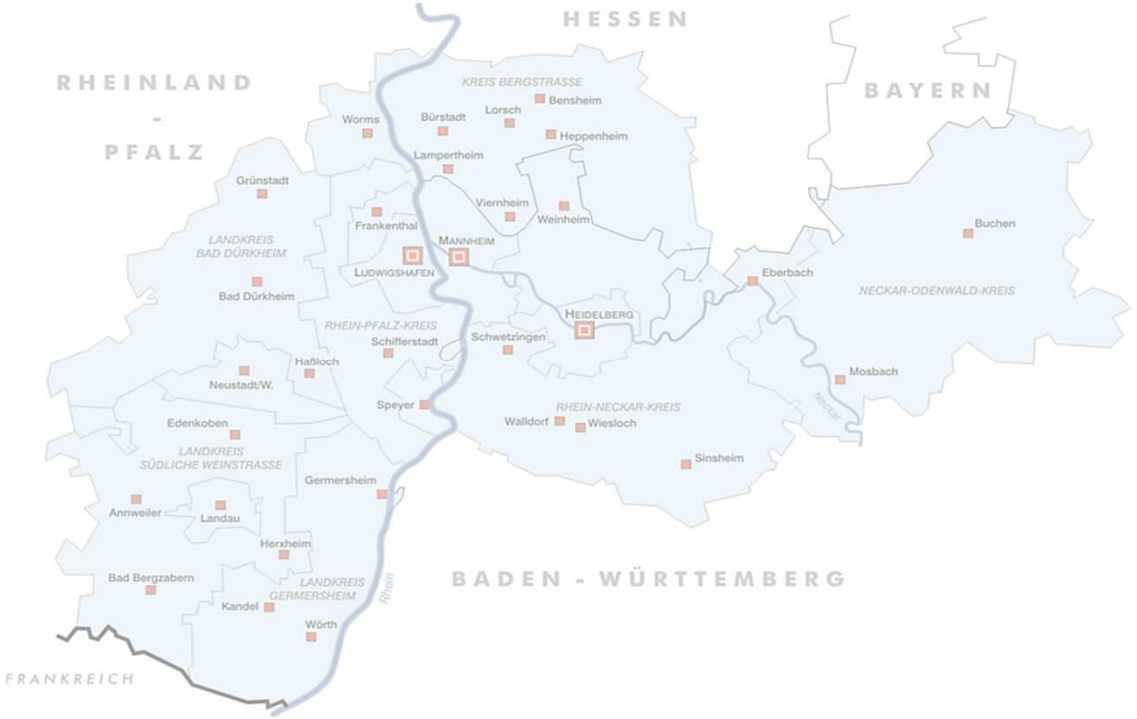


Energy Concept for the development of former military areas in Mannheim

Mannheim, 24 September 2013

Dr. Alexander Kuhn, CEO MVV Enamic Regioplan GmbH

Metropolregion Rhein-Neckar

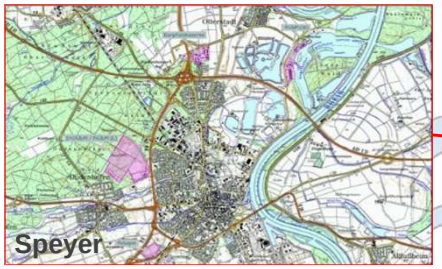
MVV Enamic

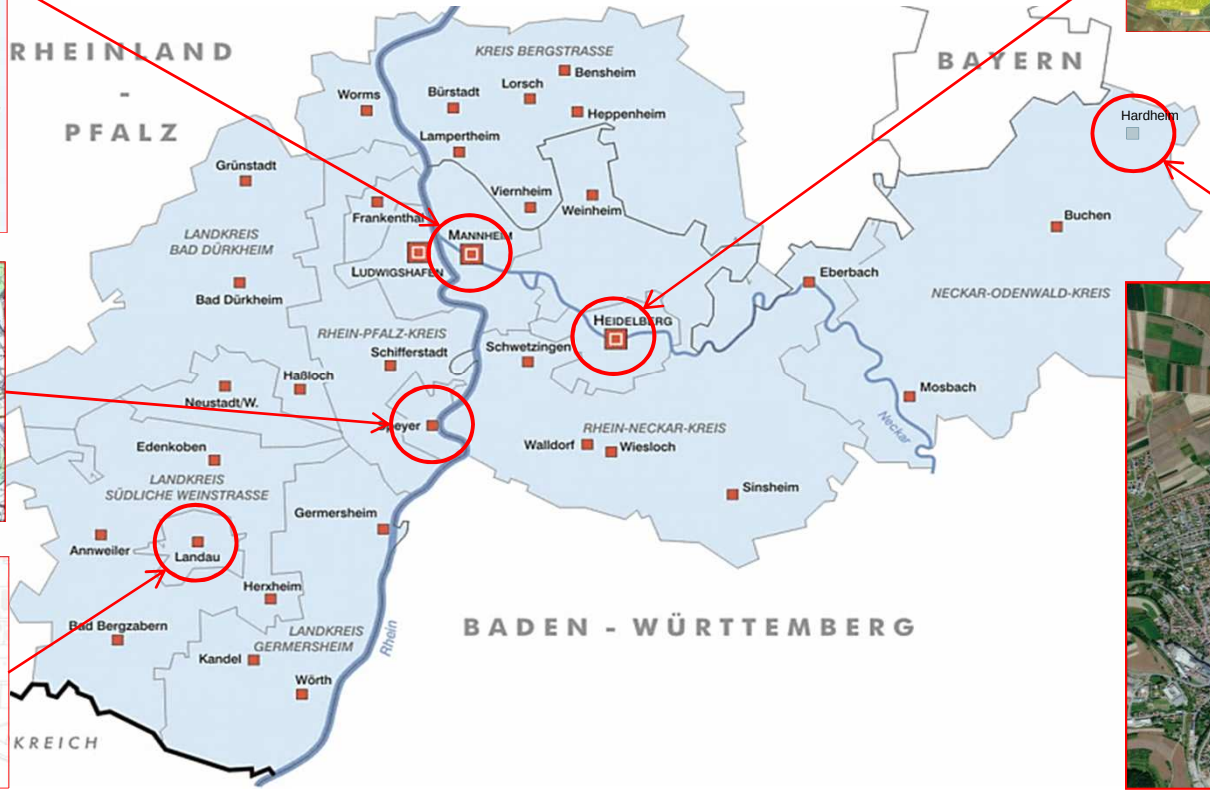
Conversion areas in the Metropolitan Area Rhine-Neckar and in Mannheim

