IEA EBC Annex75: Kosteneffiziente Strategien in der Gebäudesanierung auf Stadtteilebene

Karl Höfler, David Venus

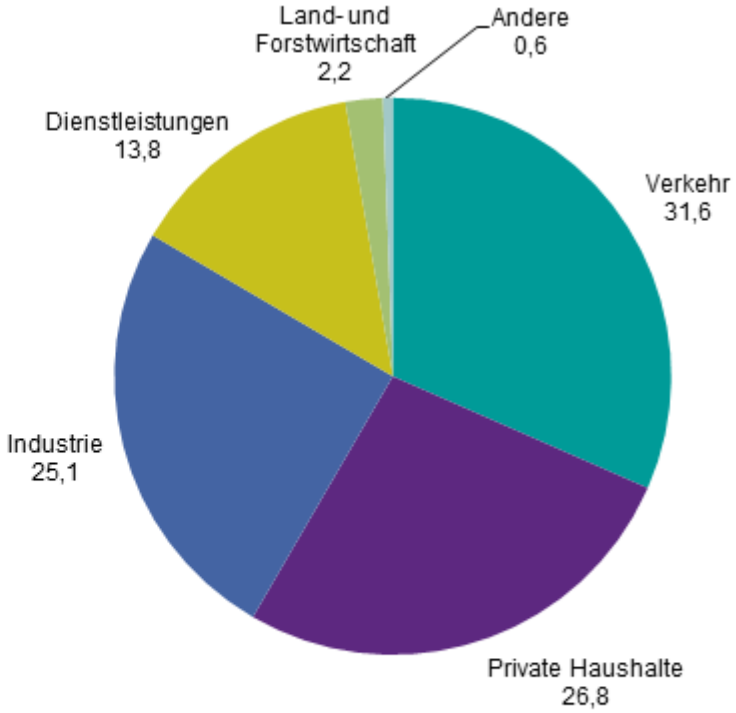
AEE – Institut für Nachhaltige Technologien (AEE INTEC)
A-8200 Gleisdorf, Feldgasse 19
AUSTRIA

Inhalt

- Hintergrund
- Forschungsprojekt IEA EBC Annex 75
- Berechnungsmethodik
- Case Studies und Best Practice
- Erwartete Ergebnisse

Hintergrund

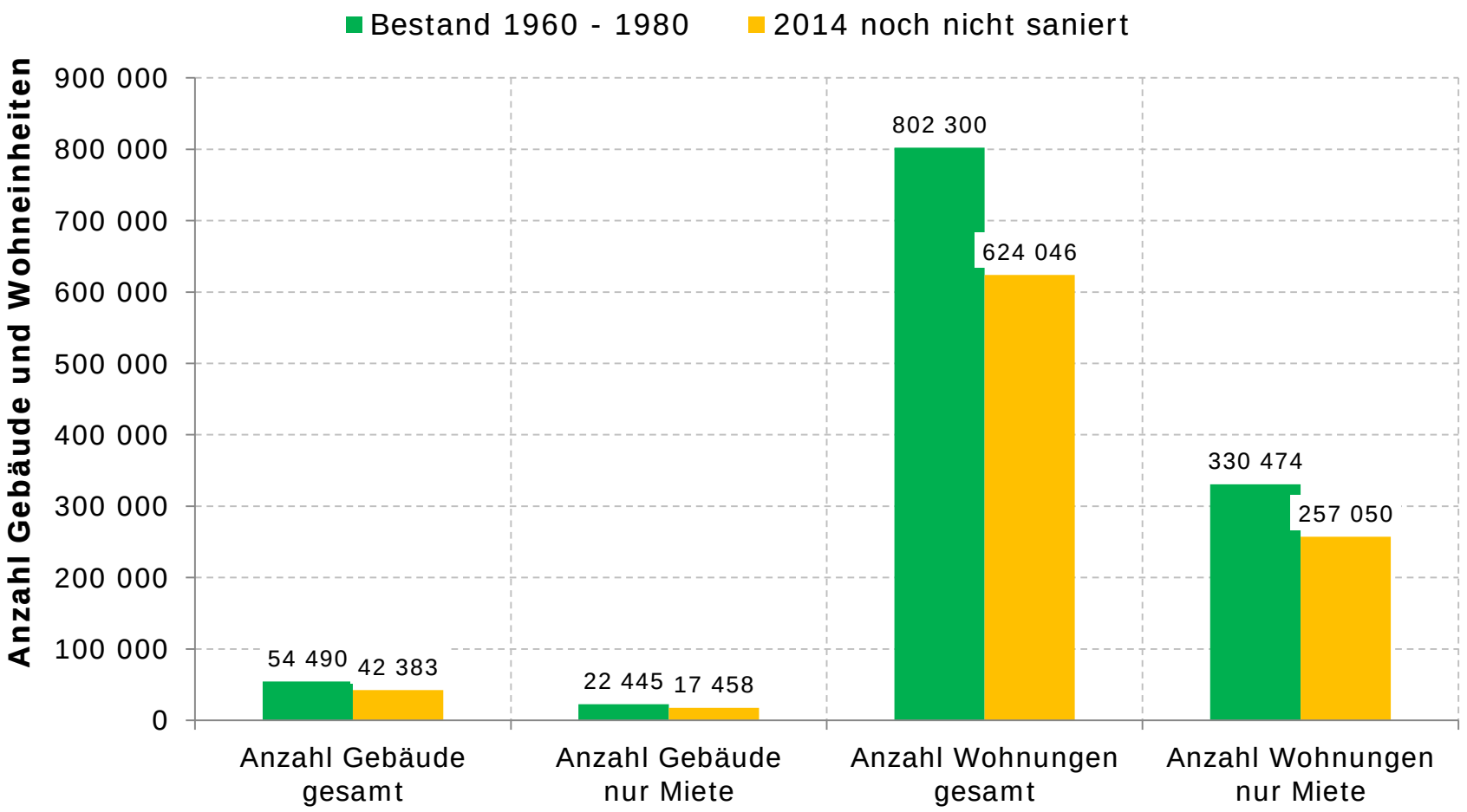
Final energy consumption, EU-28, 2013



([1]) Rundungsbedingt ergibt die Summe nicht genau 100 %.
Quelle: Eurostat (Online-Datencode: nrg_100a)

