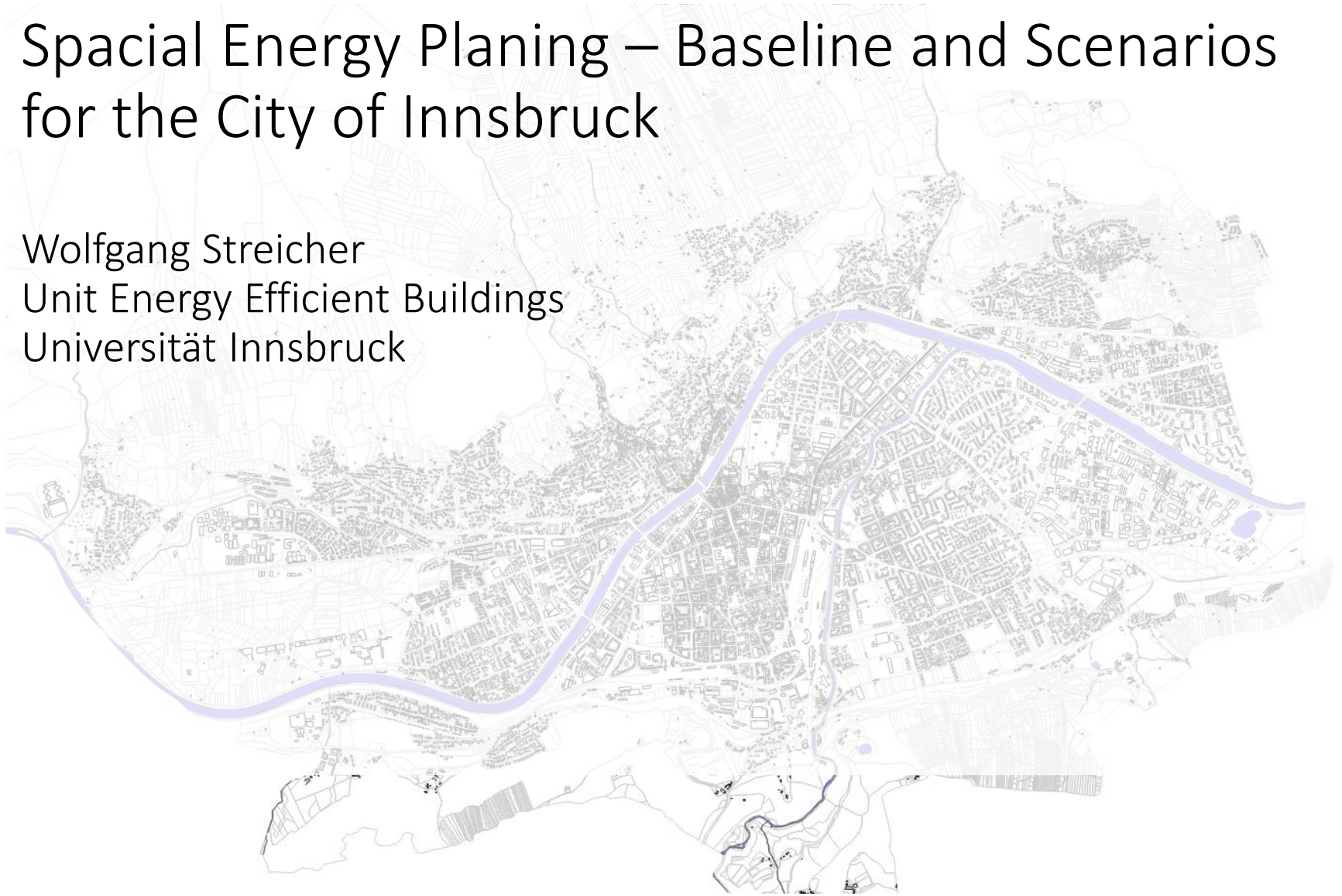


# Spatial Energy Planning – Baseline and Scenarios for the City of Innsbruck

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# Data bases for the Baseline Innsbruck

AGWR Database Buildings & and Planned Buildings (Source: City of IBK)

AGWR Database Existing and planned buildings units (flats, offices etc.)