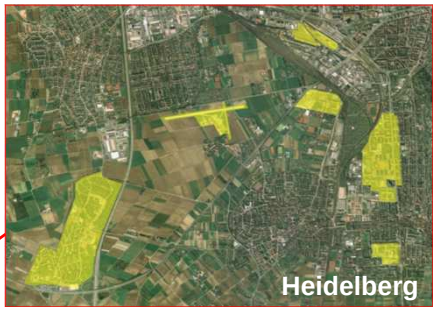
Conversion area in total **ca. 990 ha**

Heidelberg, Mannheim, Schwetzingen ca. 760 ha
(equates settlement and traffic area of Schwetzingen)

Speyer, Hardheim (Neckar-Odenwald-Kreis) ca. 230 ha







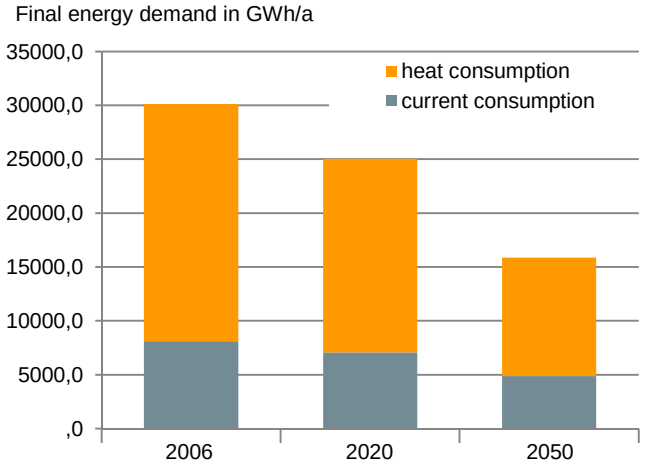
Metropolregion Rhein-Neckar

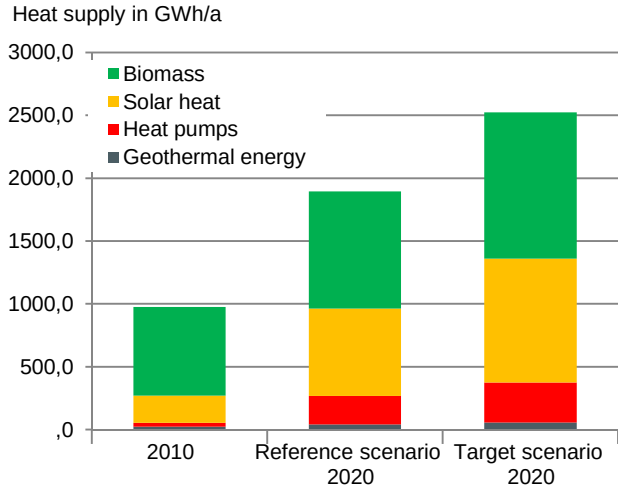
MVV Enamic

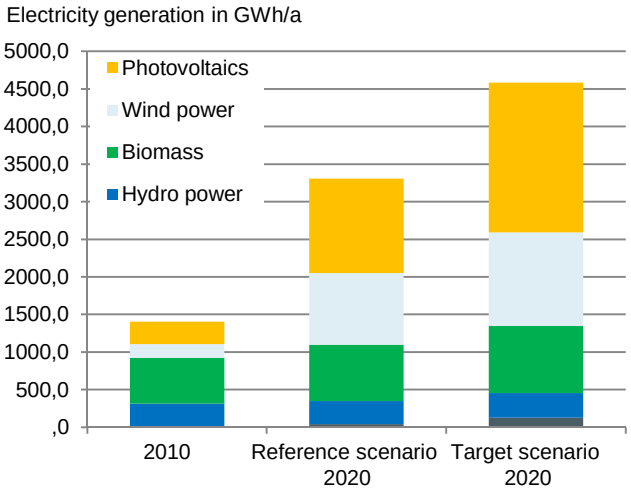
General principles of the energy policy in the Metropolitan Area Rhine-Neckar

- Scenario for energy savings and efficiency
- Sceanario for the development of renewable energies - heat
- Sceanario for the development of renewable energies - electricity

- **Reducing heat consumption about 18 %** compared to 2006
- **Enhance share of renewable energies in buildings about 14 %** in 2020
- **Reducing current consumption about 10 %** compared to 2006







