
# TRANSATLANTIC URBAN CLIMATE DIALOGUE *plus* – WORKSHOP #2

Transatlantic Exchange in Development of Successful Municipal Utilities: The Role of the Community Energy Planning

Fairfax, Virginia, USA
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Workshop Proceedings

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Transatlantic Urban Climate Dialogue *plus*

The Project is supported by the Transatlantic Program of the Federal Republic of Germany as Part of the European Recovery Program (ERP) of the Federal Ministry for Economic Affairs and Energy

# The Project

The “Transatlantic Urban Climate Dialogue” (TUCD) is grounded in several model institutional partnerships and precedents of successful exchanges on urban sustainability between German and North American regions. These partnerships are characterized by the inclusion of governmental, academic and commercial partners.

In April 2013 the TUCD received a grant for an extension of the project from the Transatlantic Program of the Federal Republic of Germany as Part of the European Recovery Program (ERP) of the Federal Ministry of Economics and Energy.

The core structure of “Transatlantic Urban Climate Dialogue plus” (TUCD+) is the same as the previous project. The dialogue between elected officials, senior corporate representatives, technical experts and practitioners from Germany, Canada and the United States on the mutually beneficial transfers and applications of Integrated Community Energy Plan (CEPs) among the metropolitan regions of Northern Virginia, Guelph, Stuttgart and the Ruhr Valley was supposed to be intensified by two further workshops. TUCD+ runs from October 2013 to September 2014.

The first workshop of TUCD+ was held in Berlin, Germany, February 17–19, 2014. The participants represented the urban regions of Northern Virginia, Guelph/Ontario, Stuttgart and the Ruhr Valley. The second workshop took place in Fairfax, Virginia from August 25–26, 2014.

Again, the Environmental Policy Research Centre (FFU) of the Freie Universität Berlin oversees the project.

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# Opening Session

## KEYNOTE SPEECH

## The Global Significance of Sustainable Energy Planning at the Local Level

*Michelle Wyman, Director for Intergovernmental Affairs, US Department of Energy*

### Climate Change

President Obama has made clear that he has an all-of-the-above approach to energy. This strategy is not merely a slogan, but a clear-cut pathway to creating jobs and at the same time reducing carbon emissions, which recently stood at their lowest level in 20 years.

This all-of-the-above approach starts with a commitment to low carbon technologies. Today, more than any time in our history, the global community including the United States, understands the serious threat of climate change to the global economy, our security, and our way of life.

Last month, the Federal Government released the third National Climate Assessment – the most comprehensive scientific report to date laying out climate change impacts in every region of America.

- The Climate Assessment documents in rich detail the observable impacts in our country – and the threats further impacts pose in the near and distant future. A team of over 300 experts compiled over 800 pages of findings, which were exhaustively peer reviewed.
- It is compelling reading. From Alaska and New York to Florida and the Caribbean, rising sea levels, rising temperatures, more extreme droughts and rain events, and public health impacts are already taking a serious toll. Climate impacts pose a grave threat to our economy.
- For example, at risk today is the only highway link in the United States to the energy infrastructure in Port Fourchon, Louisiana, which supports 90 percent of the nation's offshore oil and gas production. Already flooding periodically, rising sea levels would cut off that key industrial complex from the mainland – and jeopardize our vital energy supplies.

Increasing precipitation, temperatures and sea levels in the United States

If we look at the Northeast, between 1895 and 2011, temperatures increased by almost 2°F, while precipitation increased by more than 10%. Since 1900, we've seen a sea levels rise more than a foot in this region – increasing coastal flooding and tidal surges. We know that things are only going to get worse. The Northeast has already experienced a greater increase in extreme precipitation than any other region in the United States.

### What are we doing about it?

It's the cities, counties, regions and states that are leading progressive efforts to address these challenges.

Many of these places see the significant opportunities that address climate change offers. If we do the job right, we'll generate hundreds of thousands of new jobs, a cleaner

environment, and sustainable economic growth. You are demonstrating that first-hand through the work on community energy planning in Guelph, Stuttgart and Northern Virginia.

We know that there are many low-carbon energy pathways to a prosperous future while mitigating climate change risks to a significant degree, including through energy efficiency and new renewable technologies.

Community Energy Planning is one step to sustainable economic growth

In recent years, we have made remarkable progress in clean and renewable energy. In the last five years, we have more than doubled the amount of electricity we generate from wind and solar in the US alone.

Today, these technologies represent a relatively small market share domestically, but with the dramatic growth rate that we are seeing, we expect a very large portion of our electricity capacity will come from wind, solar and other renewables in the coming decades.

### Examples

- Onshore Wind Power: Since 2008, wind power capacity has more than doubled. And wind was the fastest growing source of electricity in 2012, representing 43 percent of all new generating capacity.
- Photovoltaics: The price for a PV module has declined more than 75% since 2008. And last year, solar deployment set a record with 4.75 gigawatts installed in 2013.
- LED Lighting: In the last five years, the cost of super- efficient LED lights has fallen more than 85 percent and sales have skyrocketed – there were more than 34 million LED lights installed in America at the end of 2013.
- Electric Vehicles: Last year, Americans bought nearly 100,000 plug-in electric vehicles, nearly twice as many as sold during 2012. And the cost to manufacture advanced electric vehicle batteries has dropped by more than 50% since 2010.

The common denominator with all of these examples is they create and rely on energy. Diversifying the energy infrastructure system to support the range of energy efficiency and renewable energy options is a key priority of this Administration.

And for cities, counties and regions, “localizing” energy systems offers increasing appeal to achieve greater reliability, stability and low-carbon energy portfolios. Community energy planning is not just the wave of the future or something that more progressive local governments in other countries like Germany and Canada are doing, it is happening now right here in the US. Right here in Northern Virginia.

Diversification of energy infrastructure as a key priority of the Obama Administration

### Climate Change Impacts

Bottom line, for the balance of the President’s term, and the Energy Secretary’s tenure, they are committed to doing all they can to advance a clean economy. They are serious about bringing down the growth curve of energy use for the obvious reason that energy waste

makes no sense. But the larger reason is that climate change is a real and immediate danger to our existence on this planet – and that doing nothing or doing something half-heartedly are not options.

