

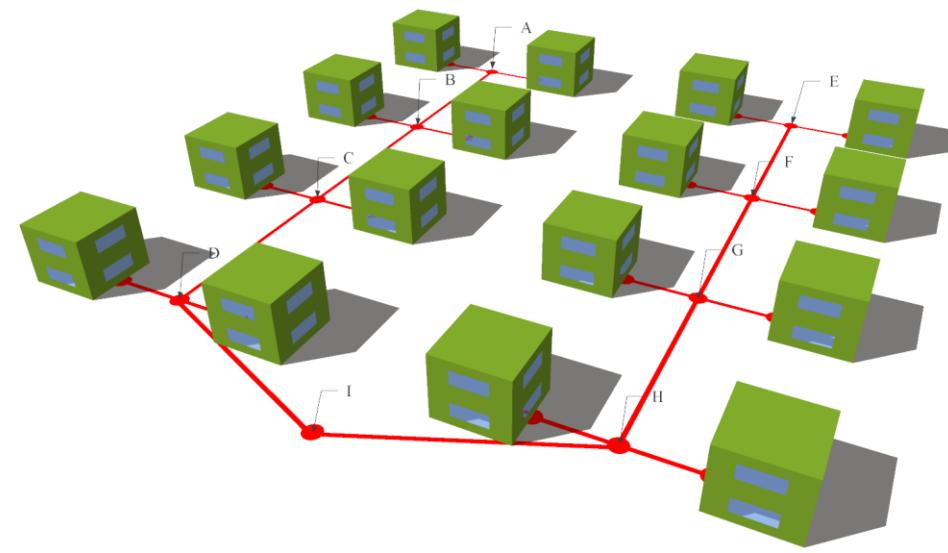
# Building modelling group

IBPSA Project 1 – WP3.1 – DESTEST

Update 20/04/2020

# Start simple: 16 identical buildings

- Single-family dwelling of 1980
  - Thermal performance based on TABULA project for Belgium
  - Two-zone model (day zone and night zone)
  - Only heat demand for space heating
  - Standard occupant (ISO 13790)

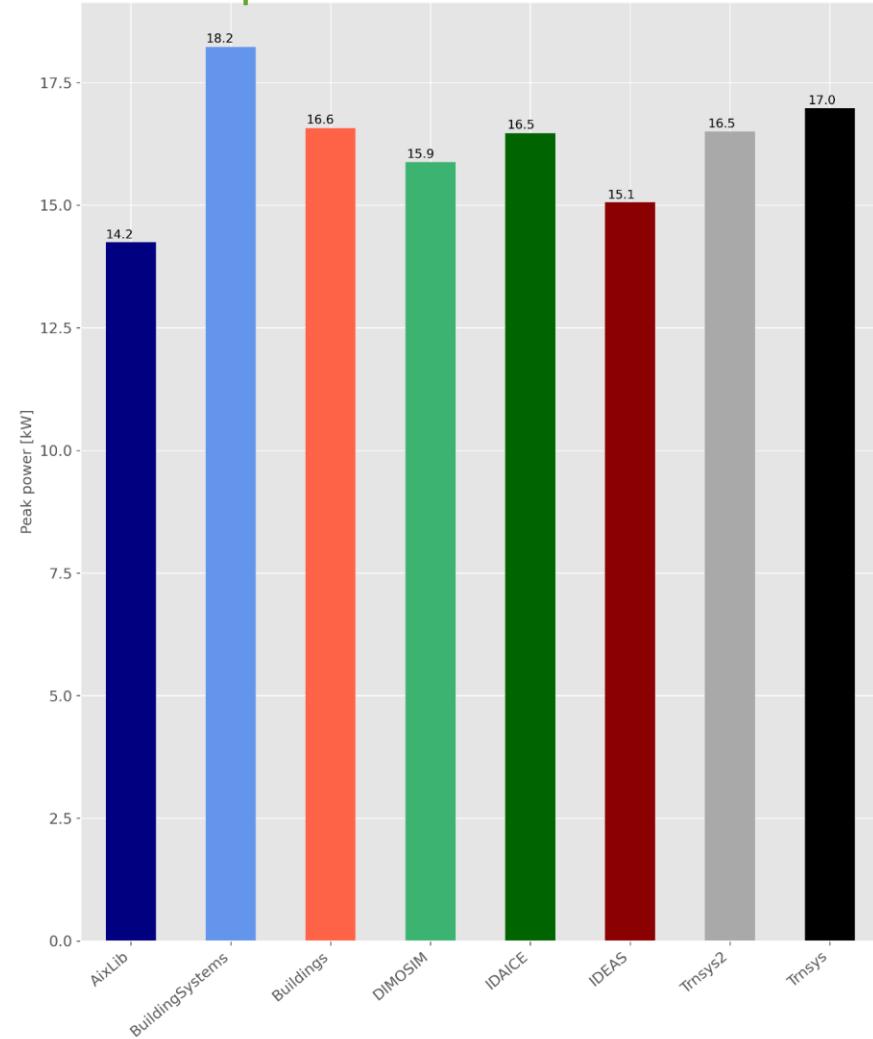


# Participants

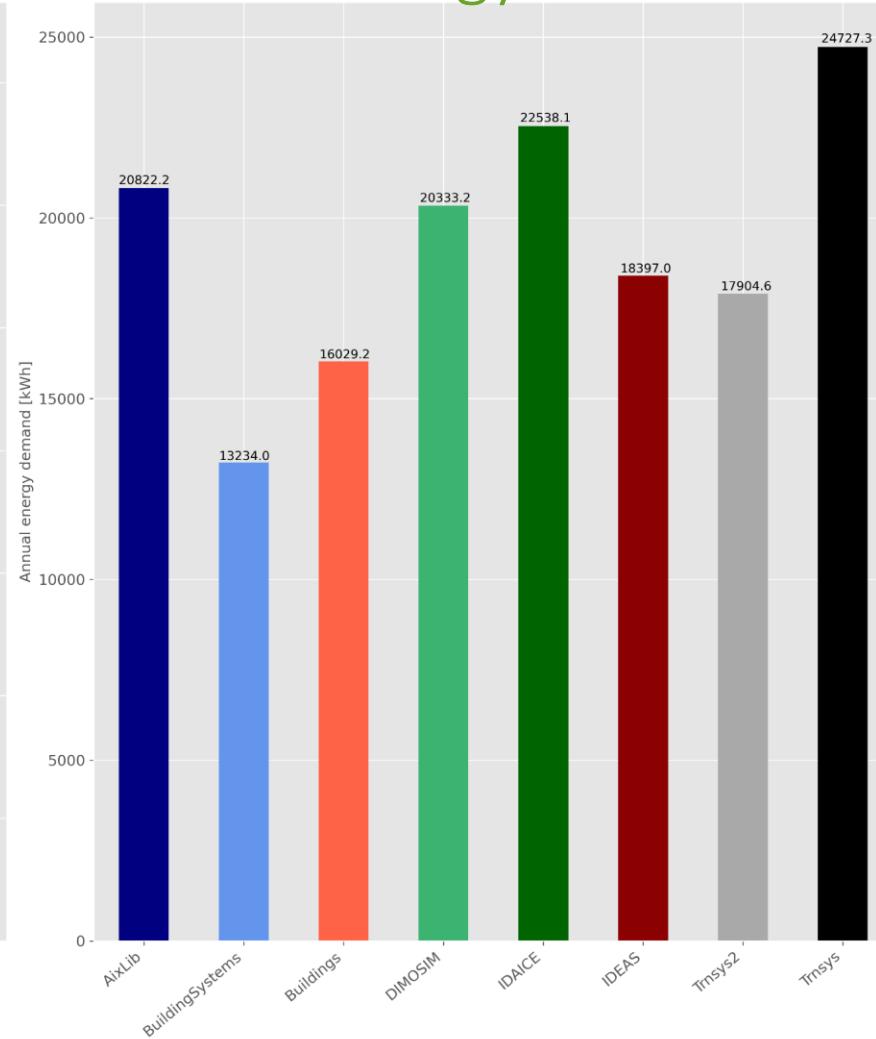
Modelling environment	Modeler	Affiliation of participant
Modelica IDEAS	Ina De Jaeger	KU Leuven / VITO / EnergyVille
Modelica Buildings	Alessandro Maccarini	Aalborg University
Modelica AixLib	Michael Mans	RWTH Aachen
Modelica BuildingSystems	Haris Shamsi	UCD Dublin
IDA ICE	Øystein Rønneseth, Igor Sartori	Sintef Norway
DIMOSIM	Enora Garreau	CSTB
Trnsys	Enora Garreau	CSTB
Trnsys2	Lien De Backer	UGent

