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7th - 11th March 2016

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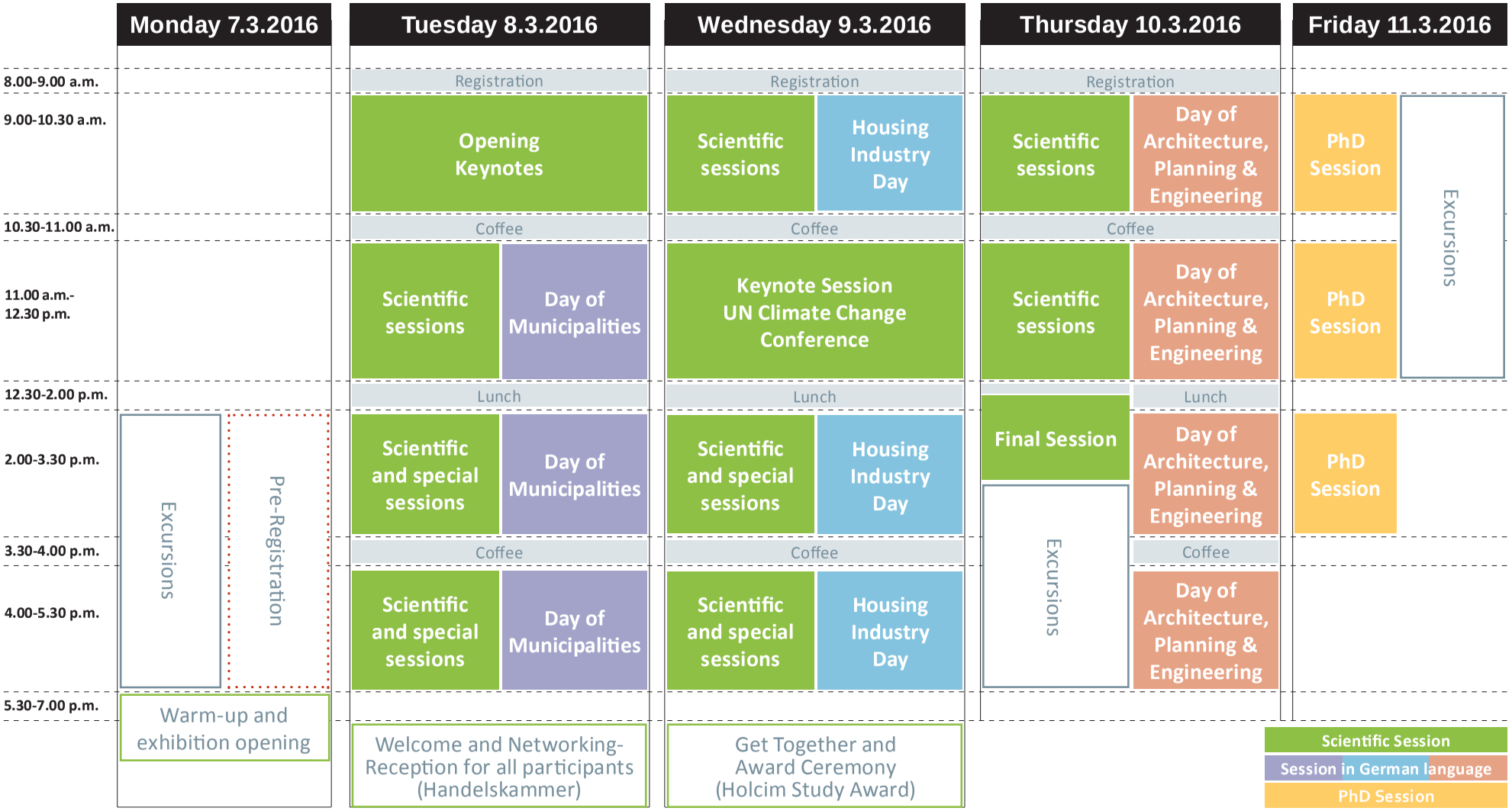

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Networking Intelligent Cities for Energy Efficiency – The Green Digital Charter Process and Tools

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Summary

The Green Digital Charter (GDC; http://www.greendigitalcharter.eu) is a declaration committing signatory cities to use information and communication technology (ICT) to address climate change issues ("ICT for green") as well as improve their resource management ("greening ICT"). In the course of the FP7 funded NiCE (Networking intelligent Cities for Energy Efficiency) project under the lead of EUROCITIES an action framework, application guidance, and monitoring tools were developed and best practice exchange, learning and networking activities organised. Four research and practice partners and five partner cities (Bologna, Eindhoven, Linköping, Manchester and Warsaw) were involved. The paper presents the elements and implementation of the toolkit and the results of a follow up survey of signatory cities on progress and challenges of GDC implementation.