### Conclusion

This Administration is taking action. But we also need the best minds and leaders at the local level to continue to 'manage up' and show us how its done.

Prove us right; press us for policies that enable further action. Continue to reinforce the work through proof in concept so that the United States can institutionalize the new energy economy across its energy system. Technical exchange efforts like the Transatlantic Urban Climate Dialogue are essential to further enabling and empowering national leadership.

## The Understanding of the Bioeconomy

*Prof. Dr. Andreas Pyka, Center for Research and Innovation Services,*
*University of Hohenheim, Germany*

### Definition – Bio-economy

"Bio-economy covers all manufacturing sectors and associated service areas that develop, produce, process, handle, or utilise any form of biological resources, such as plants, animals, and microorganisms. This spans numerous sectors, such as agriculture, forestry, horticulture, fisheries and aquaculture, plant and animal breeding, the food and beverage industries, as well as the wood, paper, leather, textile, chemicals and pharmaceutical industries, and aspects of the energy sector" (BMBF: National Research Strategy Bio-Economy 2030). Bio-economy is associated with a knowledge based, innovative and sustainable way of economy.

### The Challenge: Transforming an Economy towards a Bio-based Economy

Textbook economics assumes stable structures in order to apply the famous optimization toolkit. This is necessary because the uncertainty of open development processes (driven by innovation) is at odds with the idea of well-framed decision problems subject to optimization.

### Qualitative Changes – from micro to meso to macro

In a historical perspective the transformation towards a bio-based economy is nothing exceptional. However, in order to analyze these qualitative economic developments, one has to apply new tools, which focus on change. Economic development best can be observed on an aggregate macroeconomic level, but it can be neither explained nor understood without analyzing the sectoral transformations (new industries emerge, mature industries disappear, previously successful technologies and competences become obsolete while new competences become to dominate and economically very dynamic regions might stagnate with other geographical regions taking over the lead).

All sectorial changes are triggered on a microeconomic level by innovative and entrepreneurial activities – "creative destruction" and "destroying the circular flow" (J. A. Schumpeter, 1912). And all sectorial changes ask for severe changes in the behavior of consumers.

**What qualitative changes are to be expected in a bio-based economy and what are the research questions to be addressed in BECY?**

- The transformation will be driven by inventive and innovative activities. How does new knowledge emerges and spread within an economy?
- New products and services based on renewable resources will replace $CO_2$-intensive products. This substitution triggers several changes: Will these products and services be produced by the same actors that have produced their predecessors? At which part of the value chain the high incomes will be earned?

**What qualitative changes are to be expected in a bio-based economy? And what are the research questions to be addressed in BECY?**

- Can subsidies and taxes influence the transformation towards a bio-based economy?
- Where does the new knowledge come from?
- What role is played by university research, firm research and cooperation between different actors?
- How will labor markets adapt?
- What role is played by high-skilled migration?
- How will the institutions coevolve?
- How is daily life affected by the new technologies?
- What role will consumers play?
- How can policy influence the transformation?

In the US the change of environmental awareness of the citizens began in the late seventies. However, the coordination of the local, national and international policies is still problematic. Comparing Germany and the US, it is obvious that Germany has succeeded in rising awareness among population. The education has a tremendous importance and is the key to success. In the US education of the citizens on sustainable development is lacking, therefore the constant dialogue with public is needed in order to change public behavior.

- Lession learned
  - → Information and Education are key factors for success

## CASE STUDY NORTHERN VIRGINIA

### Local Energy Alliance Program (LEAP) – Re-Energize Reston Project

*Barbara Englehardt, LEAP, Northern Virginia (NOVA) Outreach Manager*

LEAP is a nonprofit organization with the mission to promote and implement energy efficient and renewable technology solutions to improve the comfort, health and performance of buildings in Northern and Central Virginia. The over-arching goals include cost savings, job creation, local economic development and energy self-reliance.

#### The general reasons why energy efficiency matters in Northern Virginia

- Economic (profit)
  - → Cost savings
  - → Clean sector jobs
  - → Scarce resource
- Environmental (planet)
  - → Climate Change
  - → Pollution
  - → Health concerns
  - → Stewardship of natural resources
- Community (people)
  - → Putting cost savings back to local economy
  - → Clean sector jobs in local community
  - → Value of building stock
  - → More desirable place to live

[1] Case studies in order of appearance of presentations during the Workshop

### Occupant Benefits (People)

- Comfort
- Health
- Safety
- Savings and performance
- Value

### A couple specifics about Virginia – the housing stock

- 3.3M homes
- The median age of homes in VA is 34 years
- If no renovations or improvements have been done, these homes are built to 1980 standards
- 1.16M homes built before 1970 (prior to insulation standards)
- Even if insulation has been added in the attic, there is a real opportunity to reduce energy use (because most people have never heard of air sealing)

What motivate people to act and our messaging depends on our audience. Different people have all of these different motivators and it is our job to figure out what triggers action.

### Challenges of Energy Efficiency (EE) in NOVA

- Lack of understanding and knowledge with all the stakeholders here in NOVA.
- Contractors and builders are getting better in green building standards, but building codes and industry knowledge are still lagging.
- Bankers, appraisers, and realtors don't understand how to evaluate or incorporate the value of EE in home sale, which lessens the motivation for homeowners to invest in EE.
- Not captured in the appraisal process.
- Not captured in the sales transaction – EE not currently in the NOVA MLS system.
- Lack of perceived value for energy efficiency improvements.
- Energy efficiency improvements are not visible – homeowners like tangible improvements like granite countertops, or even solar. Harder to get them to invest when you can't see it.
- Investment of money – LEAP can often make a business case for EE investments with the payback, but it's often longer than homeowners want to take given value isn't always realized in the market.
- Investment of time - NOVA has residents with fairly high incomes levels, but sometimes the challenge of time to have the conversations and do the energy improvements is a big hurdle.
- Lack of understanding and knowledge with all stakeholders involved
- Homeowners
- Builders and contractors
- Realtors
- Appraisers
- Financial institutions

- Particular to NOVA – Virginia is that it has a history of being a coal state. Taxes are relatively low. The state is relatively conservative. Utility has strong political power. Unlike some of the neighboring states, NOVA does not have a lot of state rebate programs to fund conservation efforts. So as a nonprofit working to promote and implement energy efficiency and renewable technologies, with any progress, LEAP is making true impacts in the marketplace.