Quelle: ZREU - Zentrum für rationelle Energieanwendung und Umwelt GmbH, 2011

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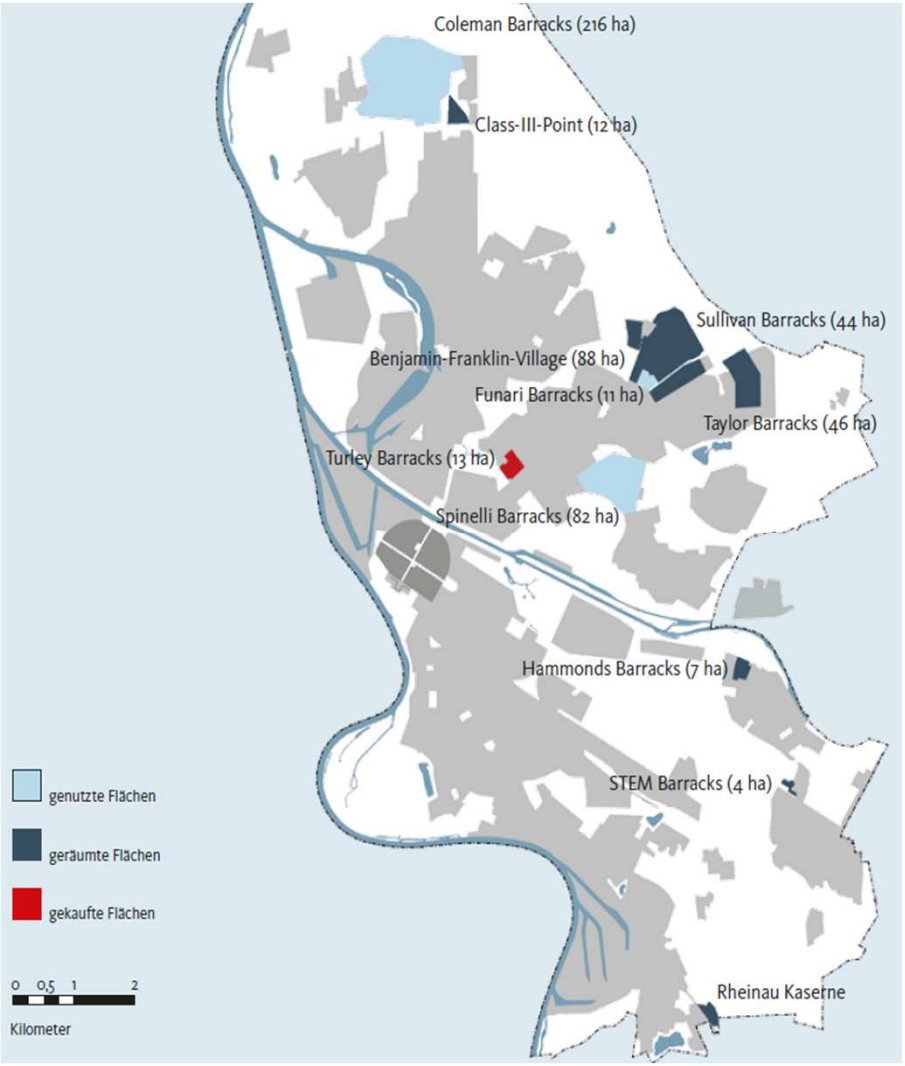
Conversion areas in Mannheim: 500 ha in total

Ambition to energy-efficient & high-quality civil engineering



„To assure the attainment of the climate protection aims in Mannheim, district-based solutions and energetic standards shall be considered and developed for the conversion areas.“

White Paper II, City of Mannheim

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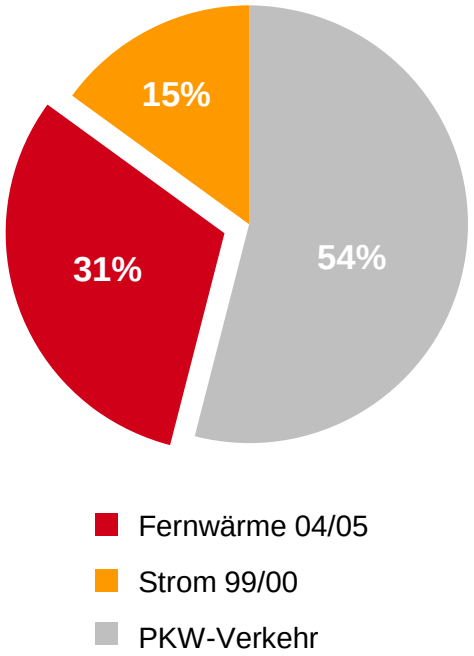
Heat supply in the conversion areas
Energetic optimisation of buildings and districts

- **What used to be?**
- **What shall be?**
- **How to achieve it?**

Energy consumption
U.S. Army (411,721 MWh/a)
(5,0 % of the final heat energy in Mannheim without industry)



The aim is to
reduce the final energy demand for heat about 31 %
to 87,516 MWh/a

Brand „Energy“:
„…to be considerably better off …than before.“
(Klimaschutzkonzept MA 2020)

Energetic development of buildings and districts

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Energetic optimisation of buildings and districts
Required minimum standards

	Objective	Conversion areas	Target value
New buildings	EnEV - 30 % (kfw-Effizienzhaus 70)	z.B. Turley, Spinelli, Hammonds	~ 54 kWh/m²a
Existing buildings	EnEV	z.B. Spinelli, Taylor, BFV, Hammonds	~ 77 kWh/m²a
Heritage buildings	EnEV + 40 %	z.B. Turley, STEM	~ 108 kWh/m²a
Industrial and non-residential buildings	EnEV	z.B. Taylor, BFV	depending on type of use

Realization in practice:

- Integration of energy-efficient and renewable generation: **District concepts**
- Innovative **building technology**
- Adequate refurbishing of the **building envelope**