Hintergrund - Sanierungspotential

Großvolumige Wohngebäude in Österreich



Quelle: Basisdaten von Tabula - Episcope

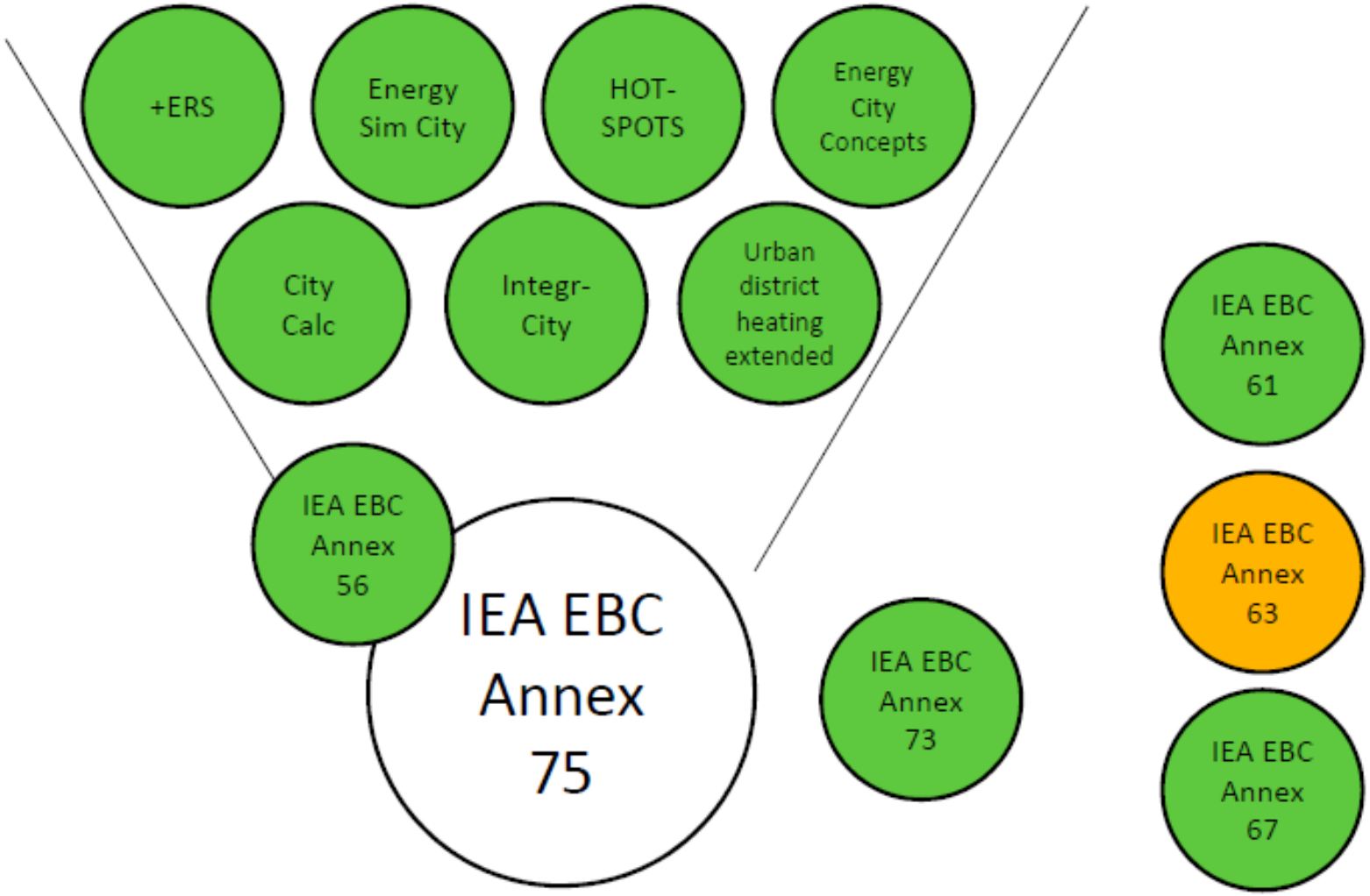
Hintergrund - Fragen

Fragen?

1. Was ist die beste Gebäude-Performance einer kosteneffizienten Sanierung auf **Stadtteilebene** in Bezug auf:
   - geringen Energieverbrauch
   - geringe Treibhausgasemissionen
   - Erreichung von zusätzlichem Nutzen
   - Kosteneffizienz

2. Durch welche thermische und gebäudetechnische Maßnahmen kann diese erreicht werden??

Hintergrund – FO-Projekte



Hintergrund – Annex 56

Website (http://www.iea-annex56.org/)

Hintergrund - Idee

IEA ANNEX 75

einzelne Technologien

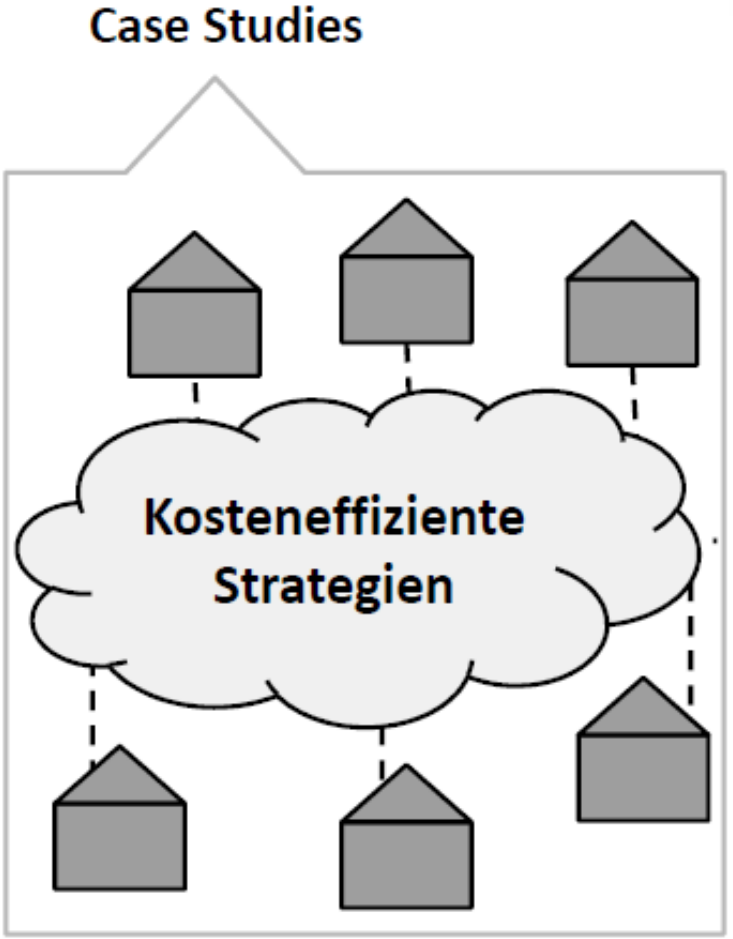
Wärmepumpe
Fernwärme
Abwärme
Solarthermie
Photovoltaik
...

+

Methodik

LCC
LCA
Co-Benefits
...