Person Structure (Source: Statistik Austria / City of IBK)

Laserscan / Surface and Terrain model (0,5 m x 0,5 m) (Source: City of IBK)

GIS Building shape files & building address coordinates (Source: City of IBK)

EMIKAT Data 2005 / 2010 (Industry energy demand) (Source : Province of Tyrol)

Energy certificates NHT & IIG

Calibration by

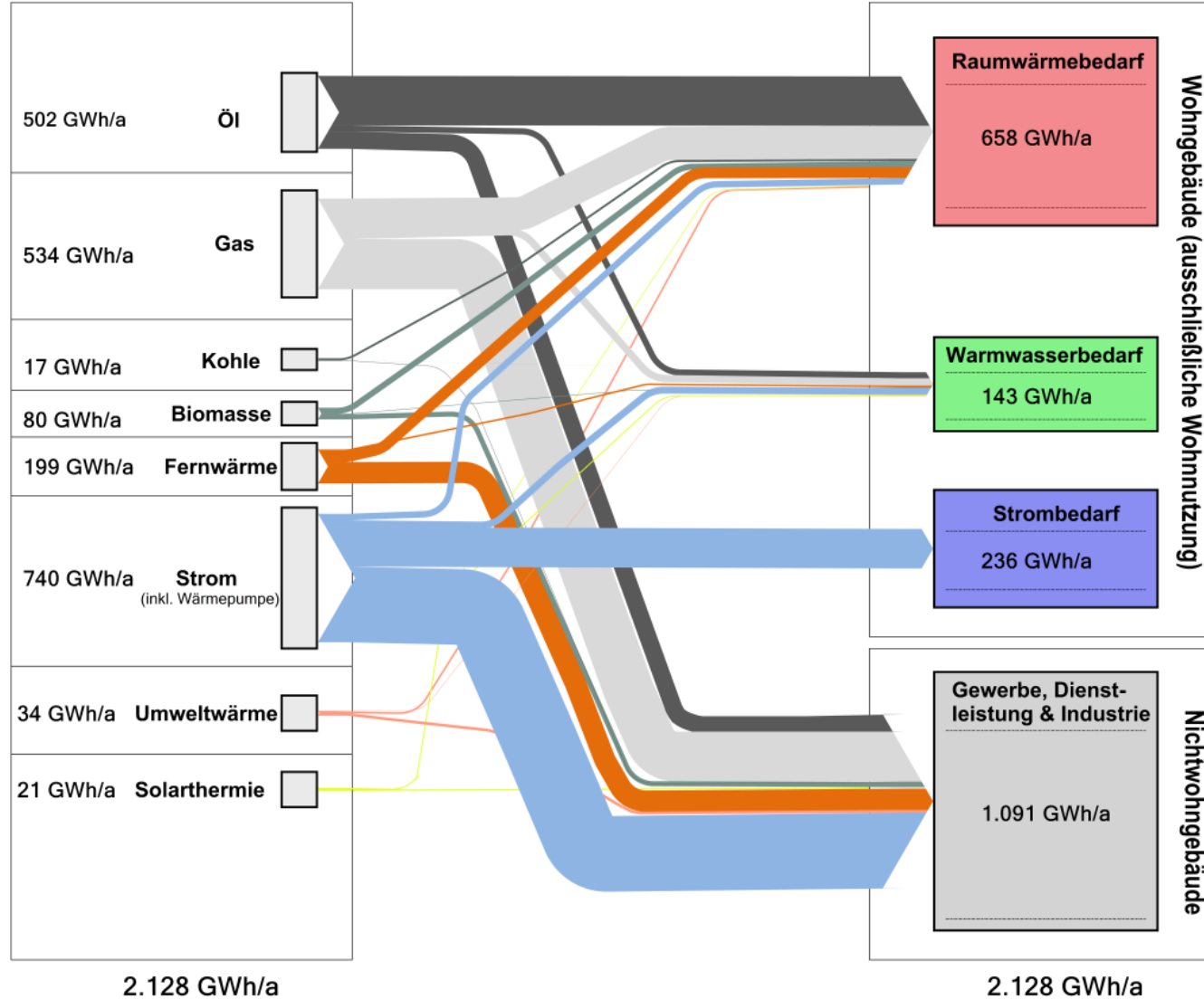
100 m x 100 m raster heat demand & calibrated by measured heating energy demand (Source: TIGAS)

100 m x 100 m raster electricity demand & calibrated by measured el. demand (Source : IKB)