# Peak power & energy demand

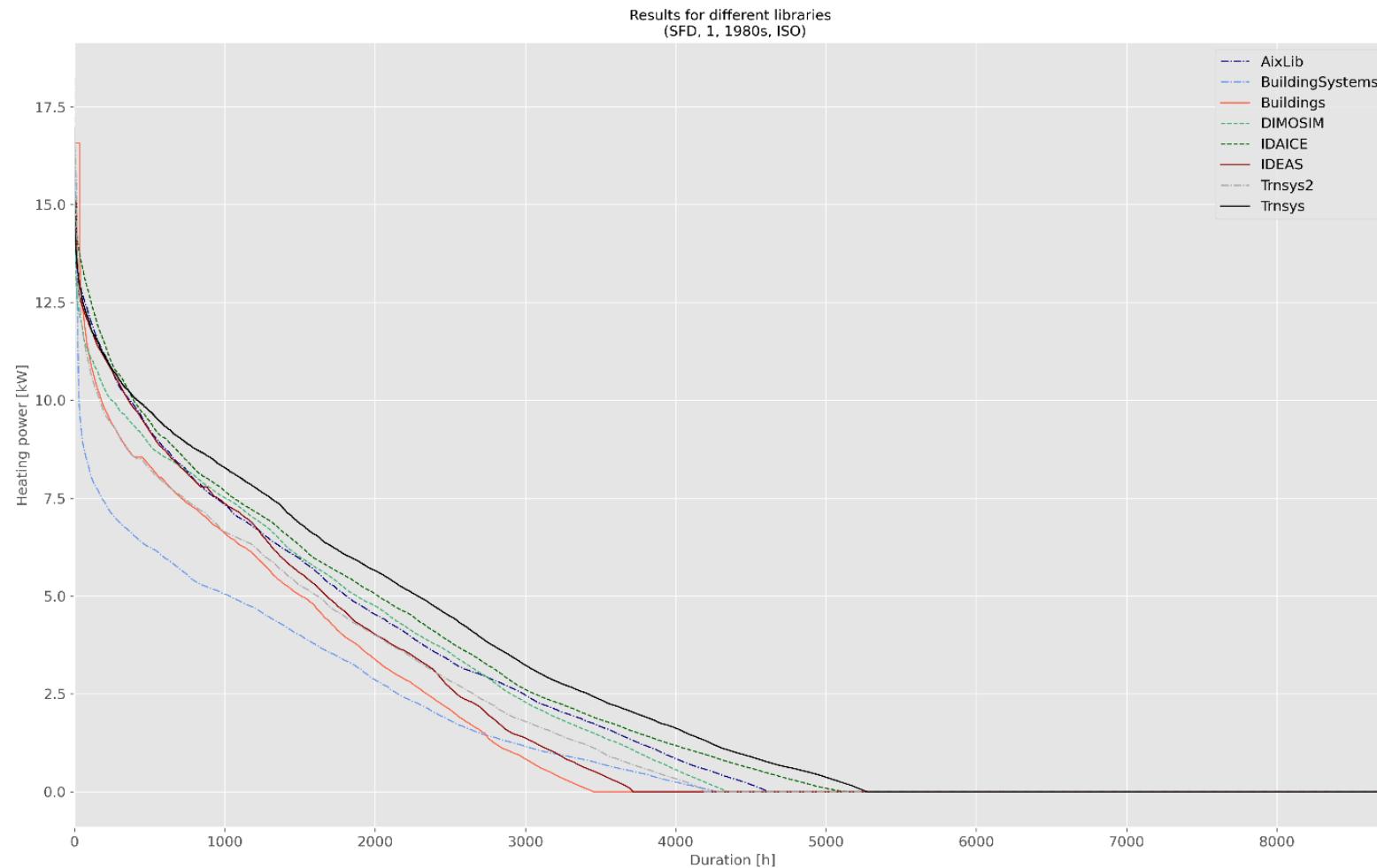
## Peak power



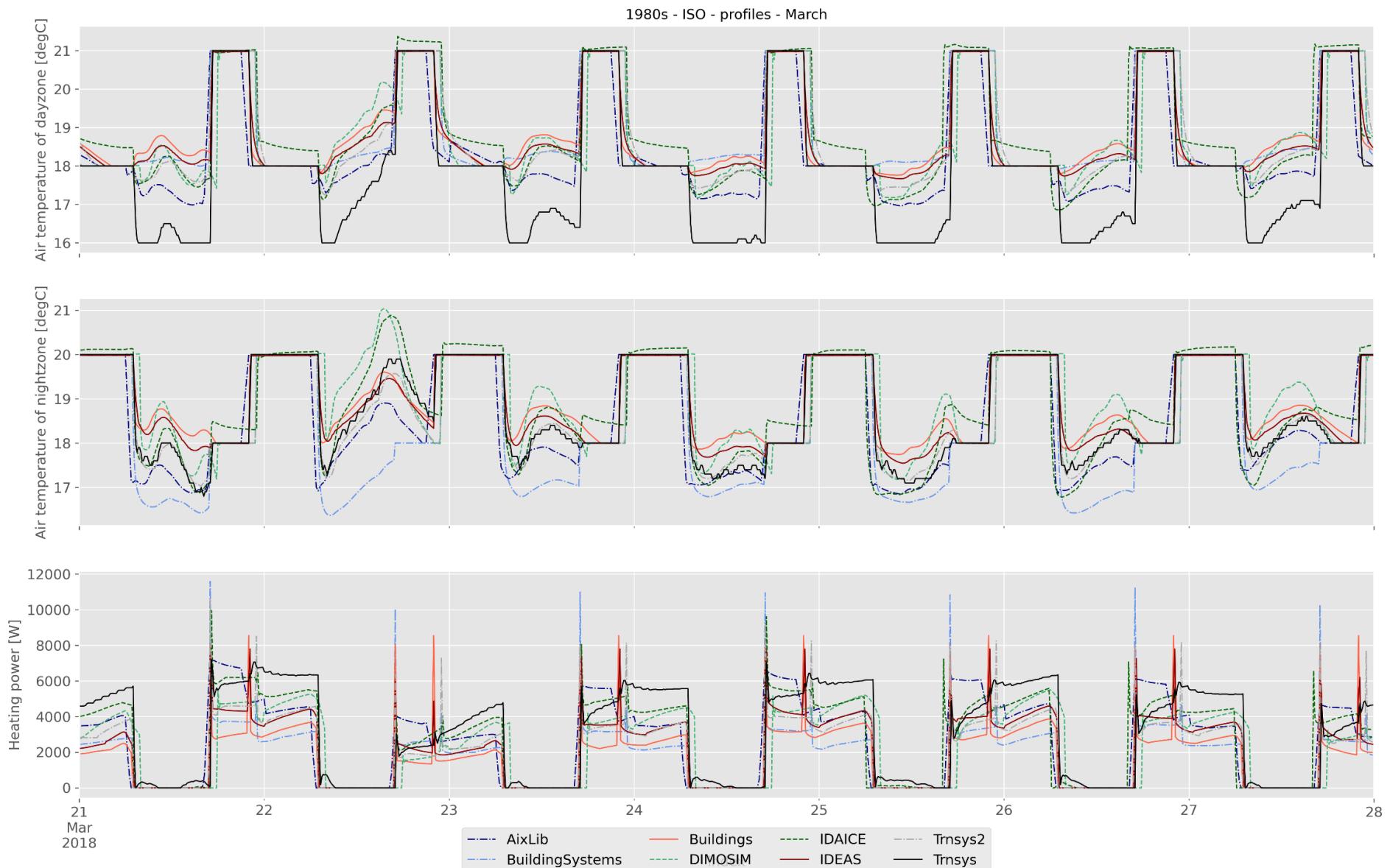
## Annual energy demand



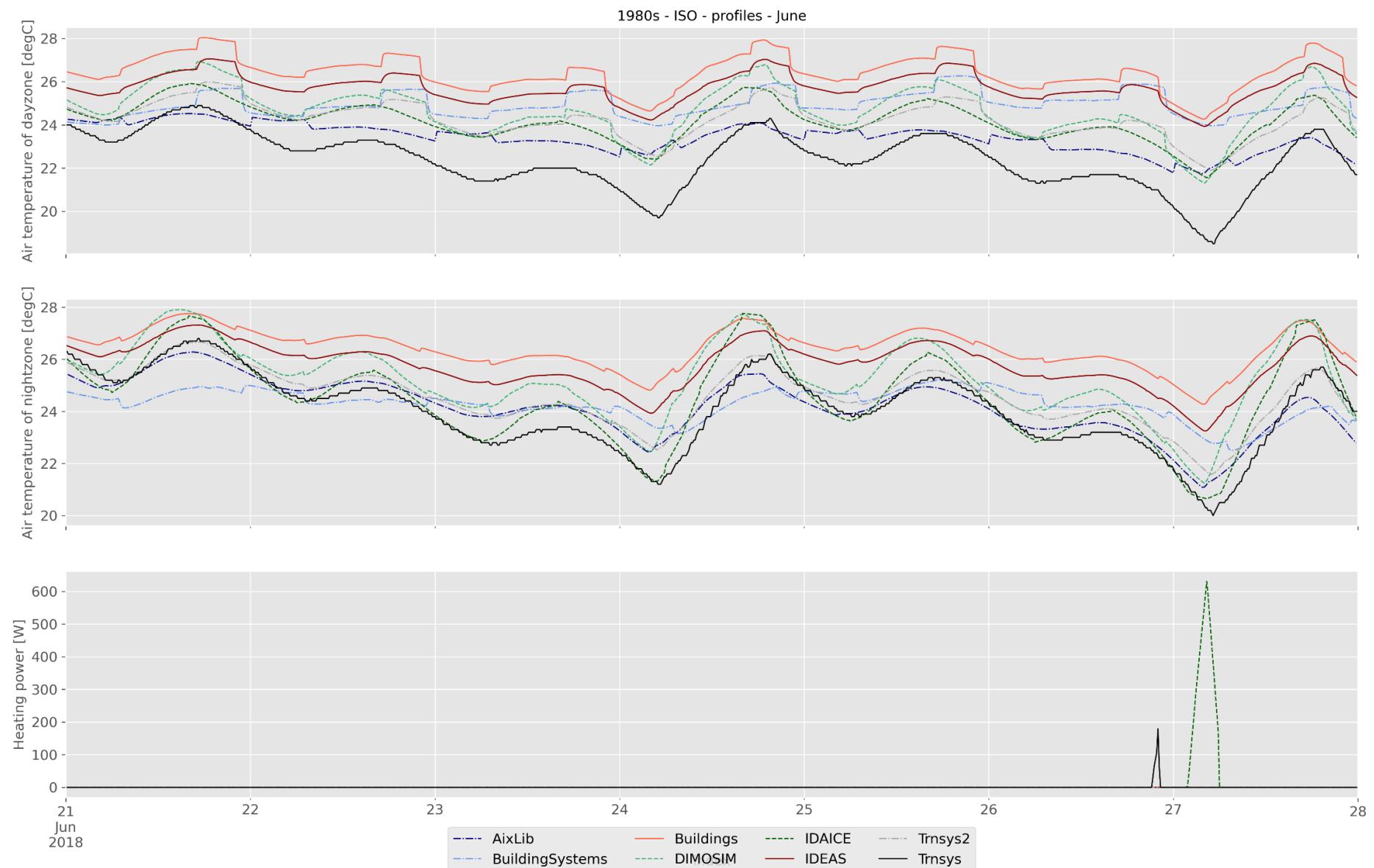
# Load duration curve



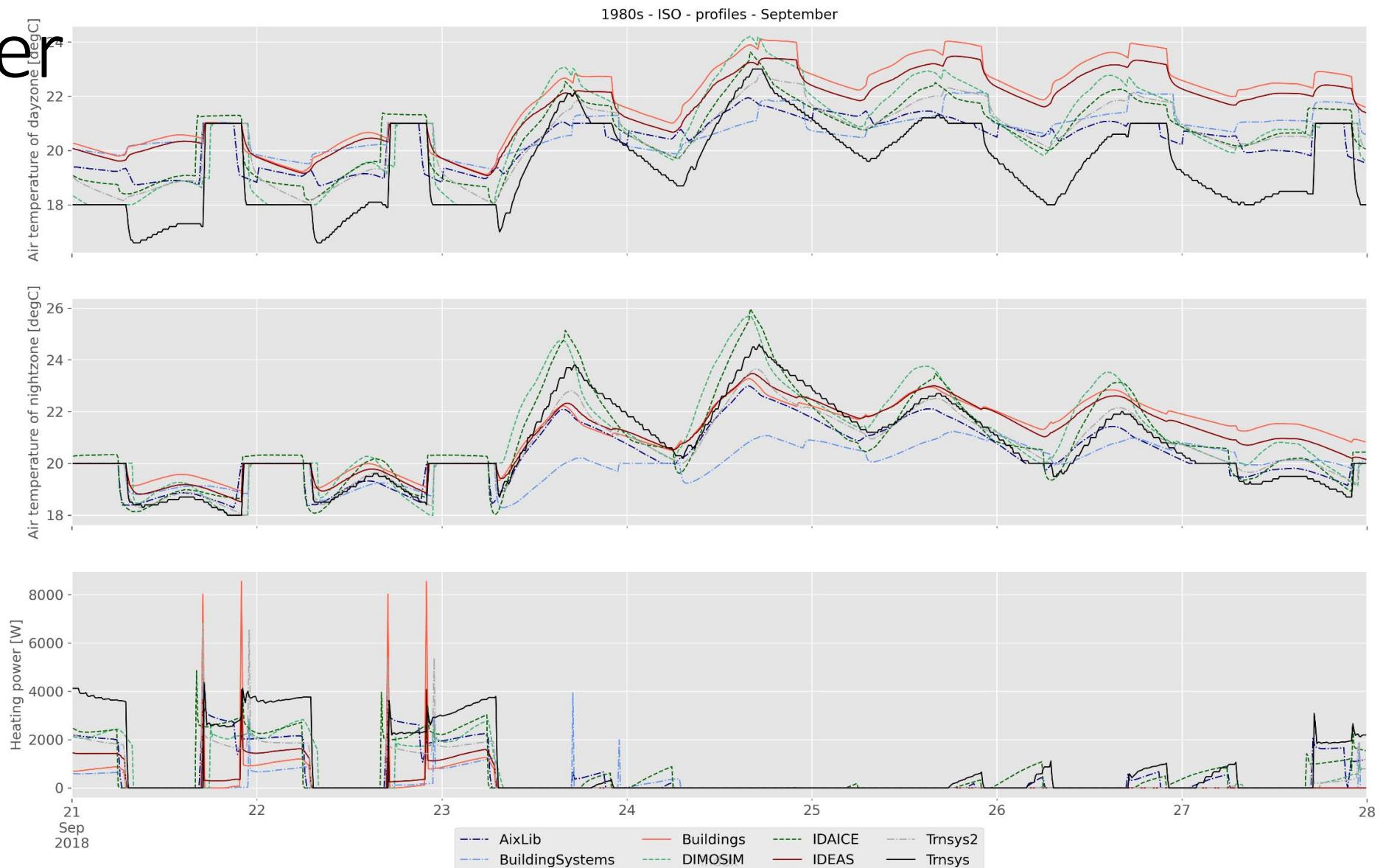
# Profiles: March



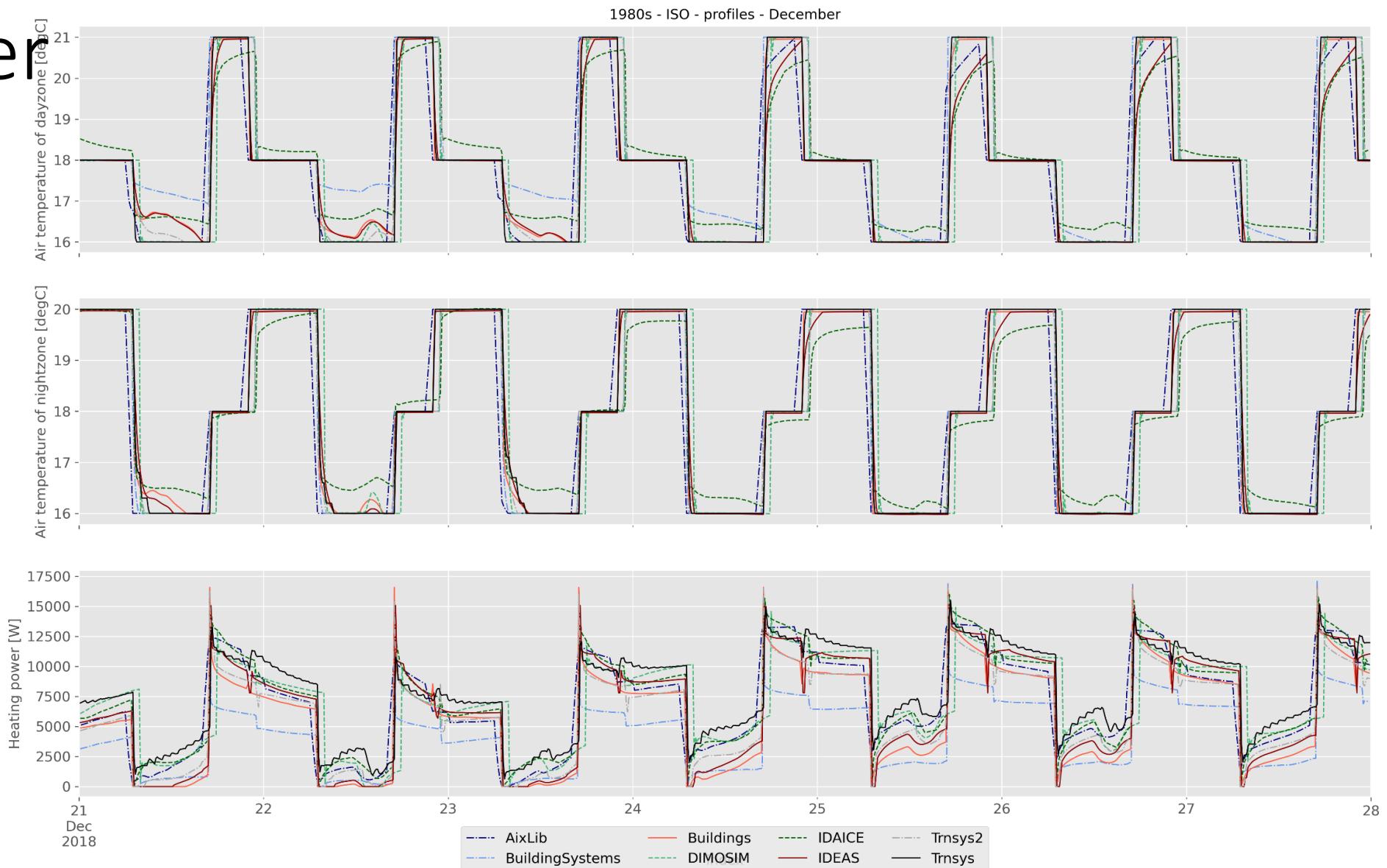
# Profiles: June



# Profiles: September



# Profiles: December



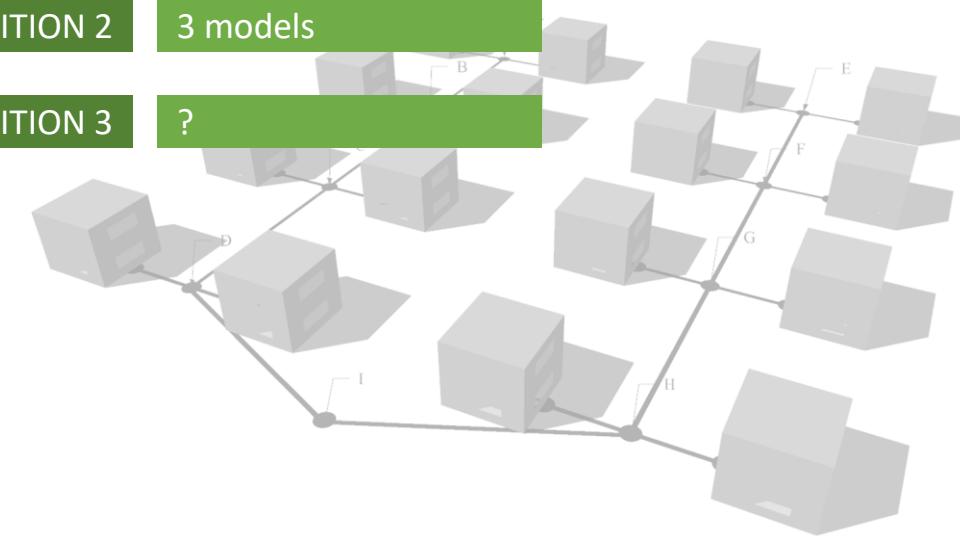