=



Dissemination

IEA EBC Annex 75

IEA EBC Annex Proposal

Cost-effective strategies to combine energy efficiency measures and renewable energy use in building renovation at district level

Presentation to EBC Executive Committee

Organizations from the following countries have expressed interest for participation (8):
AT, CH, CZ, DK, ES, IT, PT, SE

Proposed Operating Agent:
Manuela Almeida
University of Minho
Portugal

ExCo Meeting
Sydney, 18 November 2016

IEA EBC Annex 75

The Goal: reach cost-effective energy and carbon emission optimization in building renovation in urban districts

Key question: Where is the balance point between energy efficiency measures and measures that promote the use of renewable energy?

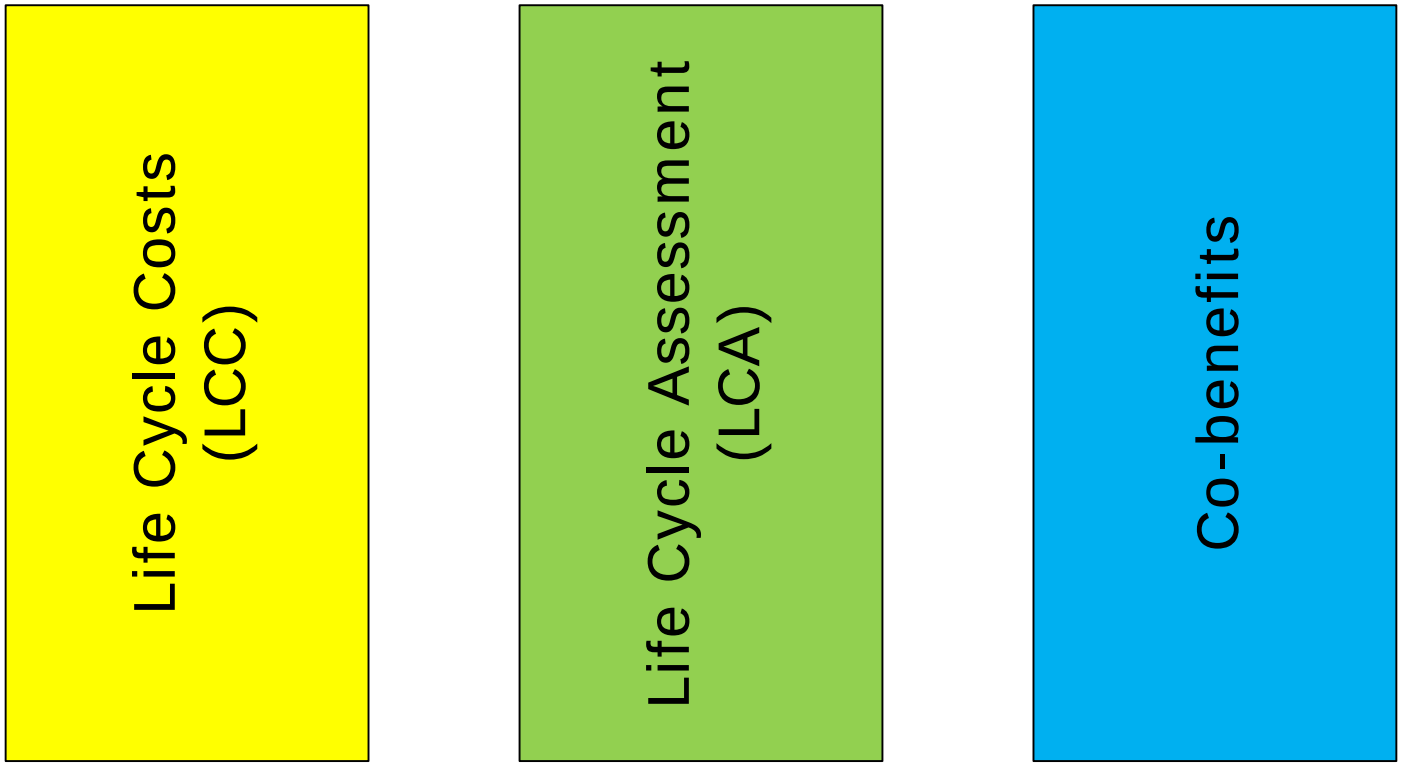
- Annex 56: At the building level
- Annex 75: At the level of groups of buildings / urban districts

IEA EBC Annex 75

- Subtask A: Technology Overview
- Subtask B: Optimization Methodology and Strategy Development
- Subtask C: Case Studies
- Subtask D: Policy Instruments, Stakeholder Dialogue and Dissemination

Berechnungsmethodik

Kosteneffiziente Gebäudesanierung auf Stadtteilebene
unter Berücksichtigung von
Lebenszykluskosten, Primärenergie und Treibhausgasemissionen

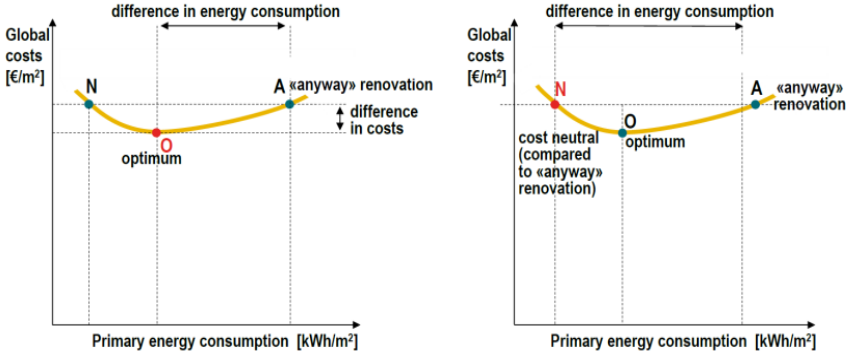


Berechnungsmethodik

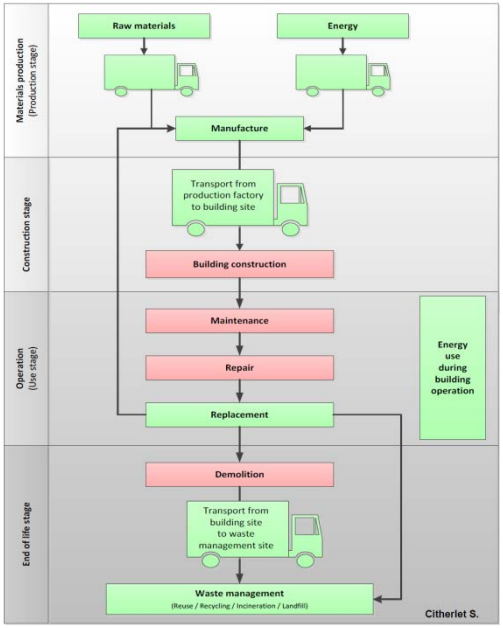
Energy in Buildings and Communities Programme