### The Local Energy Alliance Program

LEAP is:

- The one-stop shop of who to call, what to do, and how to pay for it when it comes to making energy improvements in buildings
- Facilitator- sets program standards and works with a network of vetted contractors who are able to deliver those standards
- Educators on the importance of saving energy and how to go about doing it
- Technical resource for homeowners if they have questions during their energy improvement projects, helps provide information on available rebates or tax incentive
- Provides a quality assurance role. This provides piece of mind for the homeowners
- Review energy audit reports and spot check jobs so that we know the contractors are delivering on their promisses
- Issue Certifications as an independent third party verifier (provides certifications for Home Performance with ENERGY STAR and Green and Energy Efficient Appraisal Addendums)

### LEAP Relies on Alliance Partners

As a facilitator and as the LEAP name implies, Local Energy Alliance Program, we rely on an "Alliance" model. LEAP leverages partnerships and resources in ways that are mutually beneficial to all parties involved:

- Governments including federal, state and local governments
- Utilities, which includes Dominion Power, a dominant force in Virginia
- Rely on working with other nonprofits and associations with aligning interests – NVRC, Building Performance Institute, Efficiency First, Interfaith Power & Light, Community Power Network
- Financial Institutions –work with banks and credit unions to help provide low cost financing for energy improvement projects
- Chambers of Commerce and Businesses – It is key that LEAP is working with commercial entities to build this work into our local economies in order to make the efforts sustainable.
- Universities: The headquarters office of LEAP is in Charlottesville where they work closely University of Virginia. They look to the universities for the latest research in technology, policies, and solutions related to energy efficiency, renewable energy, and climate change.

### LEAP Services – Improve building comfort, health and performance

Residential Energy Efficiency Programs:

- → Home Performance with ENERGY STAR
- → Home Energy Check-Ups
- → Home Energy Improvement Renovation Package
- → Home Seller's Package
- → Community Campaigns
- → Retrofit Program Management (Upcoming trial)

Residential Solarize Campaigns:

- → Commercial Efficiency and Renewable efforts
- → PACE, Energy Performance Contracts, Benchmarking, Labeling, Business Case Studies
- → Better Business Challenges
- → Congregation Walk-through Energy Assessments

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http://leap-va.org/

## CASE STUDY STUTTGART

## Stuttgart Region – Sustainable solutions, public participation and acceptance in context with the "Energiewende"

*Thomas Kiwitt, Verband Region Stuttgart (VRS), Executive Technical Director*

### Recent overview of Energy – consumption in Stuttgart

Where does carbon–dioxyde footprint come from?

- → One third from residential area and services
- → Another third from industry and power stations
- → Remaining part is transport

#### What can be done?

1. Hardly any direct influence on private households and services
   - > Typical business of local activities, like municipalities/counties
   - > Mostly by special agency – dedicated for this task

2. More influence on industry and energy production – however: most important is business cycle: There is low consumption when business is going bad – like in 2009 [Obviously – that's not a solution]
   - > VRS offers information campaign via Stuttgart regional business development agency
   - > VRS supports pilot projects/research programs on efficiency
   - > VRS provides dedicated sites for the use of renewable energies (wind turbines, bio mass, large scale PV)

3. Transportation is equally important, but often reduced to the drive chain, or focused on electric motors. A program to promote electric cars and provide the charging infrastructure:
   - Fast busses between railway corridors
   - Park & ride facilities
   - Traffic management and information

Still most important – in numbers of passengers is, of course, the Suburban train S-Bahn, an electric-driven mode of transport – used by 350 000 commuters every day. VRS is responsible for the grid and the operation of this mass transport system.

To make this system reliable and affordable, it needs to be assured that:

1. people have access to the S-Bahn
2. the S-Bahn serves all relevant places – city centers, large residential and business areas.

Moreover, where the S-Bahn is not an option, VRS wants to support a relatively close proximity of housing and working and tries to bring residential, commercial and industrial areas together.

That means:

- → Dedicated areas for industrial development with the idea to bring jobs to people and to reduce traffic and energy consumption/emissions
- → Dedicated Areas for wind turbines – idea: wind to electric power. Expected effect: Quit nuclear power, Reduce GHG
- → Conflicts: wind turbines = green power & pure conscience vs. wind turbines = noise + infrasound + spoiled scenery + ....



### New challenges for elected officials and administration

- → There is no alternative to transparency in planning procedures
- → More and active information = public awareness
- → Public awareness = enhanced debate / complexity
- → Climate protection/energy supply have a strategic dimension – even on regional level

## CASE STUDY GUELPH

## Community Energy Initiative – from Planning to Scale Implementation

*Alex Chapman, City of Guelph, Acting Corporate Manager, Community Energy*

Guelph Community Energy Initiative Supports Growth and Community Values:

- → Growth area "Places to Grow Act 2006"
- → Fifth fastest growth in Canada
- → Long-term energy plan adopted in 2007

### Community Energy Initiative 2007–2031 Plan

- Competitive energy services
- 50% less energy use per capita
- 60% less GHG emissions per capita
- Population expected to grow by 50% by 2031 to 180,000 persons
- Pillar of Economic Development

Guelph GHG Baseline has been retroactively adjusted to reflect subsequent assessments of GHG footprint due to changed Ontario Generation Mix GHG Baseline does not align with the original text version of the CEP. The Energy Baseline is unchanged.

