



Sustainable Energy Financing Platform Austria



Smart block II:

Cross-building concepts for energy in renovation of the existing building stock in urban areas

Daniel Berger, Austrian Society for Environment and Technology (ÖGUT)

Highlights of Energy Research 2018 - System Integration and Sector Coupling
Vienna – March 20th, 2018



Grant Agreement number: 696008 — SEFIPA — H2020-EE-2014-2015/H2020-EE-2015-3-MarketUptake

The project leading to this application has received funding from the European Union's Horizon 2020 research and innovation program under grant agreement No 696008.

■ SMART BLOCK II approach

- ◆ Raise refurbishment rate and the share of renewable energy by looking at building blocks instead of single buildings
- ◆ Using participative methods to motivate/enable building owners and tenants

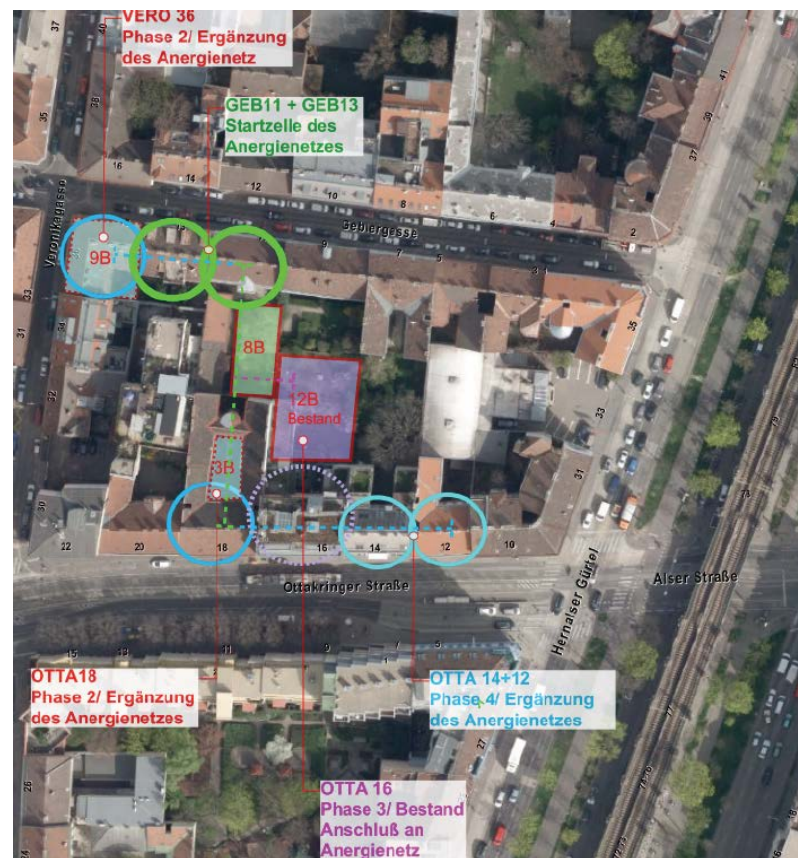