# Gradually increasing in complexity

- Single-family dwelling of 1980
  - Thermal performance based on TABULA project for Belgium
    - Also include renovation (light and heavy)
  - Two-zone model (day zone and night zone)
  - Only heat demand for space heating
  - Standard occupant (ISO 13790)
    - Stochastic occupants (16 different profiles)
- Office building

ADDITION 1    3 models

ADDITION 2    3 models

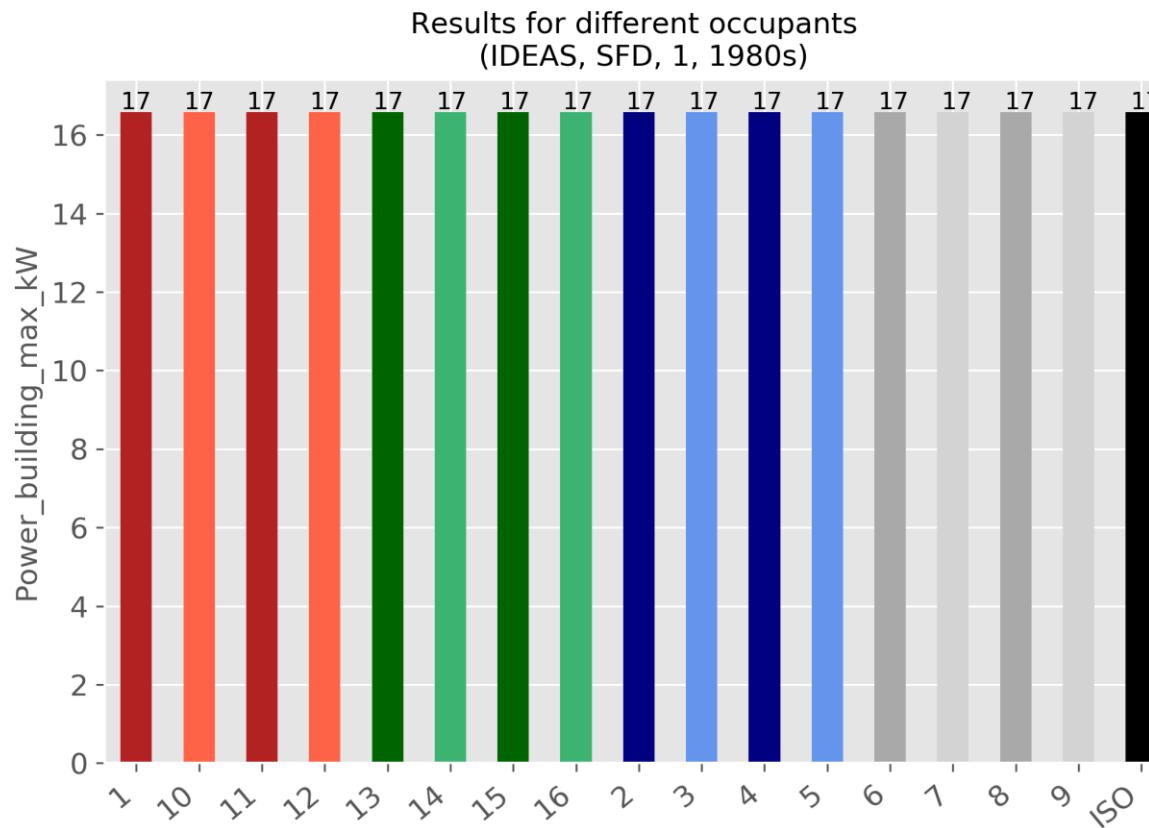
ADDITION 3    ?