### Guelph Community Energy Initiative Prioritized Strategies 2008–2031

- Above-Code building efficiency
- All construction – new and retrofit
- Energy Performance Labels
- All construction – national pilot
- Transport efficiency
- Urban design and vehicle choices
- Heat recovery and integration
- New District Heating infrastructure
- Industrial and other sources
- Clean & Renewable Supply
- Biomass and Solar Photovoltaic in large scale
- Extensive Combined Heat & Power
- New energy services supply company

### New Municipal Utility Structure

With the recent decision to combine the GHI/GMHI boards, this is the most likely recommended governance structure for GEER in the future. As a legal entity, the R-GEER usage has been dropped since Guelph Energy Efficiency Inc. would be the same legal and organisational platform for the non-residential energy efficiency retrofit business.

### Two Major CEI Strategies – launched in 2013

A City-wide District Energy

B Residential Energy Efficiency Retrofit

### A – District Energy Business Plan Targets

- Market Share
  - 50% of heating and cooling by 2041
- Financial Returns
  - Long-term acceptable returns
  - Benefit all Guelph residents and businesses

- Economic Development
  - Energy services attractive to inward investors
  - Establish Guelph as Canada's DE Center of Excellence
- Environmental
  - Create pathway to greatly reduced GHG
- Supply Security
  - Contribute significantly to City's distributed CHP goal
  - Increase City's strategic fuel flexibility
- Business Structure
  - New Municipal Thermal Utility

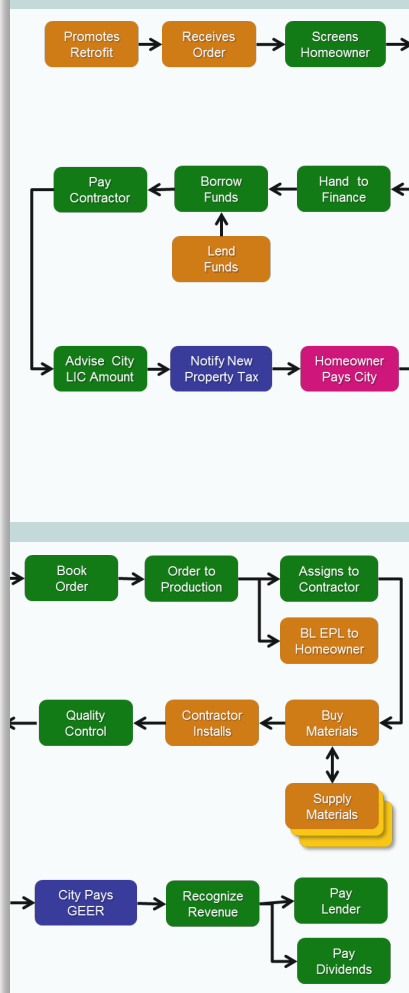
### B – Residential Energy Efficiency Retrofit Business Plan Goals

- Overall R-GEER Goal
  - Efficiency retrofit of 80% of 38,400 homes by 2031
- Homeowner Goals
  - Enhanced property value
  - Reduced energy costs
  - Increased comfort
- City Goals
  - Meet 2031 CEI targets for existing homes
  - Support economic development
  - High-quality employment
  - Investor Goals
  - Acceptable returns

These goals were agreed by the entire PWT (City, Envida, Consultants) and frame the challenge for the subsequent analysis and BP development 38,400 is 80% of the current stock of 48,000 homes in the City. R-GEER only applies to existing homes – new residential construction will have a different game plan to meet the overall CEI targets. This and following slides summarizes the disparate and complementary goals for all stakeholders. Third-Parry investors will supply the bulk of the capital needs of the BP. With the recent decision to combine the GHI/GMHI boards, this is the most likely recommended governance structure for GEER in the future. As a legal entity, the R-GEER usage has been dropped since Guelph Energy Efficiency Inc. would be the same legal and organisational platform for the non-residential energy efficiency retrofit business.

The economic development has to be seen as a motor to solve climate change. Economics keeps everybody in conversation. Guelph is willing to take the risk and to use mechanisms such as urban sustainability platforms to learn and to teach new things.

> *"The City of Guelph is the poster child of world-class Community Energy Planning"*
> *Bob Chiarelli – Ontario Minister of Energy – April 10th, 2014 in Guelph announcing provincial approval for cogeneration projects that will serve both major manufacturers and the city's district energy network.*




Guelph Business Model

## CASE STUDY BOTTROP

### InnovationCity – Energy Turnaround – Bottom-up

*Bernd Tischler, Lord Mayor of Bottrop*

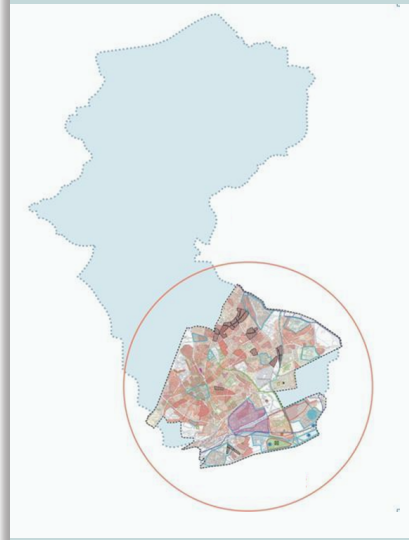
#### Sustainable, Holistic Modernization of City Districts

InnovationCity Ruhr has been initiated by the Initiativkreis Ruhr, an association of the 70 biggest companies in the Ruhr Area. InnovationCity Ruhr is their latest and biggest project. They started the competition to define a model town, to have a possibility to transfer all products, technologies and ideas to reality.

First of all we started by retrofitting the existing building stock, following the idea of the "Energiewende" – energy transformation – from below. Today, after two years of intensive project work, the perspective has become wider:

InnovationCity Ruhr is about the sustainable, holistic retrofitting of city districts.

Bottrop is a very attractive place to live and work. And in comparison to other cities in the Ruhr area, Bottrop registers a rather low unemployment rate. Bottrop finds itself in the middle of a far-reaching structural change: In 2018 subsidies for the mining industry will run out. The last coal pit to be closed is „Prosper Haniel" in Bottrop. This will result in the loss of many jobs and apprenticeship places. Until 2018 around 1000 new jobs need to be created in the region to compensate those lost in the mining sector.