Cost-effective energy and carbon emission optimization in building renovation

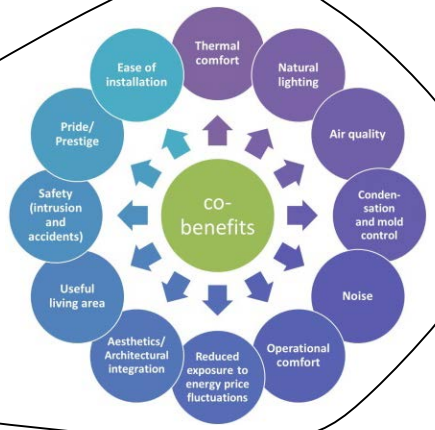
Life Cycle Costs (LCC)



Life Cycle Assessment (LCA)



Co-benefits

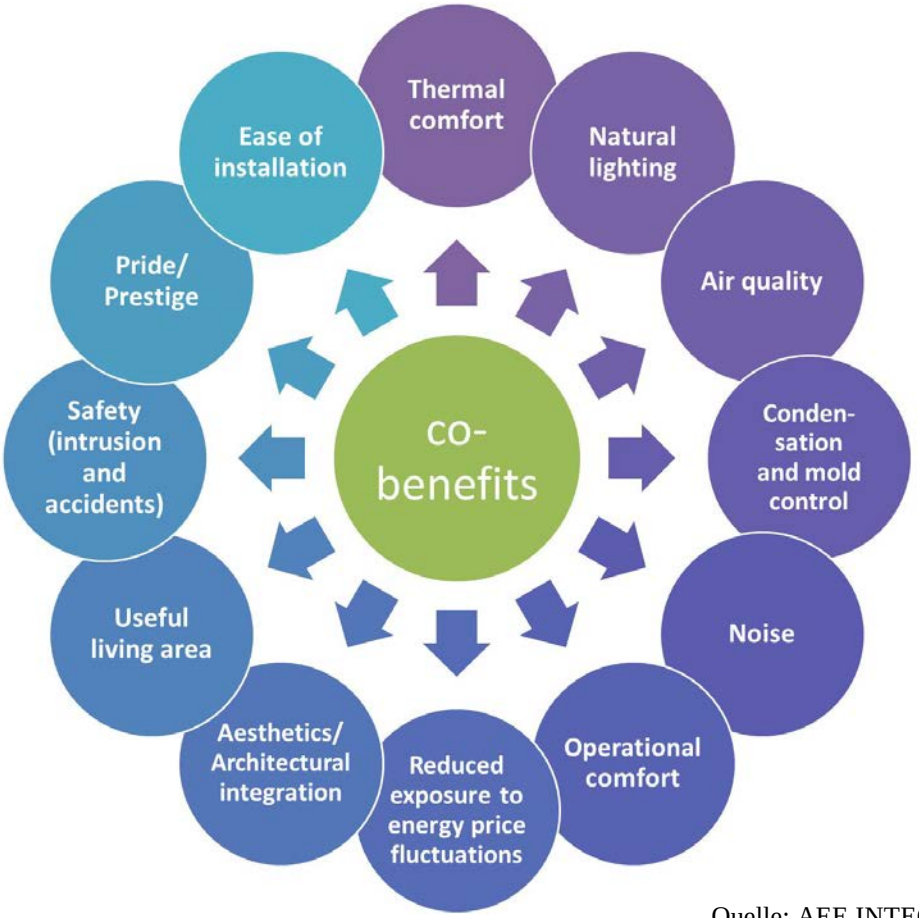


Quelle: IEA EBC Annex 56

Berechnungsmethodik

Co-benefits

- Nebeneffekte der Gebäudesanierung
- Nutzen abseits von Energie-, Emissions- und Kosteneinsparung
- Können positiv aber auch negativ sein
- Spielen eine wichtige Rolle im Entscheidungs-prozess



Quelle: AEE INTEC

Sanierungsmaßnahmen

Gebäudehülle

Maßnahmen zur Verbesserung der thermischen Qualität der Gebäudehülle, wie z.B. Wärmedämmung der Fassade, des Daches, des Fußbodens und/oder Fenstertausch

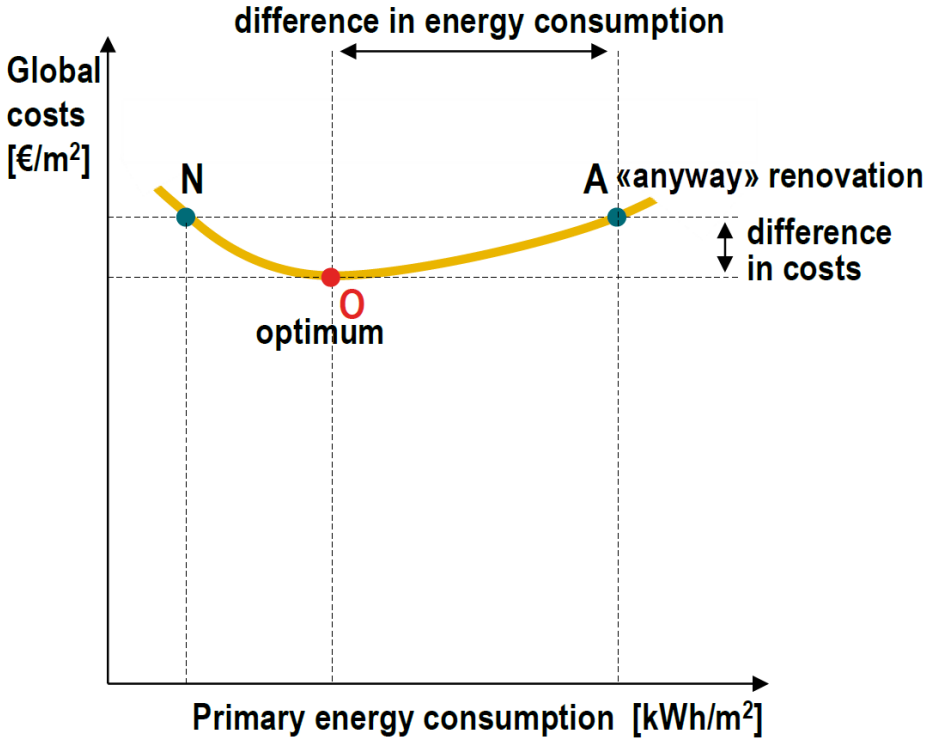
Haustechnik / Netzverbund

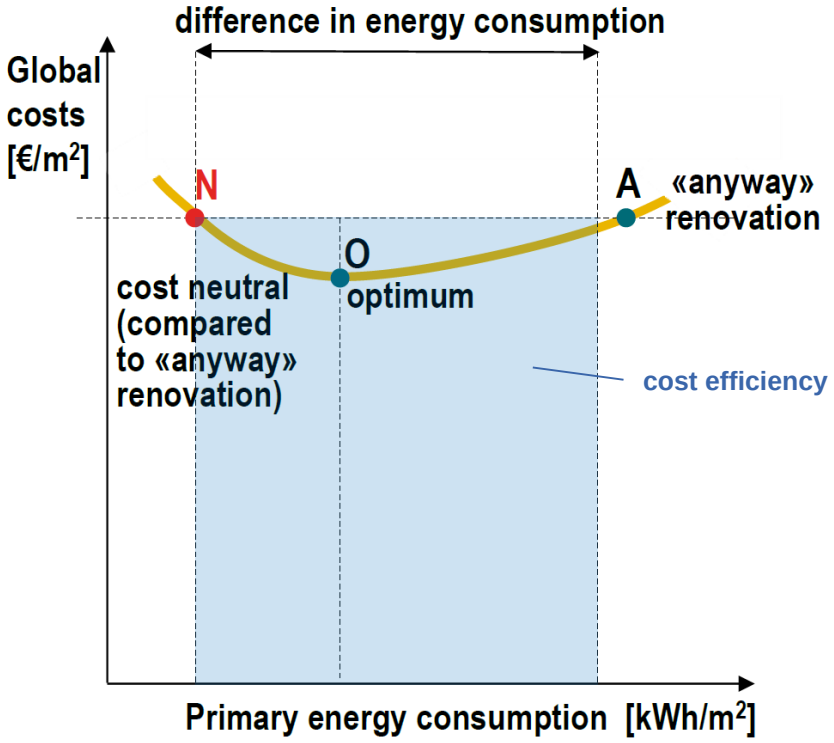
Modernisierung bzw. Erneuerung von Heizungsanlagen, Brauchwarmwasserbereitung, Kühlung, Lüftung sowie Allgemein- und Haushaltsstrom (z.B. Beleuchtung)