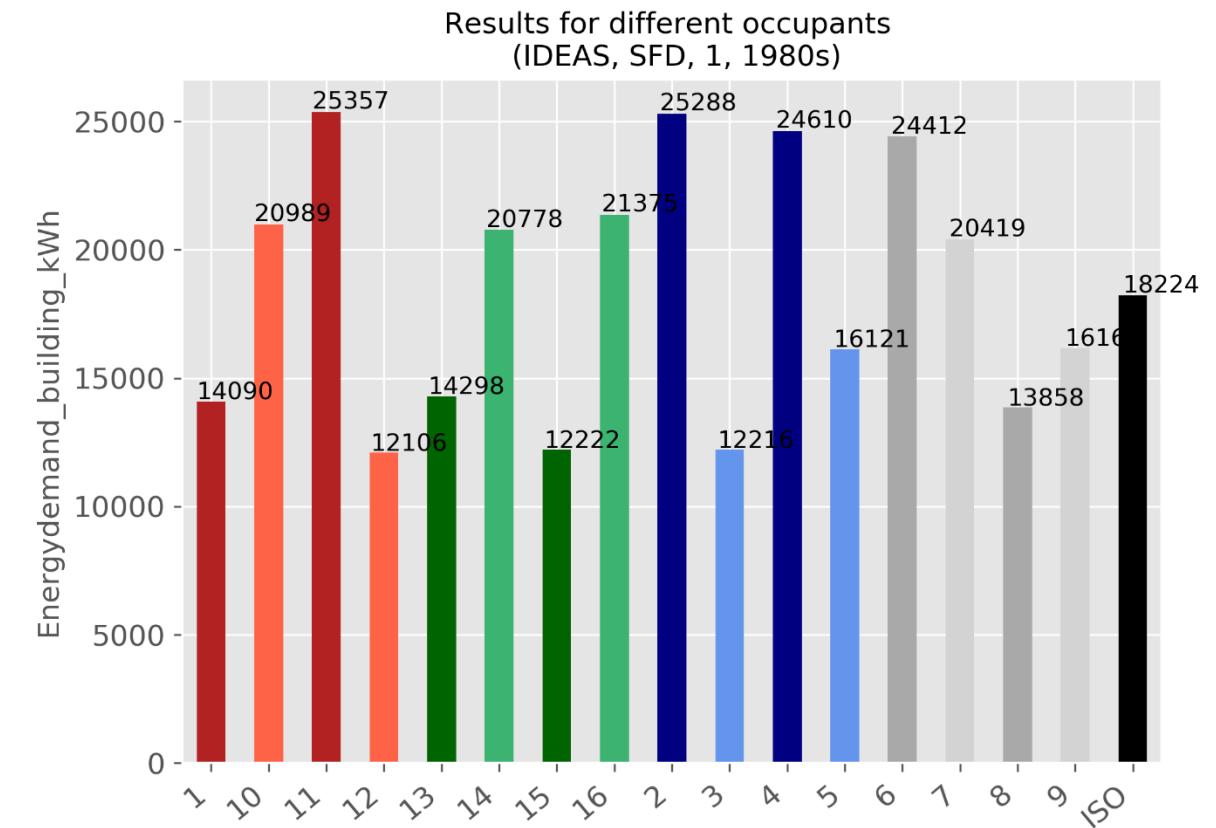
## SECOND COMMON EXERCISE

# Peak power & energy demand

## Peak power

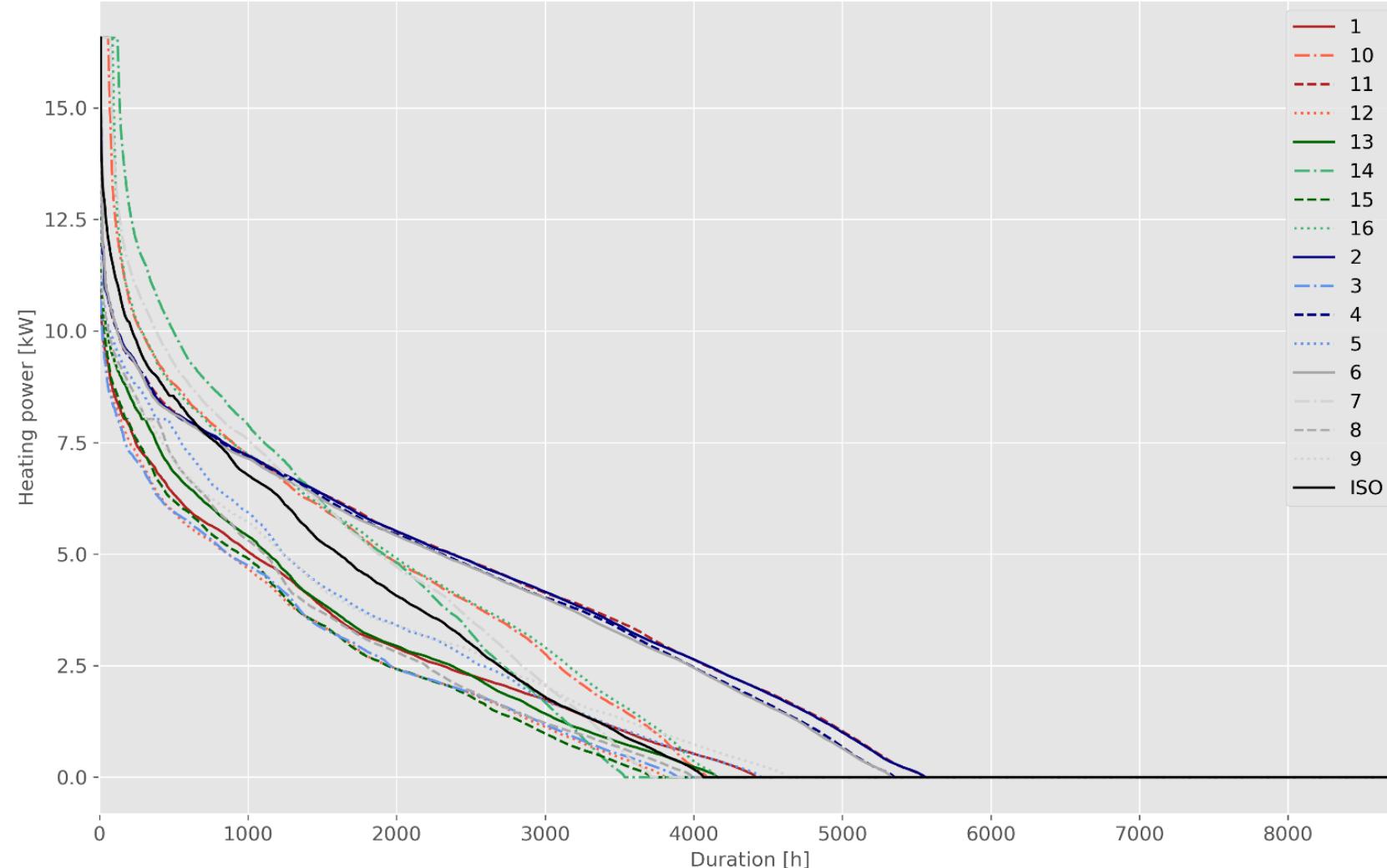


## Annual energy demand



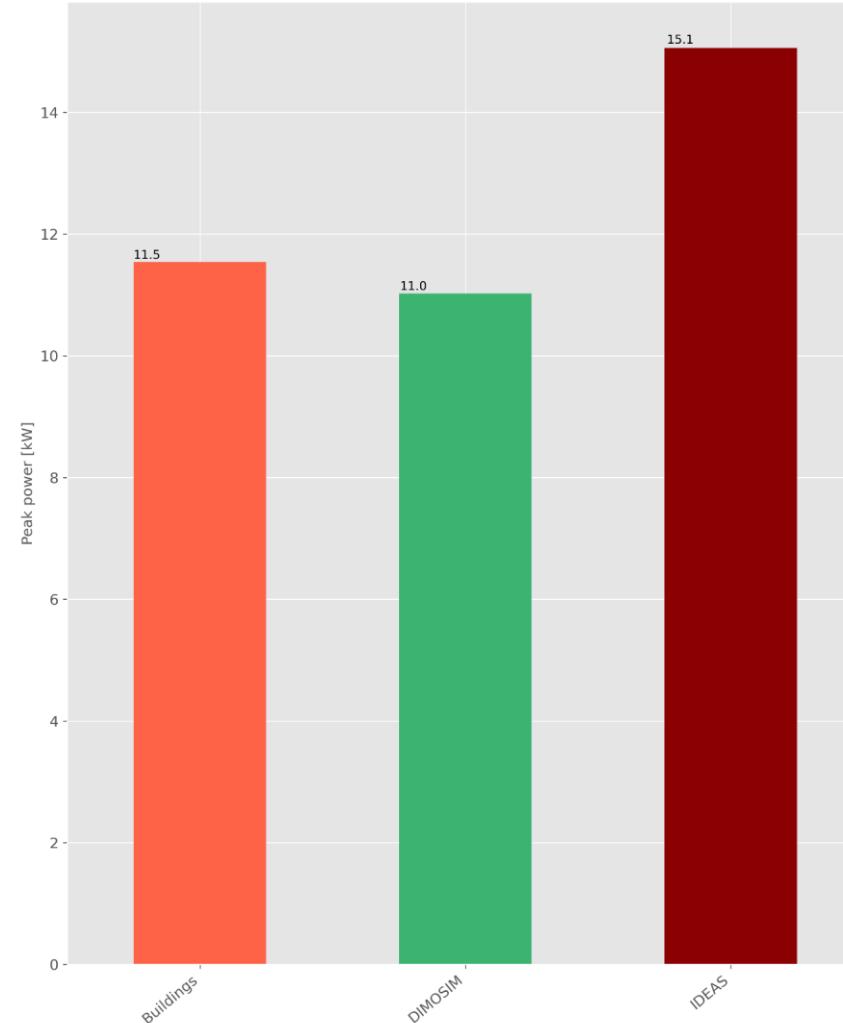
# Load duration curve

Results for different occupants  
(IDEAS, SFD, 1, 1980s)