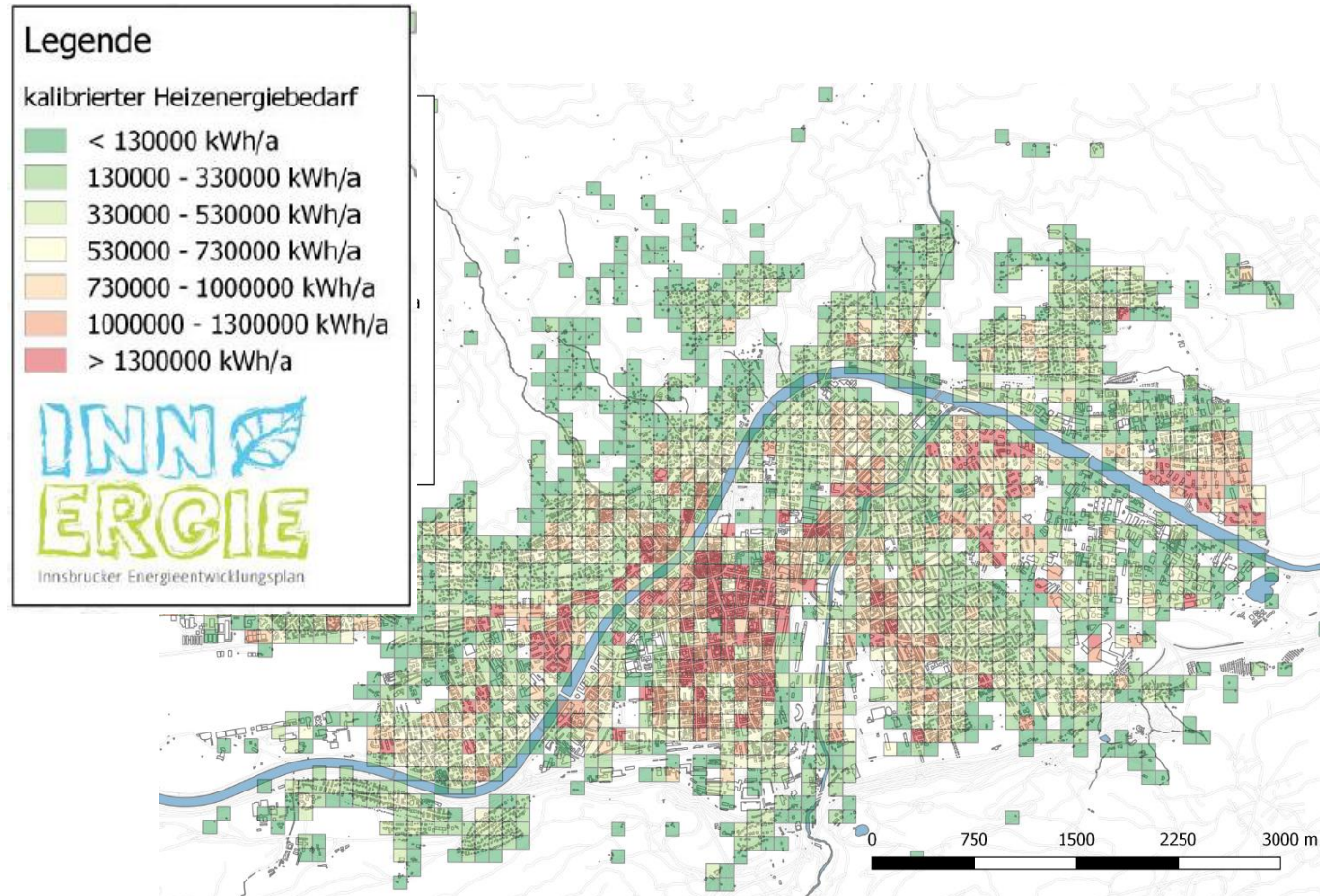
*AGWR ... Address-, Building and Apartments Register (Status: December 2015)*

