

# Optimization of District Heating & Cooling systems



## ***D7.6: Dissemination and communication plan (Ver. 2)***

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<b>Abstract (public)</b>	The purpose of this document is to report the plan and progress of dissemination activities being carried out in <i>OPTi</i> .
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## EXECUTIVE SUMMARY

The purpose of this document is to provide an updated plan and progress of dissemination activities being carried out in OPTi. In this document, we have detailed the framework of the dissemination plan; i.e. the different activities we are performing throughout the duration of the project to disseminate its outcomes. We would first provide an overview of the dissemination materials and define our target audience. Thereafter, we provide a summary of our plan of execution to achieve widest possible dissemination of the materials and assets generated by OPTi, to these target audiences. This would also include, wherever applicable, progress we have already made and include short reports of the progress made so far.

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## 1 INTRODUCTION

In the OPTi project, we have defined a separate work package to conduct dissemination and exploitation of our activities. The objectives of Work Package 7 are to define and carry out the dissemination and exploitation of the results of the project. Specifically, we plan to ensure the widest possible dissemination of the research results and create a business case and societal impact case for the modelling and optimization of District Heating and Cooling (DHC) systems. This document is an updated version of Deliverable 7.3 (Chandan, 2015), where we update our plan for dissemination of our activities and also provide details of the progress made till date. It is suggested that this document be read with Deliverable 7.3, (Chandan, 2015) for a complete understanding of dissemination and exploitation dimension of the OPTi project.

### 1.1 OVERVIEW OF ACTIONS

While conducting the technical research and progress in OPTi, the objective of the dissemination task is to ensure we have a wide reach of this project with respect to exploitation of the tools and technologies as well as ensure highest possible visibility of the scientific results. We recall that our proposal document has stated the following activities for which we would have a plan of action:

- Setup a website that will serve as a comprehensive portal for research and technology issues related to modelling and control of district heating and cooling systems, including access to public reports and publications that are created in the project.
- Organize symposiums and workshops to bring together stakeholders as well as other projects working on similar topics in the area of DHC systems.
- Target scholarly articles and papers conference/workshop proceedings and journals and as white papers.
- Creation of the project leaflets/brochures, posters and demonstration videos outlining the project objectives and scope.
- Dissemination through newsletters and social media.

This document describes a plan of action, which is an updated version of Deliverable 7.3, (Chandan, 2015), that we have created to achieve these goals with respect to achieving highest dissemination and exploitation potential.

### 1.2 DEPENDENCIES WITH OTHER DELIVERABLES

The project has separate deliverables on the initial project promotion material such as the leaflets and posters (Deliverable 7.1). The project also has a separate deliverable for the external web page (Deliverable 7.2). As such, in this deliverable, together with Deliverable 7.3 (Chandan, 2015), we cover a short summary of these works, primarily for completeness. Apart from these, the project has two separate deliverables on Business and Exploitation plans (Deliverables 7.4 and 7.6.). These deliverables would report our plans of broad spreading of information related to OPTi to various audiences whom we can impact with this project. This would also include a chapter targeted towards stakeholders, who are also potential audience for Business and Exploitation plans. A deliverable 7.5 called "OPTi assets" would include a demonstration of the produced OPTi assets, and hence would constitute our main exploitable item. The present document, however, would only cover general overview of how we are trying to disseminate information of our project to these stakeholders.

### 1.3 OVERVIEW OF THE DELIVERABLE

In the rest of the document, we would first provide an overview of the updated dissemination materials and an updated definition of our target audience. Thereafter, we provide a summary of our updated plan of execution to achieve widest possible dissemination of the materials and assets generated by OPTi, to these target audiences. This would also include, wherever applicable, progress we have already made including short reports.

## 2 UPDATES ON DISSEMINATION MATERIALS AND TARGET AUDIENCE

### 2.1 DISSEMINATION MATERIALS OVERVIEW

Two type of posters and a leaflet are available when needed for dissemination purposes.

The public channels that were initially available were:

- The website, <http://www.OPTi2020.eu>
- A group on LinkedIn, <https://www.linkedin.com/grp/home?gid=8406591>

We have complemented these with:

- A group in Facebook, <https://www.facebook.com/OPTi2020project/>

### 2.2 TARGET AUDIENCE OVERVIEW

The two main categories of targeted audiences are unchanged:

- Scientific and technical community
  - Research groups, suppliers of equipment, DHC operators, providers of energy to DHC systems etc.
  - The form is scientific journals, conference presentations, demonstrations, commercial material.
- The general public and consumer communities
  - Customers to DHC operators, politicians, environmental organizations etc.
  - The form is web based information, participation in debates, on-line discussions.

The content and format of the communication with our different target groups will be tailored with the audience in mind. