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ENERGY SUPPLY SOLUTIONS

SWITCHING FORM BUILDING TO DISTRICT LEVEL

Momir Tabakovic, Benjamin Böckl, Daniel Nauschnegg, Johannes Wall, Herbert Hemis, Clemens Theuermann-Bernhardt, Michael Alexander Berger

Vienna Energy Club 25th June 2019

PREFACE

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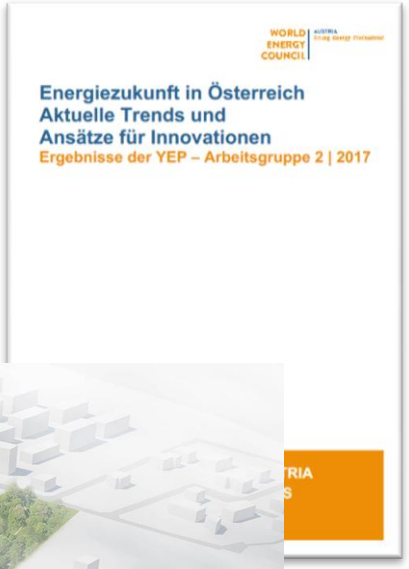
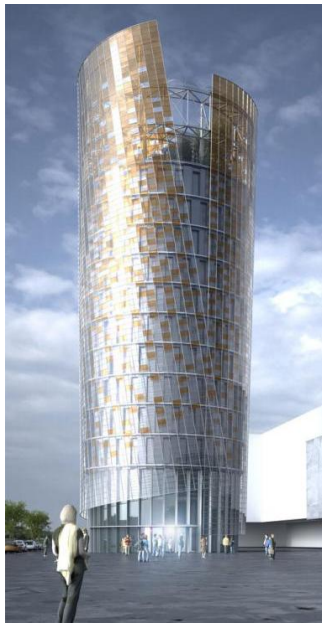
- Follow up WEC YEP Cycle #1 2015 – 2018
- Switching from building level to district





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REPORT STRUCTURE

1ST DRAFT

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1. Motivation

2. Initial Situation
   a. Definition – “District“
   b. Definition – “Plus-Energy-District“

3. Overview on energy supply solutions on district level in Austria

4. Districts and their contribution on “#mission2030”

5. Analysis of selected districts and their business models (development strategies), energy concepts and technologies.

6. Tools on how to deal with energy supply solutions on district level

7. Recommendations on plus energy districts
   a) Public Administrations
   b) Project developers

8. Members of our working group

9. Literature

SUSTAINABLE DEVELOPMENT GOALS

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Picture Source: https://www.isglobal.org/en_GB/-/sdgs-and-global-health

INITIAL SITUATION

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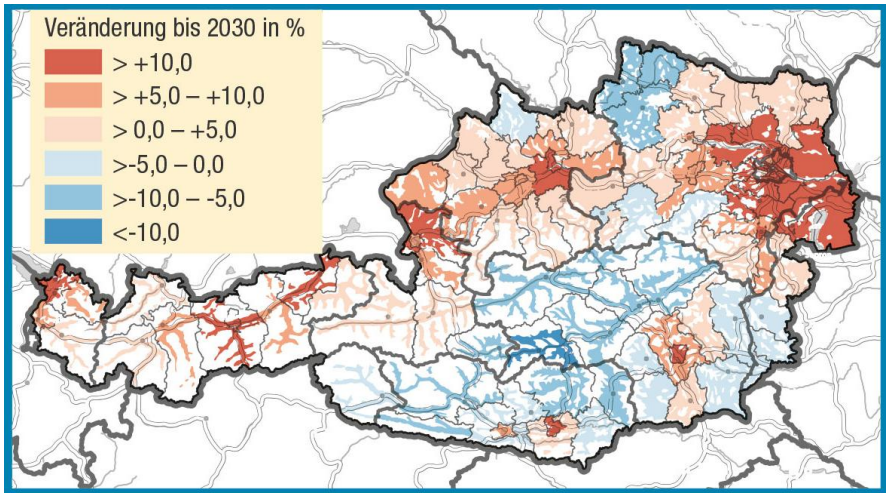
- Increasing urbanization
- Importance of focusing city districts
- Energy exchange (supply – demand)
- Demonstration projects and technologies