Keywords: ICT, energy efficiency, smart cities, climate change, resource management

1. Introduction

Cities today face the unprecedented challenge of achieving environmental, social and economic sustainability. One of the core challenges on this way is tackling carbon emissions. Information and Communications Technologies (ICT) have an important part to play in this process: They are an enabling technology ("ICT for green") as well as an energy consuming infrastructure themselves ("greening ICT"). The Green Digital Charter (GDC; [1]) is a declaration committing signatory cities to deliver on the EU climate objectives through the innovative use of ICT. Signing the Green Digital Charter allows for both political commitment and a step-by-step practical process, so cities can use ICT to address climate change issues, as well as improve their resource management, cooperate with other cities and stimulate their economies and citizens' wellbeing. Today (2015) 46 cities are GDC signatories [2].

NiCE (Networking intelligent Cities for Energy Efficiency) was an FP7 funded project under the lead of EUROCITIES to support cities in the achievement of their goals as outlined by the Green Digital Charter [3]. Four research and practice partners and five "reference cities" (Bologna, Eind-

hoven, Linköping, Manchester and Warsaw) were involved. NiCE is supporting cities in three key areas:

- Toolkit for cities – monitoring and reporting tools for cities and developing frameworks for action to aid cities at all stages during their efforts to green ICT.
- City support and action – a series of targeted exchange and learning activities (e.g. exchange on best practice examples).
- Outreach and engagement – a series of networking and visibility events to increase the number of Green Digital Charter signatories.

The toolkit is the main supporting mechanism for cities in the roll-out of their green digital activities. It provides an action framework, application guidance, and monitoring tools that are implemented as an online platform. This paper focuses the development of the action framework, the assessment and monitoring of activities and the concluding survey of signatory cities on progress and challenges of GDC implementation.

2. Methodology

As an EU FP7 “coordination and support action”, the overall project methodology followed a transdisciplinary approach involving scientific and ICT expertise and in particular practitioners from the reference signatory cities in the co-creation and dissemination of knowledge and tools. The exchange and cooperation with the practitioners was implemented as an iterative dialogue through workshops, bilateral consultations and written feedback.

The project was concluded by a survey of signatory cities on progress and challenges of GDC implementation. The survey was conducted in a qualitative approach as a semi-structured telephone survey. Drawing on the EUROCITIES Database of ICT contact persons all 41 signatory cities (at the time of the survey) were contacted, 18 expert interviews could be derived of which 13 covered the full range of issues.

3. Results

3.1 Action framework

A core challenge at the beginning of the project was to extract, interpret and structure the detailed commitments and targets behind the political phrasing of the GDC for practical implementation [4]. From the charter text 102 commitments for different types of action were extracted, which aim at different types of objectives (e.g. strategic or practical implementation) and scales of relevance (e.g. city administration or city-to-city exchange). Based on this analysis of the commitments in the Charter, European policy, city initiatives and activities, as well as direct feedback from the NiCE Reference Cities Group an *“Action Framework”* was designed as a three dimensional matrix (Fig. 1). The dimensions of the action framework are:

1. The **application areas** for a city: Public Lighting, Green ICT, Energy, Buildings, and Transport. In addition, “Cross-domain” and “Other” application areas are considered to widen the scope.
2. The **type of activity** cities might undertake: Operational, Measurement, Exchange, Policies, and Governance.

3. The **roles that ICT** can play: Innovation / Substitution, Analysis / Decision support, Perception / Behaviour, and enabling Efficiency improvements.

The action framework provides a baseline document for all further work: At first, it helps local actors to get an overview of the overall action field and identify locally relevant starting points and approaches to action. Second, it provides the ontology and basic structure for the NiCE best practices and tools database and third it is a reference for monitoring progress.

