

# Boverket

Swedish National Board of Housing,  
Building and Planning

## Practical use of measured consumptions for EPCs

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# Outline

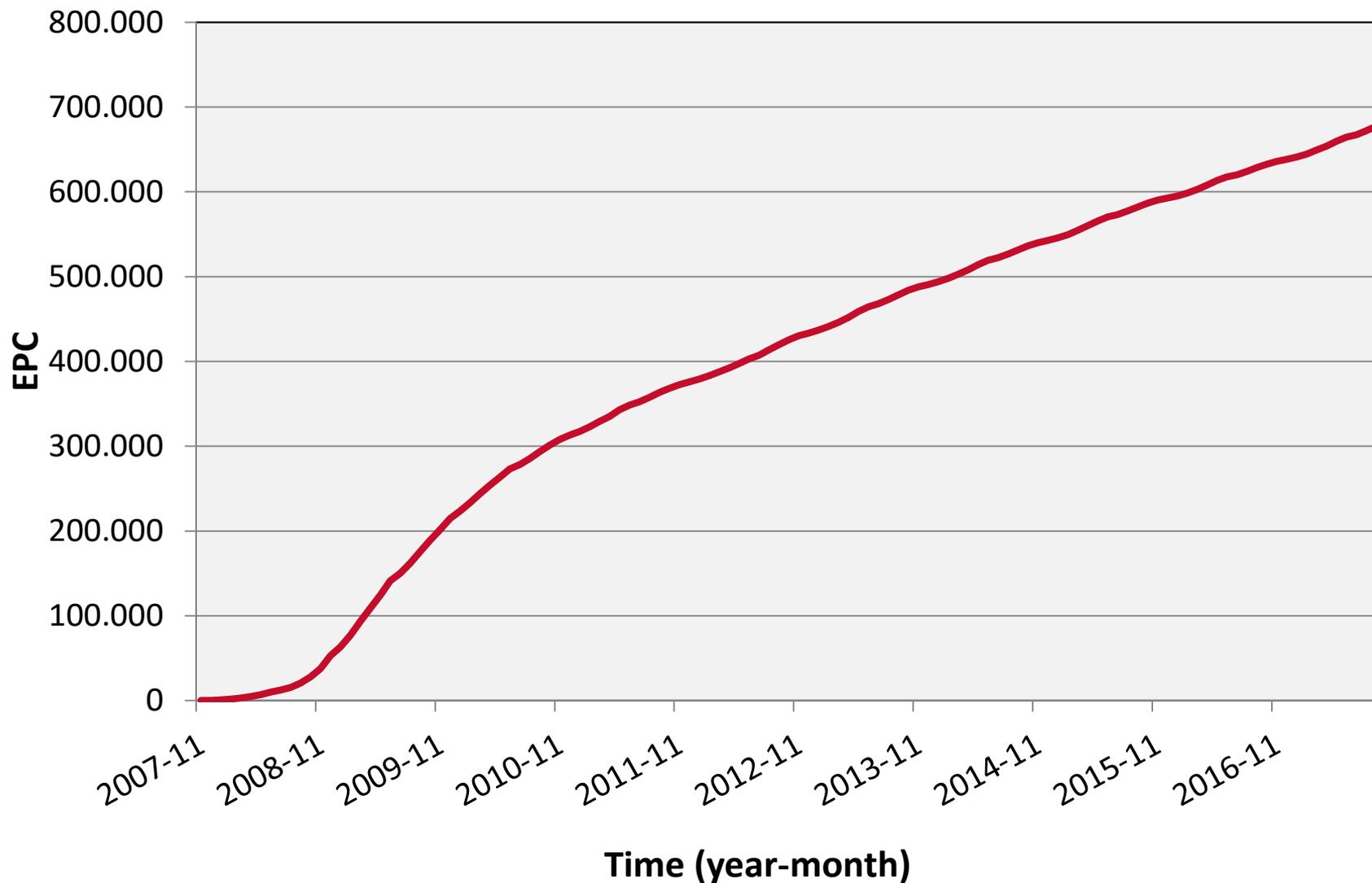
- Why Sweden has chosen measured values
- Statistics
- Data handling
- The user response
- Challenges using measured values

# Why Sweden has chosen measured values

- Measured values are the recommended source for EPCs.
- Calculated energy consumption can be used only if measured values are not available.
- Measured values show the real energy consumption including building quality, cold bridges, ageing etc.