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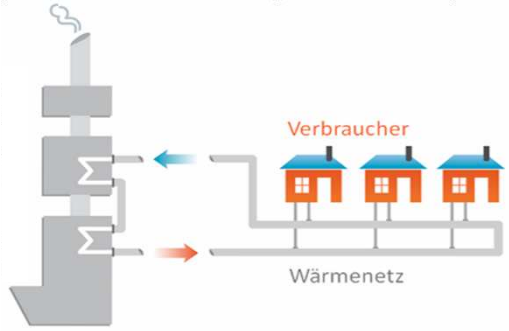
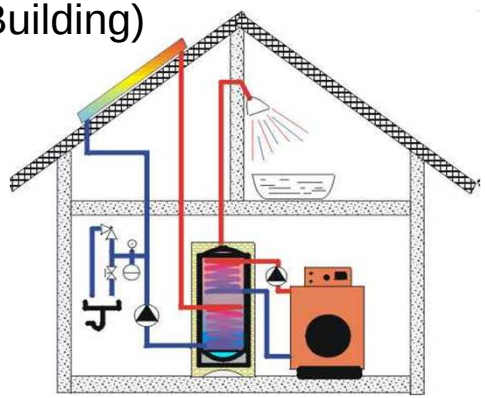
Heat supply options
Heat generation for refurbished existing buildings

Central generation
(District heating network)



	Applicability	Costs	Ecology
Wood pellet heat plant	+	-	+
CHP unit	+	o	++
District heating	++	++	o
LowEx District heating (return line)	++	++	+

Decentral generation
(Building)



Wood pellet boiler	++	o	+
CHP unit	o	-	++
Natural gas condensing boiler	++	+	-
Brine-/water-heat pump (vertical loop)	-	- / o	o / +
Solar heat	-	--	+

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Turley Barracks Mannheim
Investors competition

- **Investor alliance**
  Heberger und Deutsche Wohnwerte
- **Architect:**
  MOTORLAB ARCHITEKTEN
- **Energy concept:**
  LUWOGE consult GmbH

The City of Mannheim (MWSP) intends to divest plot areas of in total 24,081 m² in proximity to the city centre for residential purposes in terms of an open investors selection process.

- Urbanistic and architectural development proposals for reconstruction
- Net dwelling area ca. 18,000 m²
- Energy concepts - 3 options for kfw 55

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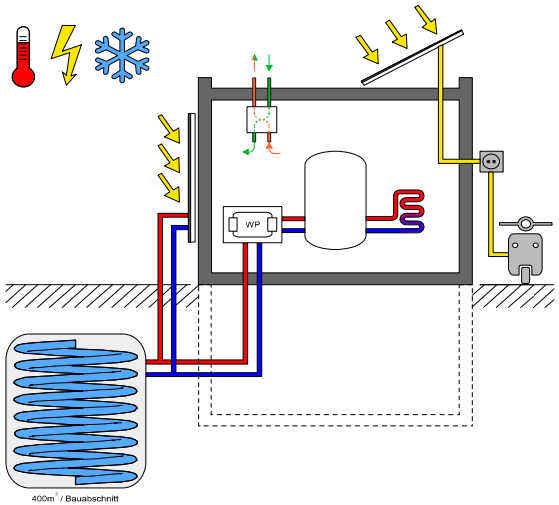
Turley Barracks Mannheim

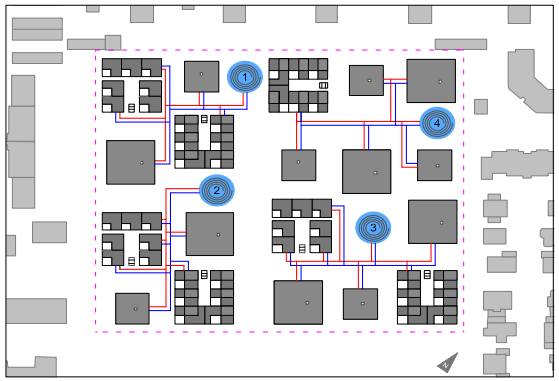
Energy concepts for reconstruction buildings

Ice storage & heat pump

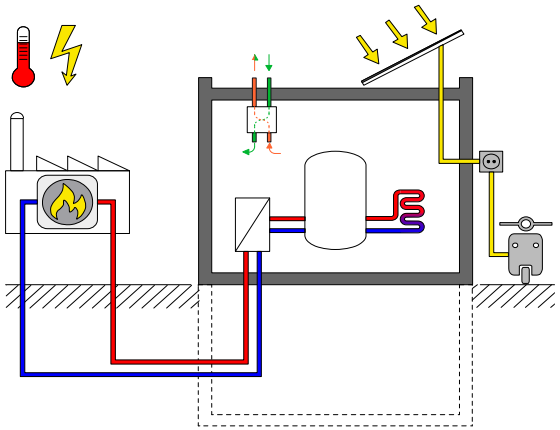


Lebenszykluskosten*

Ökoeffizienz (Primärenergie)

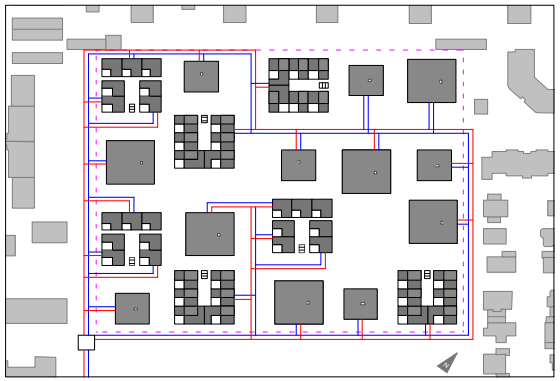


District heating

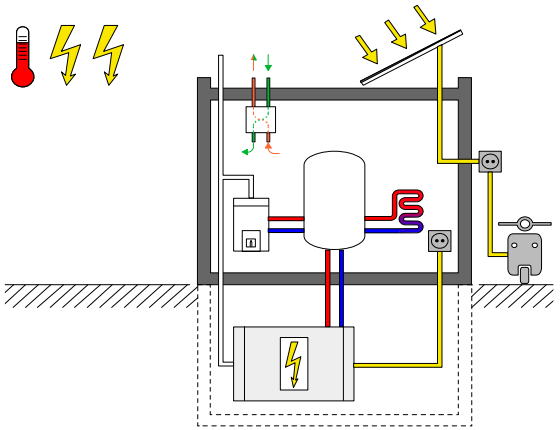


Lebenszykluskosten*

Ökoeffizienz (Primärenergie)