The idea of InnovationCity Ruhr includes the goal to cut $CO_2$-emissions by half by 2020. In the cities, climate change is more visible than in other areas:

- → The temperature is always higher
- → Frequent heavy rain events have bigger effects

Energy retrofitting also goes along with an increased quality of life in the building itself. Saving energy has no negative influence on the quality of life, but a positive one.

The concept behind the energy turnaround bottom up can be seen like this: one starts with energy retrofitting at the building level, goes on to the city district and continues with the city level. At all levels, energy consumption, energy production and energy management become interlinked.

#### InnovationCity Ruhr has a Vision

- → An automatic and intelligent system for energy management for an entire city. Each household will become an energy producer as well as consumer. These single systems are then interconnected at district or city level using smart technologies as well as storage devises
- → Such an "energy turnaround" needs to take a bottom up approach. It begins at the level of buildings and then integrates them into communication and management systems

- At the moment projects are at household as well as building level are being implemented. For example 100 CHP (combined heat and power) devises are being installed in houses and an apartment block has been refurbished into an „plus energy“ house
- The next step will then be the interconnection. At the moment Bottrop is looking for funding for a smart grid project in the district – Welheimer Mark

The pilot area is inhabited by 70.000 people and contains 14.500 buildings.

12.500 of them are residential buildings and 2000 commercial estates. It emits 246.000 tons of $CO_2$ per year. After two years, 7,82% of the house owners in in the pilot area has undertaken an energetic retrofitting of their house. Comparing the number with the nationwide average of 0,9-1,3% shows how well Bottrop is doing. This is the success of Innovation City[2].

The $CO_2$ reduction goals of InnovationCity Ruhr do not mean that Bottrop is in favor of de-industrialization. It is the exact opposite: new jobs in innovative and green technologies will be created. There is also a network of scientific partners, responsible for the scientific evaluation of all processes. Wuppertal Institut and Fraunhofer Institut are the main actors. In general, the cooperation between the state of North-Rhine Westphalia and InnovationCity Ruhr couldn't be better.

More than 200 projects have been initiated and to a high extent also implemented. They cover a wide range: Working, Living, Energy, Mobility and City planning. For example a metal working company that is now welding with solar power, LED-street lighting, measures in city planning and the design of free spaces as well. A competition has been started and three buildings are currently transferred from the existing status to plus energy level.

The houses are grouped:
- A detached house,
- An apartment building
- A commercial building.

The detached house is already finished, and the apartment building will be completed this month. Building a new house to this standard is not too difficult, but retrofitting three old ones to plus-energy-level is unique in Germany.

Yet there are no other apartment buildings or commercial buildings retrofitted like those in Bottrop. As already mentioned, the three plus energy buildings are Bottrop's best practice examples. The special background in this case: it will be implemented in the social housing sector. The six tenants won't have to pay any more rent than in other social housing buildings. They pay a little more for the net cold rent, but nothing for the energy. Therefore it is easily transferable and a good example for other cities.

[2] Source Deutsche Energie Agentur, 2013. Please be aware that DENA is using a slightly different definition of retrofitting than Innovation City Ruhr. An exact comparison is therefore difficult.

The University of Applied Sciences in Bottrop has developed to a 'think tank' of the InnovationCity Ruhr. The building was planned and financed by the state of North-Rhine Westphalia, but again, our industrial partners have taken the opportunity to implement some of their latest technologies in the building.

For example, the heat demand is provided to a high extent by heat exchangers installed in the surrounding sewage drains. The building will be opened this summer and the demand from students is already very high.

A benefit for the whole pilot area is the 100-CHP-project. They fit perfectly into small and medium sized houses, and are being installed at the moment. In a second step, they will be linked together to form a virtual power plant.

### Back to the rate of retrofitting: how did we achieve 7.82%?

- → It is all about the participation
- → Public workshops in the different quarters
- → Frequent evening events
- → 89% of all house owners in the pilot area were visited by us
- → 1300 individual consultations were held, which result in an individual, holistic and independent concept for each building
- → These efforts led to a retrofitting rate of 7.82%

The master plan is the script for Bottrop's transformation, including many different project ideas in different areas (i.e., working, energy). Bottrop now is working on the implementation of these ideas by setting up so-called "Real Labs", where new technologies and methods are being tested and developed.

Thereby, the City of Bottrop is being supported by the scientific community i.e. the Wuppertal Institute and the Fraunhofer Institutes. The city need this advise in order to develop and implement projects effectively. Moreover, it opens up new funding opportunities.

## CASE STUDY ESSEN

### Variances of scale in the implementation of Community Energy Plan

*Irene Wiese-von Ofen, President of Honour of the Agenda 21 Forum Essen*

May I introduce myself: I am presenting my report as former Deputy Mayor of the City of Essen , a city in the middle of the Ruhr District with round about 730,000 inhabitants in the middle of the sixties last century and now of 580,000 inhabitants. This decreasing combined with a loss of more than 100 000 employers is the result of the huge transition of a heavy industrialised city of coal and mining industries to a city of "the third sector" like services and other utilities, management, education and vocational training, administration, universities with new ways of curricula. After having terminated my elected term in this governmental position I founded as a Non Governmental Organisation – NGO- the Agenda 21 Forum being involved in the non profit activities of spreading the ideas and procedures of sustainability in urban and landscape development .Several times delegate to UN HABITAT I was the founding chair of the UN HABITAT Professional Forum and appointed to the World Urban Forum as member of the Advisory Board. Urban Climate Dialogue for me is therefore not only a transatlantic dialogue but a dialogue between experts in theories and practical experience as well as in governmental knowledge and responsibilities compared to civil society behaviour and focuses. So in the last 10 years the Agenda 21 Forum Essen organised successfully as an estimated NGO activities in participation procedures in mutual respect and recognition with the City of Essen.