Variation von **Energieträgern** für Heizung, Kühlung und Brauchwarmwasser

Erneuerbare Energieerzeugung, wie z.B. Solarthermie oder Photovoltaik

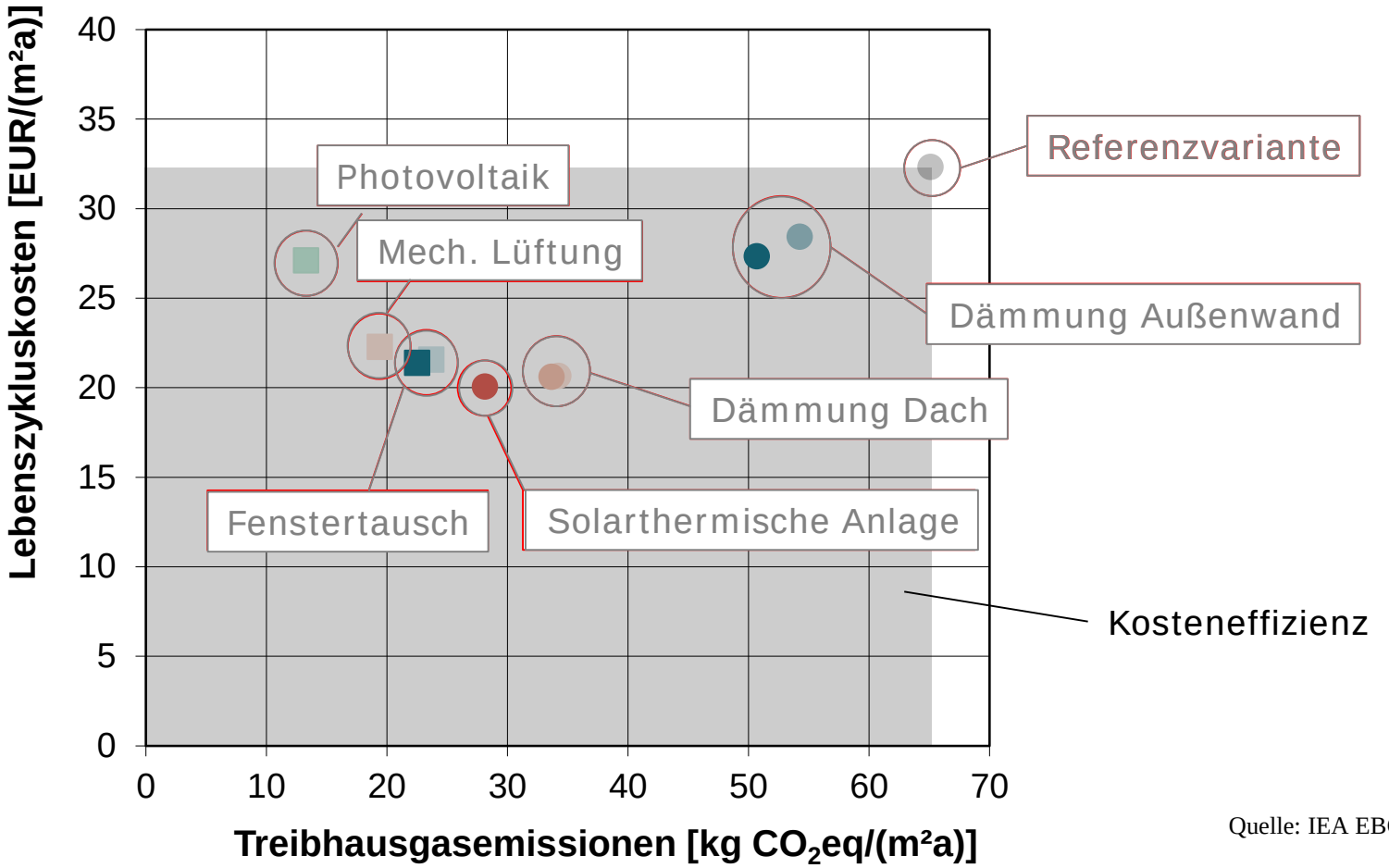
Kosteneffizienz





Quelle: IEA EBC Annex 56

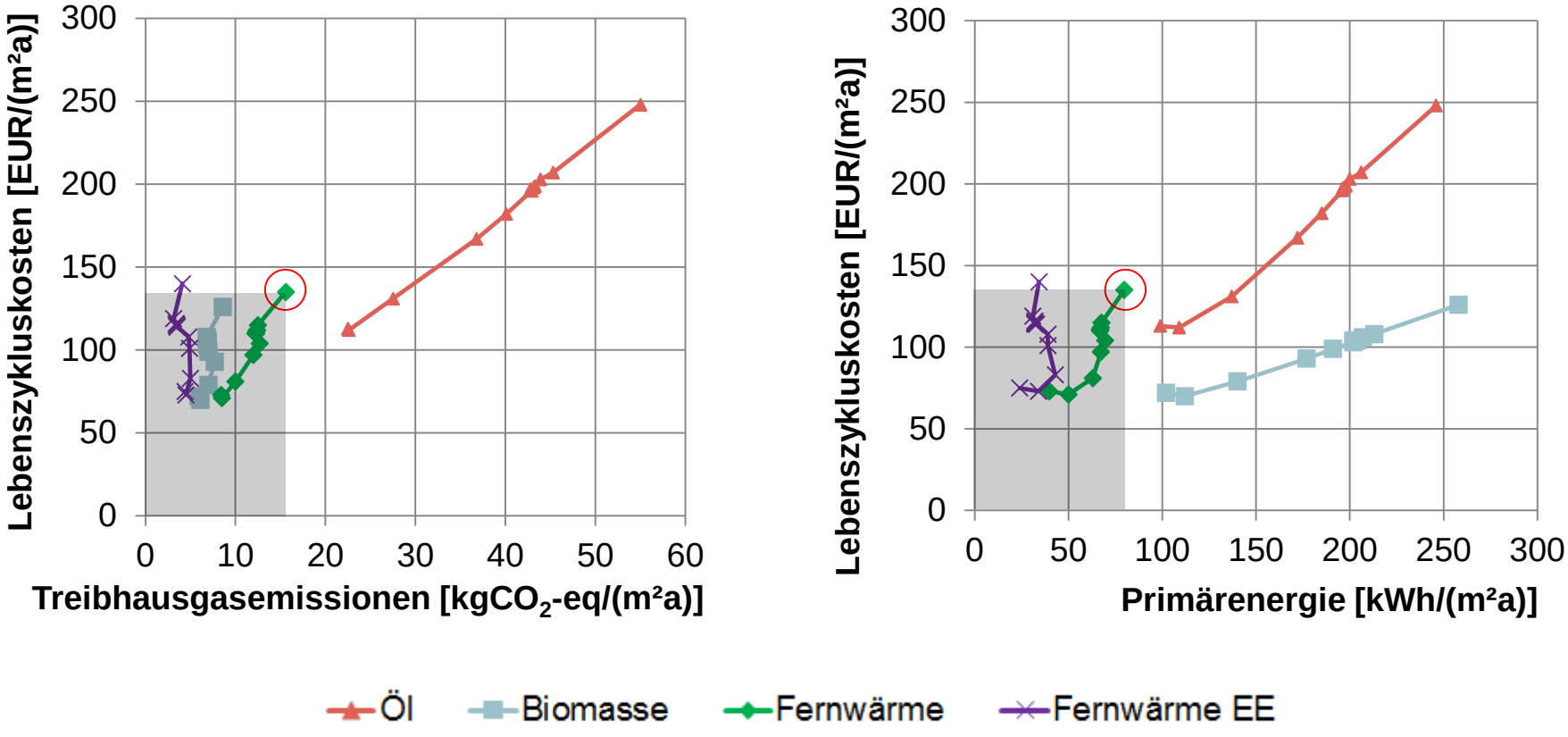
Berechnungsergebnisse



Quelle: IEA EBC Annex 56

Berechnungsergebnisse

Case Study „Backa röd “, Schweden



Quelle: IEA EBC Annex 56

Success stories and case studies

success stories

country	number of buildings	heated floor area
Austria	26	42,000
Denmark	1,228	120,000
Italy	570000 inh.	54 millions of m³
Italy	4	4,013
Italy	3	3,661
Portugal	28	80,000
Portugal	109	126,000
Portugal	25	5,000
Sweden	6	276 apartments
Sweden	14	11,956
min	**3**	**3,661**
average	**160**	**49,079**
max	**1,228**	**126,000**

case studies

country	number of buildings	heated floor area
Austria	38	13,017
Norway	?	260,000
Portugal	8	3,925
Portugal	7	2,300
Spain	249	286,094
Spain	133	178,388
Spain	114	220,320
min	**7**	**2,300**
average	**92**	**137,721**
max	**249**	**286,094**

Success stories

Case study (country)	Number of buildings	Heated floor area (m^2)	Type of intervention	Year
ALER-Varese, Sangallo (IT)	48 Apt. renovated (3 build.) 235 Apt. DH (24 build.)	3,661	Building renovation + DH (condensing gas-boilers)	2015
Quartiere Giardino, Modena (IT)	2,586 Apt. (77%) + schools & offices (33%)	~147,000	Disctrict Heating - trigeneration plant (natural gas)	1970-now.
District Heating, Turin (IT)	62,643 (90% schools surface)	?	DH (Combined cycle thermoel. group – n. gas)	1982-now.
Valdastico district, Vicenza (IT)	1 School, 2 nursing home, 1 office building	4,013	Disctrict Heating - biomass	2014
Santa Marta Campus, Univ. of Venice (IT)	5 (university + caretaker's house)	17,500	Disctrict Heating - trigeneration plant (natural gas)	2017
Kildeparken, Aalborg (DK)	942 apt.; 1,228 after renovation	96,446 m^2; 119,886 m^2 after renov.	Building renovation + DH	2014-2020
Lourdes Neighborhood, Tudela (ES)	146 renovated apart. (from 768 in DH)	11,520 m^2 renovated / 63,008 m^2 DH	Building renovation + DH (biomass+gas)	2010-2012

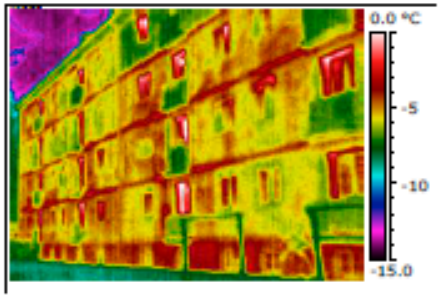
Success stories - Salzburg

building typology:

- 95% social housing (common room, hair dresser)

years of construction:

- Old houses built 1948 - 1960



- no. of buildings: 14 renovation (286 flats)
- and 12 destroyed an rebuilt (before 337 – after 350)
- total heated floor area: about 42.000 m² (gross)

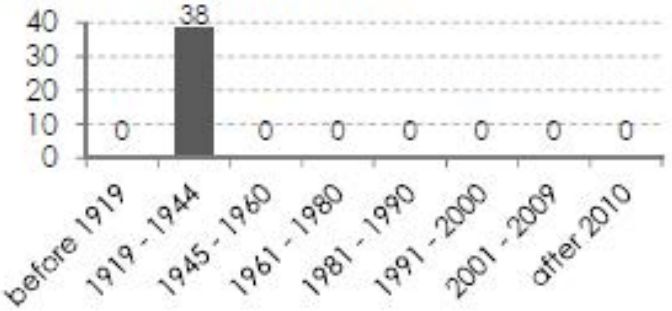
- realisation measures already carried out: yes
- renovation period: 2012- 2012
- New built house after house: start demolition 2013, new built finished September 2015 – End 2018

