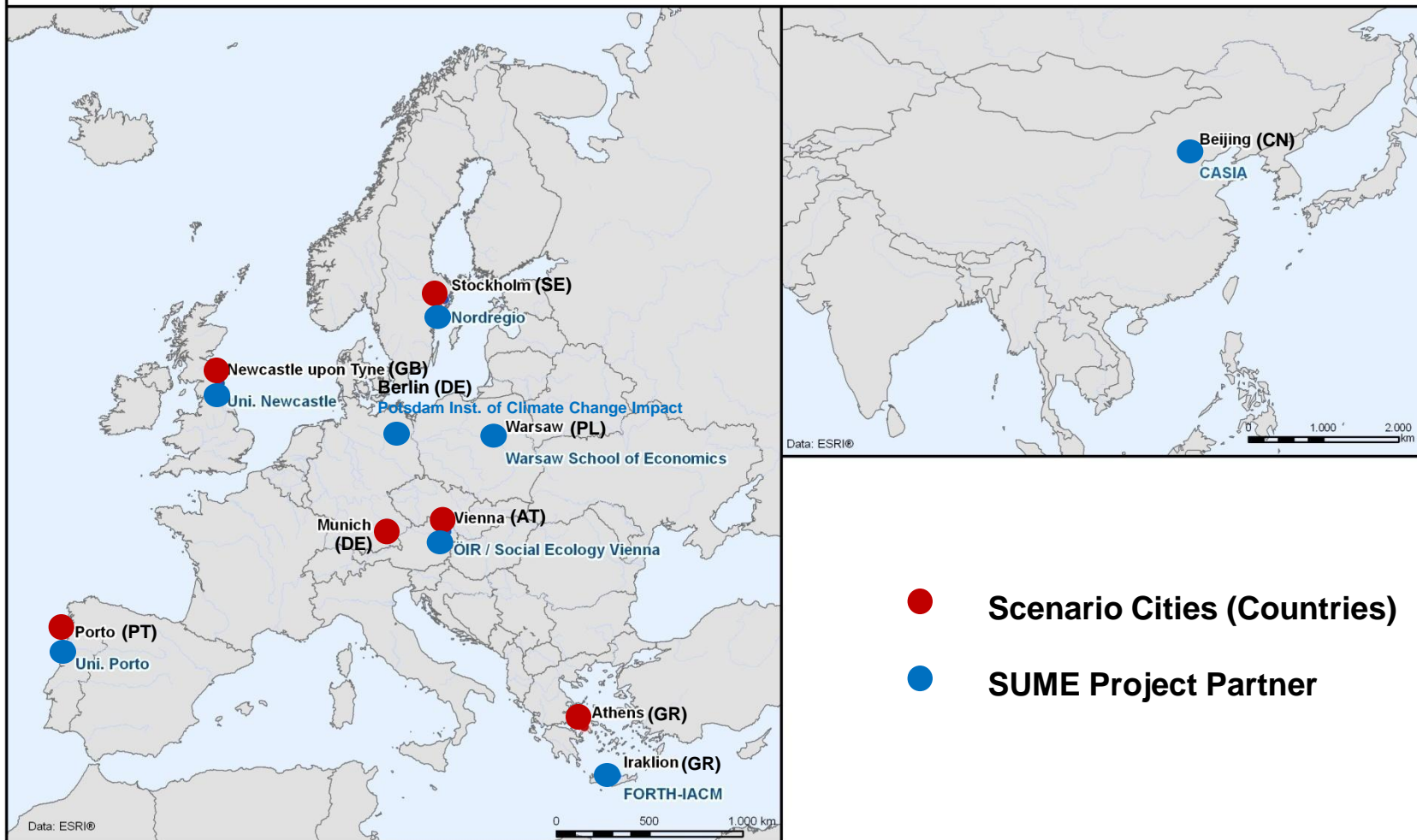


SUME: **Urban Planning for Energy and Resource Efficiency**

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SUME Project Partners & Case study cities



The first challenge: Resource efficiency

Challenge :

- ▶ **How can future urban growth** (population, income) on a world wide scale be accommodated with the **Climate Change Agenda** (CO₂ reduction objectives) ?