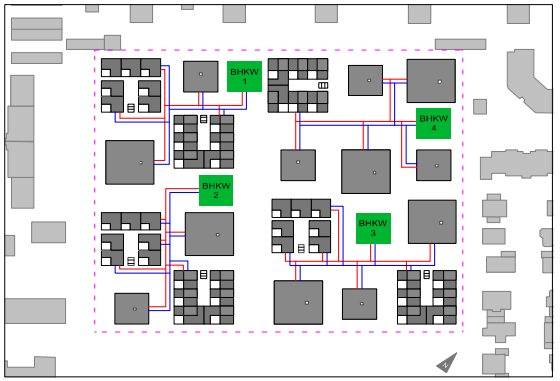


CHP units & gas condensing boiler



Lebenszykluskosten*

Ökoeffizienz (Primärenergie)



* Investition, Lebenskosten, Wartung

Quelle: LUWOGE Consult GmbH

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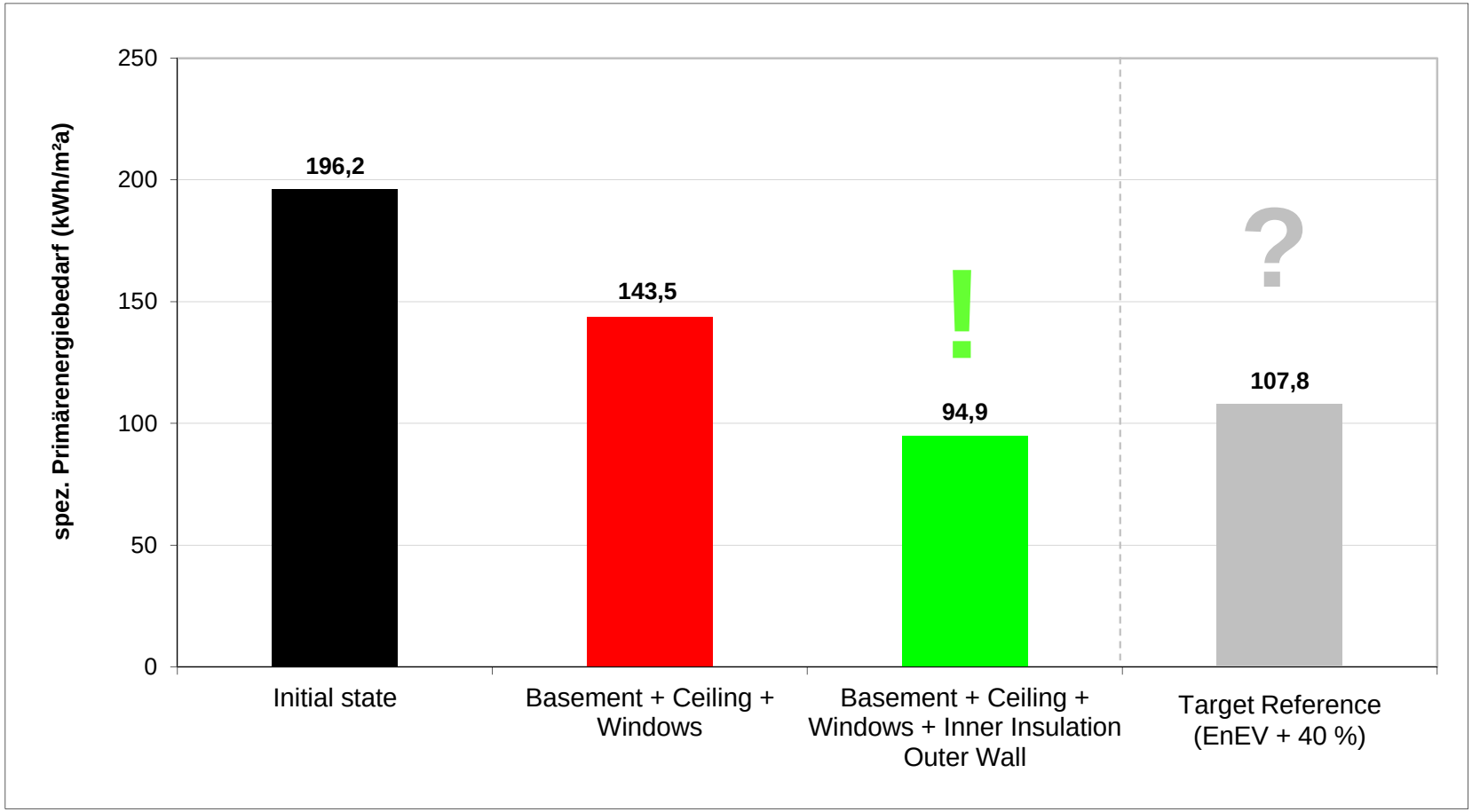
Energetic optimisation of buildings and districts

Energy savings in heritage buildings



- A complete refurbishing of the building fulfills the energetic target
- Thus the delivery costs of heat can be cut in half.