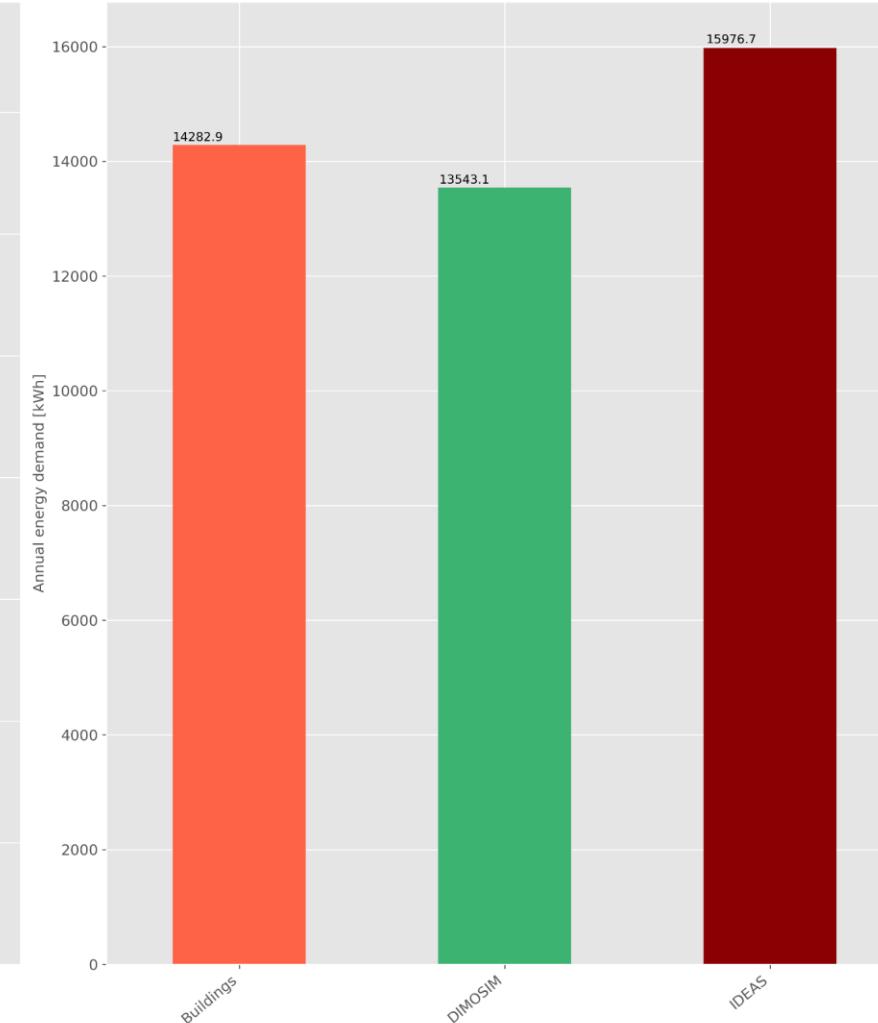


# Peak power & energy demand

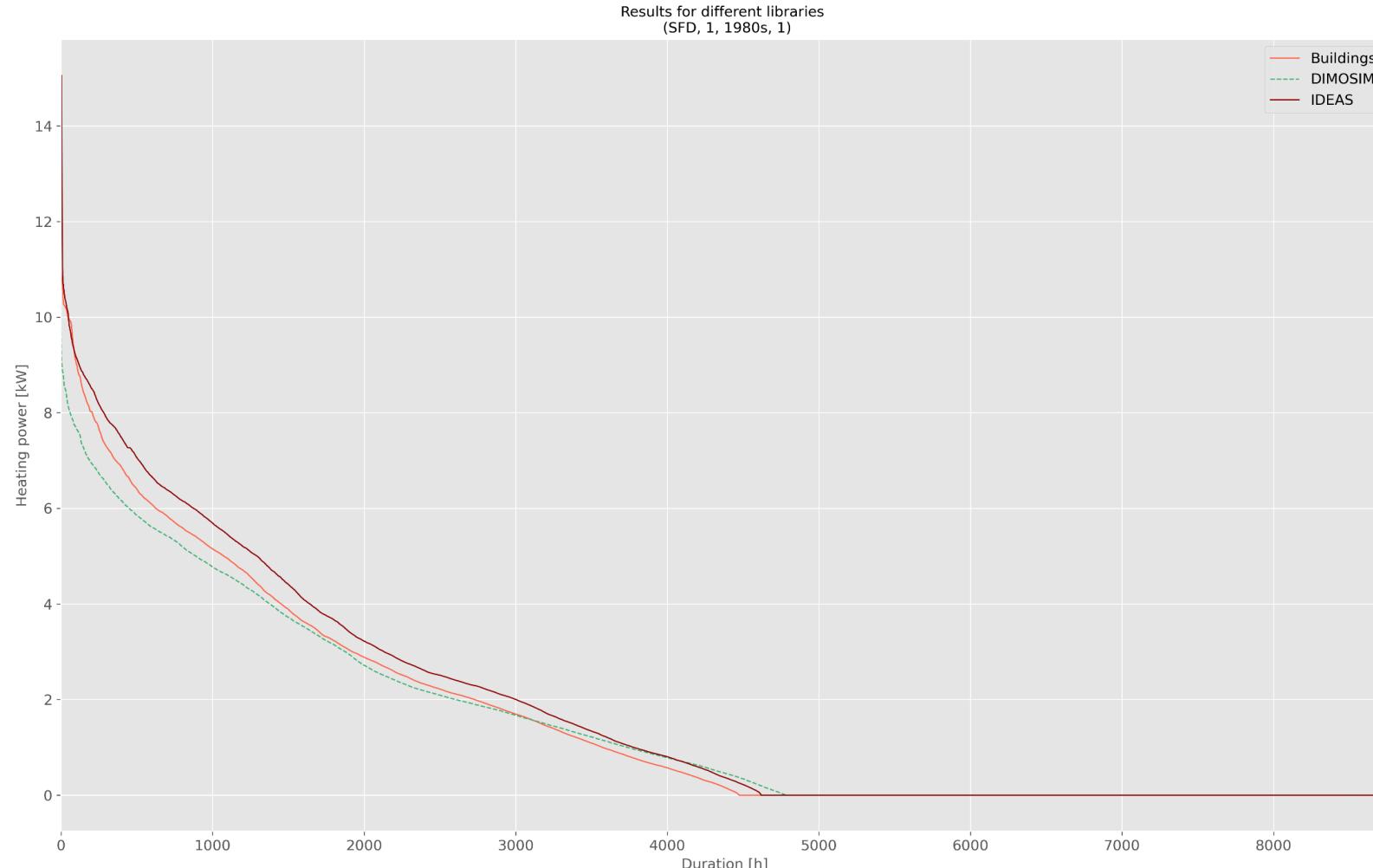
Peak power



Annual energy demand



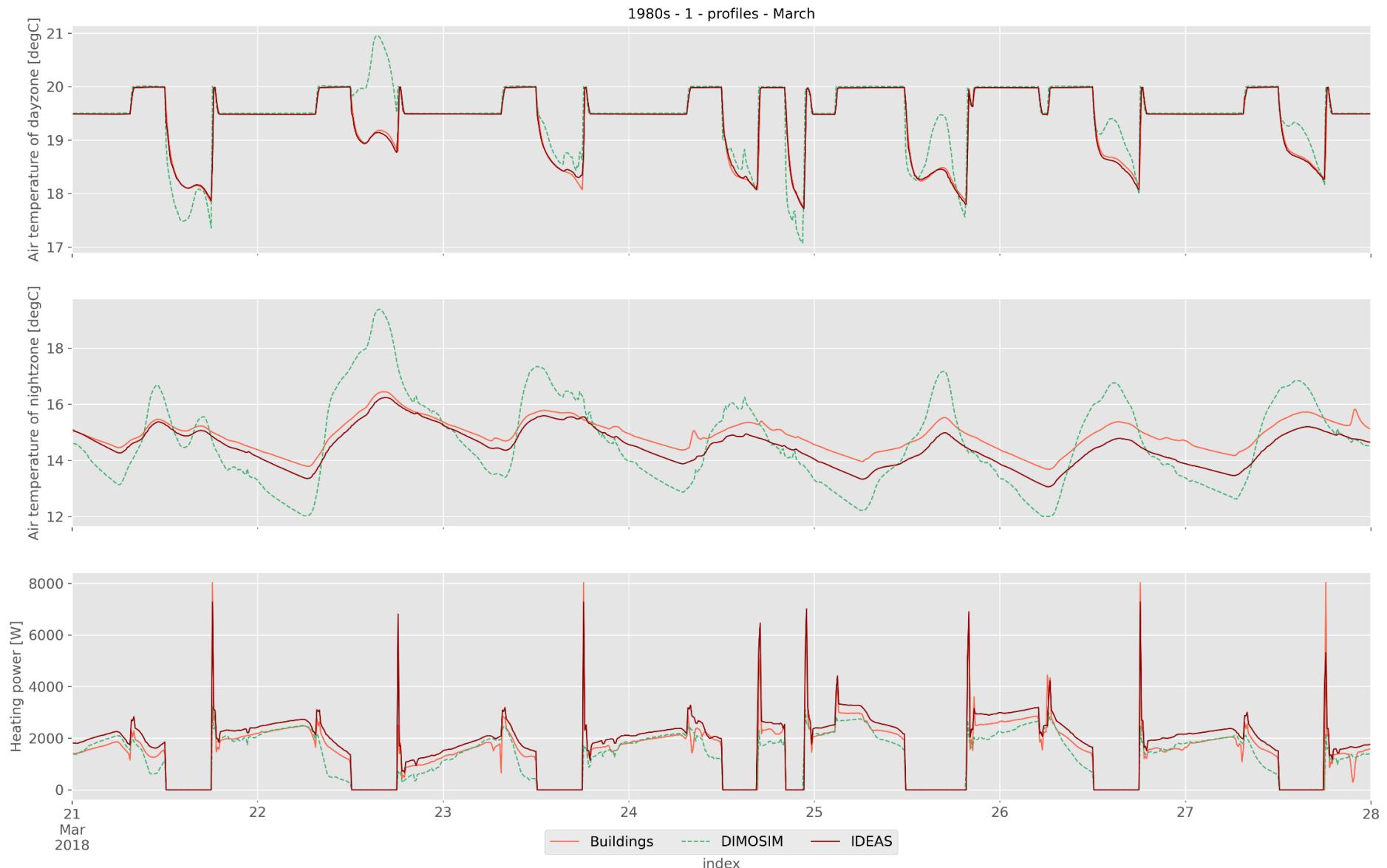
# Load duration curve



## SECOND COMMON EXERCISE

Results from Buildings & DIMOSIM & IDEAS for occupant 1

# Profiles: March

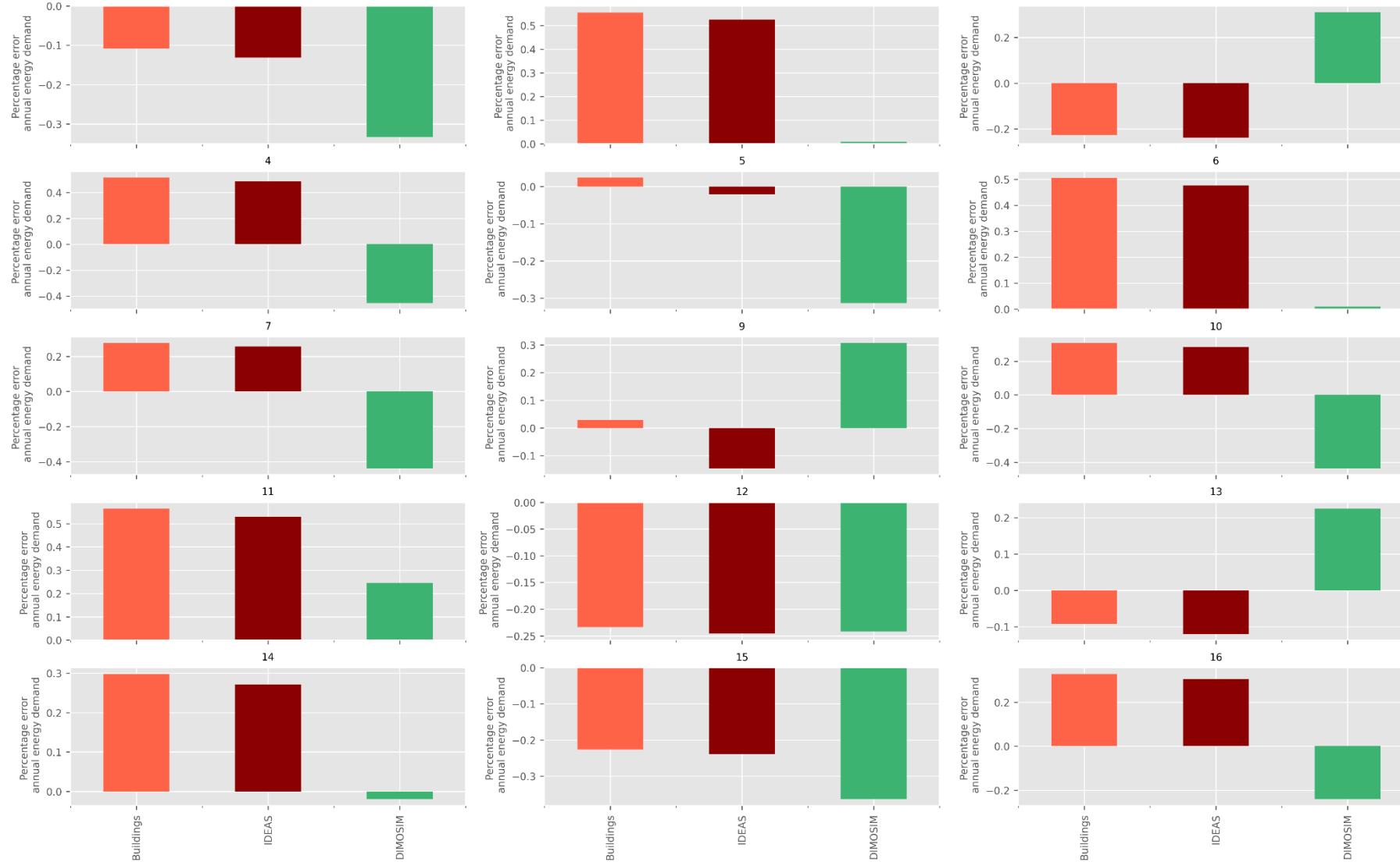


## SECOND COMMON EXERCISE

Results from Buildings & DIMOSIM & IDEAS