Source: VCÖ Factsheet 215-12 | Data: ÖROK 2014, Statistik Austria 2014

GOALS

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- Interdisciplinary analysis and consideration of energy supply solutions on district level
- Focusing on plus energy districts comprehensive energy concepts
- Especially district heating/cooling and adapting to climate change
- Deductions and recommendations

Screening #mission2030

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- 27% of the annual energy in Austria is demanded bey heating, cooling warm and hot water supply.
- Great potential on improving the contribution of the building sector (fossil heating systems e.g. oil)
- Focusing district heating based on industrial waste heat utilization
- Thermal retrofitting insulation (considering summer heat protection / cooling measures)
- Energy efficiency on heating and cooling demand
- Buildings as energy storages
- Increasing on-site generation relieving transmission grid

DEFINITIONS
PLUS ENERGY DISTRICTS

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- Not easy to find common definitions
- Legal and regional boundaries
- Different focus and priorities

- Energy supply and urban planning
  - Positive energy balance
  - System boundaries spatial determined area
  - Considering embodied carbon emissions
  - Mobility
  - Holistic consideration of energy demand

CASE STUDY VIENNA

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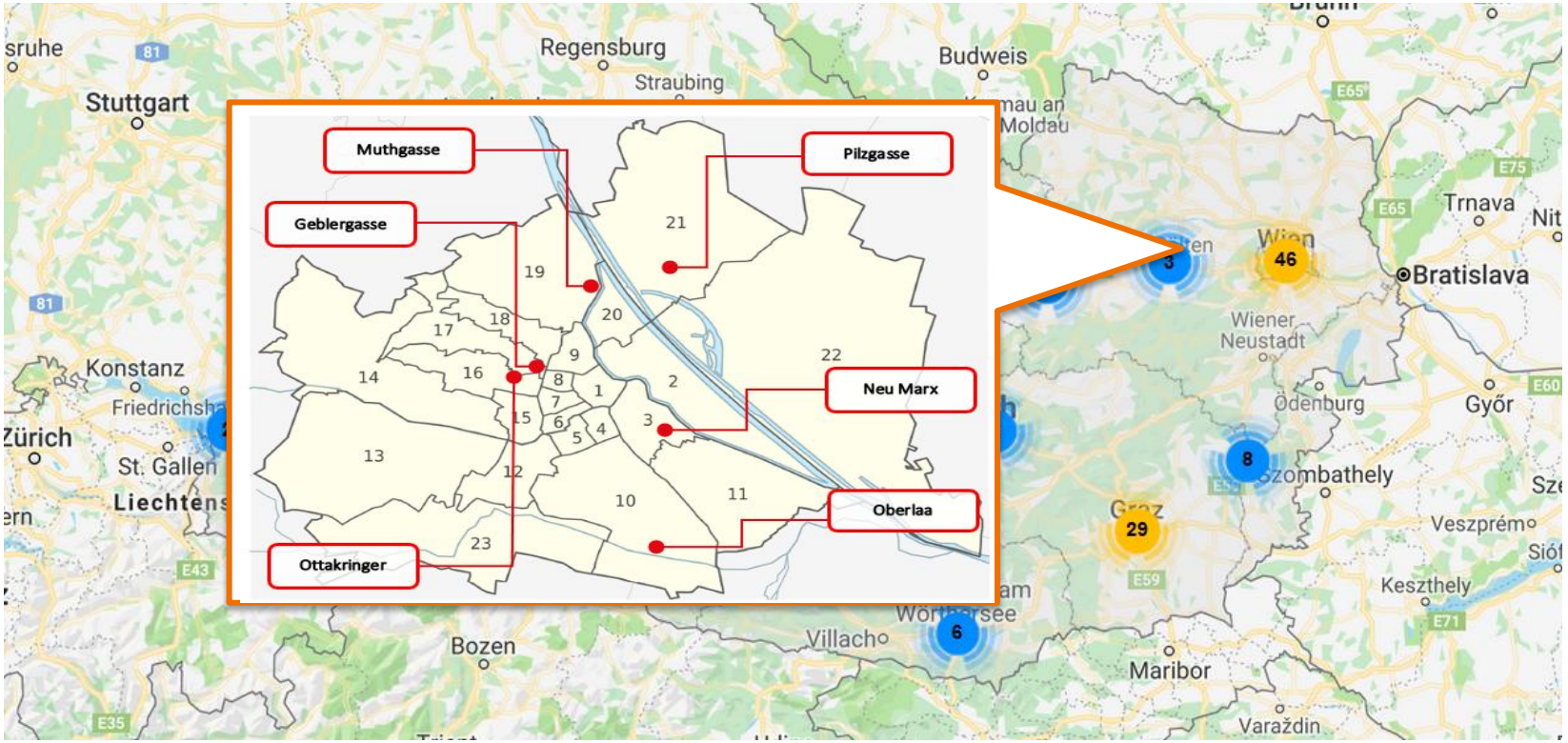
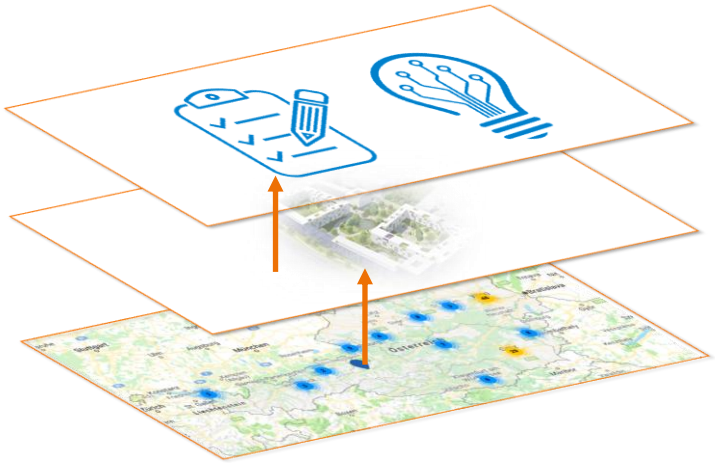
Screening projects focusing energy solutions on district level.



Source: klima+energie fonds | Österreichs Smart Cities und Smart Urban Regions

ANALYZING DISTRICTS – SELECTED INDICATORS

- General information
- Buildings and district structure
- Climate protection
- Energy efficiency
- Infrastructure (mobility)
- On-site energy supply
- Policy, administration and governance



PRELIMINARY FINDINGS

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- Rising share of renewable energy sources stets up requirements on the integration and supply reliability of the whole energy system.
- Dealing with peak demand/supply on integrating PV and pushing e-mobility
- System boundaries district level: on-site generation and supply solutions
  - Considering regional and local circumstances and sources
  - Using demand side management
  - Storage enabling flexibility
  - Linking potential for district heating