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# Results Baseline

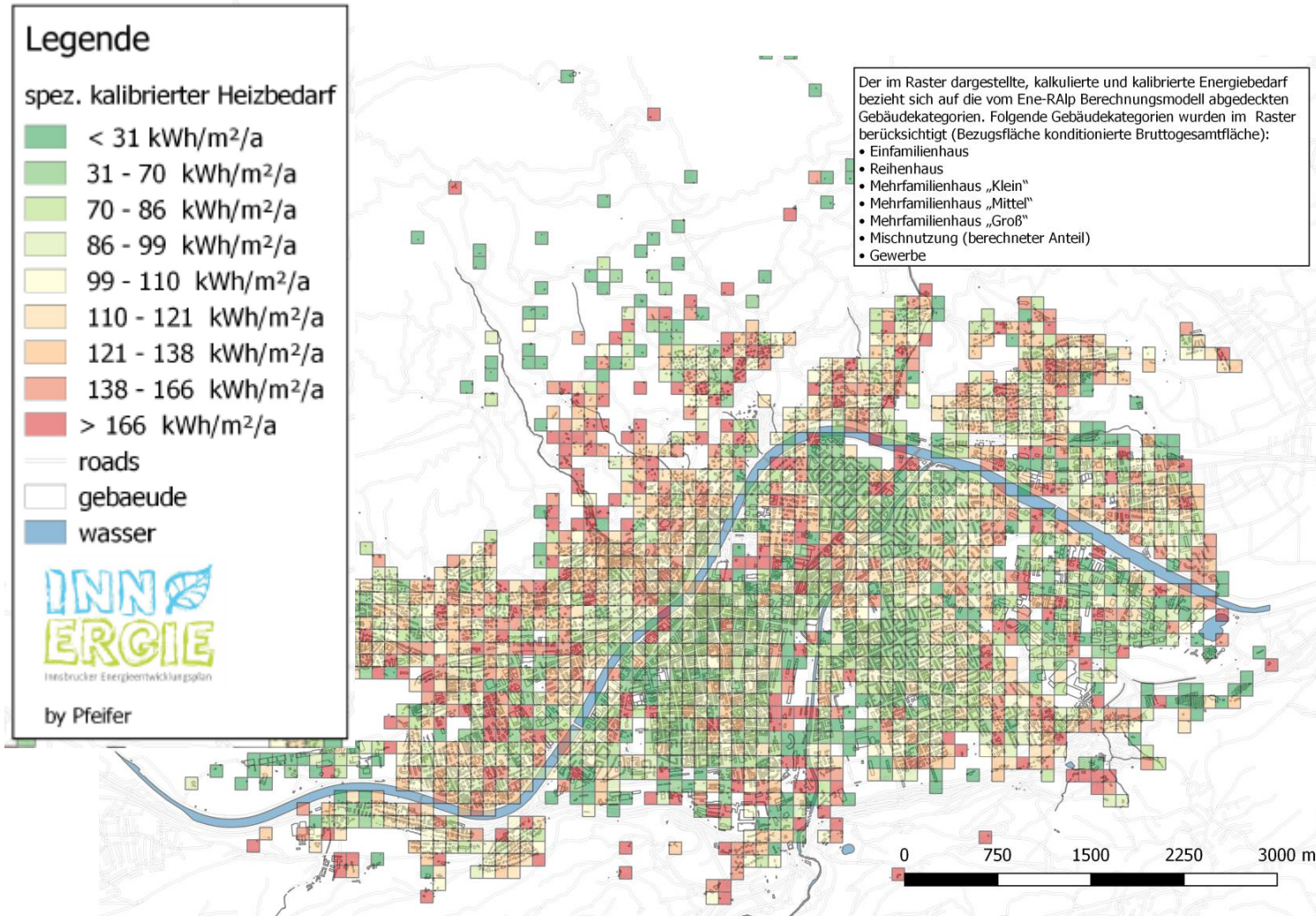


# Results: Calculated and calibrated (fm) space heat demand (SFH, RH, MFH-S, MFH-M, MFH-L, MU & COM)

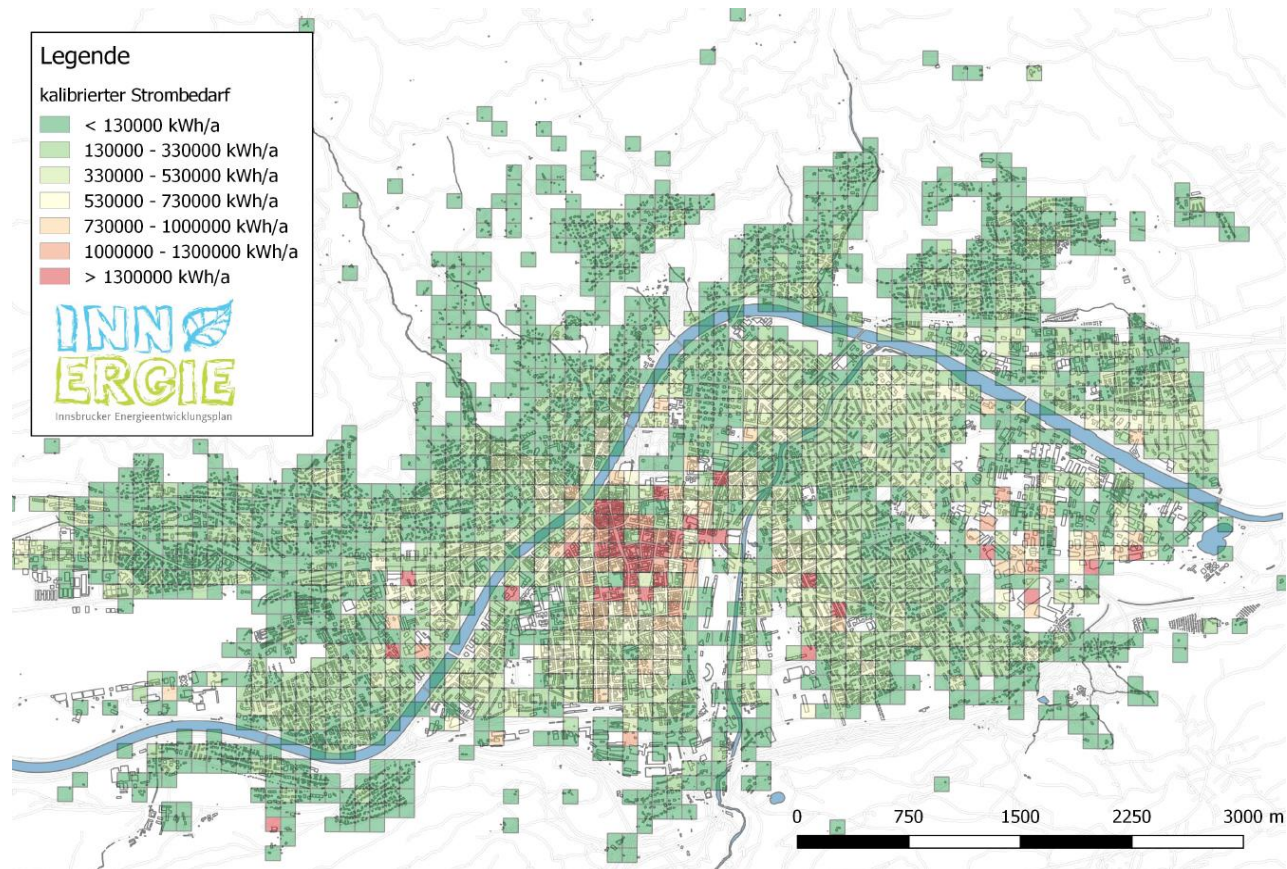




# Results: Calculated and calibrated (fm) specific space heat demand (SFH, RH, MFH-S, MFH-M, MFH-L, MU & COM)



# Results: Calculated and calibrated (fs) electricity demand (SFH, RH, MFH-S, MFH-M, MFH-L, MU & COM)



# Baseline - Critical Reflexion

## Bottom-up Baseline Approach

- The spatial approach offers large benefits for spatial energetic city planning
- Added value for internal administration processes by combining different data bases.
- complex and time consuming approach
- Different data with different structures, backgrounds and quality is a challenge