- Community Energy Plans particularly with regard to the methodology are sectorial development plans. Nevertheless they have an impact on numerous other planning fields.
- They have an impact on infrastructure (technical as well as social ), traffic and mobility, and they are as well related to education, have impact on research or production
- Energy plans as the drafting of an experts report with special technical preconditions are to be established in integrated procedures concerning affected institutions and the relevant inhabitants of the city or quarter or country – that depends on the scale.
- Therefore energy plans are meanwhile part of planning processes at any level. Following the various scales their relevance at the more general spatial planning level uses more top down strategies - but operate only effectively in cooperation with bottom up strategies at the area or quarter level.
- As to the broader spatial level community energy plans are orientated to political and economic goals as part of the general climate goals of the European Union and the Federal Republic (EU defines the amount of $CO_2$ emission up to 2020 .The member states have to ratify and implement by various measures the set up goal). The Federal Government follows EU requirements and adds own national targets such as restrictions in using green areas for settlement, in protection of landscape, in subsidising renewable energies, in laws like demands for allowed maximum heating volumes etc. Communities have to obtain these objectives within their planning responsibilities

- Municipalities- and so did it the City of Essen - integrate in these energy plans other urban activities such as reusing brown fields, raising density, conservation of green areas and using their green potentials for new energy technologies, changing the mobility patterns and the modal split of mobility concepts, implementing special approaches in education programmes to the topics of energy development, global thinking and local acting So this comprehensive thinking makes participation more difficult to organise, but easier to convince and offers people to change themselves from participants to involved persons.
- Therefore in the last ten years more and more special community energy plans with special dedication to adaptation and mitigation took place in the planning philosophy.
- By implementing renewable energy targets into building construction, urban renewal, mobility and global transport systems, it is remarkable that the scale of the quarter has becoming more and more adequate for common activities to gain the objectives set by EU/ Federal Republic and other urban construction and renewal programmes. Technical answers are not enough to be developed only on the level of the building itself.
- Therefore competition initiatives as well as financial support are linked with the quarter scale (KFW-the main German state-funding bank- finances quarter manager for preparing as well as over-viewing the modernisation of the existing building stock at the quarter level). Today modernisation and adaptation reach approximately 2 % of the building stock per year. Augmentation is intended to 3 % per year.
- The scale of the quarter is as well adequate for giving initiatives of the civil society a chance, finding neighbourhood approaches, meet social dimensions and create identity
- The Government of NRW started a special initiative of funding quarters
- NRW is as well the first government to decide on a climate protection law with special goals in $co_2$- reduction and intends to organise in 2022 a climate –exposition in which all municipalities are involved. In April this year a roadmap for local activities was presented for the EXPO. Local energy plans play an important role in realising the set up goals.
- Linking the different levels of responsibility and power is the main challenge. Already 120 research projects on climate, sustainability and environment are on the way.
- The task is to reflect the principle of subsidiarity in relation to the relevant scale.
- Subsidiarity as the main principle of the European Union means to set up a legal frame that the states have to ratify so that the activities in any of the member states solving the relevant requirements and challenges – in this case the adequate solutions of the energy turn around – have a comparable standard in their responsibility of implementing the relevant measures at any level within their states.Sometimes inhabitants or politicians of the EU think the guidelines of the EU are too autocratic ,but because of agreement of the member states they are the appropriate method for balancing the unanimous goals by extremely different initial positions in the different member states.
- That means the EU by involving the states defines targets by unanimous decisions
- The states define goals to reach these requirements up to a certain time and intensity
- The communities follow those goals by defining their special activities and processes

- Courses of actions are defined following the “principle of counter flow”, that means top down and bottom up meet themselves and influence solutions ,decisions and measures
- Within the communities these principles are following in relation to their scale and size
- So variances in implementing community energy plans are necessarily following scale and territorial limits in relation to economic, social and cultural concerns
- Any energy plan at the level of a housing group or quarter is only to develop and to implement by procedures of inclusion of the affected owners. Needed are expert capacity and mediation knowledge, financial guidance and belief in cooperation methods
- To recommend is the involvement of district political institutions and relevant stakeholders
- Therefore the application for “Green Capital” of the City of Essen was a huge mobilising process in all parts of the society with an ongoing growing sense of commitment.
- The same is to observe in regional planning policies, as the Ruhrdistrict is in the middle of the process of designing the new Regional Plan. The responsible institution RVR started with dialogues, a competition and a participation process via journals so that everybody could share all ideas .Energy planning is part of this discussion processes..
- This is the ongoing process of balancing interests and possibilities of the decision making elected bodies, who learned a lot in the last years to manage these complex processes and to take into consideration the variances of scale as well as cultural, ethnic, economic and ecological aspects beyond technical and priority demanding climate aspects.
- So it is necessary to convince the people by changing their behaviour and most important is to overcome the gap of knowledge. We from the Agenda 21 Forum are one of the most active non-profit groups to spread these ideas of sustainability and offer an open forum for multiplication the principle of subsidiarity and balancing interests.
- Looking not only on the involvement of the civil society it has developed that companies and municipalities reflect these goals and procedures .Companies meanwhile are obliged to publish yearly sustainability reports Specialists like experts of relevant sectoral technical knowledge, scientists like research groups and cooperation of universities as well as non-university institutions together with the civil society are relevant catalysts in an advising role to politicians on participation methods to foster energy efficiency and climate change.
- So climate change issues have not only an impact on urban planning, participation formats or architecture. Through local energy plans the municipalities are trying to implement new concepts of mobility as an important sector of relevance.
- Further on a whole economic branch is influenced on various levels: that is energy supply. Germany is a country of centralised companies like RWE, E.ON, NWEB, ect. Renewable Energies with solar panels, geothermal energy and bio gas depletion in the quarters itself came into existence production. in housing as well as industrial or rural areas. That means decentralisation and producer production by consumers.