TAKE AWAY MESSAGE

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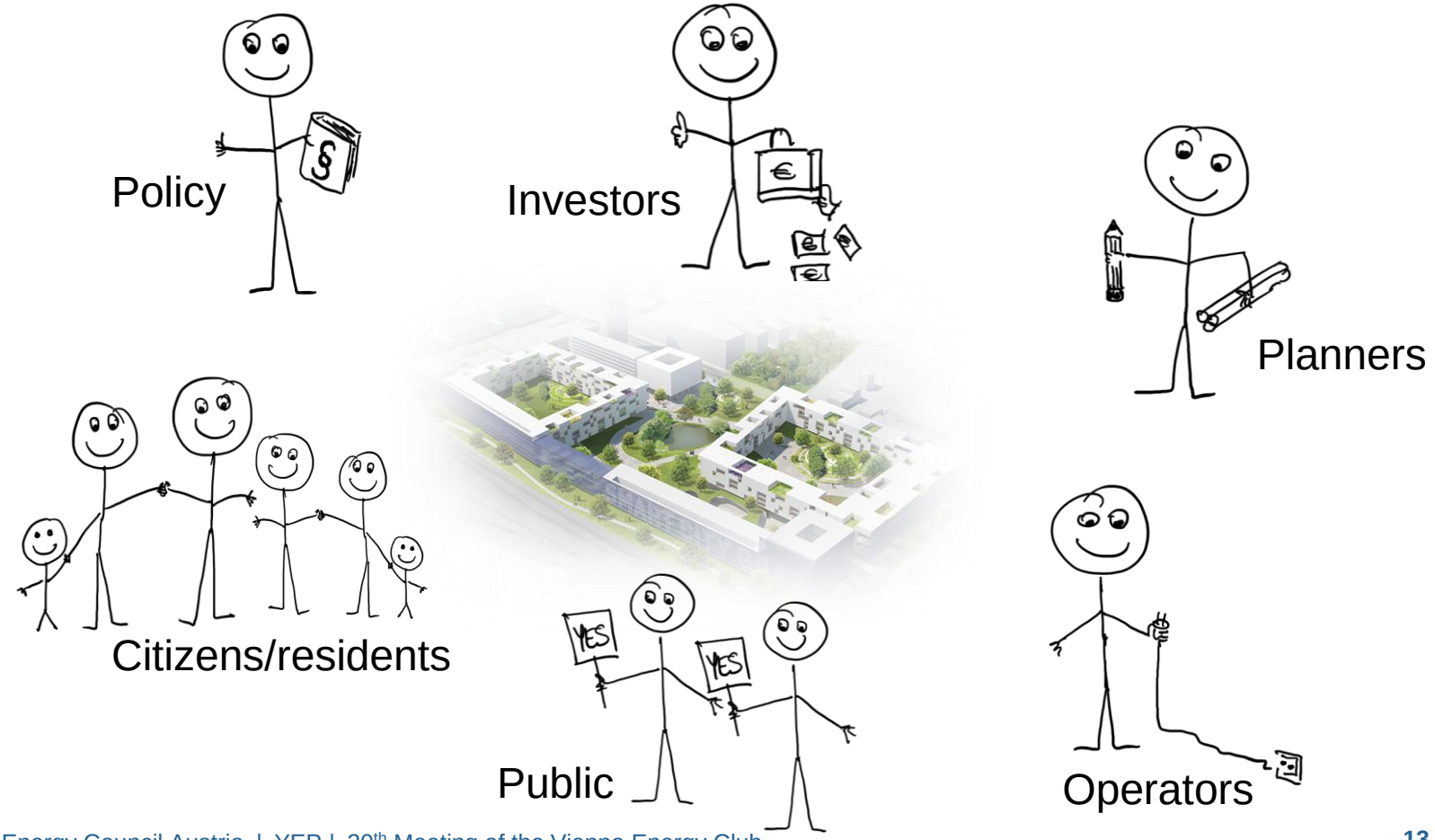
Linking relevant stakeholders and decision-makers



TIMELINE

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1 Kick off, bundling up as a working group [Summer 2018]

2 Research and screening relevant information on districts [Fall/Winter 2018]

7 Final Submission/ Presentation (intended)

3 Merging of content [Spring 2019]

4 Selecting and analysing districts
- energy concepts
- technologies
- implementation plan / strategy

6 Review Process by WEC YEP board [Fall 2019]

5 Summary and recommondations [Summer 2019]

WORKING GROUP MEMBERS

WORLD ENERGY COUNCIL | AUSTRIA YOUNG ENERGY PROFESSIONALS

- Momir Tabakovic | 1. contact person
- Benjamin Böckl | 2. contact person
- Herbert Hemis
- Daniel Nauschnegg
- Clemens Theuermann-Bernhardt
- Michael-Alexander Berger
- Johannes Wall

WORLD ENERGY COUNCIL | INSERT MEMBER COMMITTEE LOGO HERE

Thank you

Johannes Wall

j.wall@gmx.at

Vienna Energy Club 25th June 2019

GROUP MEMBERS

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Momir Tabakovic

Ing. Momir Tabakovic PhD., MSc., get his PhD. degree in Renewable Energy from the Technical University in Bratislava and his MSc. degree in Renewable Energy from the University of Applied Sciences(UAS) Technikum Wien. He is researcher and lecture at the University of Applied Sciences Technikum Wien in the field of renewable energy, especially in the field of Building-integrated photovoltaics, thermoelectricity and smart city.

He is a member of the Austrian Photovoltaics Technology Platform. For several years he is member of the World energy council and the International and European Thermoelectricity Society. Within the European project Dem4BiPV (Development of innovative educational material for Building-integrated Photovoltaics) he is responsible for the integration of BIPV course in the master program at the university AS Technikum Wien. He is also leading national and international smart city and building projects that deals, especially with the integration of Photovoltaics in the building skin.

GROUP MEMBERS

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Benjamin Blöckl

Dipl.-Ing. Benjamin Böckl got his degree at studying Industrial Energy Technology at Montanuniversität Leoben, where he is also currently finishing his PhD. His main research topic is to analyze the effect of energy storage systems and sector coupling technologies on load flows within the energy supply system. Additionally he graduated from the generic management program at University of St. Gallen.

GROUP MEMBERS

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Herbert Hemis

Dipl.-Ing. Herbert Hemis is an expert for energy planning in the City of Vienna since 2015. As urban planner he is connecting the fields energy and urban planning. He works also as project assistant for the EU funded projects (Smarter Together and Urban Learning) as well as national funded projects. The experiences of these projects will be integrated in the tasks of the City and vice versa. Two main tasks at the moment are the development of energy zoning plans (district heating zones) and generating energy data models like a heat atlas for the city. He worked before in the private sector and in research for the Technical University of Vienna.

GROUP MEMBERS

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Michael A. Berger

Mag. Michael A. Berger earned his degree in business administration at Vienna university of economics and business and London School of Economics and Political Science. He currently works as a controller at VERBUND Hydro Power GmbH. His main Topics are strategic planning activity, based budgeting and financial forecasting analysis.

GROUP MEMBERS

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Daniel Nauschnegg

Dipl.-Ing. (FH) Daniel Nauschnegg has a degree in energy technology and successfully completed his business studies at the university of applied sciences in Krems. He is a energy autonomy coach and consultant for renewable energy.

Since 2011 he is CEO of an electrical installations company specializing on photovoltaics and energy storage. Since 2014 he operates an engineering office on energy coaching, education and training.

Since 2017 he is member of the Austrian Standards committee 235 on economic energy usage in buildings. Furthermore he is contributing to the OVE – Austrian Electrotechnical Association – working group on photovoltaics and storage systems. He is also member of the federal guild of electricians.

GROUP MEMBERS

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Johannes Wall

DDipl.-Ing. Dr.techn. Johannes Wall BSc. studied structural engineering and economic engineering at Graz University of Technology and the University of Calgary in Canada. His PhD thesis was on “Life-cycle orientated Modelling of Planning, Tendering and Awarding Processes” focusing on the consideration of sustainability aspects in planning and project management processes.

Until 2017 he was an university project assistant and doctoral candidate at the Institute of construction management and economics at Graz University of Technology. Since 2018 he is responsible for sustainable building certification at the Ed. Züblin AG in Frankfurt.