- Difficult legal situation (data protection and legal contract framework)
- The data IT infrastructure must fulfil all data security laws.
- In future there will hopefully be an inclusion of all findings in the standard administration processes.

# Energy scenarios Innsbruck



# Definition Scenarios

Timeframe: **2015-2050**

Sectors included: **Residential** and **Non-residential Buildings including Industry**

**Scenario 1:** Base-Scenario („Business-As-Usual“)

**Scenario 2:** Medium-Scenario

**Scenario 3:** Target-Scenario Tirol 2050 (no fossil fuels in 2050)

- -50% Final energy until 2050
  - +30% Renewables until 2050
- } No remaining fossil energy carriers in 2050

# Quality of new buildings – Example MFH-M

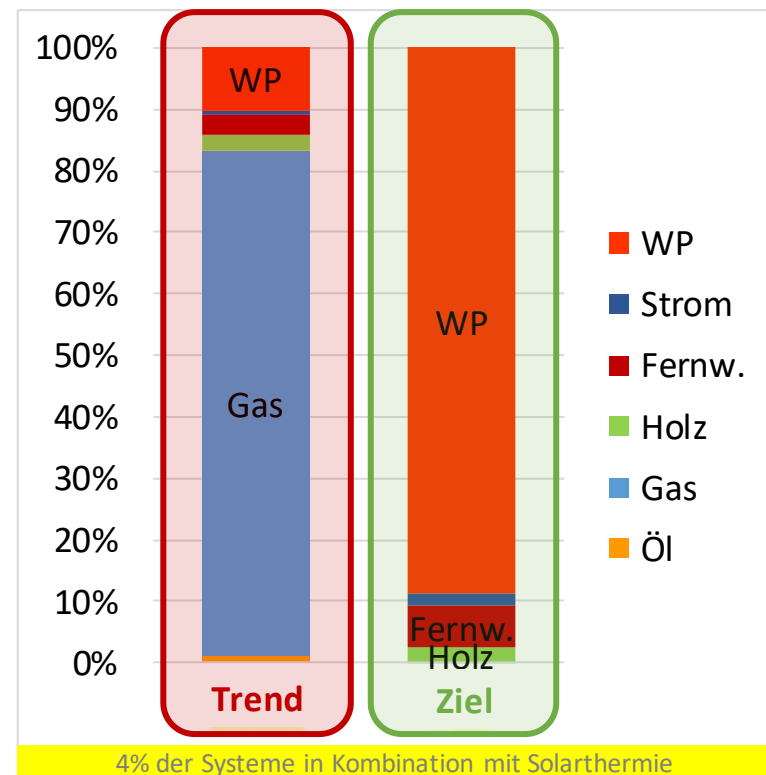
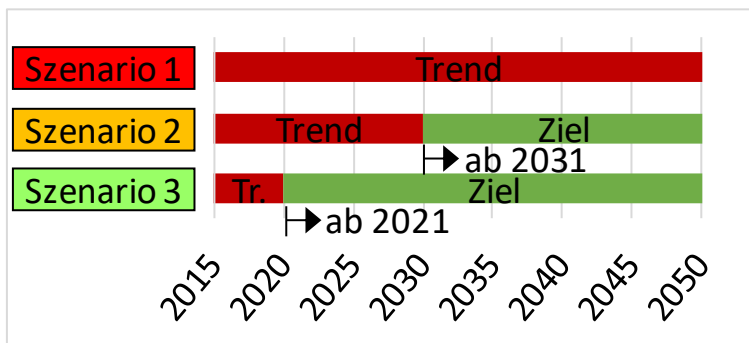
HWB with Air Heat recovery (related to: conditioned gross-area)