- So far the focus of discussion is directed to organisational as well as participation and contract design consequences of this development .Public utility companies on the one side and big housing companies on the other side began to think about models for self-supporter.
- The adequate scale for initiatives like this is the quarter Co-operative societies are one well known model as well. Housing companies founded limited companies for this special purpose of producing and selling local energy using the economic advantage for their clients. But because utility companies are municipality companies they act very often local – like cross subsidization of the local public transport. And because of this different interests and financial power there are little cooperation between these municipal companies because of their liability to the owner .So there is less regional impact on the general security aspect of energy supplies in the national dimension. This is going on to be changed. Especially the research of future storage technologies for the supply of the renewable energies is the main challenge for securing the continuity of energy supply.
- Utility companies in the Ruhr district bought the STEAG, the former Energy Company of the Ruhrkohle RAG (former coal mine production co-operative , now responsible for the eternal costs of the closed mines ) to open new markets and business areas. It is not yet decided whether these shifts guarantee success One point is the uncertain situation for the guarantee of supply and the other the question of the development of the traditional companies (RWE lost half of the market capitalisation, the result is a big deficit in the urban household of the cities, that hold RWE shares from the times of the company's formation. More than 100 companies are already in a network named "Thyga-Group". The association of German Cities is supporting this idea of wide spread networks in this sector as well. They recommend building up special business models.
- The advantage of these new developments is that the changing in supply and market models is linked to energy changing aims and cost reduction as well as energy efficiency and housing modernisation goals.
- At the quarter level the integration of owners and tenants is feasible (especially of council tenants because of lower prices are possible) and the defined number of person concerned may be bound by contract. For a whole city this is not feasible.
- Taken this into consideration  the principle of subsidiarity has to be reflected, that means "freedom" within a legal frame and "self responsibility" for activities in relation to the relevant scale, so that any level has the responsibility for solving concerned requirements.
- Giving the power for solutions to the lower level the higher level must be sure, that the lower level is able to solve the problem. Adequate solutions for the energy turn around depend on how people trust in the decision makers – and this is to a certain extend related to the right scale. The determining question for all measures is how courses of action follow the "principle of counter flow", that means top down and bottom up meet themselves and influence decisions and procedures will hopefully harmonise solutions.

## CASE STUDY DINSLAKEN

### Dinslaken on its Way to be the $CO_2$-free District

*Dr. Michael Heidinger, Mayor of Dinslaken*

City Works "Stadtwerke Dinslaken":

→ Local energy and heat supplier owned by the City
→ Long experiences in $CO_2$ reduction

#### Milestones: Former colliery area = Laboratory for the City

- 2011–2013: Elaboration of a climate protection: concept for the city Dinslaken
- 2013 : Energy concept for a $CO_2$-neutral energ supply of the former colliery area including historical garden city in the neighbourhood (in total 7,000 inhabitants).

#### Energy and heat production focusing on

→ Photo-voltaic systems
→ Biomass cogeneration plant
→ Combined heat and power technology
→ Wind turbine
→ Utilization of waste heat

#### Energy and heat production +

+ Reducing the energy consumption in the existing buildings
+ High energy standard of new buildings
+ New energy storage technologies

#### Conclusion

→ Within the next 8 years we will develop the largest $CO_2$ neutral area in Germany
→ Heat and electricity will be produced completely by sustainable sources.
→ Construction has already started.
→ This development will be used as a model for other city districts.

## Green Infrastructure and Sustainability

*Dr. Matthew Rice, George Mason University,*
*Dept. of Geography and Geoinformation Science, Assistant Professor*

### Energy Analysis and Mapping

- Energy usage (Guelph & Stuttgart): Transportation is a major usage (36% for Guelph)
- Transportation is a major problem for the Northern Virginia Region
- What lessons can be learned from TUCD partners?
- What transportation issues exist for Mason and local community?
- What contribution can we make?
- What research questions can we address?

### Environment and Sustainability

The Environmental Sustainability Committee is committed to guiding the City of Fairfax to become an environmentally sustainable "green city":

- Resource conservation
- Preventing ecological harm
- Renewable resources
- Encouraging self-sufficiency
- Home Energy Conservation & Weatherization
- Environmental Survey
- Advise: Capital Improvements Programs
- Advise: Stormwater Management
- Advise: Development Projects
- Evaluation of City's Recycling Program
- Energy retrofits in City buildings.
- Partnership with the Local Energy Alliance Program (LEAP)
- PACE program

### Local Sustainability: Smart Growth

Priorities:

- Sustainable development
- Walkability
- Environmental preservation
- Economic vitality

### Grassroots movement to build community resilience

- Peak oil
- Climate change
- Economic crisis

**Goal:** Engage communities in home-grown, citizen-led education, action, and multi-stakeholder planning to increase local self reliance and resilience.

Transition Town Fairfax

## Review of the Future of the TUCD Partnership – the Policymakers' Perspective

*Dr. Nicola Schelling, Verband Region Stuttgart, Regional Director*

TUCD+ has achieved a great deal in the recent workshops. On both sides of the Atlantic, participants have implemented projects initiated by exchange of examples of best practice.

For instance:

- In January 2014 the city of Guelph commissioned its first district heating grid after the model of the district heating supply system in Stuttgart and Dinslaken
- Arlington's County Board was inspired by the community energy plan in Guelph and adopted the Community Energy Plan as a new element of the County's Comprehensive Plan in mid-June 2013
- The Stuttgart Region has likewise benefited from this exchange of knowledge and experience
- In future participants have to concentrate more on two issues: securing regional supply in the electricity sector, and the requisite capacities for electro-mobility and charging stations.

The exchange of knowledge and experience operates in all four regions. In view of the positive experiences and developments in the last few years the participants look forward to tackling new projects with you and giving a new shape to our collaboration.

Six policies as being of especial importance – i. e. much more than in the Transatlantic Climate Dialogue to date, because they impact equally on all four metropolitan areas:

1. *Ensuring sustainable and affordable mobility*
2. *Regional development and business promotion*
3. *The exchange of knowledge and co- operation between higher education and business*
4. *Green infrastructures and quality of life*
5. *Climate protection and adapting to the consequences of climate change*
6. *Decentralizing and regionalizing energy production and distribution*

The Verband Region Stuttgart would very much welcome extending the transatlantic co-operation to include these policies, because exchanging ideas on these issues is very important to all participants.