# Annual heat demand

Impact of different occupants for the 1980s buildings, relative to ISO occupant

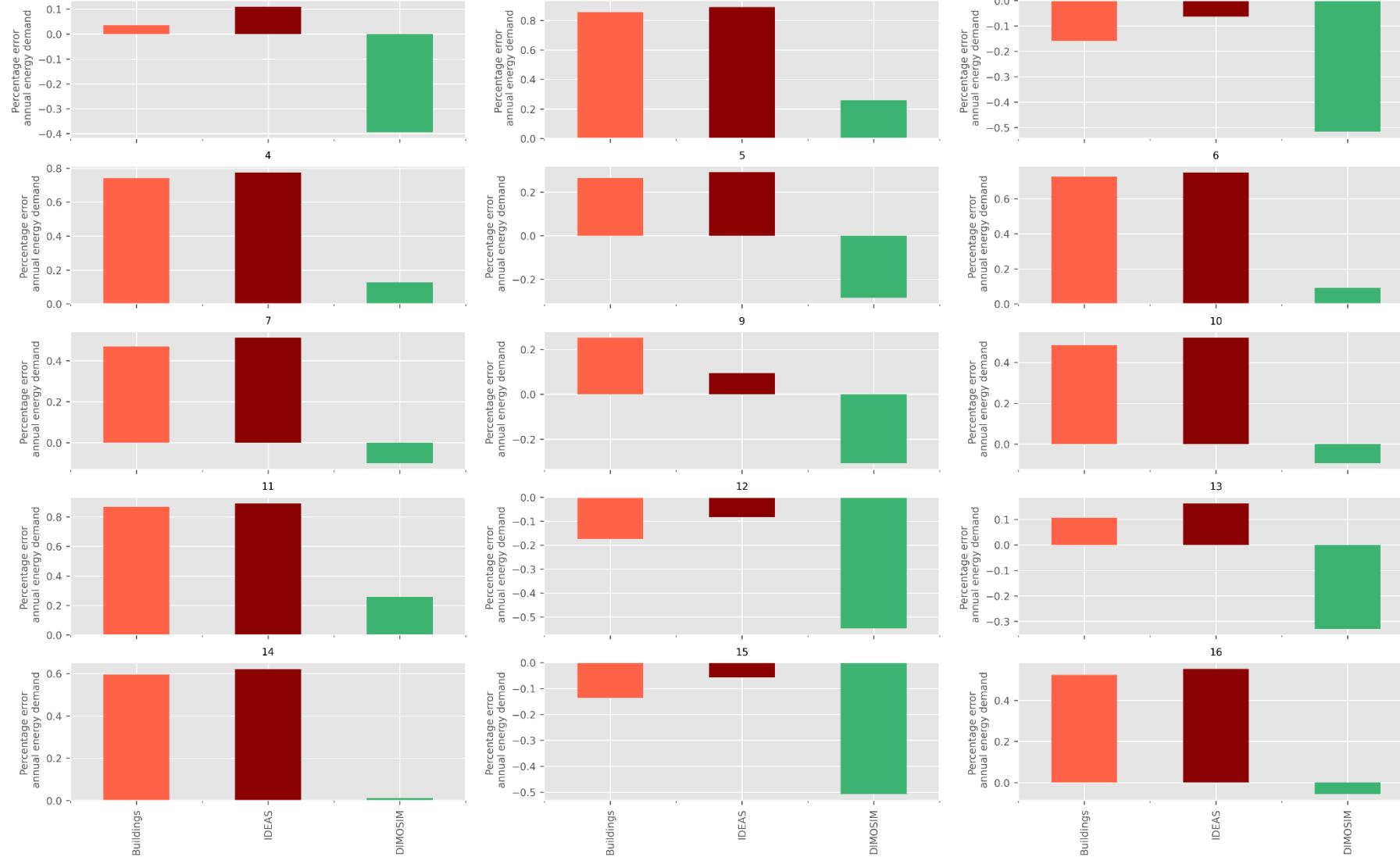


## SECOND COMMON EXERCISE

Results from Buildings & DIMOSIM & IDEAS

# Annual heat demand

Impact of different occupants for the 2000s buildings, relative to ISO occupant

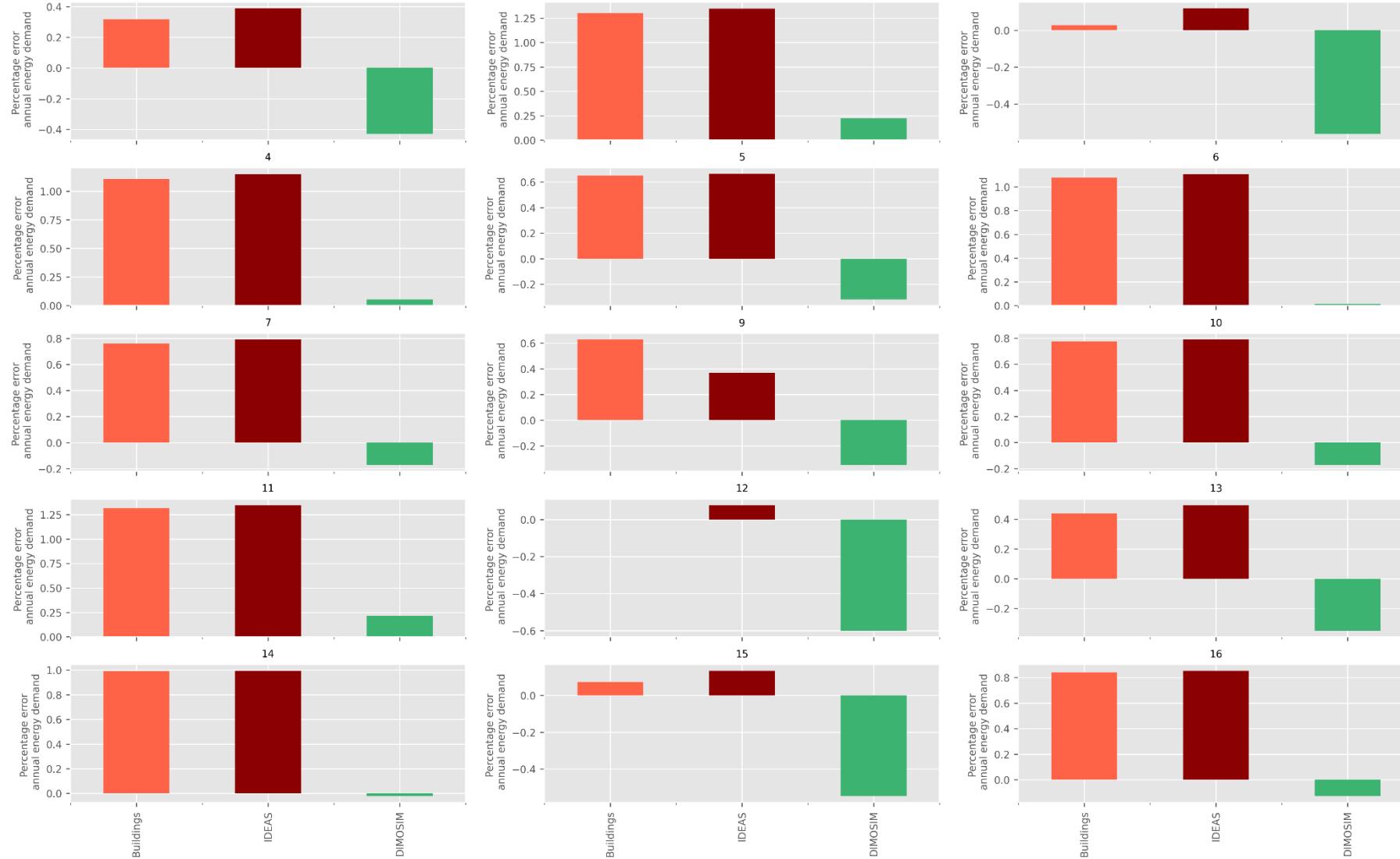


# SECOND COMMON EXERCISE

Results from Buildings & DIMOSIM & IDEAS