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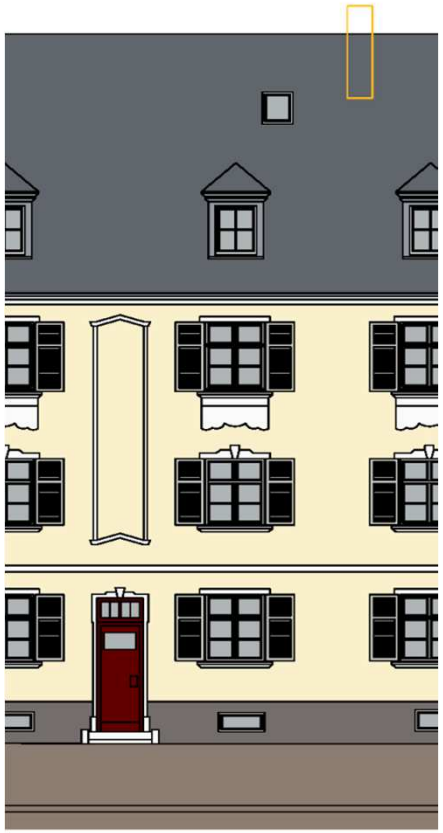
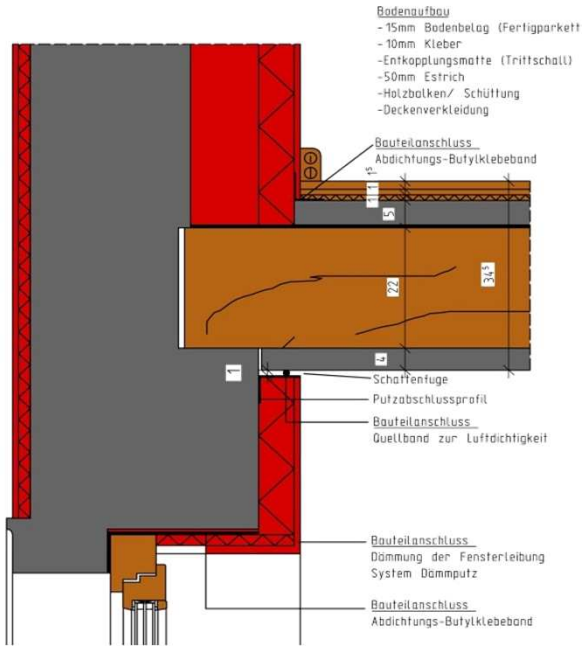
Hohenzollernhöfe, Ludwigshafen

Rehab for a heritage housing complex with passive house components





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Hohenzollernhöfe, Ludwigshafen

Rehab for a heritage housing complex with passive house components

▸**Bauherr:**

LUWOGE

▸**Energiekonzept:**

LUWOGE

▸**Energetischer Standard:**

KfW-Effizienzhaus 100

▸**Realisierung:**

in mehreren Bauabschnitten

▸**Projektschwerpunkte:**

Kombination aus Innen- und Außendämmung

Verwendung von PH-Komponenten

z.B. energieeffiziente denkmalgerechte Fenster

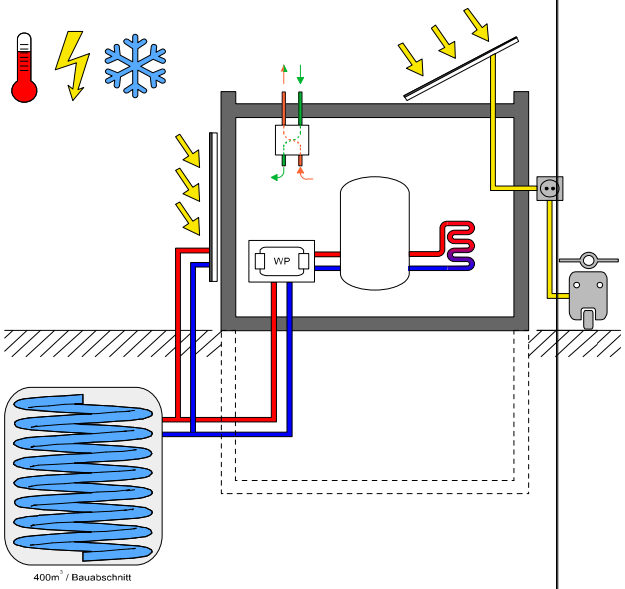
dezentrale Lüftungsanlage mit Wärmerückgewinnung

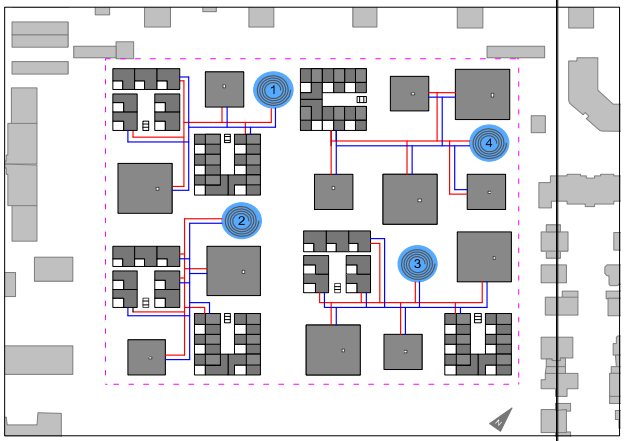
Soziokulturelle Einbindung (generationsübergreifend)

MVV Enamic

„TURLEY BARRACKS“ - MANNHEIM

Energiekonzept LUWOGE consult - Variante 1





Quelle: LUWOGE consult

- Dezentrales Nahwärmenetz mit je einer Sole-Wasser Wärmepumpe mit Eisspeicher und Heizungspufferspeicher je Bauabschnitt

- Variante mit geringstem Endenergiebedarf, sehr hoher COP durch freigesetzte Energiemenge beim Phasenübergang von flüssig zu Eis und umgekehrt. Regenerative Kühlung möglich, Übergabe z.B. über Heiz-und Kühldecken. Kombination mit Solarthermie und Photovoltaik günstig. KfW 40 erreichbar. Überschüsse können eingespeist oder für E-Mobiliät verwendet werden.