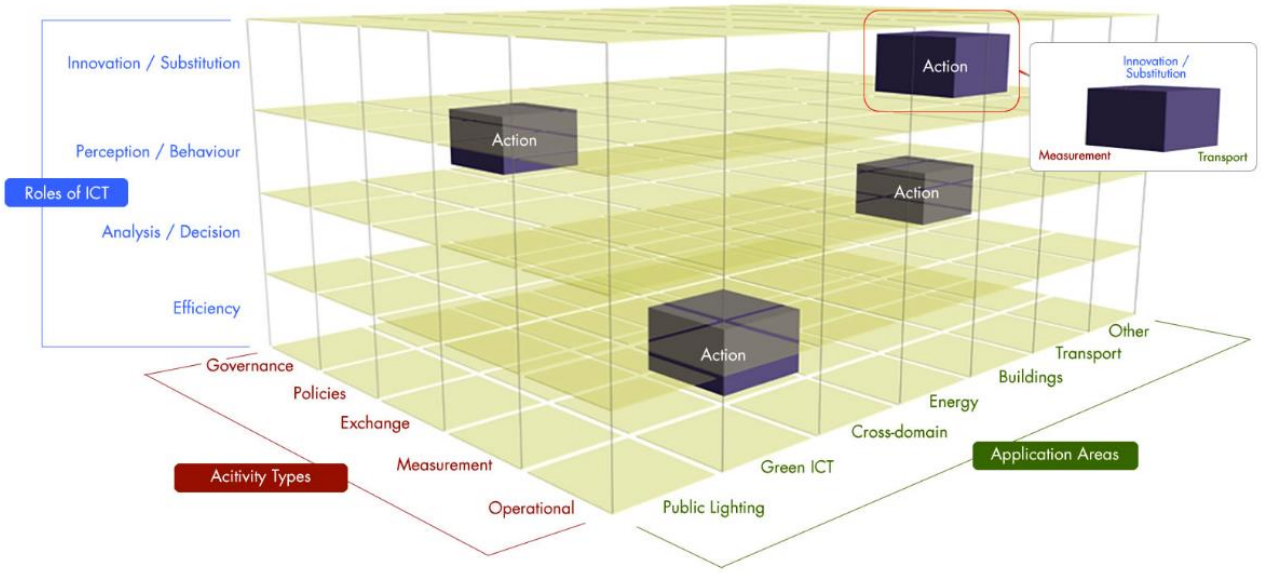

Fig. 1 NiCE GDC Action Framework [5]

3.2 Self-assessment and monitoring

„We signed the Green Digital Charter on Friday. What should we do on Monday?“ In fact, the Green Digital Charter provides a lot of ideas and starting points for Green Digital Activities. However, each city is different with respect to Green Digital progress achieved and options for further targeted initiatives. To this end and besides the action framework, the NiCE project also elaborated an analytical tool for cities to review their local situation and to support the identification of starting points for action. In a first attempt, the tool was set up as an indicator system that directly reflected the 102 commitments of the GDC. However, during the feedback process with the practitioners it became clear, that a comprehensive set of GDC indicators is not manageable in everyday practice. As a result, the broad variety of issues was then condensed into a consistent set of 26 “Self-Assessment Questions” (SAQ). Close cooperation with the NiCE partner cities (Reference City Group) assured that the final set of SAQ is at the same time meaningful and operable for practitioners in the cities.

The SAQ are organised along the activity types of the action framework and refer to all of the commitments of the GDC. The self-assessment tool is implemented online and allows cities to easily assess their current state on green digital activities, their strengths and weaknesses concerning their green digital development and to monitor progress. Along with the questions, the tool provides explanations, background information (e.g. linkage to the generic GDC commitment) and practical examples, providing starting points for action.

After completing all the 26 SAQ, the results are displayed as progress achieved in a percentage of GDC fulfilment for each activity type and as an overall result. As an element of benchmarking, the total progress result is compared to the average of the top ten cities. Finally a qualitative verbal feedback is given, that invites to browse the database of activities and tools, that is also implemented in the toolkit and populated by the participating cities (Fig. 2).