# Annual heat demand

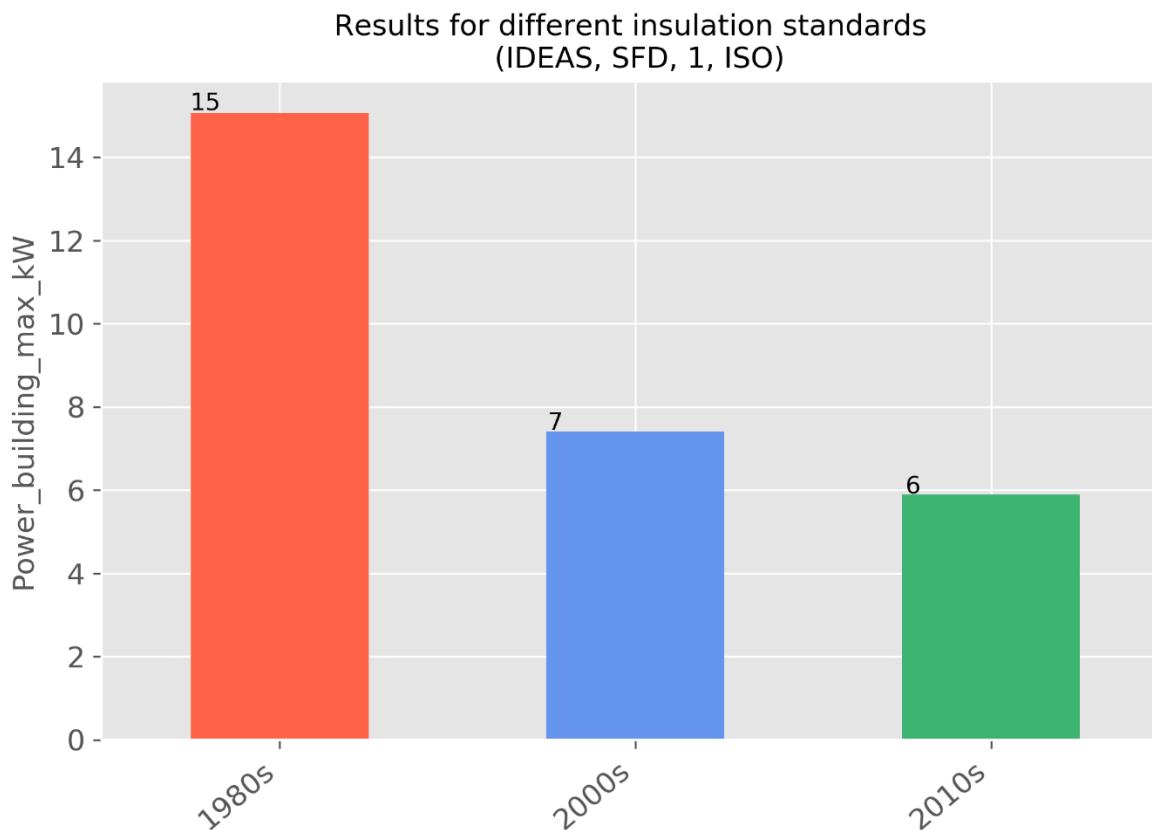
Impact of different occupants for the 2010s buildings, relative to ISO occupant



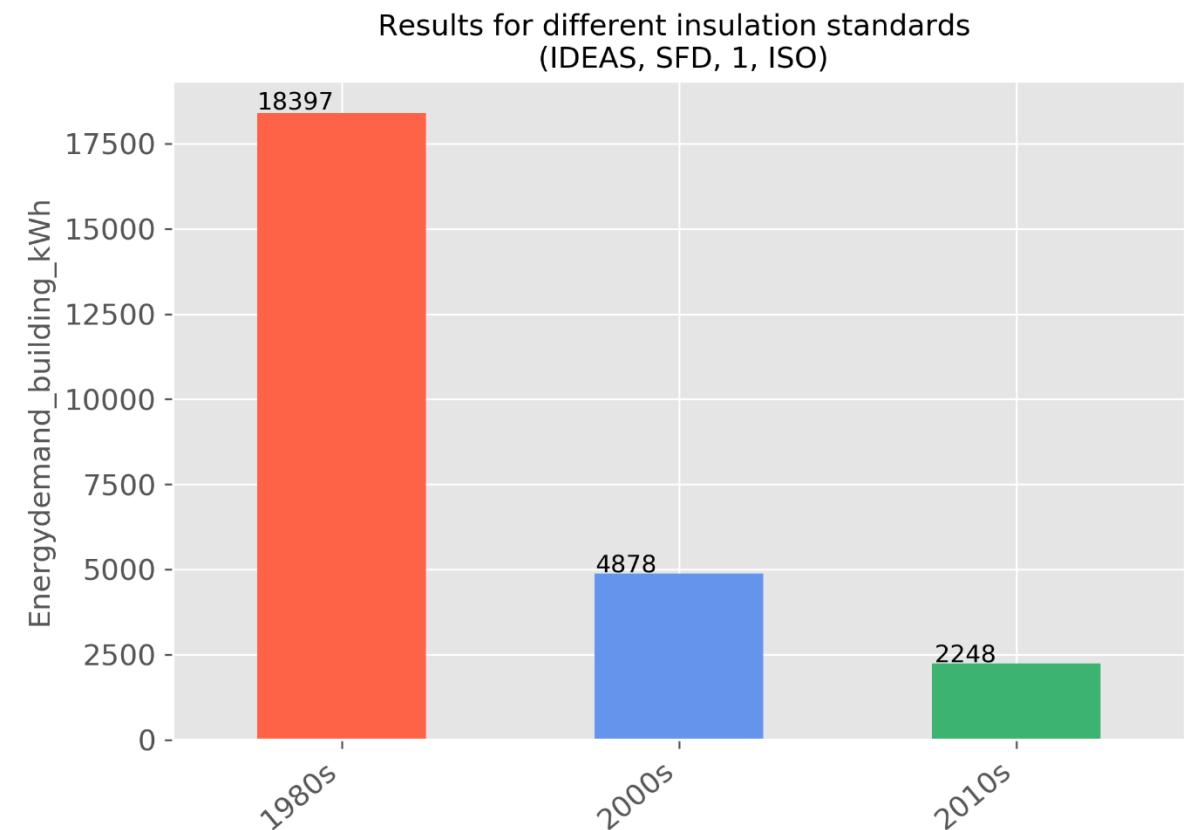
## 3RD COMMON EXERCISE

# Peak power & energy demand

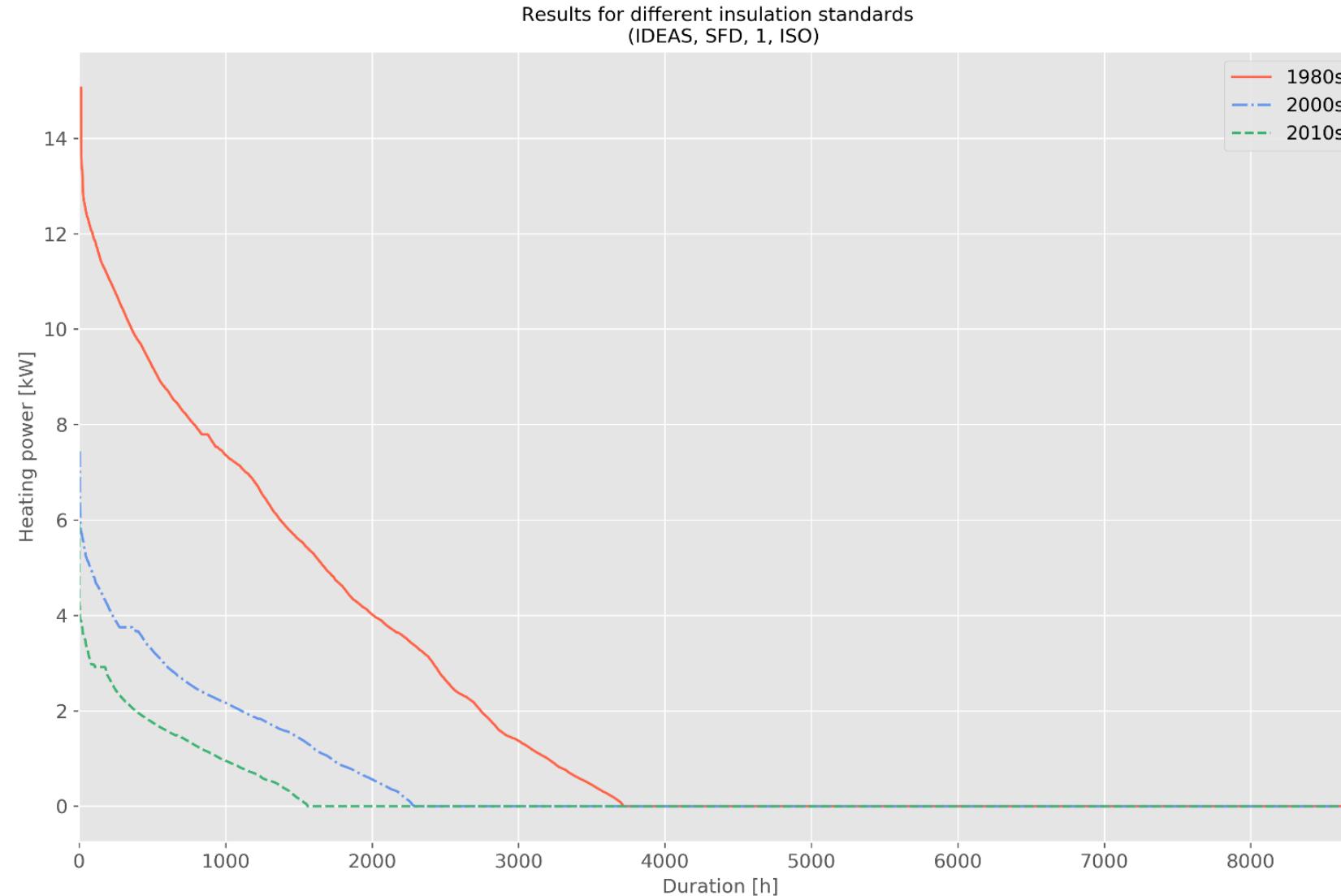
## Peak power



## Annual energy demand



# Load duration curve

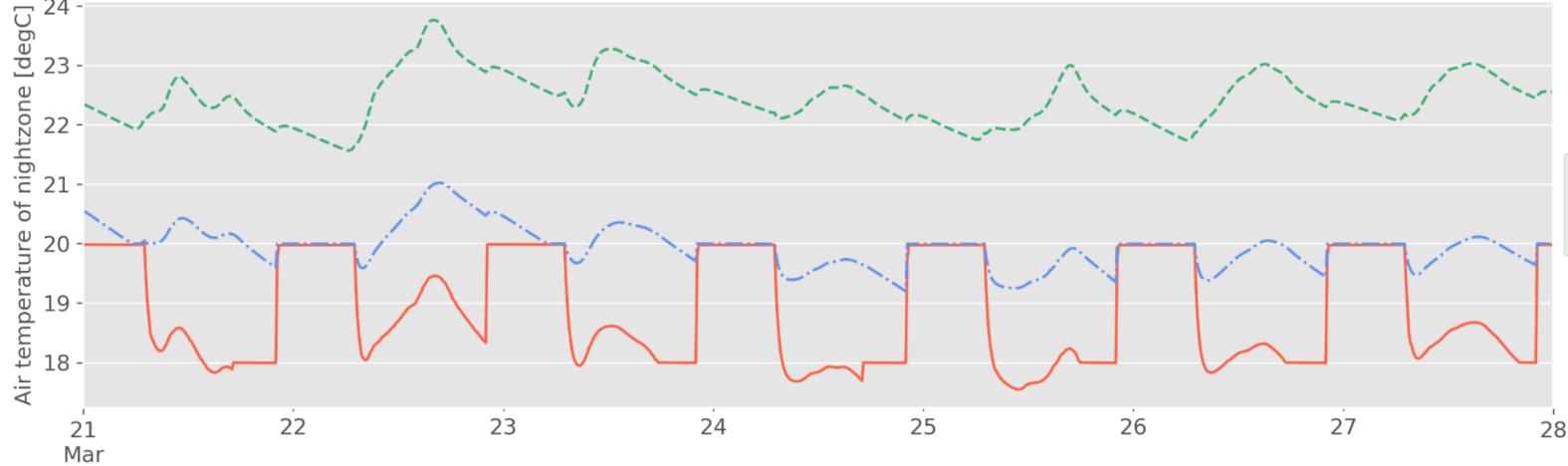
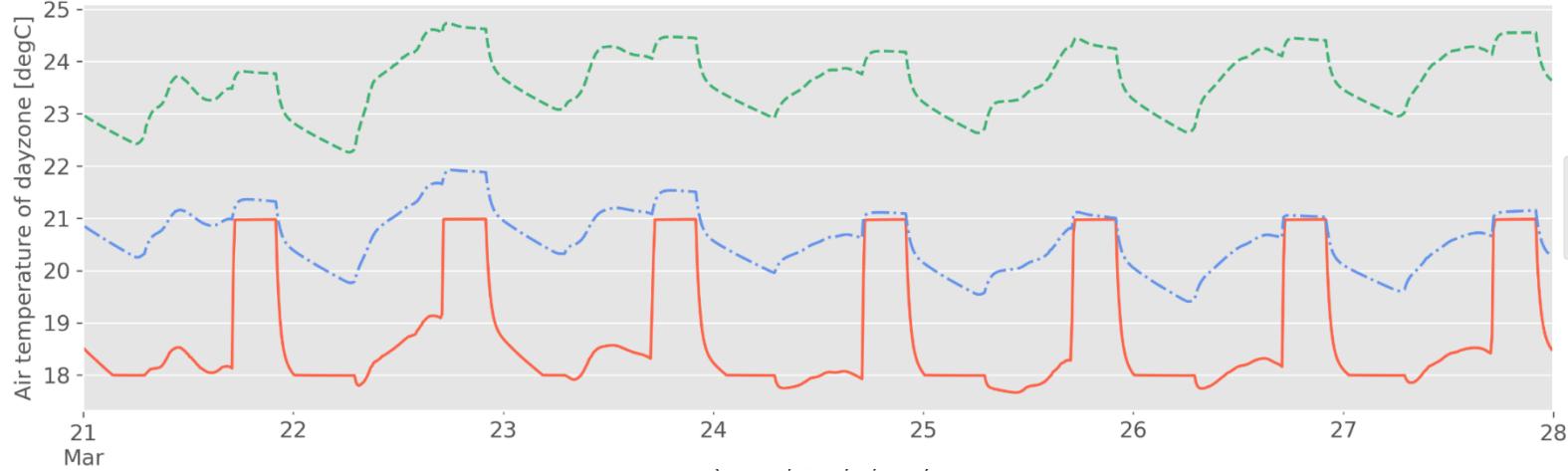
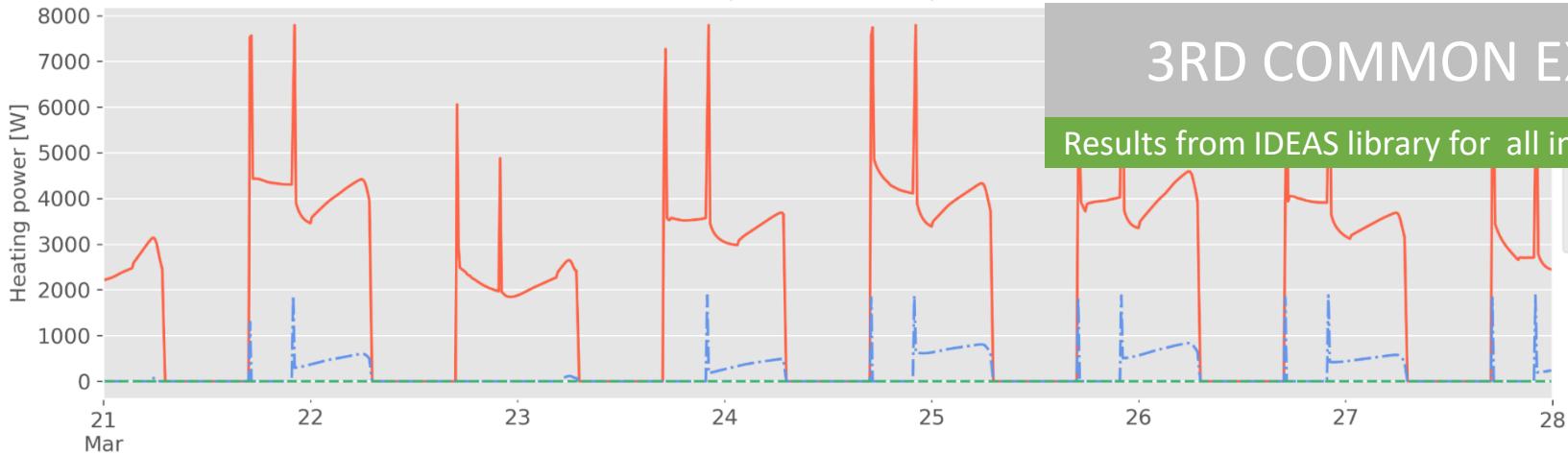