■ SMART BLOCK II solution

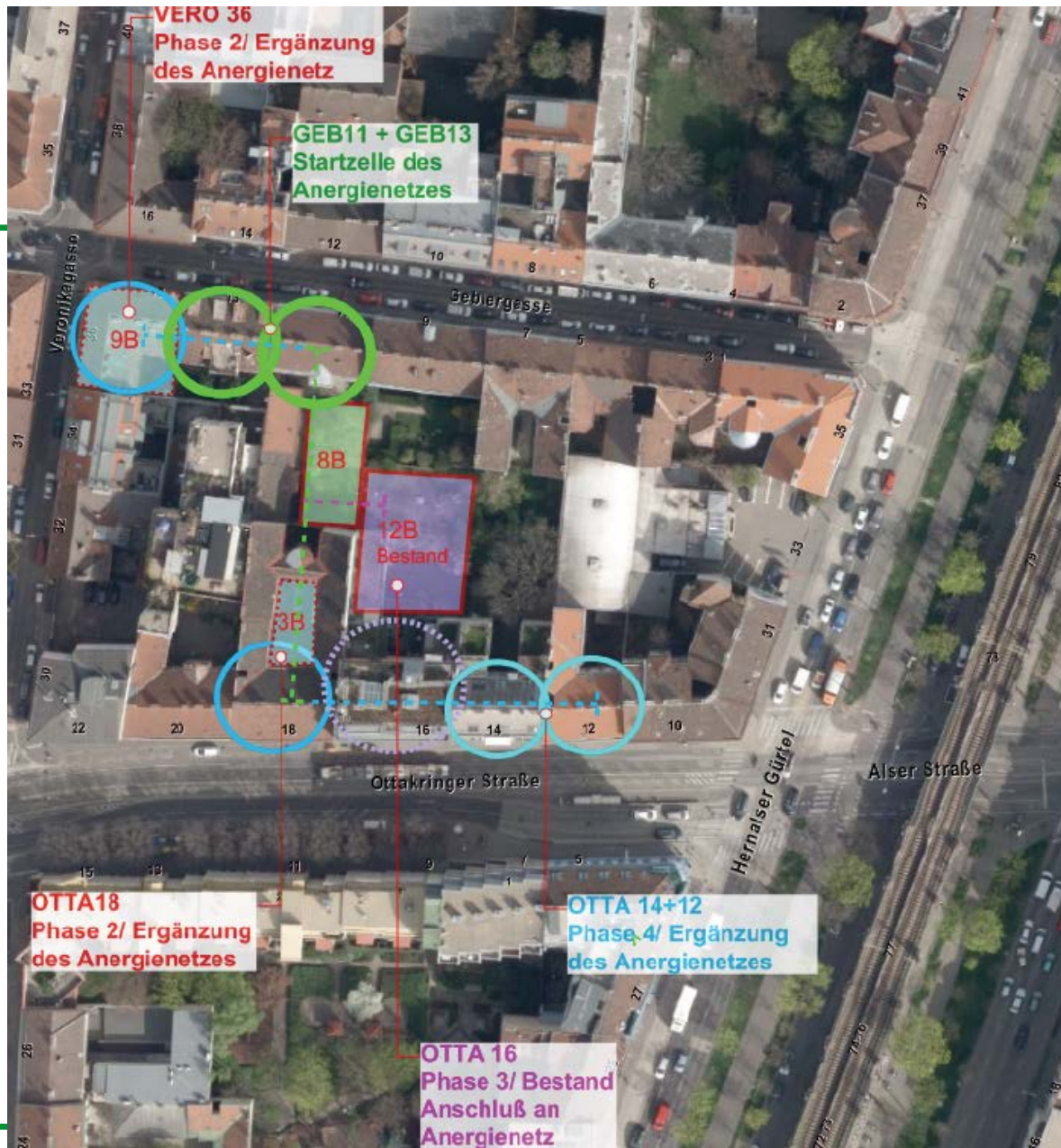
- ◆ Technical solution with seasonal heat storage by deep drilling, hybrid solar collectors and heat pumps, SPF >6
- ◆ Organizational solution through joint energy system for a block of buildings: economy of scale and gaining synergies (solar, storage mass, peak load planning)
- ◆ Economic solution: Investment and operating by supply contractor. High investment costs shared between landlord and tenant



■ The pilot project in detail

- ◆ Block of 18 buildings, tenant houses
- ◆ Phase I: 2 buildings, 20 apartments
start of construction: spring 2018
Phase II: 4 additional buildings
(planned 2019 and 2020)
- ◆ High investments for geothermal, solar and heat pump, **but low energy costs.**
- ◆ Full cost: lower than district heating system
- ◆ 85% energy savings compared to district heating (20 vs. 157 MWh/a)

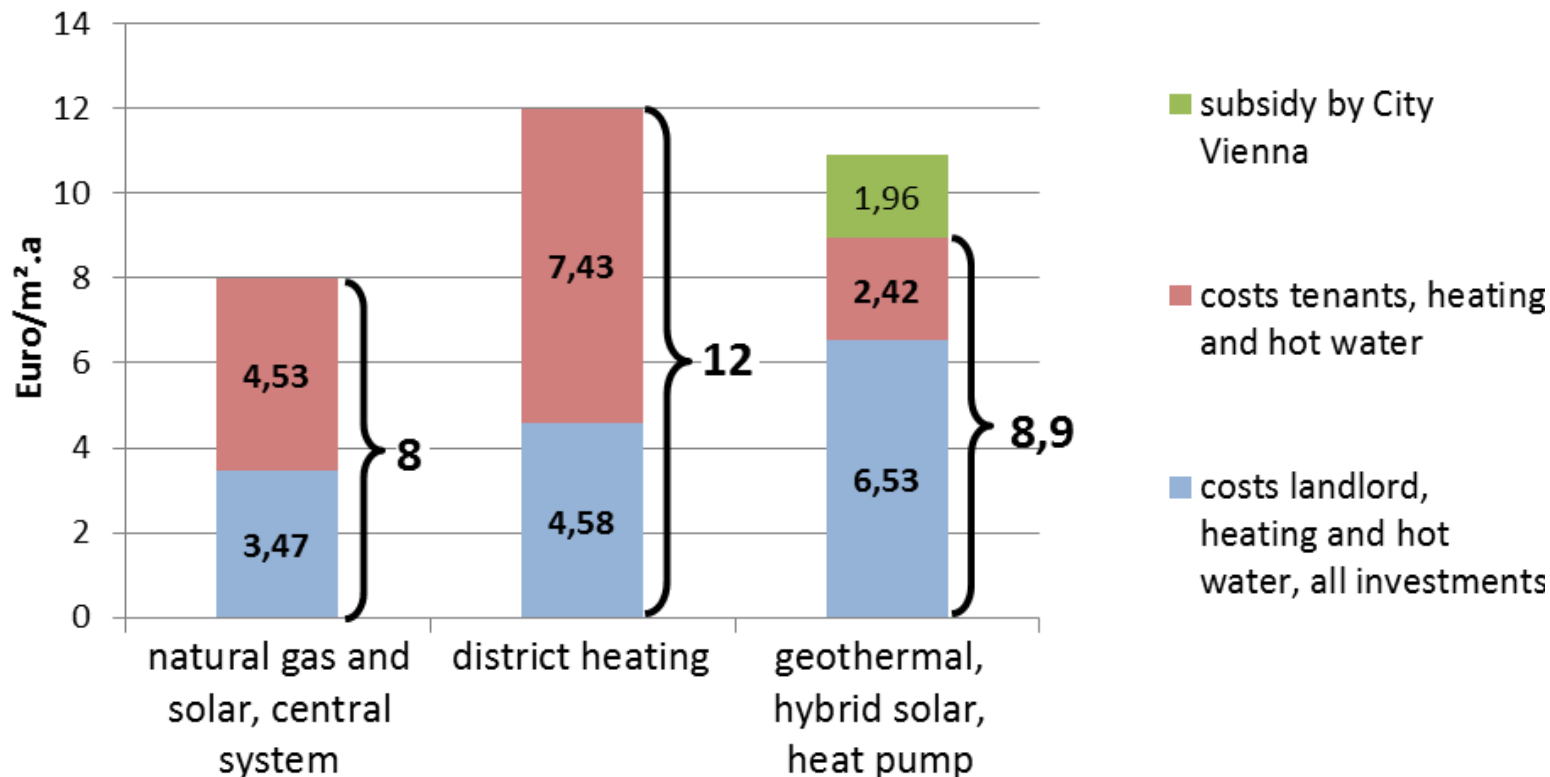




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■ Full costs for heating and hot water for a typical Viennese building comparison over 20 years



- **Energy Grid and Heat Pumps to couple heat sector and electricity sector**
 - ◆ Enabling Demand Side Management using the thermal mass of buildings
 - ◆ Flexible electricity tariff saves costs and relieves electricity grid

Stündlich angebotene Strompreise (Arbeitspreise, netto) in AT, Quelle: aWattar, 2016, Datenbearbeitung: ÖGUT



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■ Demand Side Management using energy price predictions