- ▶▶ With the scenario-, modelling- and evaluation approach, **SUME shows the options cities have** for transforming into future, more energy-resource-efficient forms (time horizon: 2050)

The SUME approach

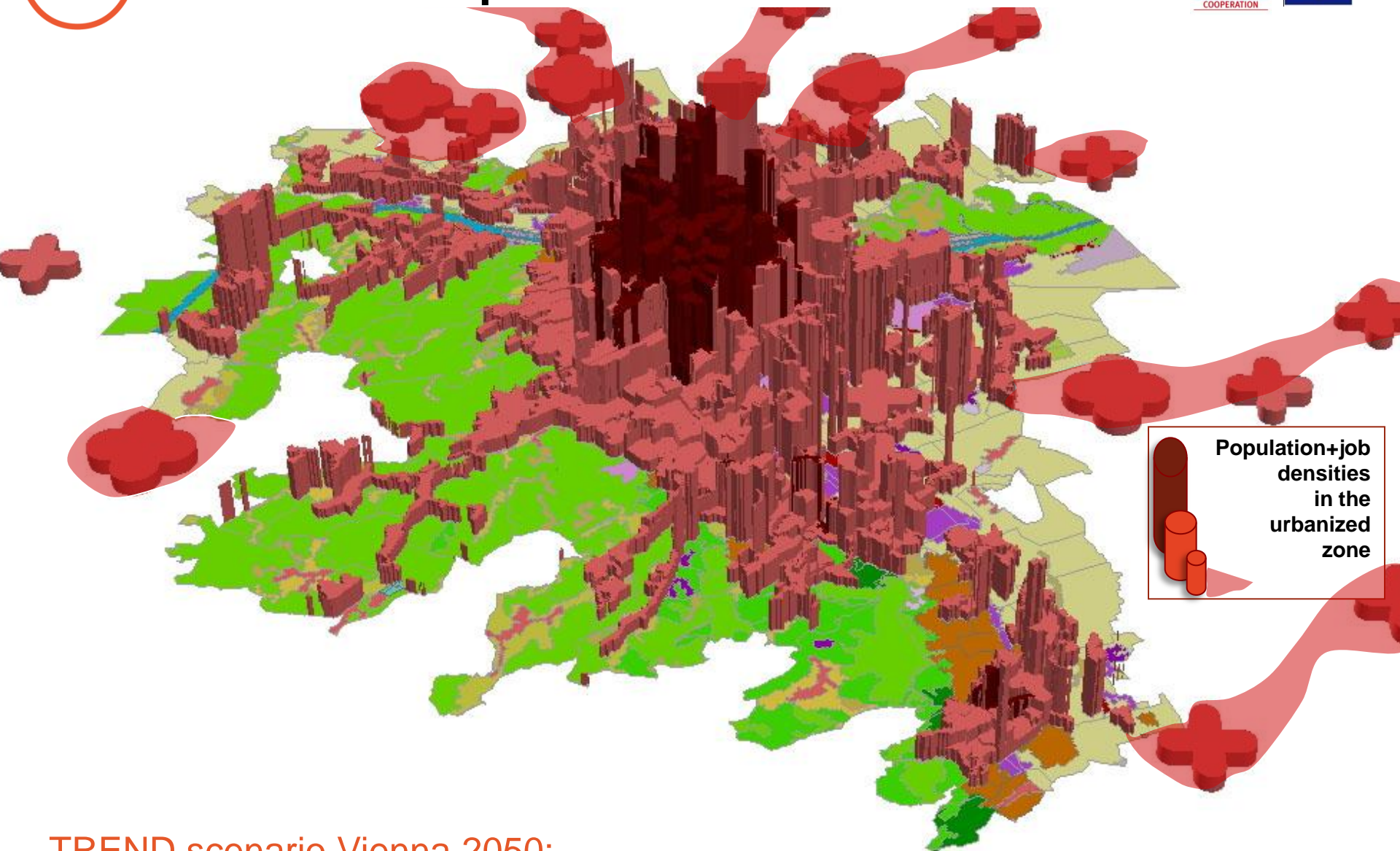
The **SUME approach** will be evaluated and tested in a number of case study cities:

- ▶ Vienna (AT), Munich (DE), Porto (PT), Newcastle (GB), Stockholm (SE), Athens (GR)
- ▶ With scenario and modelling methods applicable for all cities in Europe (and beyond)
- ▶ with a project and policy assessment method
- ▶▶ SUME provides **tools for sustainable planning and decision-making**, which have to be tailored to a great variety of urban development situations, esp. for cities which may be
 - growing or declining,
 - with high or low densities,
 - which have different public transportation systems,
 - in varying environmental and climate conditions

Questions to be answered:

- ▶ How do various (existing) **urban forms** influence the use of energy, land, materials ?
 - E.g. Athens (GR) pop. 3,5 mill – 352 km²
 - Brussels (BE) pop. 3,6 mill – 1.990 km²
- ▶ How can urban forms be changed in expanding cities ?
 - E.g. Vienna (AT) 2000-2050: pop. + 35%
- ▶ How can restructuring of urban forms be done in stable or shrinking cities?
 - E.g. Porto (PT) 2000-2050: pop. -4%
- ▶ How do urban forms influence the use of motorized vehicles ?
 - E.g. Cologne (DE) 65% of daily trips by car
 - Vienna (AT) 36% of daily trips by car

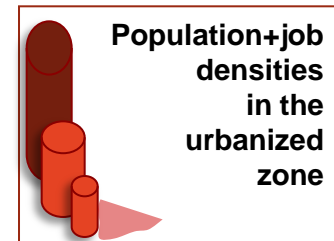
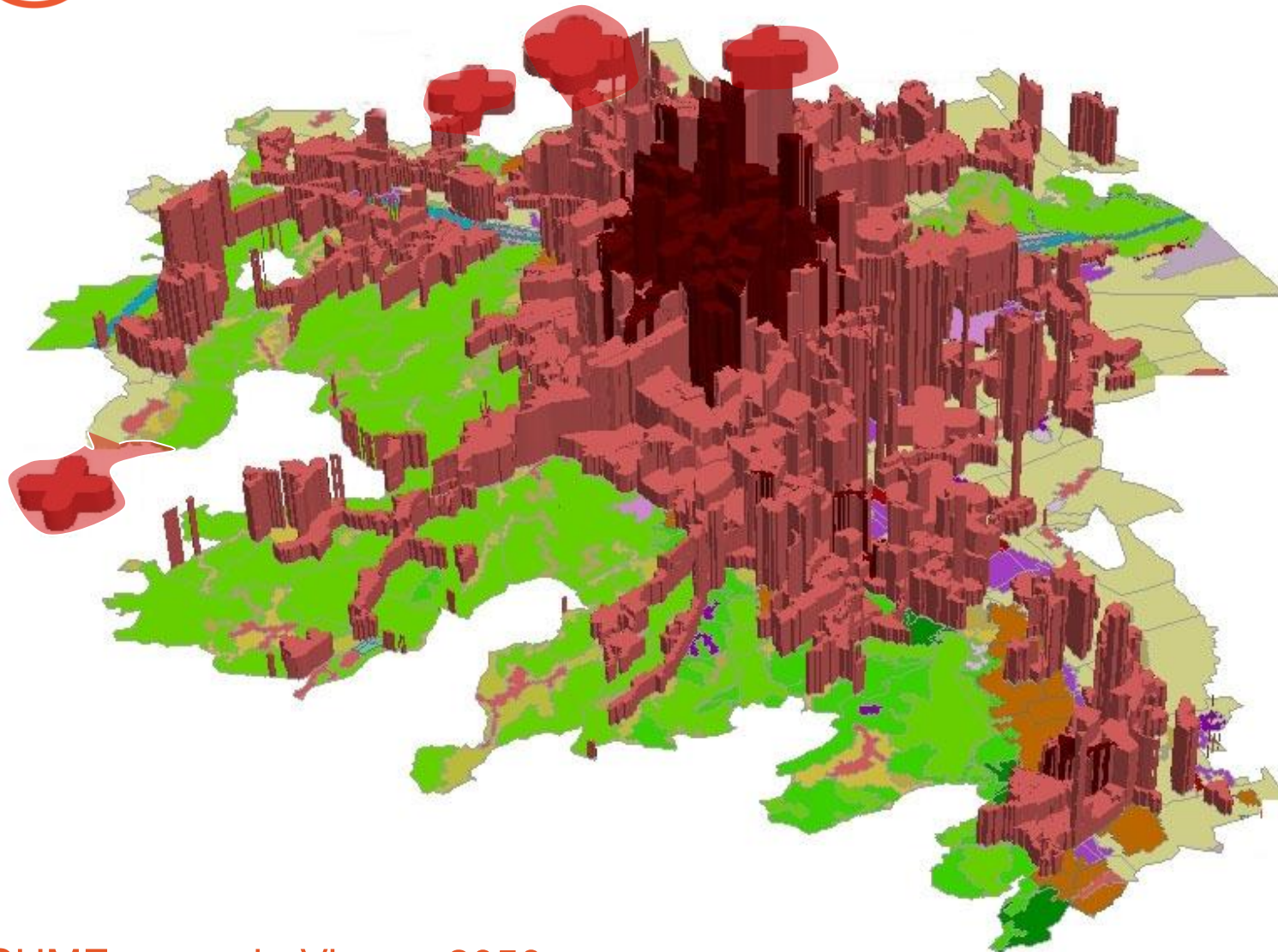
Vienna (AT): TREND spatial development scenario 2000 - 2050



