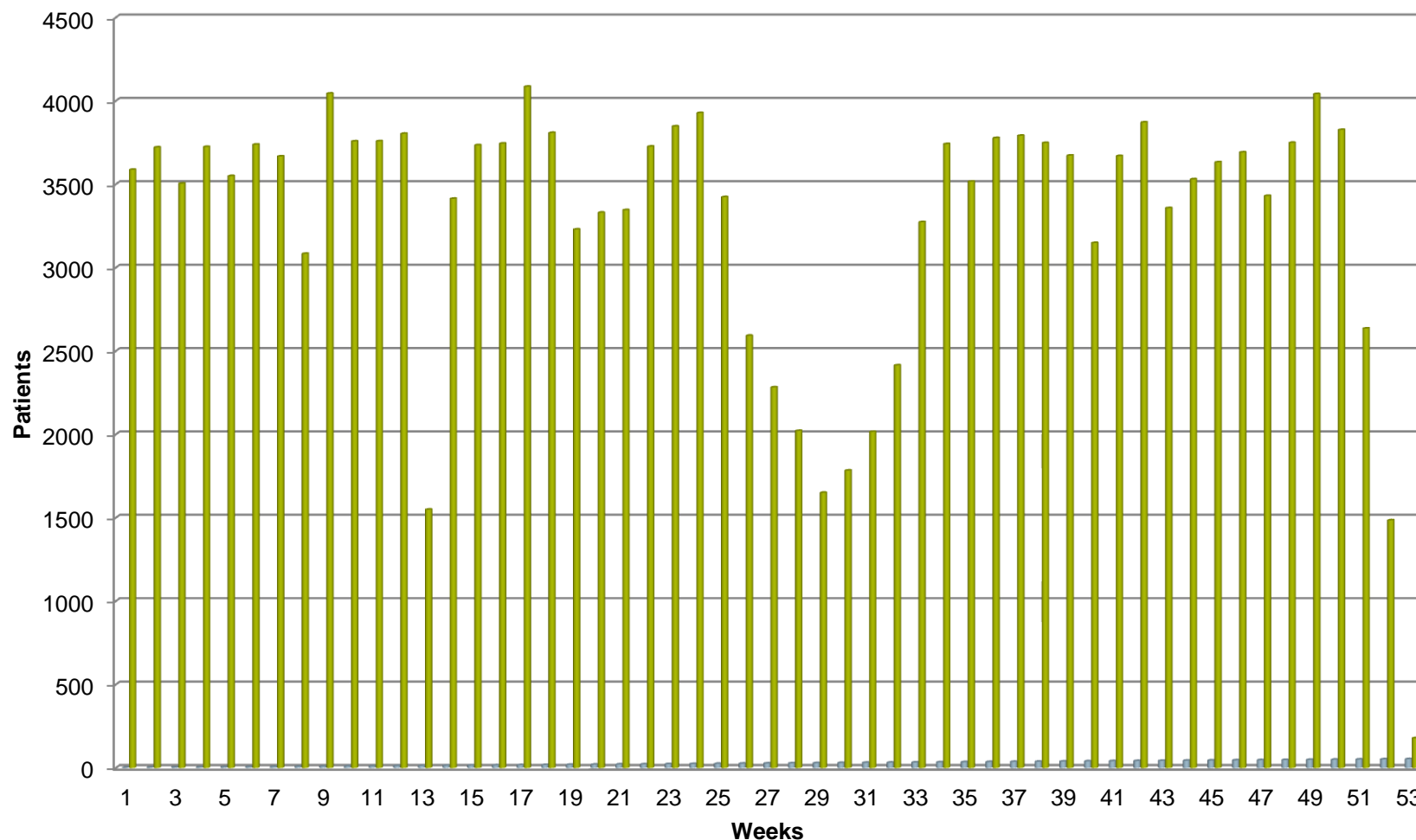


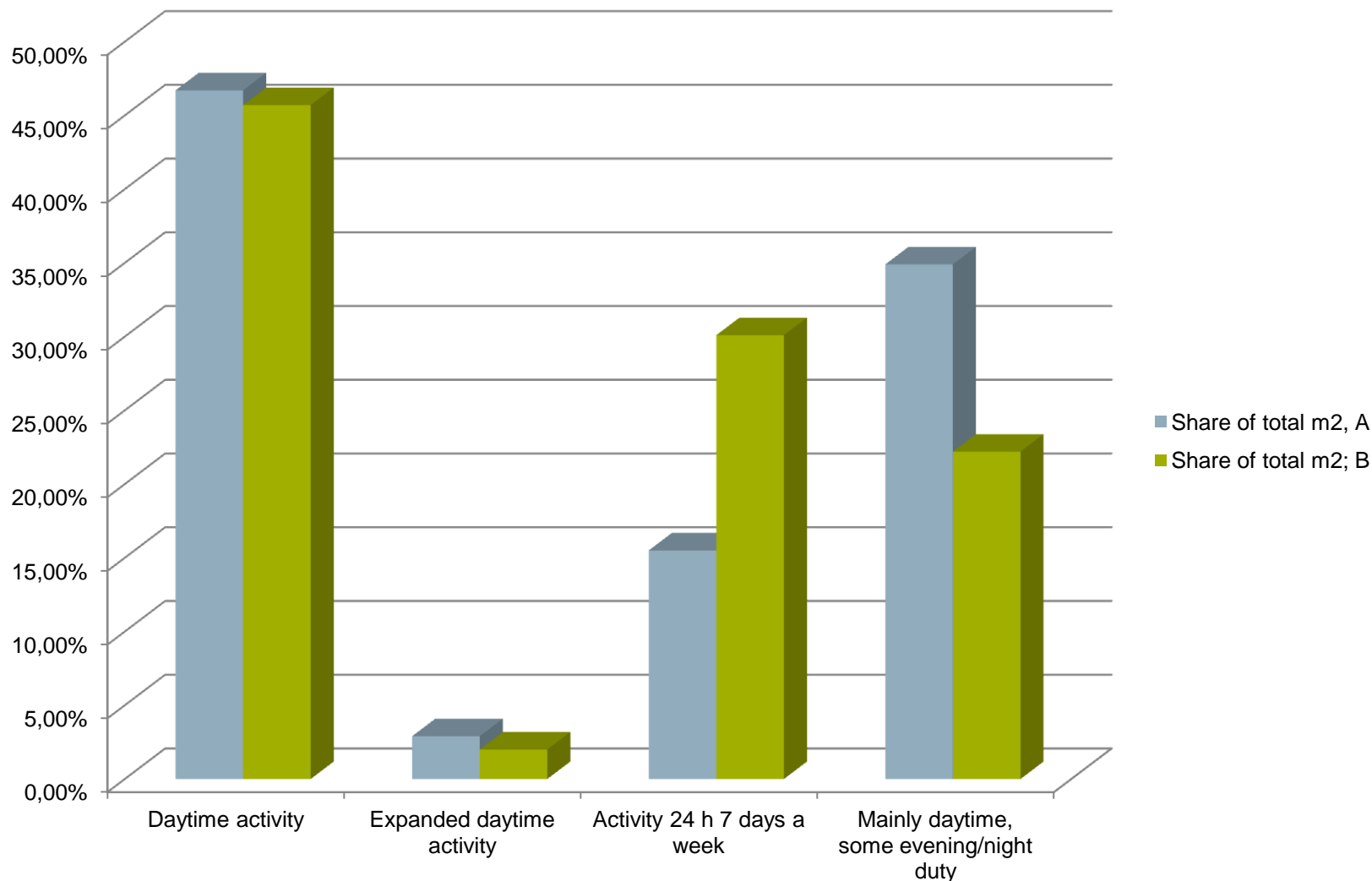
## Out-patient visits hospital B, surgical ward, during the day, 2010