# EPCs in Sweden since the beginning

## Accumulated EPCs in Sweden



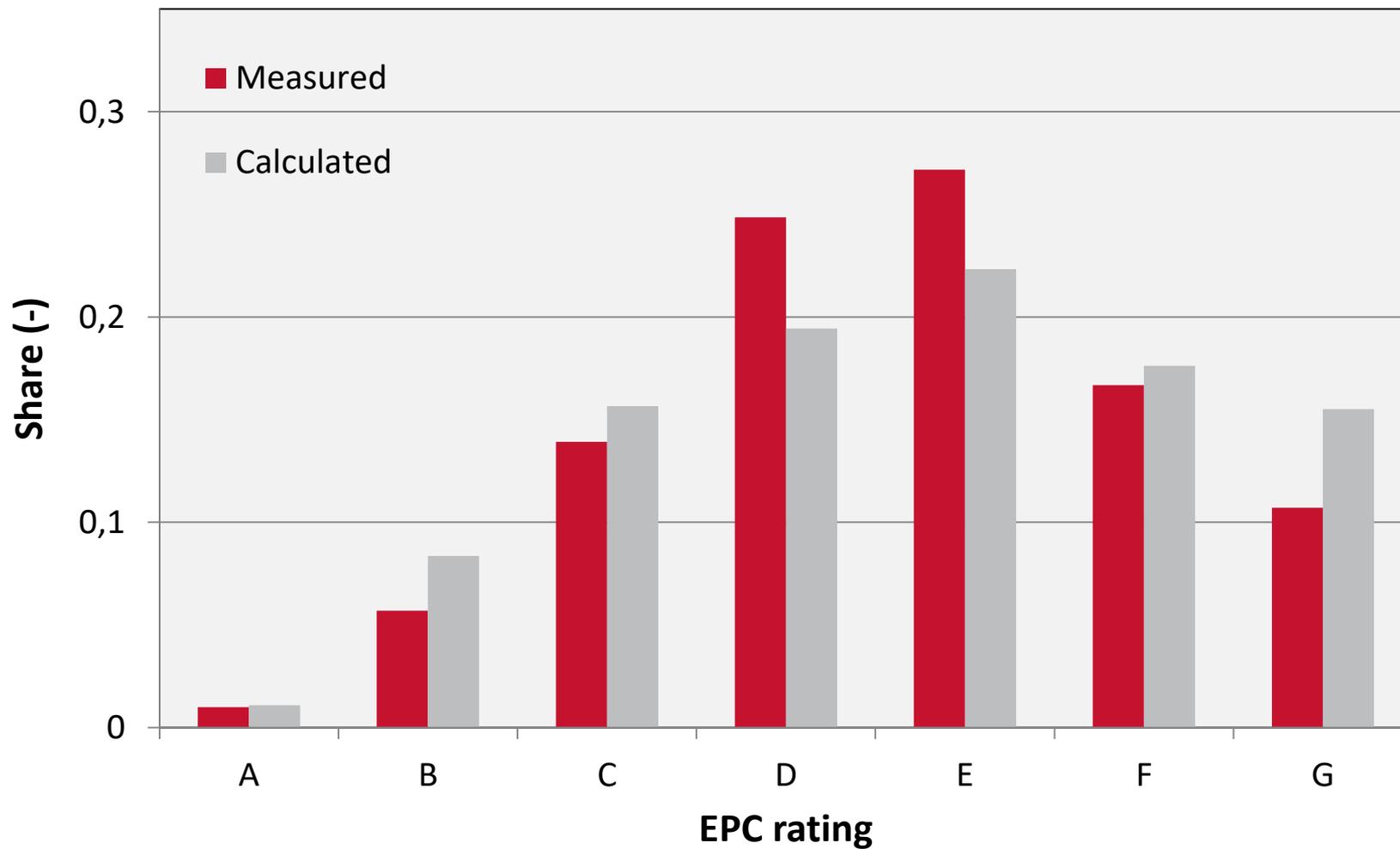
# Distribution of measured and calculated EPCs in Sweden

	Measured	Calculated
Single-family houses	92 %	8 %
Multi-family buildings	98 %	2 %
Non-residential buildings	94 %	6 %

Calculated values are more often used in new multi-family buildings. 25–40 % for buildings finished since 2014.

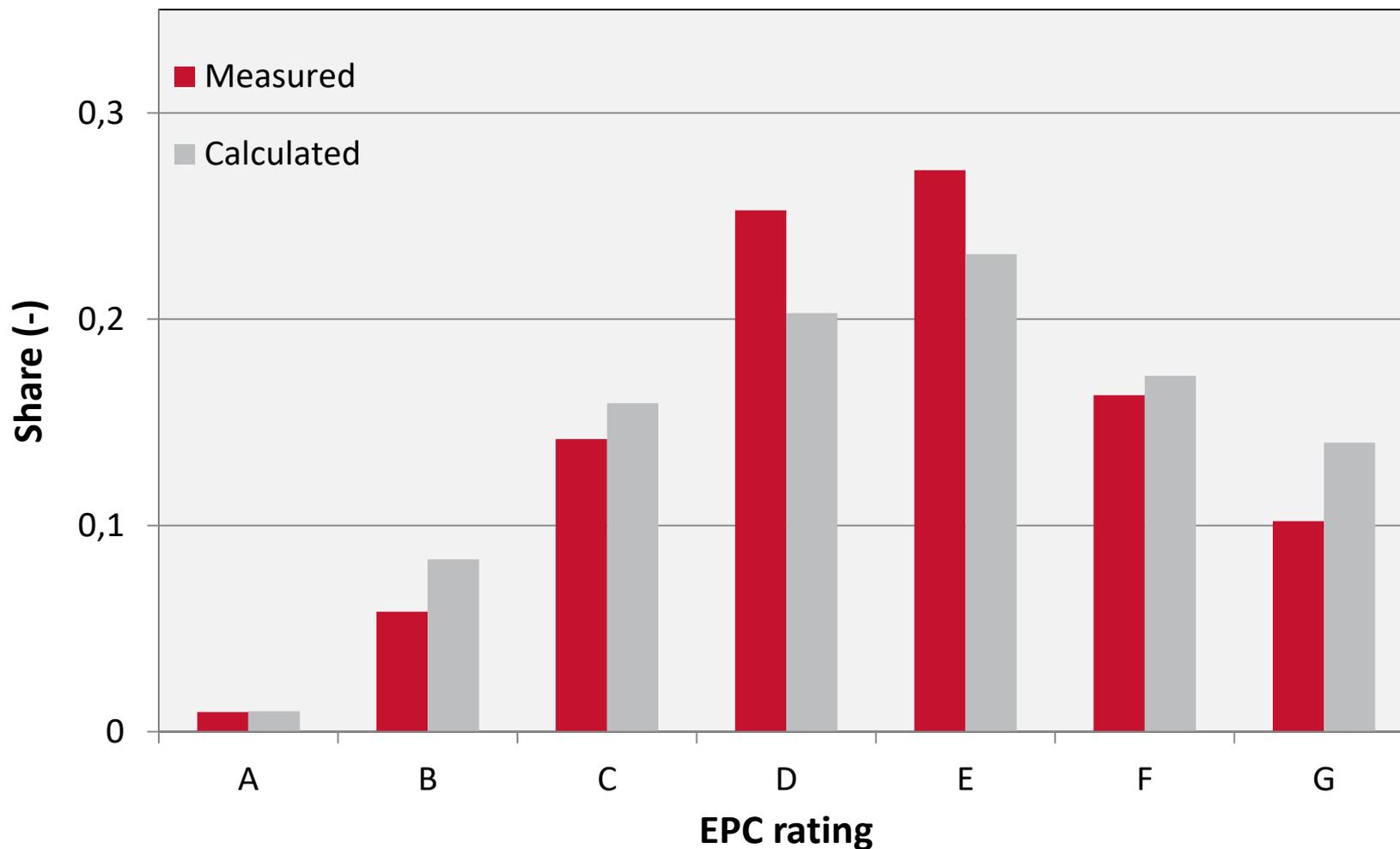
# EPCs – all buildings

## Distribution of measured and calculated EPCs - All buildings



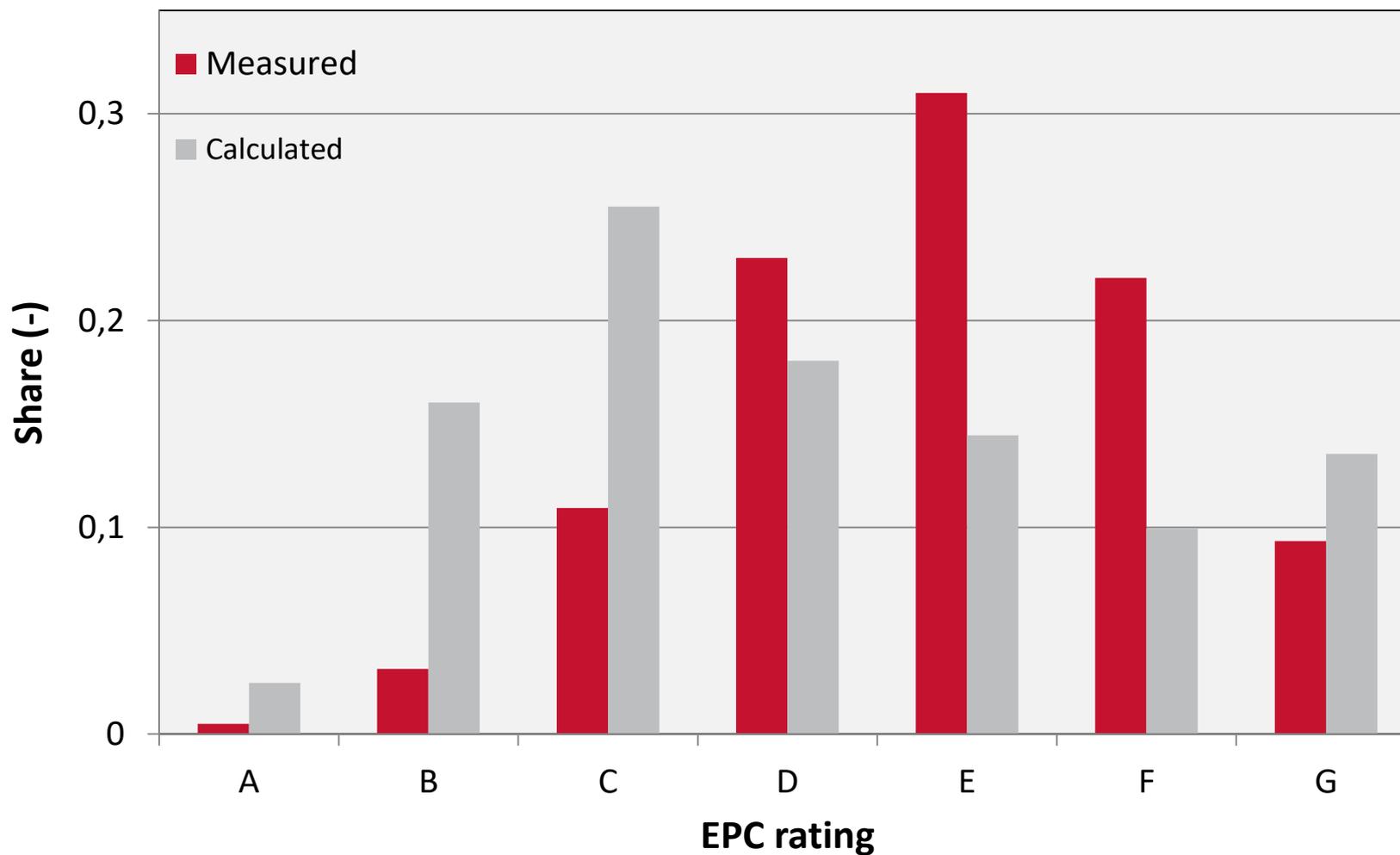
# EPC – Single-family houses

Distribution of measured and calculated EPCs – single-family houses



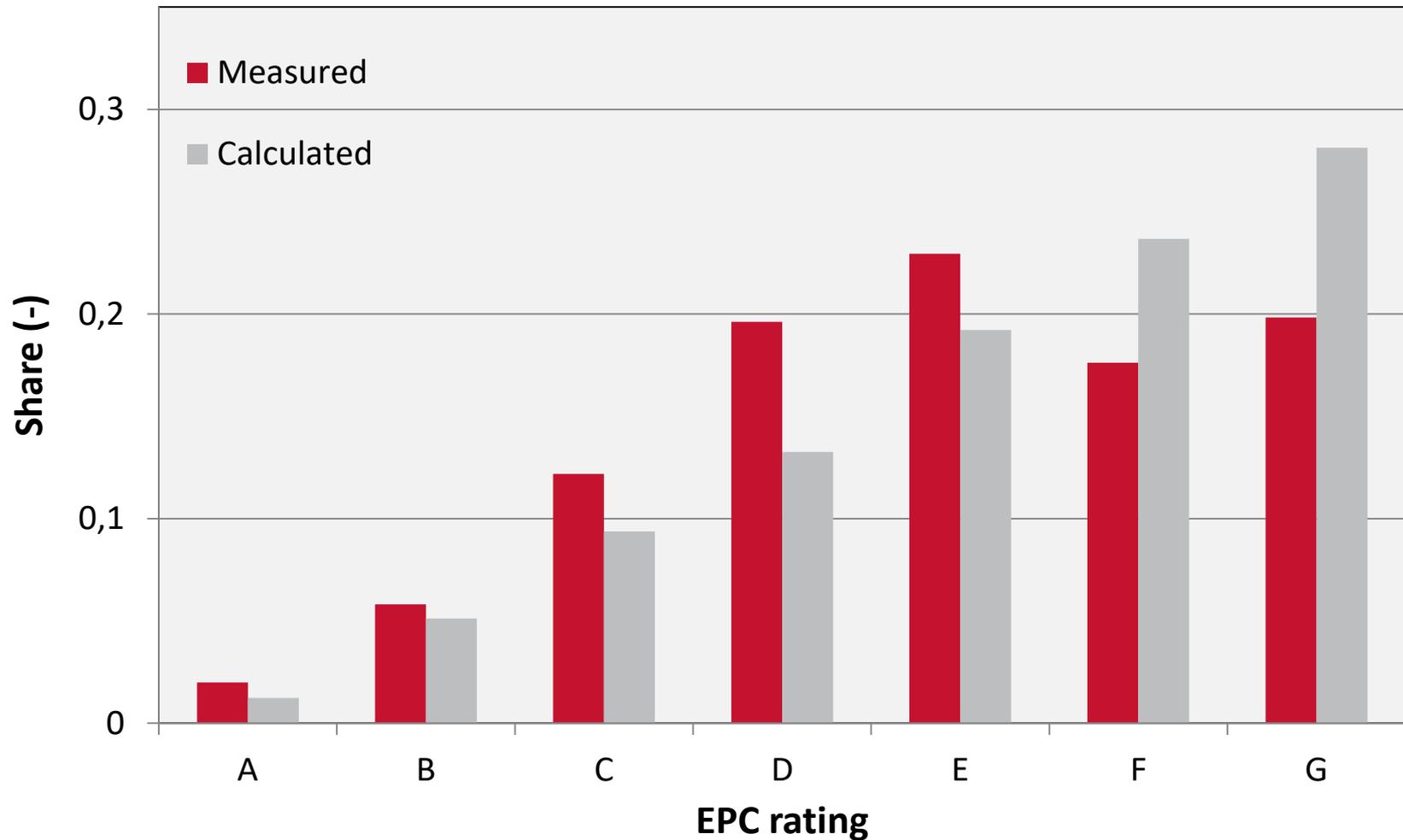
# EPC – Multi-family houses

Distribution of measured and calculated EPCs – Multi-family buildings



# EPC – Non-residential buildings

Distribution of measured and calculated EPCs – non-residential buildings



# Data handling

- Utility bills are the primary source for the data collecting.
  - 12 months consumption
- Energy consumption has to be corrected for user behaviour and climate.