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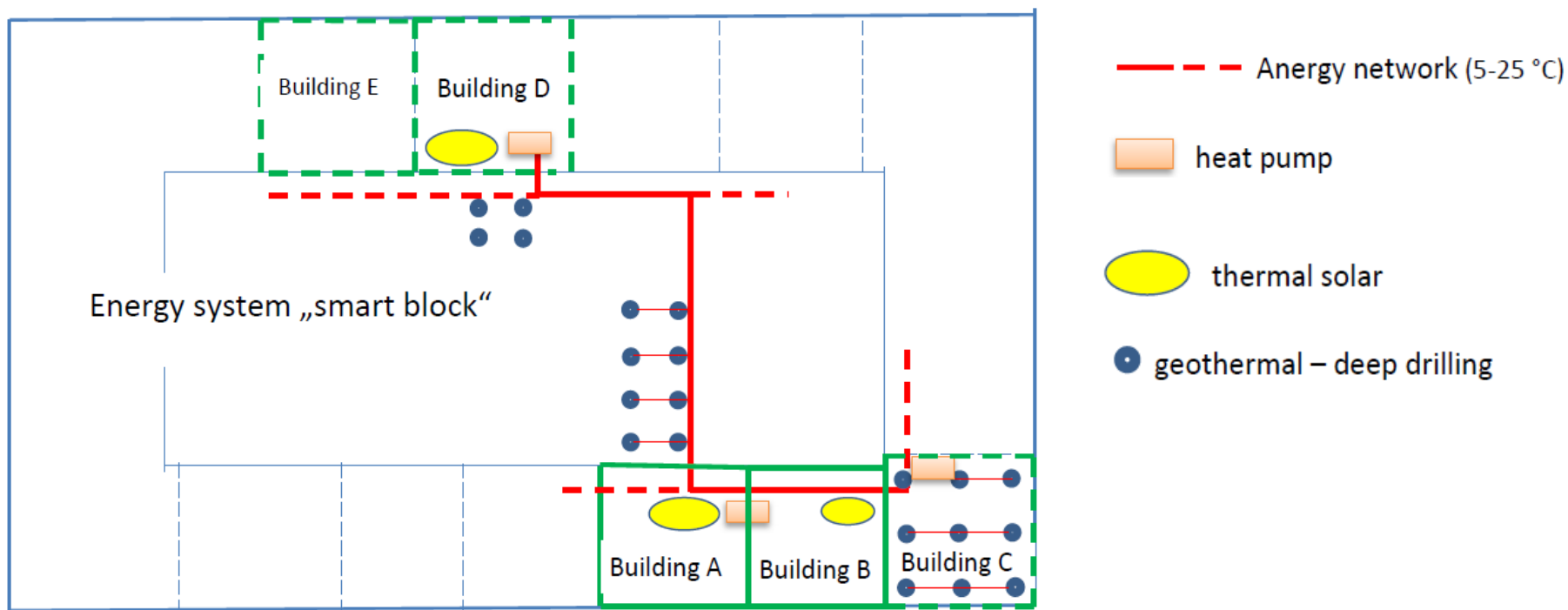
Februar	Tag 1	Tag 2	Tag 3	Tag 4	Tag 5	Tag 6	Tag 7	Tag 8	Tag 9	Tag 10	Tag 11	Tag 12	Ta
00:00	1,442	0,03	1,158	1,638	2,3	1,555	0,598	0,799	-1,234	1,368	1,746	2,159	
01:00	1,507	-0,266	0,809	1,599	2,222	1,601	0,502	0,524	-1,995	1,306	1,691	2,13	
02:00	1,327	-0,192	0,693	1,529	2,01	1,433	0,305	0,116	-1,93	1,341	1,697	1,986	
03:00	1,387	0,009	0,904	1,393	2,118	1,378	0,093	0,14	-0,552	1,43	1,766	2,069	
04:00	1,426	0,952	1,374	1,701	2,118	1,398	0,001	0,732	0,279	1,62	1,855	2,164	
05:00	2,393	1,568	2,141	2,243	2,597	1,505	-0,091	1,232	1,698	2,28	2,084	2,718	
06:00	3,59	2,292	3,325	3,196	3,392	1,608	0,113	1,617	1,975	3,059	3,082	3,643	
07:00	3,799	2,299	3,5	3,091	3,748	1,802	0,574	1,655	2,343	3,205	2,534	3,73	
08:00	3,605	2,215	3,396	2,793	3,525	1,934	0,801	1,641	2,099	3,242	2,284	3,497	
09:00	3,334	2,216	2,544	2,919	3,65	1,71	1,292	1,656	2,39	3,094	2,112	3,47	
10:00	2,924	2,253	2,293	3,022	3,594	1,65	1,379	1,661	2,493	2,998	2,474	3,348	
11:00	2,499	2,208	2,146	2,797	3,436	1,609	1,384	1,635	2,703	2,597	2,372	3	
12:00	2,196	2,209	2,095	2,687	3,195	1,511	1,219	1,61	2,869	2,774	2,301	2,693	
13:00	1,834	2,219	2,293	2,585	2,774	1,399	1,176	1,615	2,744	2,744	2,103	2,562	
14:00	1,797	2,335	2,302	2,794	2,533	1,529	1,001	1,635	2,697	2,777	3	2,5	
15:00	1,824	2,331	2,64	2,781	2,478	1,701	1,332	1,594	2,724	2,868	3,158	2,718	
16:00	2,337	2,842	3,262	3,5	2,996	1,997	1,664	2,088	3,101	3,21	3,6	3,456	
17:00	2,395	2,999	3,669	4,218	3,309	2,315	2,21	2,726	3,998	3,659	4,102	4,036	
18:00	2,265	2,461	3,619	3,901	2,801	2,102	1,723	2,102	3,406	2,944	4,134	3,556	
19:00	1,775	2,251	3,013	3,204	2,57	1,607	1,788	1,524	2,877	2,318	3,298	2,996	
20:00	1,463	1,759	2,375	2,696	2,312	1,271	1,379	1,252	2,397	2,166	2,996	2,645	
21:00	1,416	1,418	2,241	2,783	2,455	1,504	1,504	1,211	2,078	2,194	2,946	2,718	
22:00	0,844	0,953	1,713	2,398	2,271	1,174	0,029	0,972	1,599	1,888	2,61	2,545	
23:00	0,406	1,375	1,804	2,461	1,818	0,501	1,002	-1,994	1,308	1,772	2,281	2,223	

Energy price in Cent/kWh	
> 5	
4-5	
3-4	
2-3	
1-2	
0-1	
< 0	

Hourly offert energy prices (Arbeitspreise, netto) in AT, Source: aWattar, 2016, Calculation: ÖGUT



■ Energy networks as a standard solution for the existing building stock



■ Contact

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