TREND scenario Vienna 2050:

Dispersed urban development leads to expansion of the urbanized zone by +54%

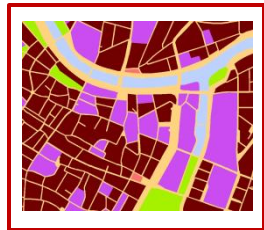
Vienna (AT): SUME spatial development scenario 2000 - 2050



SUME scenario Vienna 2050:

Densification strategy reduces the expansion of the urbanized zone to only **+14%**

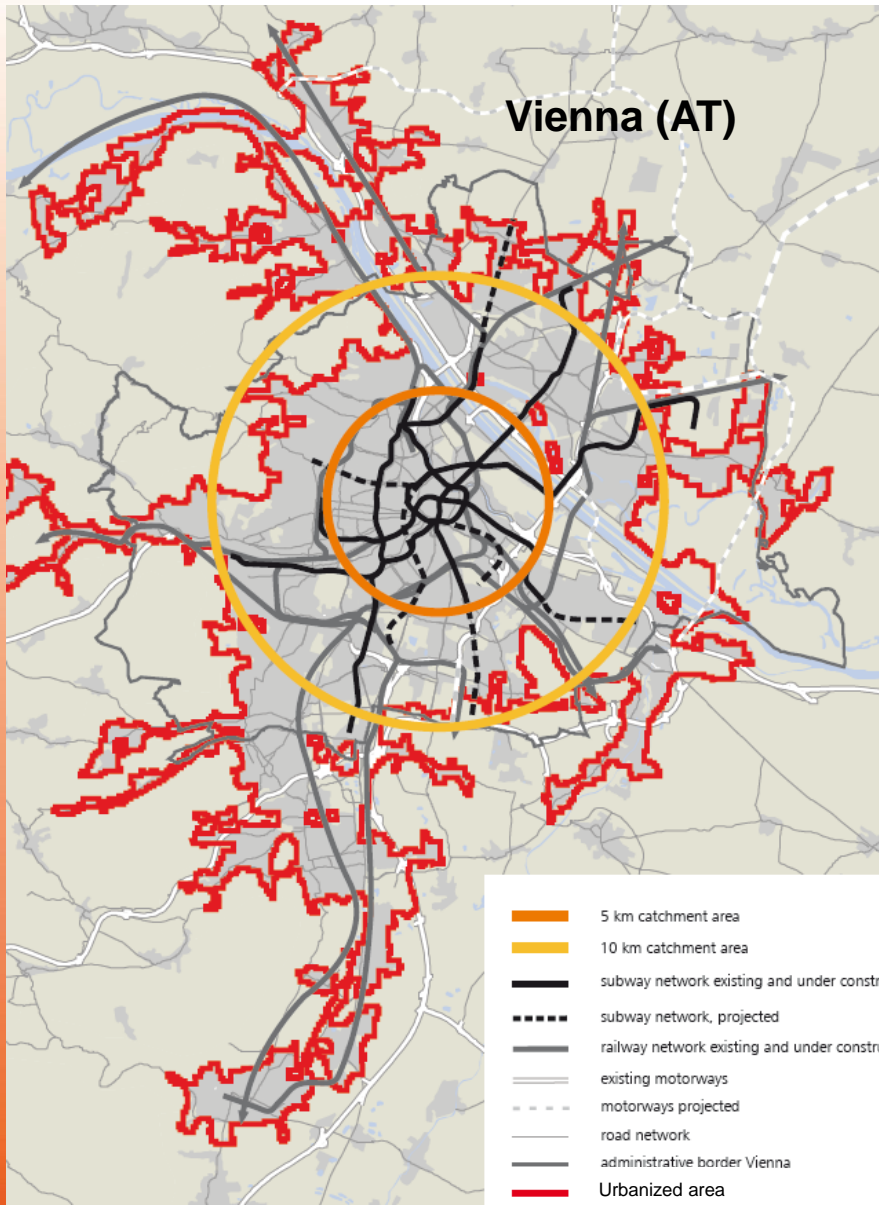
TREND vs. SUME scenarios: Growth of urbanized zones 2000 – 2050



	Density: pop./km2 in urbanized zone 2000	population in urba- nized zone 2050 (Mio.)	population change 2000-2050	Growth of urbanized zone in % 2000 - 2050	
				TREND	SUME
Vienna	4.185	2.4	+35%	+54%	+14%
Munich	4.556	2.0	+17%	+41%	+18%
Porto	3.798	1.2	- 4%	0%	0%
Athens	9.822	3.7	+9%	+24%	0%