- Die Wärmepumpe entzieht mit einem 0-grädigen Solenetz dem Wasser im Eisspeicher die Energie und führt diese über einen Wärmetauscher dem Kältemittelkreislauf zu. Dabei „vereist“ der Speicher. Im Sommer kann umgekehrt Kühlung erzeugt werden oder Umgebungswärme (Solarkollektor, Abluft der Lüftungsanlage etc.) verwendet werden, um das Eis im Speicher wieder zu schmelzen.

€ €

Lebenszykluskosten*

Ökoeffizienz (Primärenergie)

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EFFIZIENZHAUS*PLUS* IM RAHMEN DER LANDESGARTENSCHAU IN LANDAU 2014

▸**Bauherr:**

EnergieSüdwest Projektentwicklung

▸**Projektentwicklung / Energiekonzept:**

LUWOGE consult

▸**Energetischer Standard:**

Effizienzhaus*Plus (Qp -60% EnEV)*

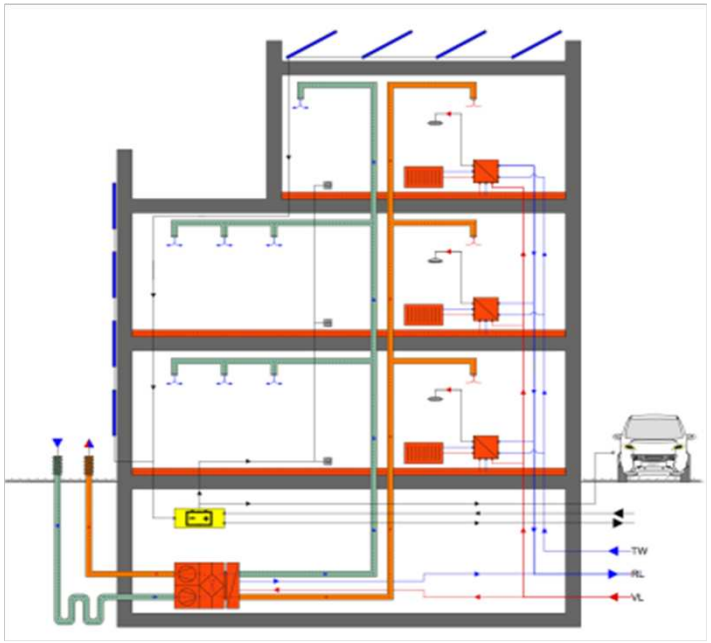
▸**Projektschwerpunkte:**

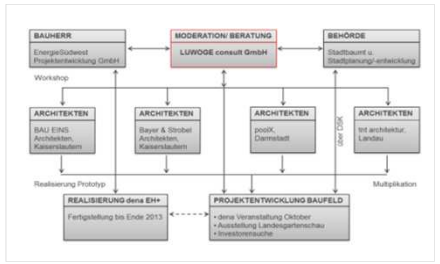
Teilnahme am dena-Modellvorhaben Effizienzhaus*Plus*

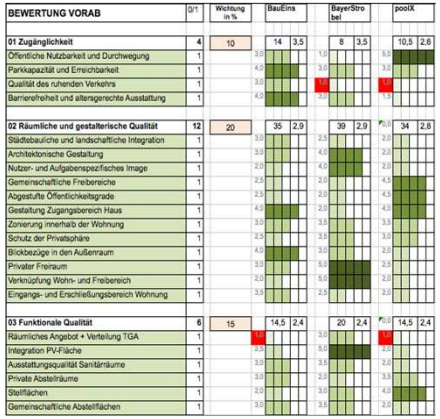
Definition der Zielsetzung

Wettbewerb mit lokalen Architekturbüros

ganzheitliches Gebäudekonzept als gleichwertiger Wettbewerbsinhalt







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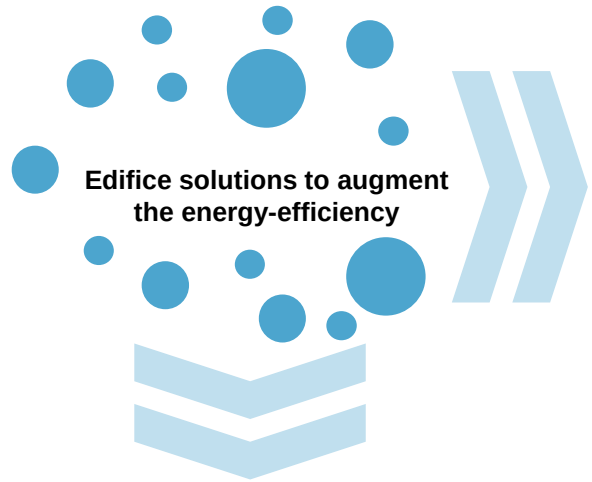
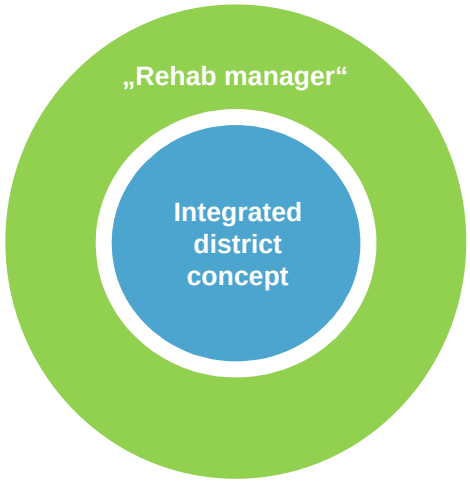
Quelle: COLLECTUS Speyer