| Spec. Space Heat demand HWB [kWh/m <sup>2</sup> a]) |             |             |            |
|---|-------------|-------------|------------|
| From year   | Szenario 1  | Szenario 2  | Szenario 3 |
| 2015  | 27          | 27          | 27         |
| 2017  | 24          | 24          | 24         |
| 2019  | 20          | 20          | 20         |
| 2021  | constant 17 | linear 17   | Step 17    |
| 2023  | 17          | 14          | 9          |
| 2025  | 17          | 10          | 9          |
| 2027  | 17          | 9           | 9          |
| Lowest-energy buildings                             |             | Passivhouse |            |

Assumption {

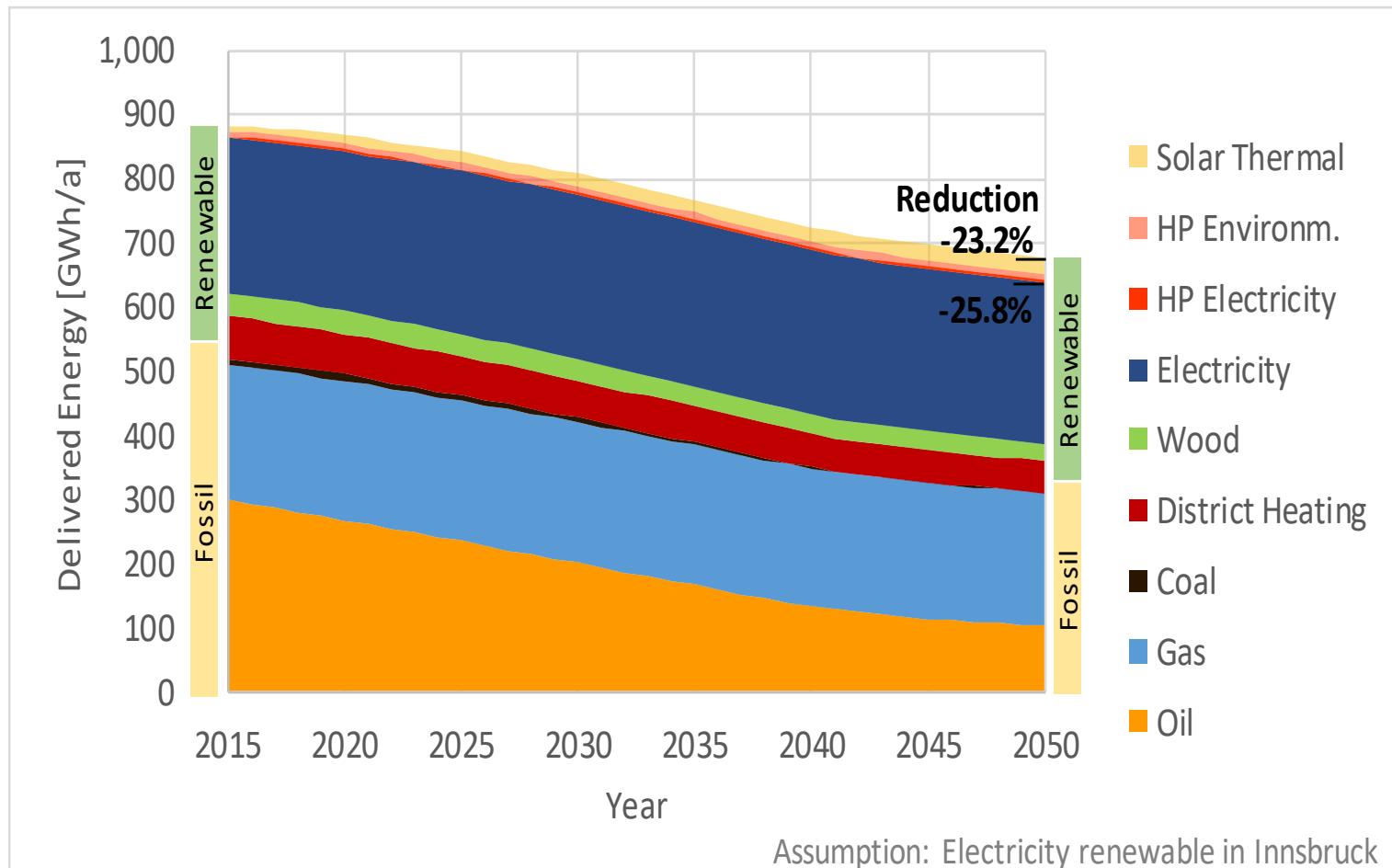
# Energy carrier distribution – Example MFH-M space heating