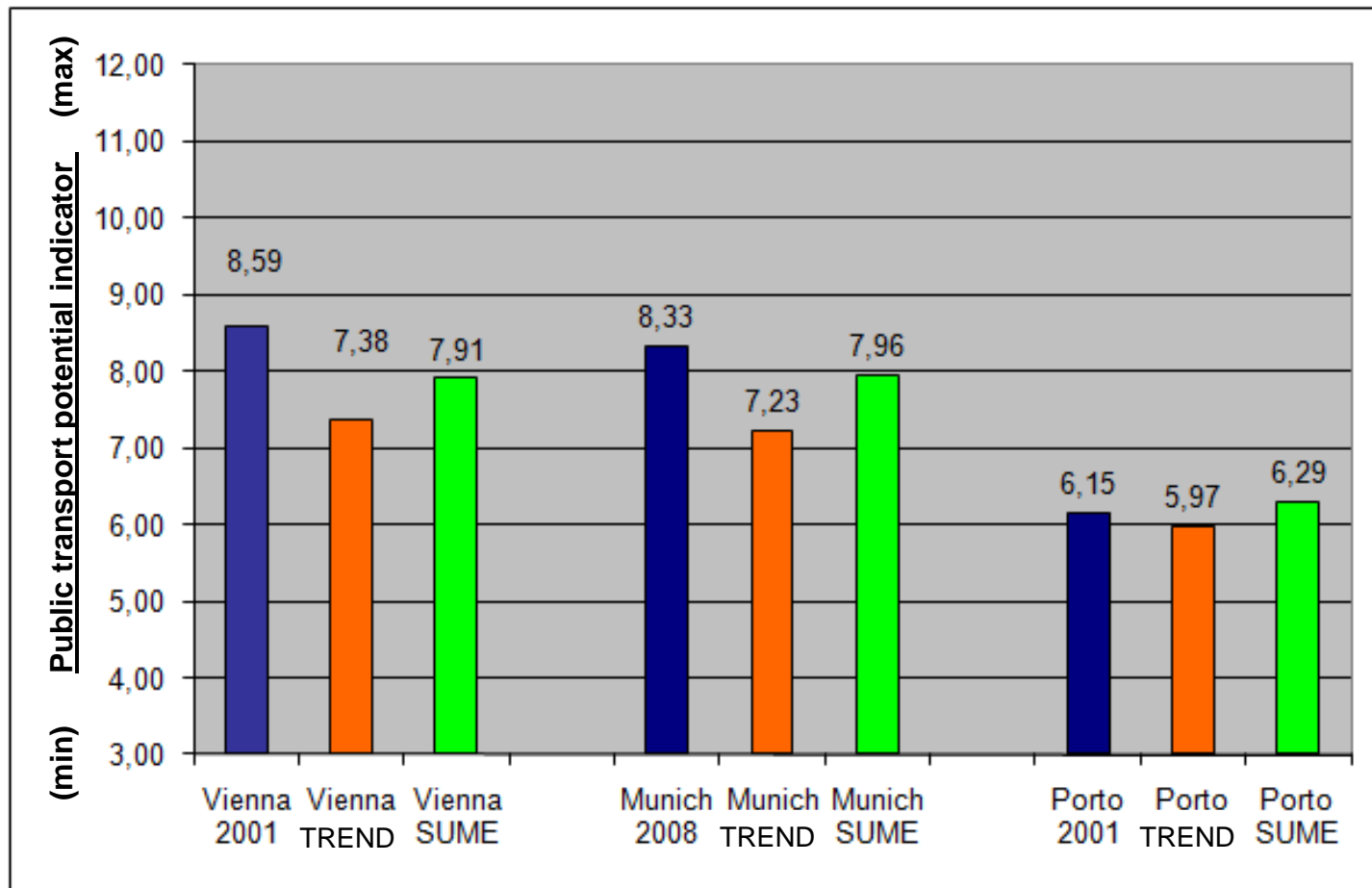
Conclusion:
Urban development can be made more compact and sustainable, if **SUME-type spatial development strategies** are applied