Energetic urban redevelopment
Promotional program by the KfW





- **Aim of funding**

  Development and implementation of an integrated distric concept targeting the augmentation of the energy-efficiency in buildings and infrastructure (especially in the heat supply)

- **Funding rate**
  Subsidy: 65 % of the eligible costs per district

- **Modules of the program**

  Module A:
  Integrated district concept

  Module B:
  Rehab manager (Implementation phase: 3 years)

ENERGIEWENDE.
WIR FÖRDERN DAS.
KFW

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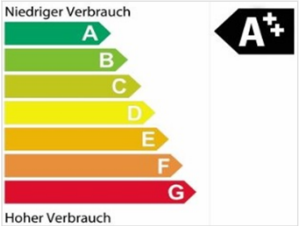
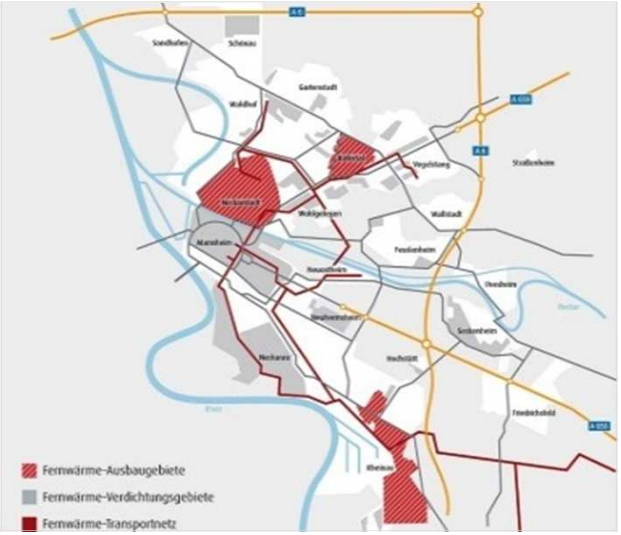
Integrated district concepts
are aiming at …





- … the augmentation of energy-efficiency in the district
- … the reduction of the fossil fuel share in favor of a supply with renewable energies and CHP (e. g. district heating)
- … the reduction of the carbon footprint caused in the district
- … the optimisation of the attitude and conduct towards mobility and the deminishment of distances between working and living
- … the establishment of sustainable urban development in the district
- … the information, motivation, consulting and monitoring of both, private households and craftspersons / manufacturers before and during the implementation

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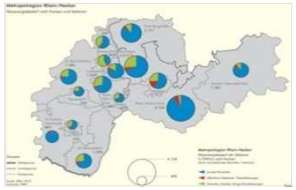
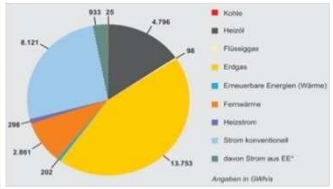
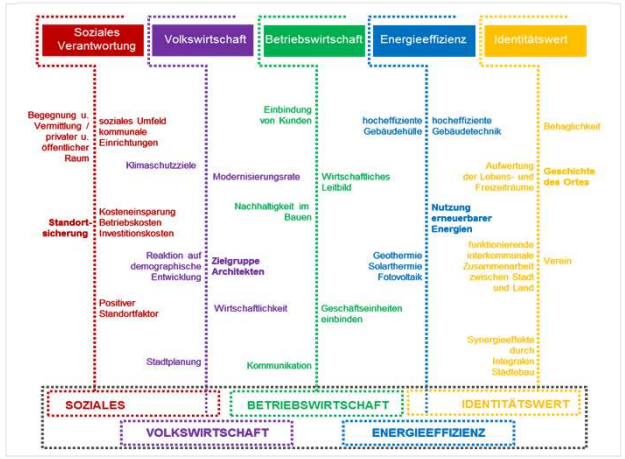
Integrated district concepts
Working steps







- **Basic analysis**

  Breaking down the different sectors and their enery consumption
  District-based balancing of energy consumption and carbon emissions in the range of heat, electricity and traffic

- **Potential analysis**

  Appraisal of energy savings and efficiency potentials in the different sectors
  Depiction of possible developments in scenarios

- **Public participation**

  Communication with and informing of all involved parties

- **Action plan**

  Development of suitable measures to tap the potentials
  Concepts for energy supply, mobility, communication, …

- **Implementation and success monitoring**

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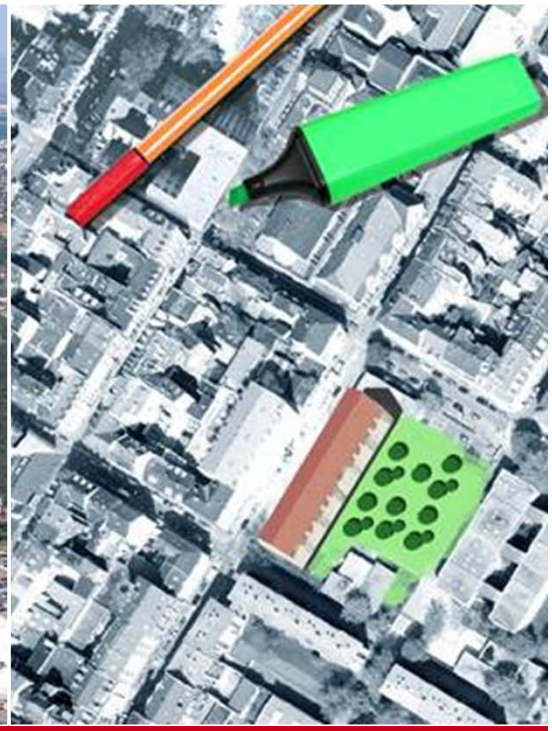

Thank you for your kind attention!

You have further questions?

Dr. Alexander Kuhn
Chief Executive Officer

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