## New buildings



# Total Scenario 1

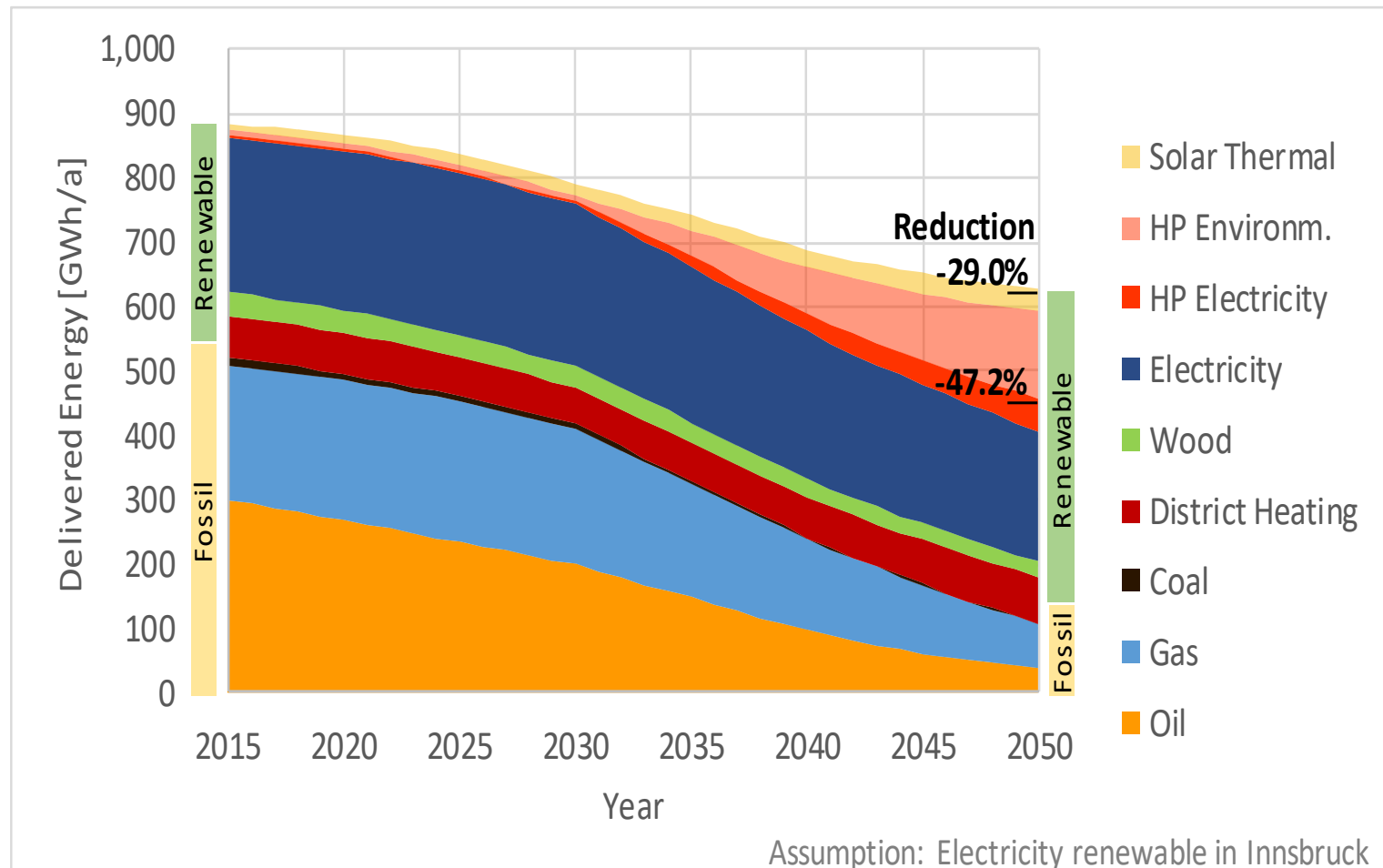
## Delivered energy demand of scenario 1 (Dobler, 2016, p. 91)