The second challenge: Transport



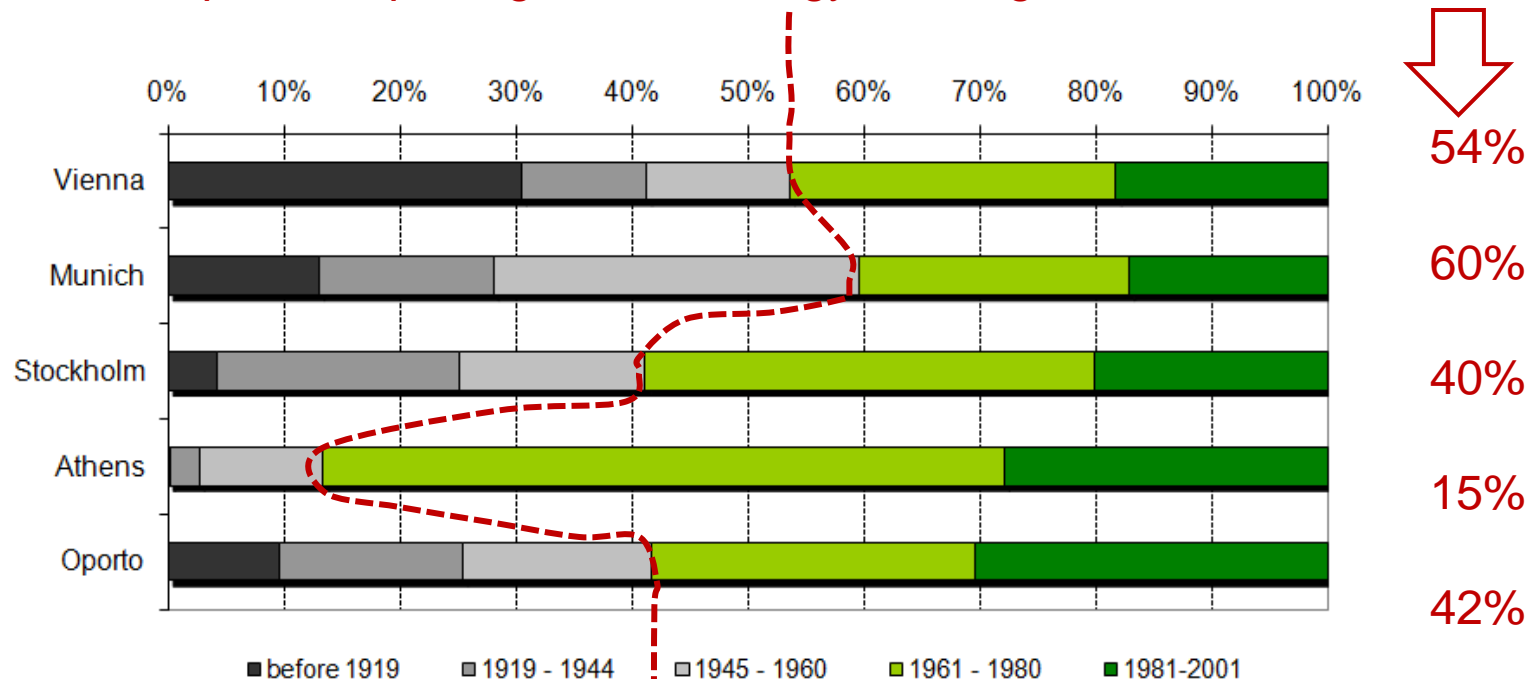
- The share of car use for daily trips is influenced by the accessibility of good quality public transport
- Growing cities tend to expand spatially, they lose compactness and access to public transport lines
- ▶ But: Urban spatial development scenarios show the trends, SUME scenarios show the potential to improve accessibility

The potential to use public transportation, depending on spatial development 2000 - 2050: TREND and SUME scenarios for Vienna, Munich, Porto