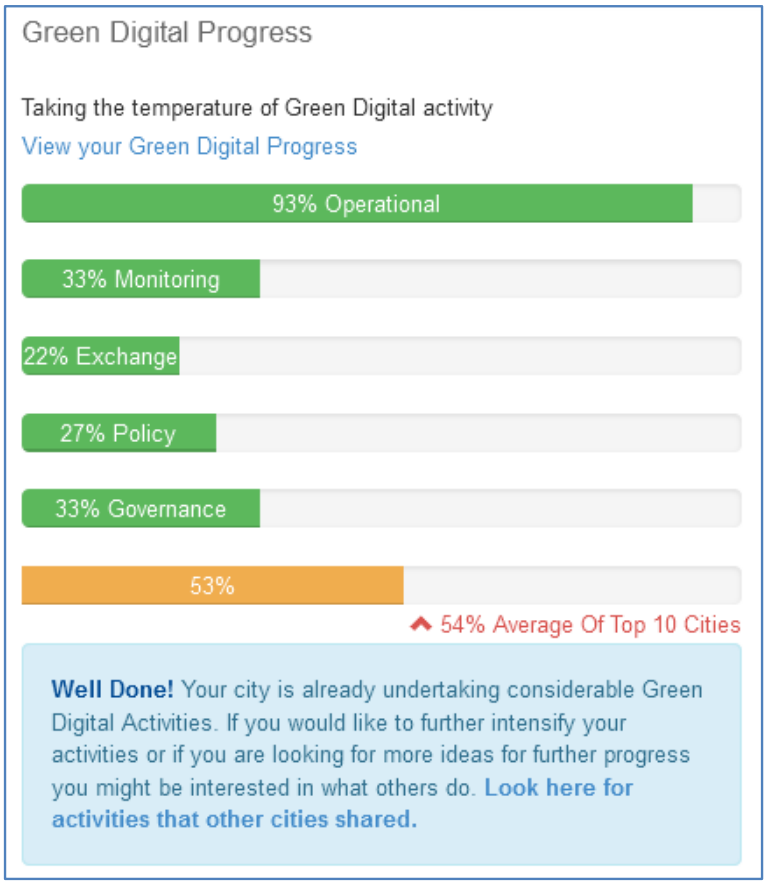

Fig. 2: Green digital activity self assessment feedback by activity type and compared to the benchmark of the Top 10 Cities (screenshot; content restricted to signatories)

Besides the self-assessment tool, two further tools are implemented; one to review the city's ICT carbon footprint and a second one to integrate GDC activities and the reporting on "Covenant of Mayors" activities, another important initiative for the implementation of urban sustainable energy policies. However, these two tools are beyond the scope of this paper.

3.3 GDC signatory cities survey

3.3.1 Green Digital dynamics:

Asked for an initial overall assessment, half of the respondents took a positive view on their green digital situation and described their situation as progressing well. Beyond that, two different general perspectives could be identified. On the one hand a merely political perspective, on the other hand an operational perspective. From a political perspective, the respondents referred to commitments and strategies like for example a digital agenda or an ICT strategy but also pointed out related low carbon programmes or roadmaps. In addition, the more general political context was mentioned, like a general aim of becoming a "smart city" or improving cross sectoral decision making to support an integrated consideration of environment and ICT related issues. From an

operational perspective for example projects dealing with energy efficiency in buildings, smart grids, electro mobility, carbon footprint measuring and real time consumption monitoring for behavioural change were mentioned.

On the other hand, shortcomings were also mentioned. Several respondents described a "gap" between digital progress and other/general city development activities: *"The willingness is there but there could be better exchange between the different stakeholders".* As a result, ICT application often appears more as a solution to particular problems but without a long term strategy.

With respect to green digital drivers and barriers, the respondents referred to quite different issues, such as economic and governance related issues, the local situation of environment and infrastructures as well as quality of life and city marketing. Main barriers were found in governance issues – in particular lack of communication and cooperation – and economic issues, such as shortage of budgets and subsequent limited human resources. Economic issues as drivers were spelled out into cost savings through the use of ICT and in general options e.g. for pilot applications provided by economic growth. The latter at the same time was reflected critical as resulting in a dependency of green digital progress from economic growth. A majority of respondents furthermore highlighted actor related and governance issues as drivers: "*Local stakeholders are the drivers to push ICT.*" Several respondents mentioned local programs to improve the environmental situation or the quality of life as supportive for green ICT, occasionally also related to marketing purposes: Towards the "*Green, save and smart city*."

3.3.2 The Green Digital Charter – Trigger for Green Digital Action?

Looking at the relevance of the Green Digital Charter for green digital progress, the survey results generally provide no evidence, that the Green Digital Charter is a particular trigger for green digital action. This does not mean, however, that the Charter has had no impact at all. Nearly all respondents pointed out that, although not directly leading to new initiatives or projects, the GDC had a general stimulating influence on the wider green digital process and progress. In particular ICT practitioners consider the political commitment as supportive for ongoing projects and initiatives. Also the involvement into a network with other cities with similar interests was welcomed for exchange and learning but also fund raising purposes. At the same time, some respondents also pointed out, that there is a lot of action similar to the GDC commitment, which sometimes makes it difficult to handle the different involvements: *"There are so many places to network, to get information".*

4. Conclusion

Summing up, the general impression from the co-operation with the practitioners and survey results is that the Green Digital Charter provides a lot of ideas, starting points and support for Green Digital activities and action. At the same time for many cities signing the charter seems to be first of all a political and symbolic act and only in very few cases backed up by a clear concept and an explicit strategy to systematically implement green digital progress. This conclusion is in line with one of the core results of the "Comparative Study of Smart Cities in Europe and China": "Most smart city projects are actually addressing the implementation of individual solutions to individual problems identified in a community rather than comprehensive overhauls of the way cities are managed." [6]

5. Acknowledgements

The results summarised in this paper have been developed by the team of the European NiCE FP7 funded coordination and support project [7] under the lead of EUROCITIES and in cooperation with practitioners from the GDC signatory cities. The major work in conducting and analysing the survey of signatory cities was performed by Sandra Wille, Leibniz Institute of Ecological Urban and Regional Development [8].

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