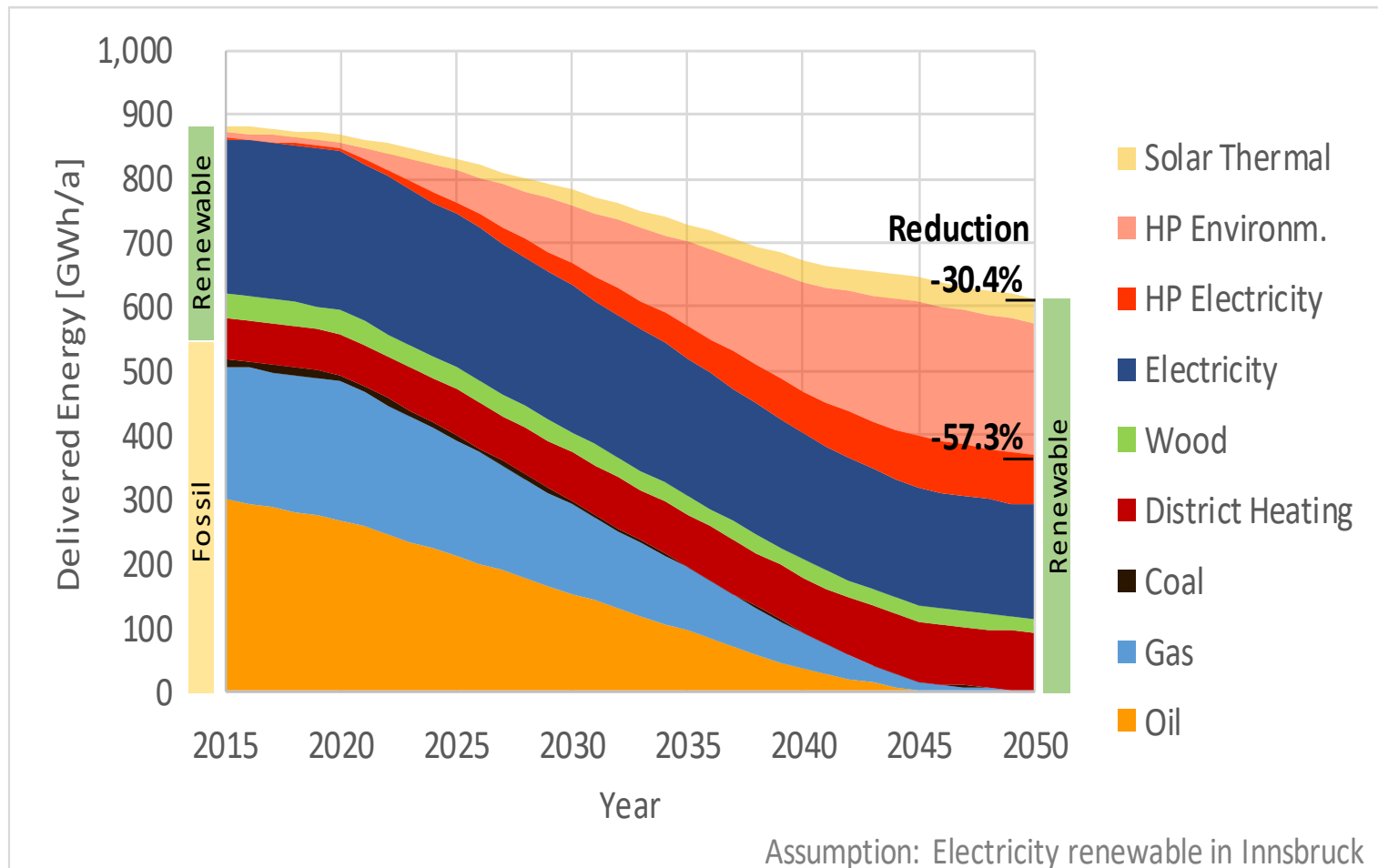
# Total Scenario 2

## Delivered energy demand of scenario 2 (Dobler, 2016, p. 94)



# Total Scenario 3

Delivered energy demand of scenario 3 (Dobler, 2016, p. 94)



## Unanimous Decision of the municipal council of Innsbruck 20.12.2017

- Scenario 3 will be followed
- The province of Tyrol should decide on the legal boundary conditions related to them
- Accompanying measures are needed.
- A plan of measures will be set up

# Outlook Project Tyrol

## Ressource- and Technology- Scenarios Tyrol 2050



Laufzeit: 07/2017 – 06/2018