# Profiles: March

(IDEAS, SFD, 1, ISO)

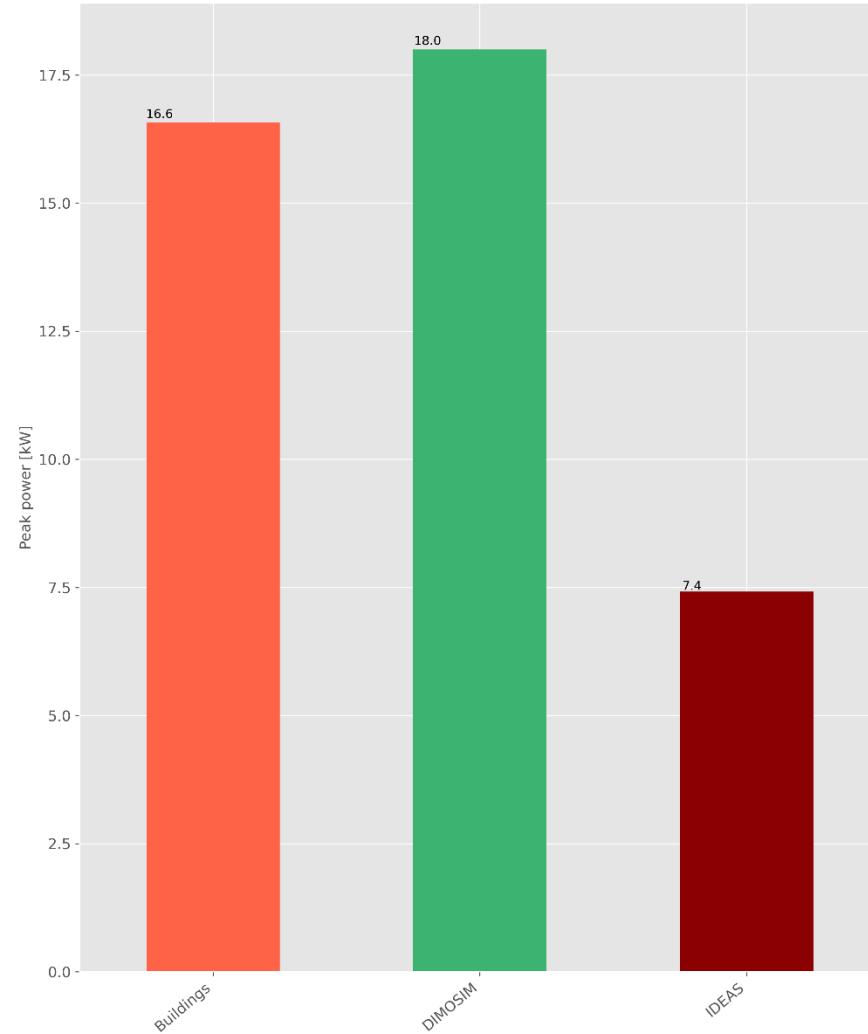
## 3RD COMMON EXERCISE

Results from IDEAS library for all insulation standards

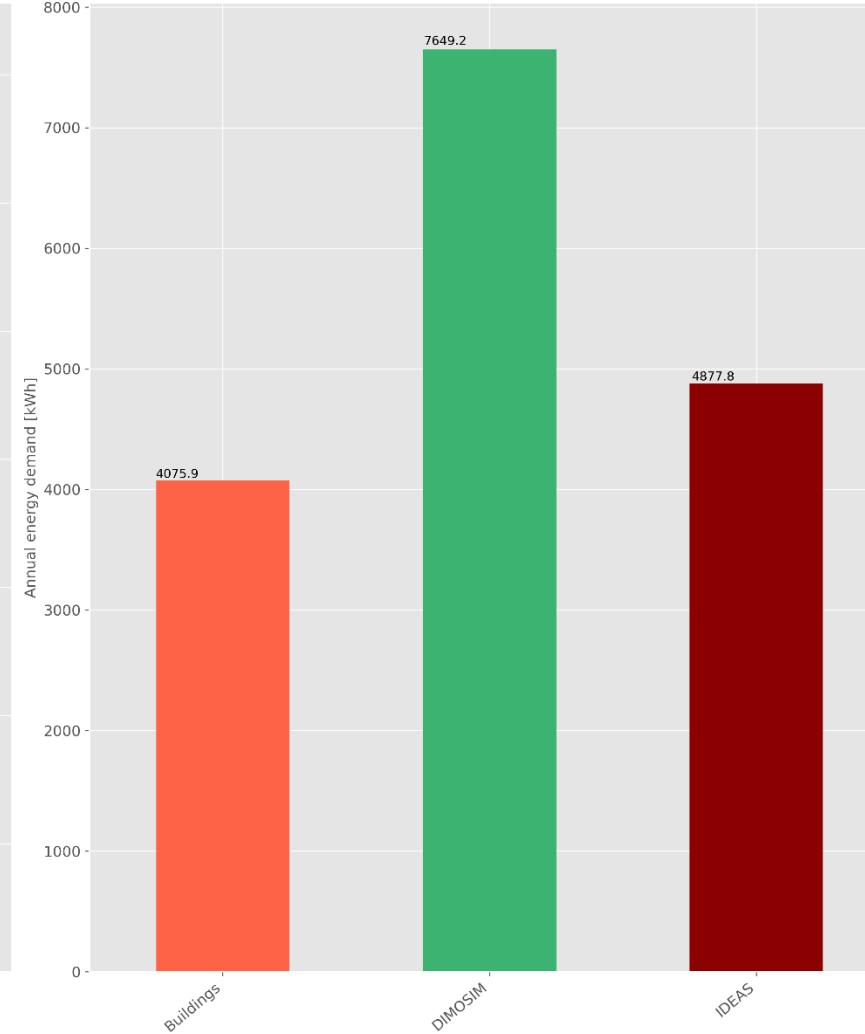


# Peak power & energy demand

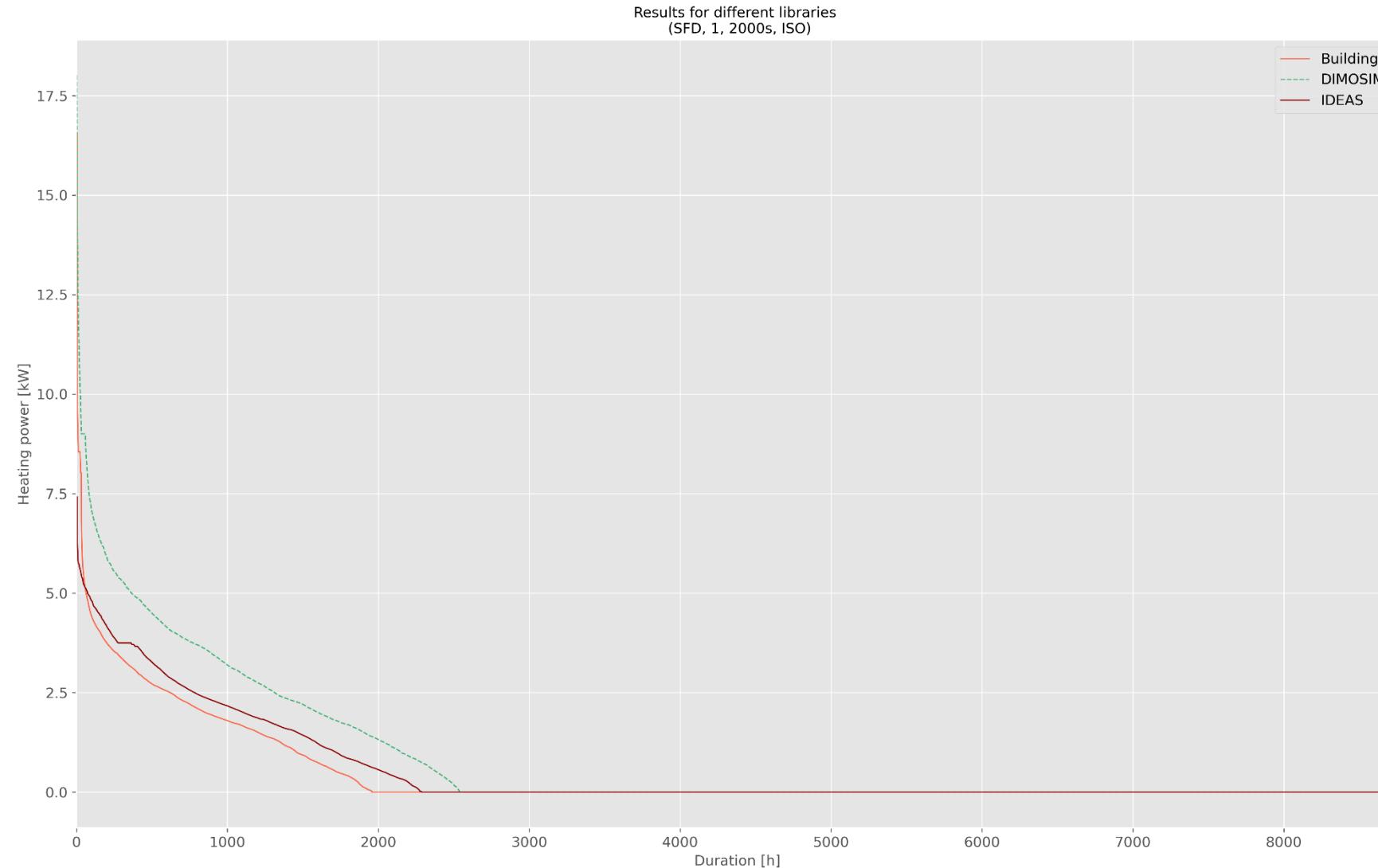
## Peak power



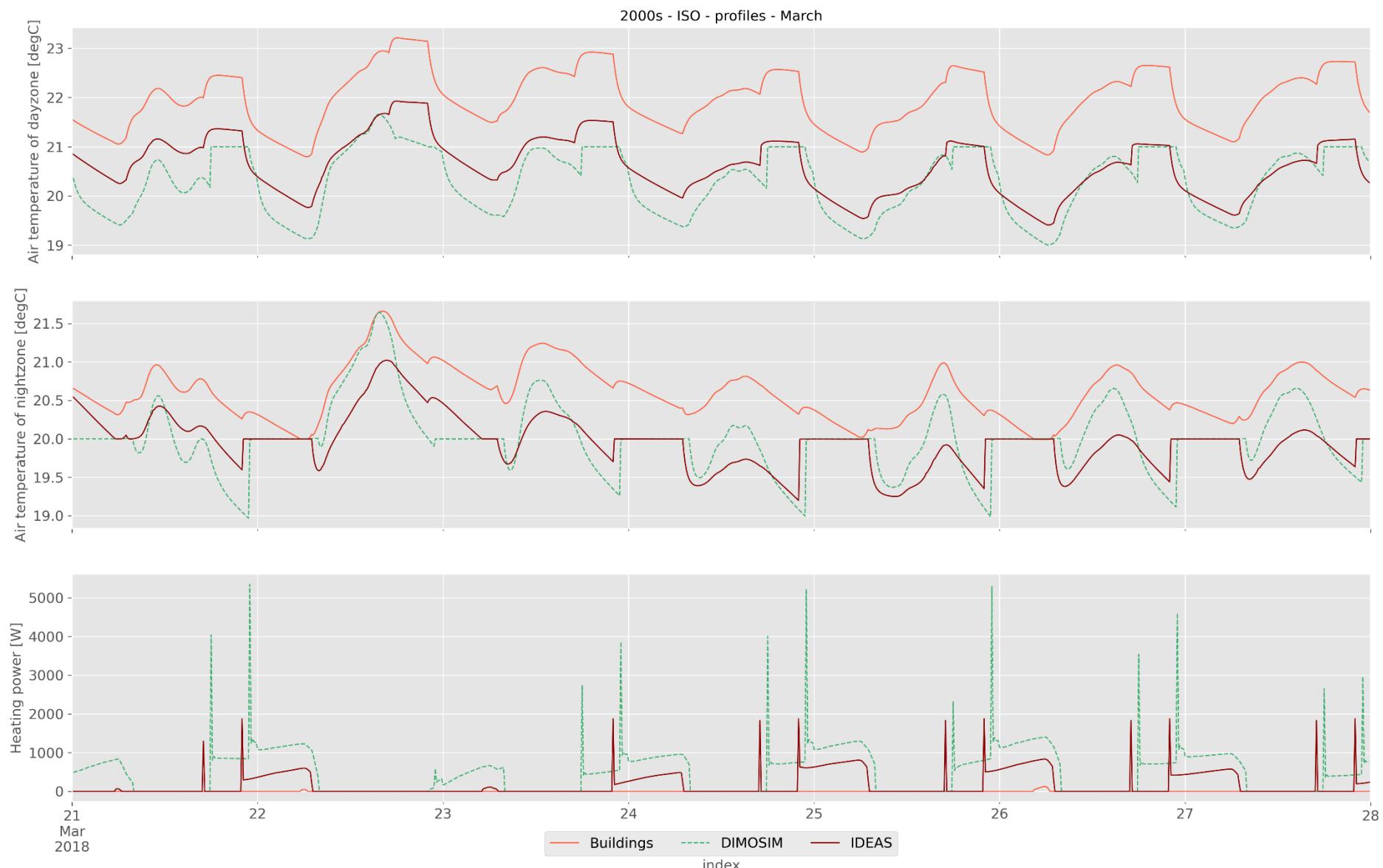
## Annual energy demand



# Load duration curve

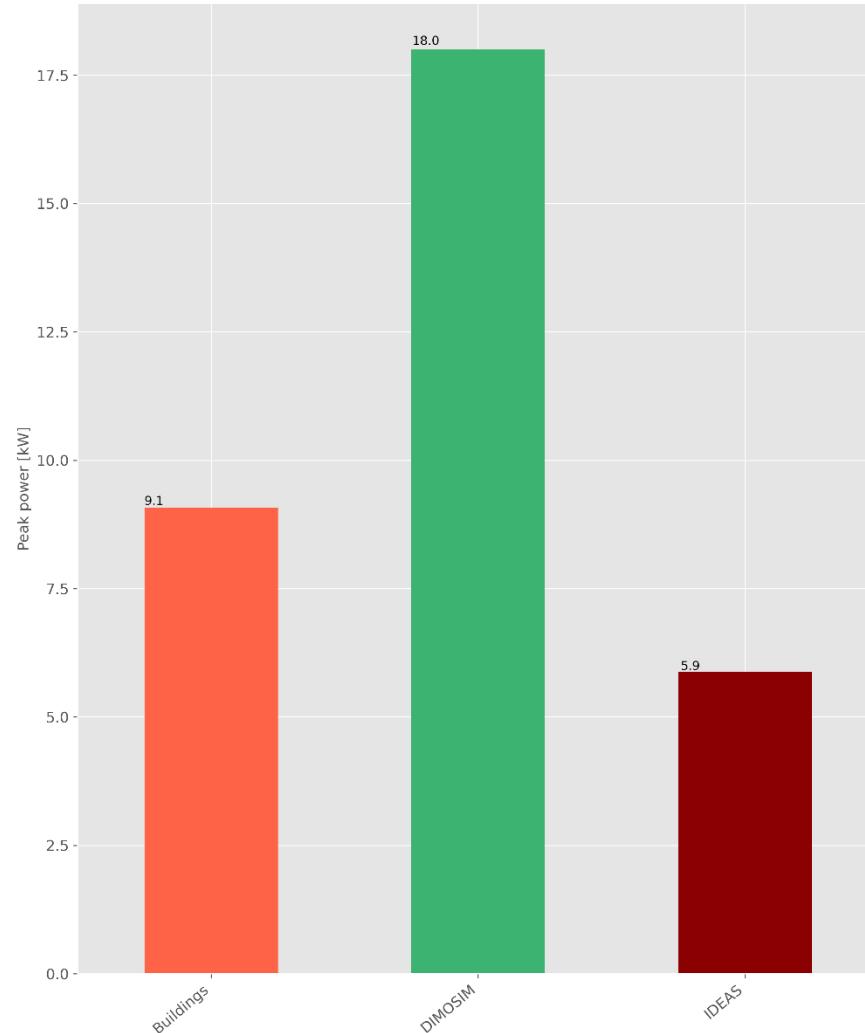


# Profiles: March

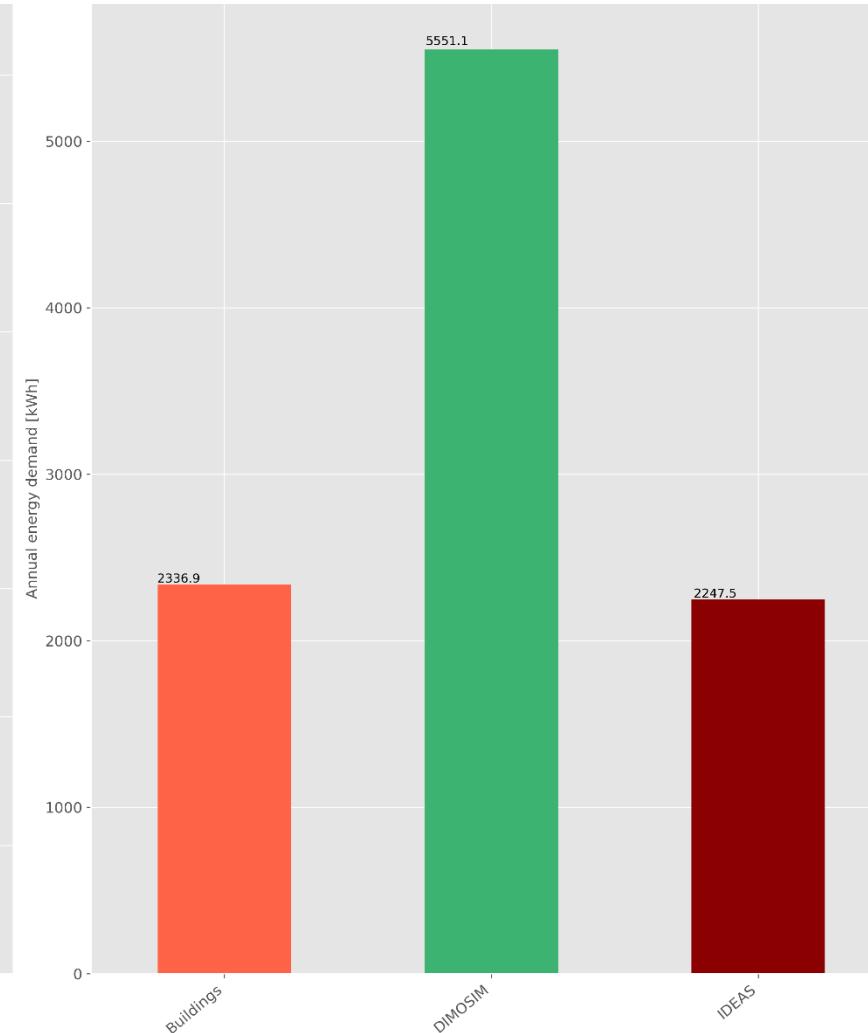


# Peak power & energy demand

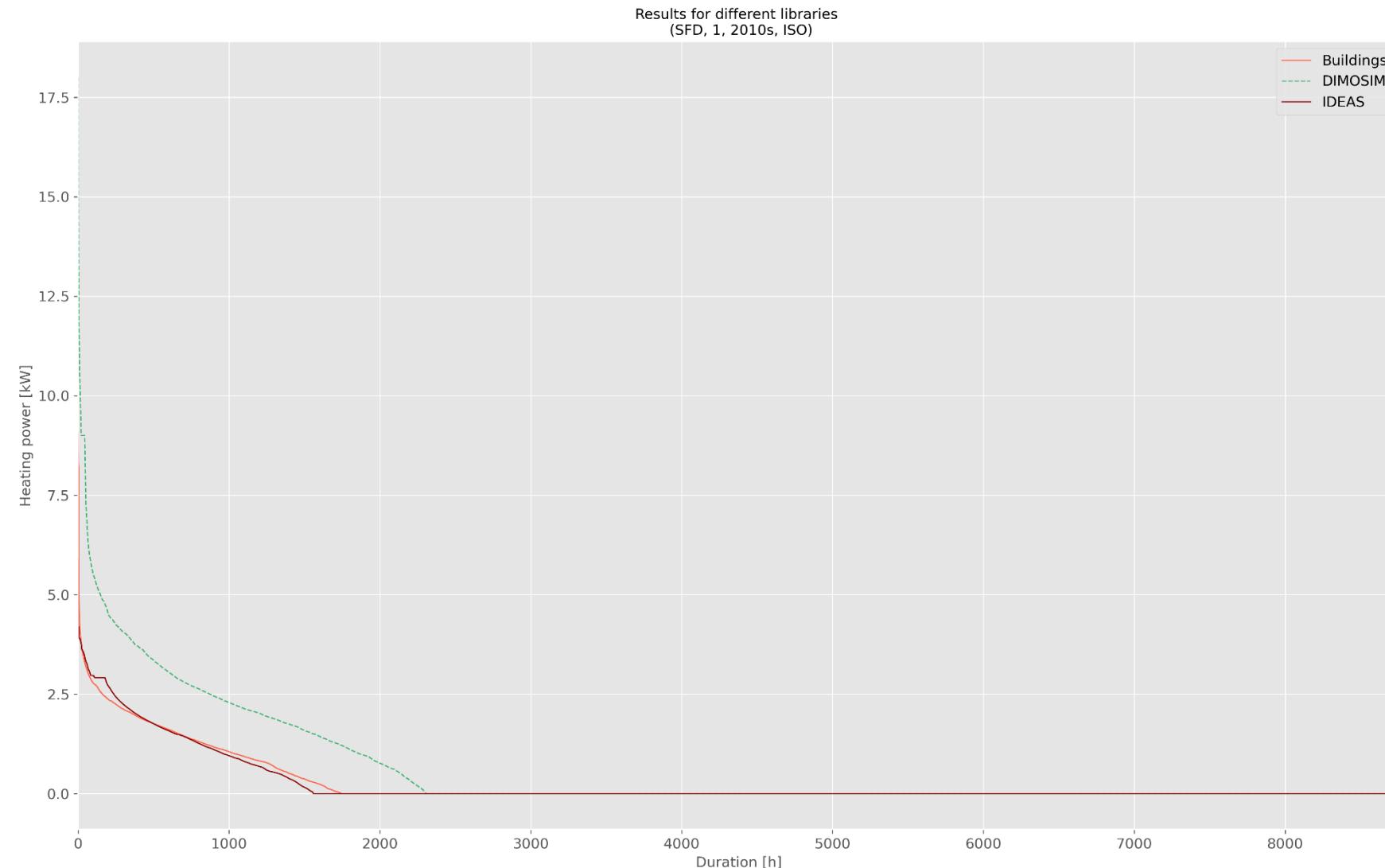
## Peak power



## Annual energy demand



# Load duration curve



# Profiles: March