- Regulation about how to correct can be found at our web page:
- <https://www.boverket.se/sv/lag--ratt/forfattningssamling/gallande/ben---bfs-201612/>

# Data handling – user behavior

- A crucial part is correction of measured values to reflect normal user behaviour.
- A new regulation was introduced in 2016 to improve the quality of normalised consumption.
- Correction for:
  - Hot tap water use,
  - Indoor temperature, and
  - Waste heat från residential energy consumption.
- Corrected values are sent to Boverkets online EPC website for correction of climate and calculation of energy performance
- Shall be applicable to
  - New buildings, and
  - Existing buildings with various degree of measurement details.

# 3 steps to correct for user behaviour

1. Distribute measured values between heating, cooling, hot tap water, property energy and domestic energy.
2. Identify and determine user dependent values and replace them with standard values
3. Calculate normalised energy consumption and energy performance

# Into the details

- The parameters chosen that have an influence and possible to identify also when the data is limited in details
- Standardized values for hot water consumption, indoor temperature and domestic energy.

# Hot tap water determination

## Options

- Direct energy measurement
- Annual water volume for hot tap water
- Overall water consumption. 35 % assumed to be hot tap water

## Normalisation

Change the real value to normalised value

- 20 kWh/m<sup>2</sup>, year for single-family buildings
- 25 kWh/m<sup>2</sup>, year for multi-family buildings
- 2 kWh/m<sup>2</sup>, year for other buildings

# Indoor air temperature

Correction is made if the deviation exceeds 1°C

- 21°C standard value indoor temperature for residential buildings
- Other buildings – indoor temperature determined by the activity

## **Normalisation**

5 % correction of heating energy per °C deviation

# Domestic energy

- The residential energy used for cooking, washing refrigerators, freezers etc is also subject to normalisation. The difference between actual and normal residential energy is determined. The normal energy consumption is set to 30 kWh/m<sup>2</sup>, year for residential buildings.
- 70 percent of the difference may be used to adjust the heating energy during the heating season.

# The user response

- The construction industry prefer measured values. Afraid that calculated values are not accurate enough and underestimate the actual energy consumption.
- Actual values are also the preferred choice for compliance check in new buildings.
- Active feed-back from the users.

# Challenges using measured values

- Actual data is not always easy to include in a regulation.
- No software issued from Boverket or other governmental authority.
- The certified energy expert has learn how to use calculations and masurement handling in an accurate fashion.