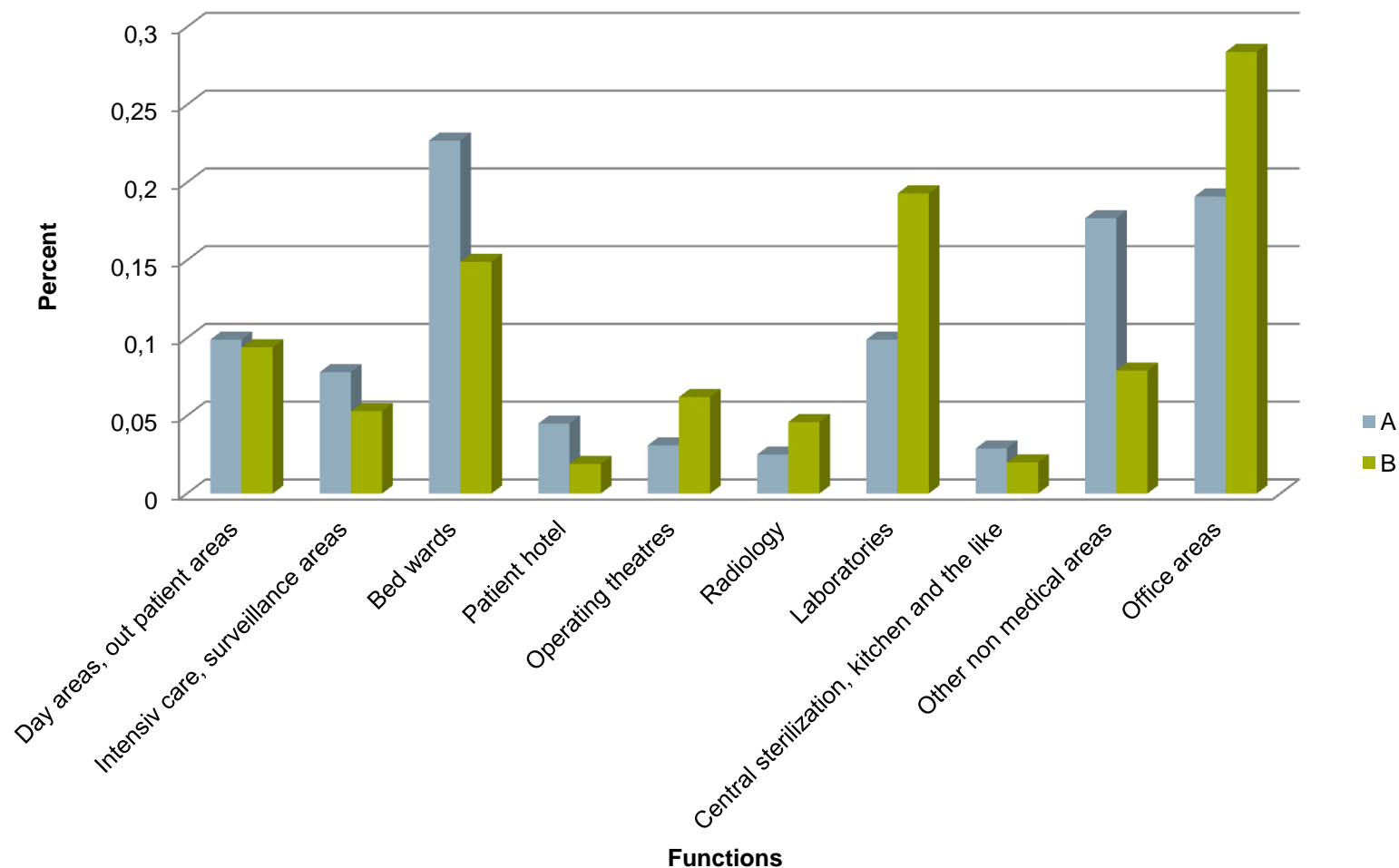


## Out-patient visits to hospital A during the year, 2010

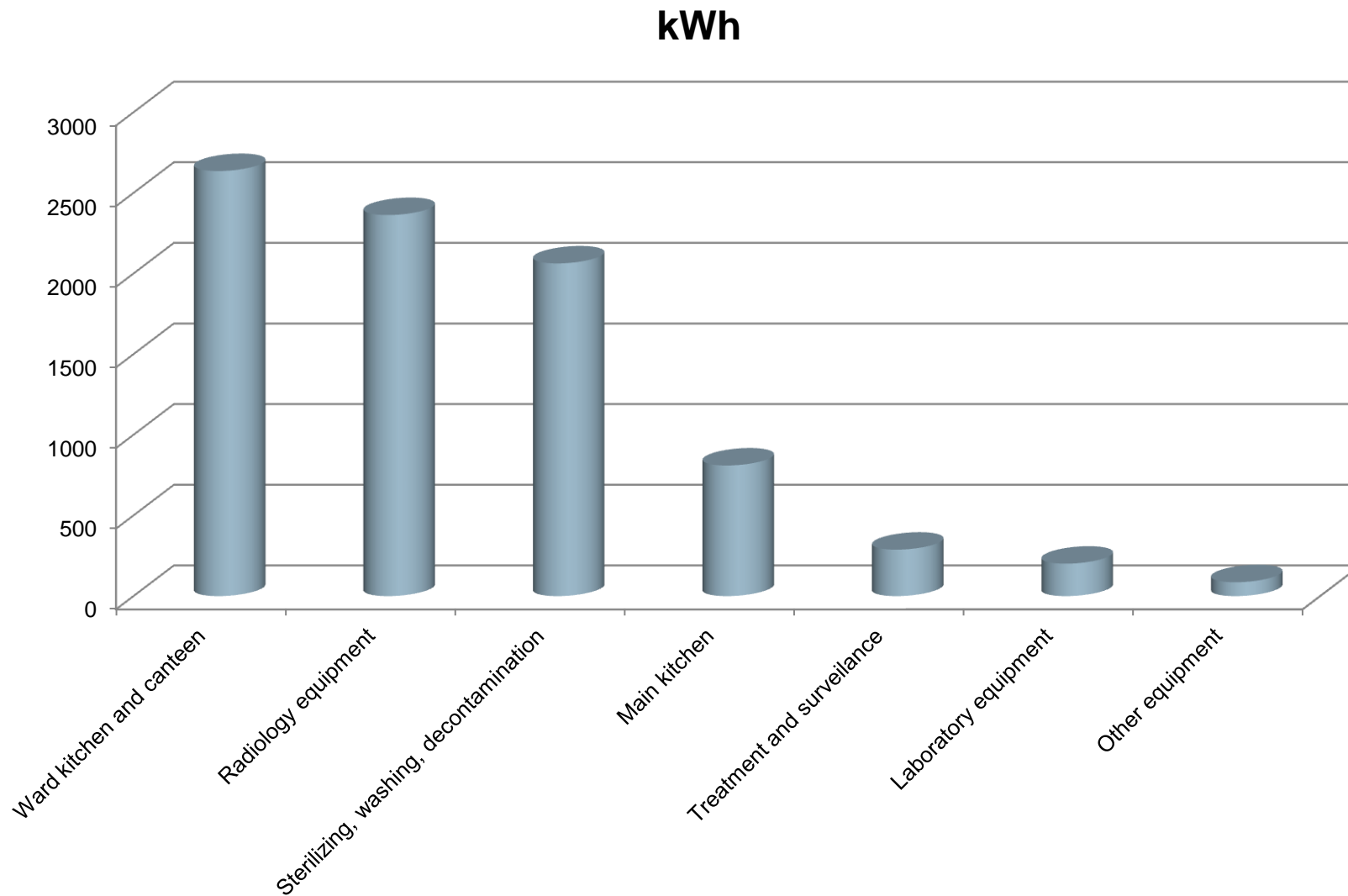




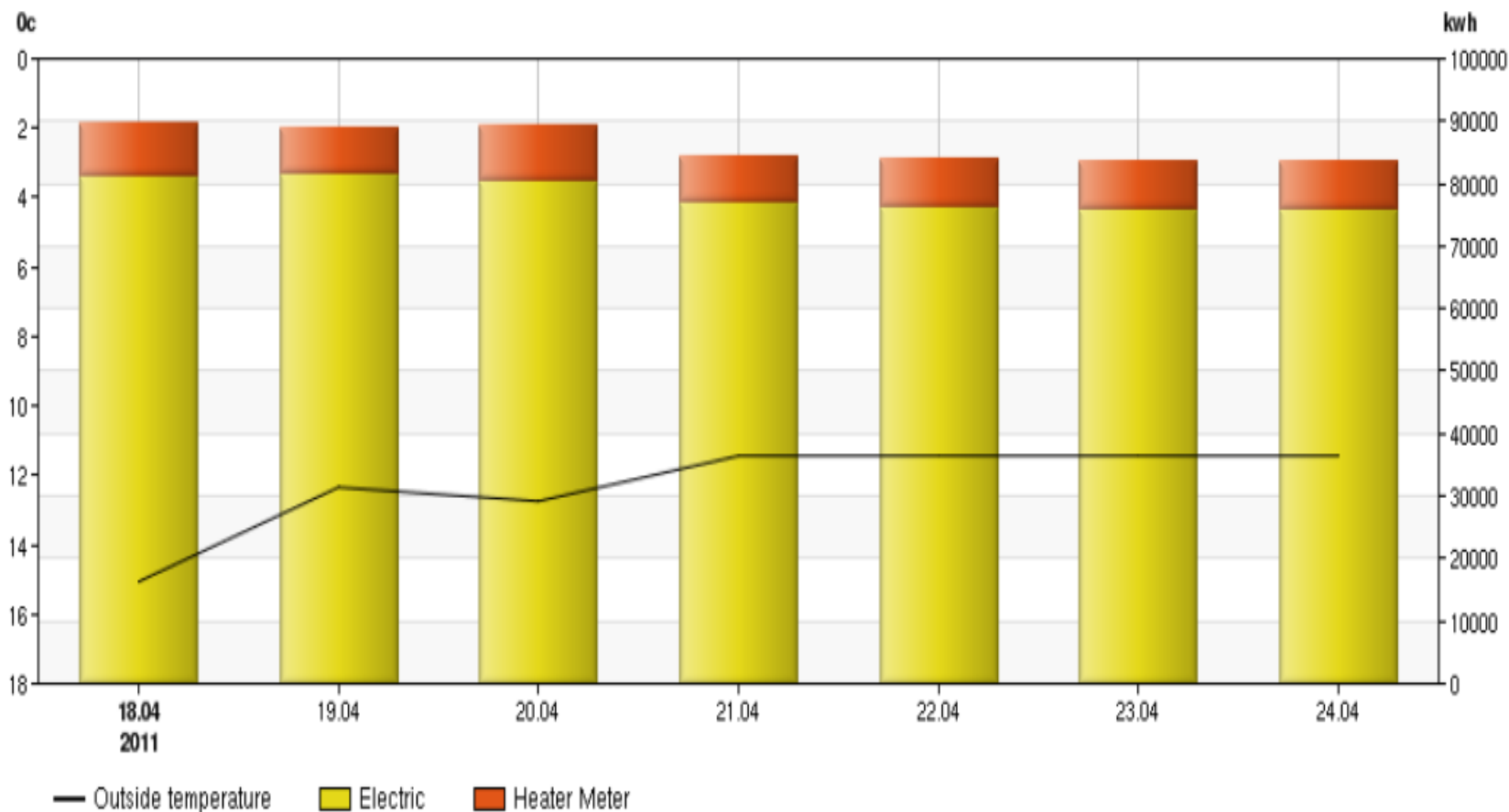
Diagramtittel



# Energy consumption hospital A according to type of equipment



# Electro and heat energy during a week, hospital B



**The hospital divided into building types, what could be the wright energy target, hospital B**

TEK definition	net area	Part of area	kWh/m <sup>2</sup> , TEK
<b>Hospital no reuse air</b>	11 806	13,6 %	330
<b>Hospital ordinary</b>	20 798	23,9 %	300
<b>Nursing homes</b>	14 657	16,9 %	230
<b>Light industry</b>	15 006	17,3 %	180
<b>Offices</b>	24 707	28,4 %	150
<b>Sum</b>	<b>86 974</b>		229

- The demand is 300/330 kWh/m<sup>2</sup> when it should have been about 230.
- The systems are dimensioned as to **one** building needing 300/330 kWh/m<sup>2</sup> when it should have been seen as a city with a diversity of needs.
- It is monitored by buildings when it should be by functions
- It is monitored as being used 24/7 but around 50 % is used 8/5.
- When all the small devices and instruments are put together they are the largest energy consumers.



- Are ventilation systems trying, partly in vain, to do the job a better organisation could have done?
- How to place functions so they cooperate using energy?
- Is there an optimum size of a ventilation area?
- When is it necessary that equipment respond fast and when can they well be asleep?





# Thank you for your attention

Low energy hospitals  
A Norwegian Research Council project