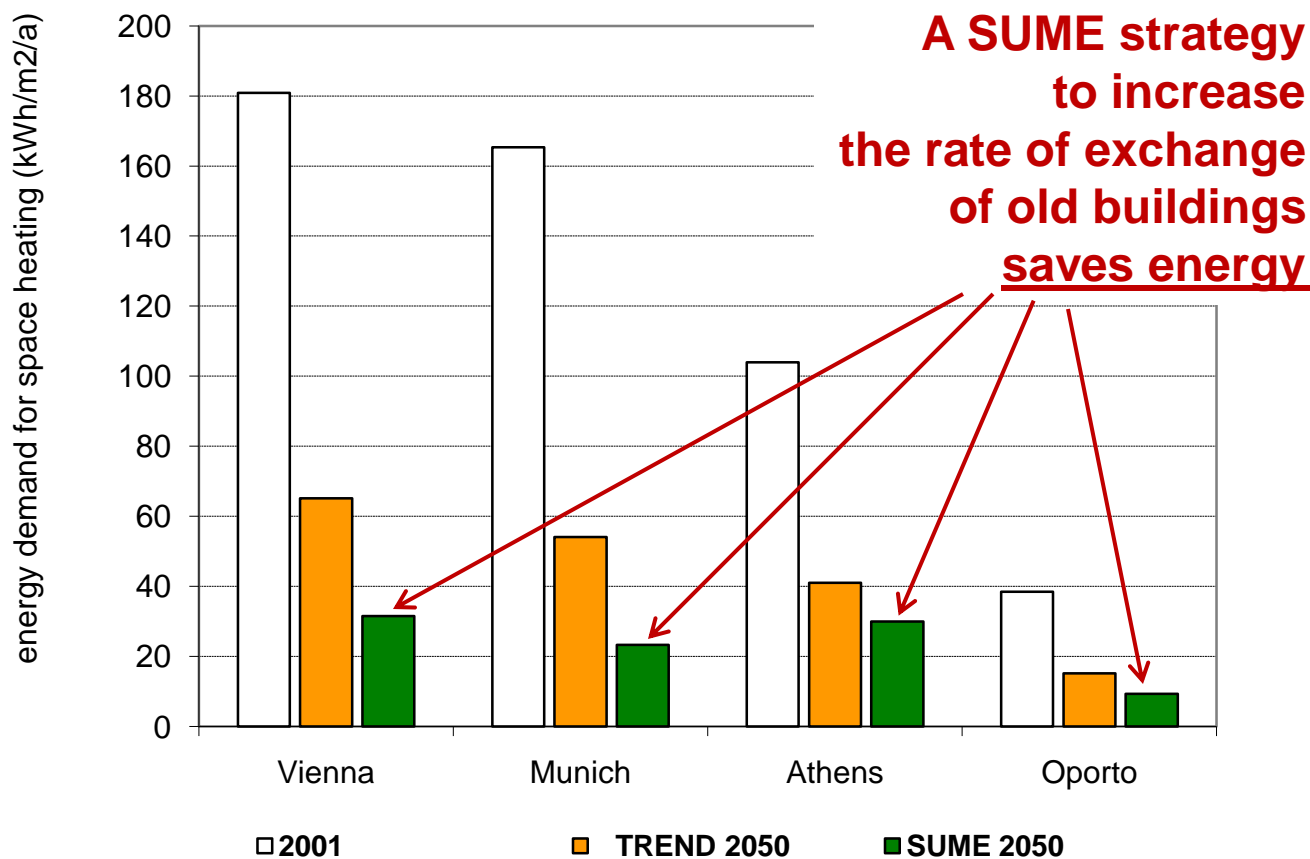


The third challenge: Transforming the building stock to reduce energy consumption

- Cities have different building age structures (and corresponding technical standards), which are decisive for the potential to reduce their energy consumption for heating
- If buildings are being replaced after 80 years:
→ the option for putting in zero-energy housing until 2050 in % of total is



How energy demand for space heating can be reduced 2001 - 2050: Scenarios TREND and SUME



SUME results so far:

- Fast growing cities have shown a massive expansion of their urbanized zones – with impacts on land use and transport energy
- But: Growing cities have the greatest potential to save (material) resources and energy in the future, depending on their planning policies (urban form & transport system)
- They also have the greatest opportunity to improve energy consumption for heating and cooling - through an accelerated increase of the share of zero-energy buildings
- **Conclusion:**
Fast growing cities have the greatest chance (and also responsibility) to contribute to sustainable urban development !

Urban development in China will have a major impact on the country and the rest of the world - for many years to come:

SUME is offering compact experience - and will learn from China !

Eco-City Dongtan-Shanghai



- **Energy**
64% reduction in energy demand,
no emissions from energy for heating,
saves 350,000 tonnes of CO2 per year
- **Mobility and Access**
Improved accessibility reduces travel
distances by 1.8M km.
Zero emission transportation reduces
CO2 emissions by 400,000 t/a