Verband Region Stuttgart

Existing Cooperation Projects:

- The transfer of knowledge, i.e. putting innovative ideas into practice.One specific example of transatlantic co- operation is our firms' involvement in trade fairs, such as the "Green Festival". The Landesmesse Stuttgart is pursuing this trade fair concept at five US exhibition centers, including Washington
- Stronger ties with the Robert Bosch Foundation and the German-American Center Stuttgart. These partnerships open up access to other cultures and provide the opportunity for discussing transatlantic issues
- The exchange of knowledge and the collaboration between higher education and business. The competition for highly qualified specialists is increasing. Only by being a dynamic pioneer and using one's potential for maximizing the gifts and skills of the top people can one survive in the competition for them and thus secure long- term location advantages.
- Needless to say, it is imperative that this exchange of knowledge is also transnational: the Ontario/Baden- Württemberg Summer Research Program, which is open to Ontario graduate and undergraduate students in Science, Engineering, and Health Science disciplines. Each successful applicant will spend between two and four calendar months in summer 2014 at a university in Baden-Württemberg, engaged in research projects relevant to her/his studies in Ontario
- The Daimler-Byrnes Stuttgart Region Scholarship. Young people from the Stuttgart Region spend an academic year in the USA and foster the transatlantic relations
- Participants are looking forward to the next project on "urban green infrastructure", for which the Free University of Berlin has applied for funding
- Green infrastructures and quality of life projects. The growing awareness of these issues among people is also putting them in the political spotlight. The Verband Region Stuttgart champions green infrastructures in the region to further raise and improve the quality of life in our region. The Verband developed a program for this: the Stuttgart Region Landscape Park. The concept was introduced to enhance the ecological quality and recreational value of open spaces within a densely populated region. It has already become a successful instrument, which helps local institutions to develop green infrastructure as an important location factor
- Flood protection, short distances to recreational facilities, climate protection and adaptation to the effects of climate change are aspects taken into account in the projects. Since 2004, the Verband Region Stuttgart has also been authorized to provide financial support for projects within the Landscape Park. So far, more than 100 projects have been completed and we have made financial commitments of around 9 million euros for funding projects. Together with third-party support, more than 20 million euros have been invested in improving the Stuttgart Region's open spaces

- Climate protection and strategies for adapting to climate change. The regional plan plays an important part in climate protection, for instance reducing demand for transport by concentrating residential development along railway lines, and facilitating the switch from car to train. The regional plan also plays an important role in adapting to the consequences of climate change.
- Restructuring of the energy production and distribution likewise poses major challenges. New technologies have to be tried out and installed. At the same time, the society's demand for affordable energy prices and a reliable supply of energy has to be satisfied.
- Involvement of general public, for instance, when working out suitable areas for wind energy in our regional plan

### Common Objectives

The TUCD+ has provides the participants with a unique model of practical, living transatlantic collaboration. Personal contacts have generated a lively and very valuable transfer of knowledge that must continue.

# Outlook

## More Academic Exchange

1. Transatlantic exchange is very important for future cooperation. The goal is to involve students more and to offer them summer schools, seminars and case studies on transatlantic sustainable development
2. To take the expertise from the universities and transfer it to the practice

## More Inter-Institutional Relations

To keep the number of workshops small and targeted on the subjects such as:

1. Climate
2. Green Infrastructure
3. Mapping
4. Water infrastructure
5. Air Quality

## Regional Goals

1. Northern Viriginia
   - To further develop the community energy plans, environmental protection and the green economy integration
   - To stay focused on future cooperation. Climate atlas in Stuttgart is an interesting idea, developing the climate mapping would be the next steps for NOVA
   - To further develop the public relations, the transatlantic dialogue needs to become more international
2. Bottrop
   - Germany started a platform “National Future” to help cities to reach national $CO_2$ reduction. Bottrop can share experiences for transformation dialogue for the US and Canada

## 3 Dortmund, Essen

- The Technical University of Dortmund intends to implement a University Network for professional exchange and research on urban development in areas in transition, be it from old industrial areas, military areas, other brownfields, spaces in decreasing situation (population, children and education, unemployment, migration etc.). Longer time ago shrinking cities was a wide spread international research project of some architects and artists that finally ended with an exhibition and not so much consequences in political actions or influences universities in their further research or curricula. So "transition" is much more than shrinking – as sometimes it is to be heard in non-professional discussions.
- The Ruhr District experience shows that a systematic professional exchange could raise the abilities of curricula and the ongoing exchange between experts of theories and practice.
- At the moment there are 8 universities in different countries/continents who are beginning in implementing such a "school" of transition professions and intend to begin with a big conference in march next year.
- The offer of the University of Dortmund to the George Mason University (GMU) as partner in the TUCD project is to be part of this beginning process and spread internationally recognitions and approaches of their research projects in these fields and of the learnings of the TUCD Project. (The mentioned interest of GMU during the workshop in water topics is for instance one of the centennial projects implemented already in the Ruhr District through the Emscher Project that is in the middle of a 25 years planning and realization process with investments of round about 4,4 billion €.)
- The result of the discussion was that a representative of the GMU will be invited to this conference in 2015.
- Dr. Wiese von Ofen had after returning already contacted the University Dortmund. A preparatory workshop for finalising the programme shall take place in November. The results shall be transferred by her to contact Rita Rowand from GMU for further consideration.

Transatlantic Urban Climate Dialogue

# "THINK GLOBAL – ACT LOCAL"

| | |
|---|---|
| Research Focus | Cities and Environmental Change |
| Institutions | **Forschungszentrum für Umweltpolitik,** FU Berlin |
| | **The Northern Virginia Regional Commission**, US |
| Head of the Project | **Prof. Dr. Miranda Schreurs**, FFU |
| | **Dr. Dale Medearis**, Northern Virginia Regional Commission, USA |
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