Case Studies - Liezen

- no. of buildings: 38
- total heated floor area: 13.017 m²

- building typology:

- years of construction:



- renovation measures already carried out: yes
- implementation period: 1989-1993

Case Studies - Liezen

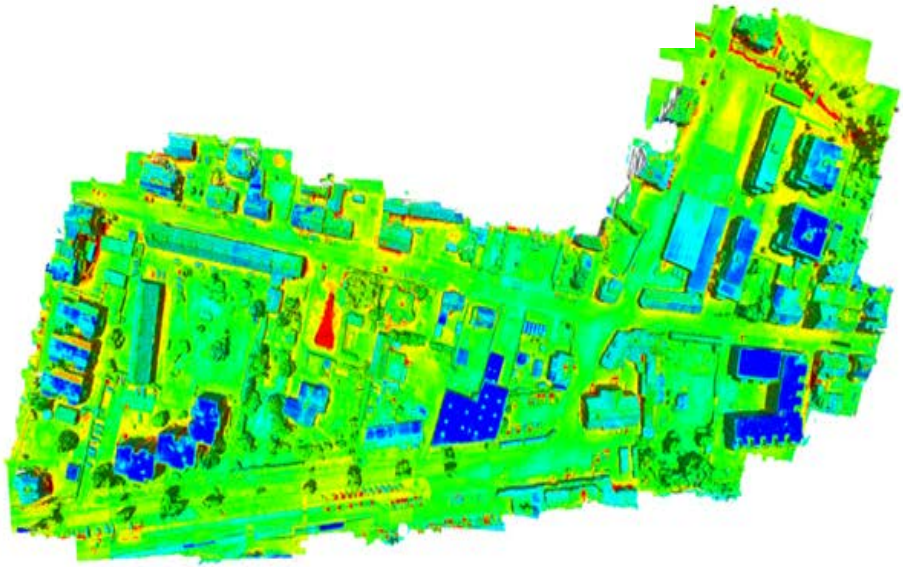
Dr. Karl Renner Ring, Liezen

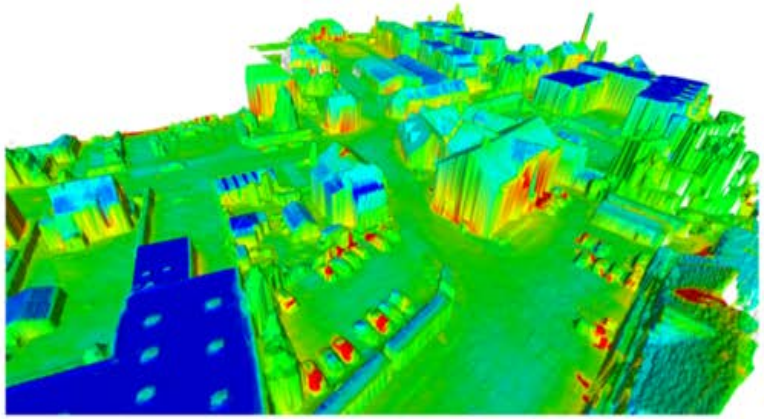
- **current heating demand: 2.653 MWh/a**
- **condition of thermal envelope:**
  - ☐ good
  - ✖ to be renovated
  - ☐ ....
- **condition of energy supply system:**
  - ☐ good
  - ✖ to be renovated
  - ☐ ...
- **what measures are planned:**
  - ✖ a plan has not yet been defined
  - ☐ renovation of thermal envelope
  - ☐ substitution of energy supply systems. Type:.....
  - ☐ integration of renewable energy sources. Type:.....
  - ☐ other measures. Type:.....

- **existing energy supply system(s):**
  - ☐ heat pump
  - ✖ natural gas
  - ☐ oil
  - ☐ biomass
  - ☐ district heating
    - ☐ renewables
    - ☐ fossil
    - ☐ mix
  - ☐ other....
- **existing renewable energy generation:**
  - ✖ none
  - ☐ PV
  - ☐ solar thermal
  - ☐ other....

- **local renewable energy sources and potentials existing?**
  - ☐ solar (thermic and electric)
    - ☐ yes
    - ☐ no
    - ✖ not known
  - ☐ geothermal
    - ☐ yes
    - ☐ no
    - ✖ not known
  - ☐ biomass
    - ✖ yes (district heating)
    - ☐ no
    - ☐ not known
  - ☐ waste heat
    - ☐ yes
    - ☐ no
    - ✖ not known

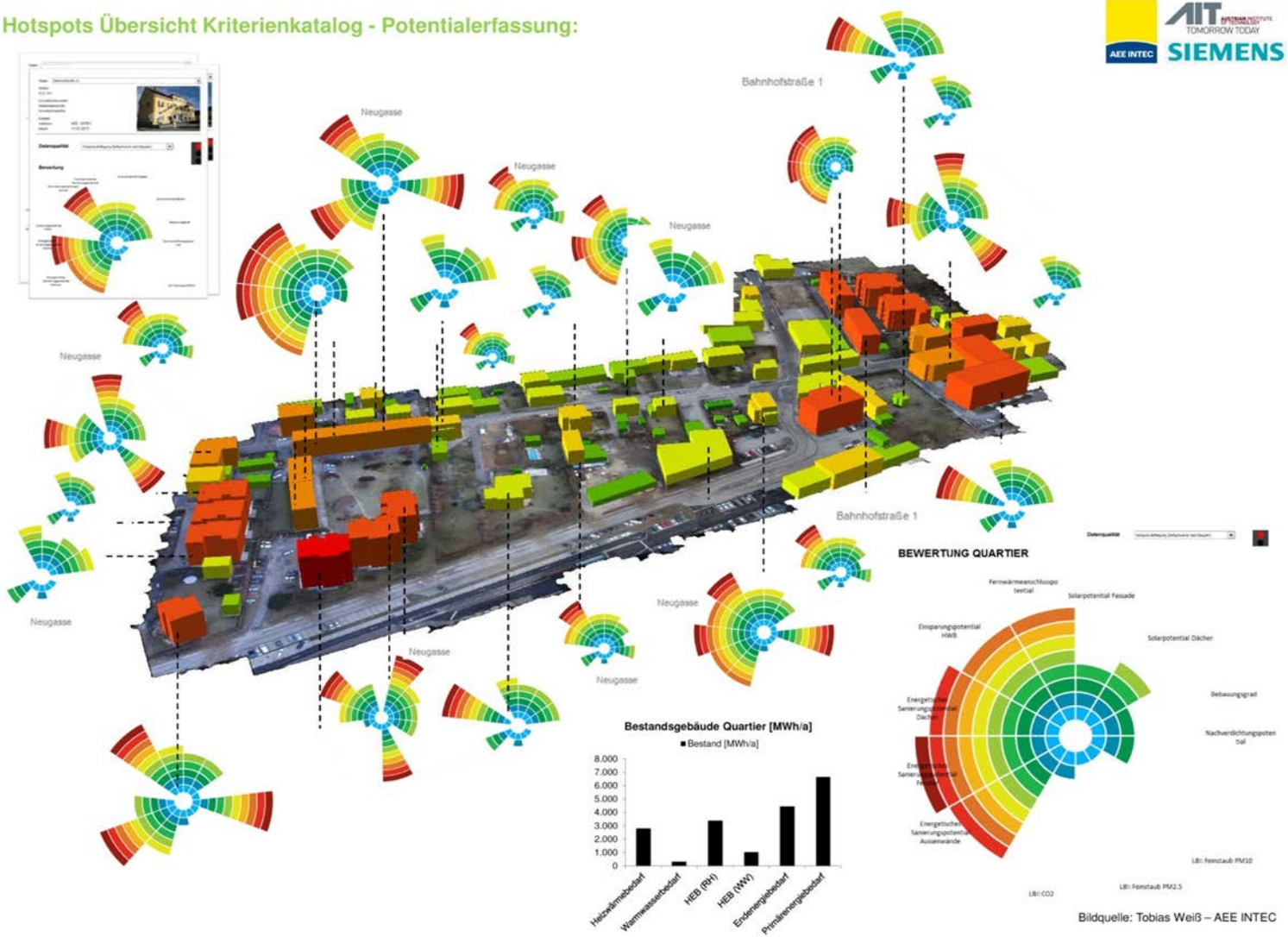
Case Studies - Hotspots





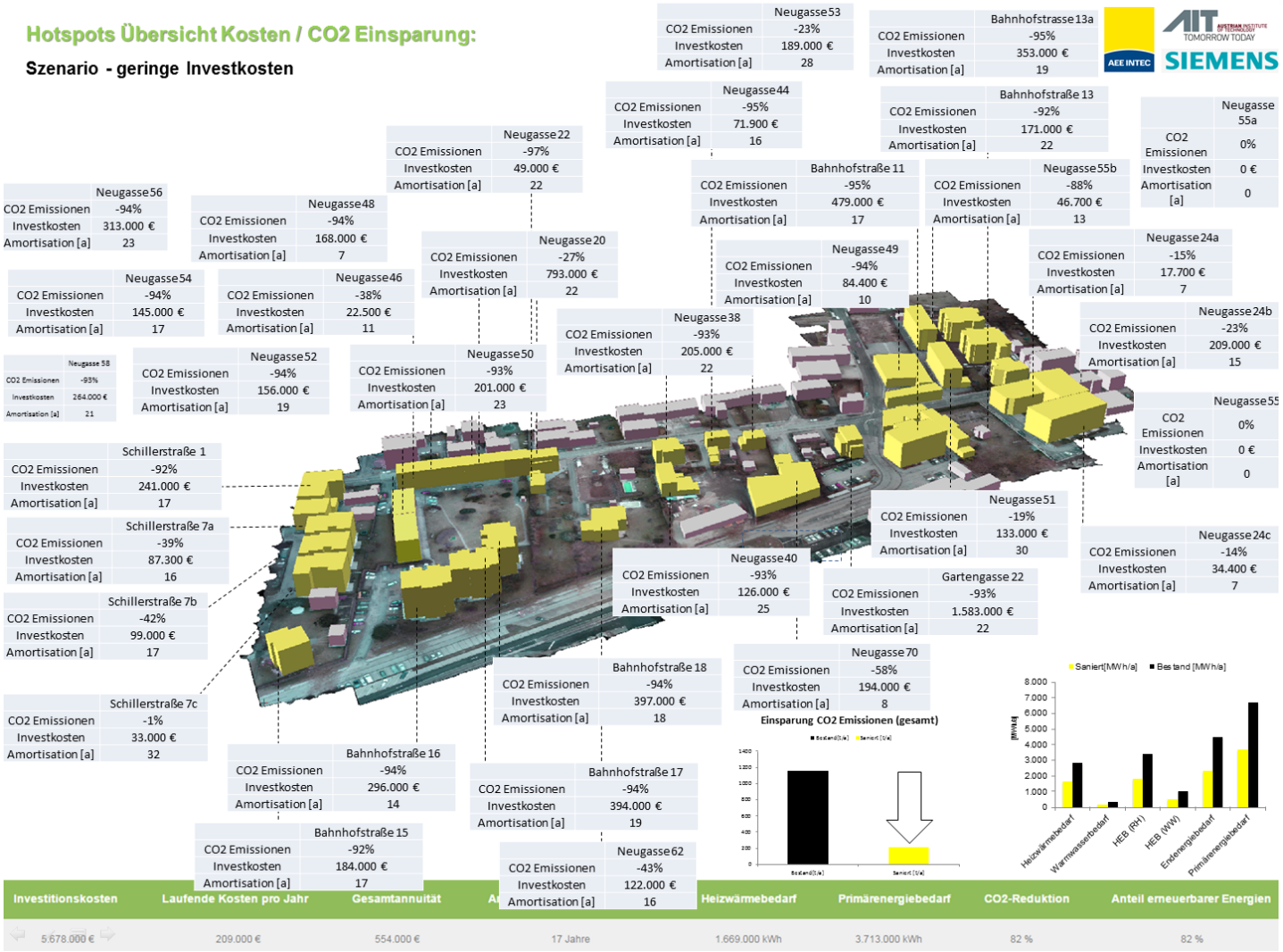
Case Studies - Potenzialerfassung

Hotspots Übersicht Kriterienkatalog - Potentialerfassung:



Bildquelle: Tobias Weiß – AEE INTEC

Case Studies – CO2-Einsparung



Erwartete Ergebnisse

- Ein Wechsel zu **Erneuerbaren Energieträgern auf Stadtteilebene** reduziert die **Treibhausgas-emissionen** deutlicher als alleinige thermische Sanierungsmaßnahmen an der Gebäudehülle.
- Umgekehrt haben Maßnahmen an der Gebäudehülle einen großen Einfluss auf den **Primärenergiebedarf** und sind daher erforderlich.
- Die Darstellung von **kosteneffizienten „Gesamt“-Sanierungen** sollen Eigentümer und Stakeholder überzeugen, in größeren Dimensionen zu denken.

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IDEA TO ACTION

Danke für Ihre Aufmerksamkeit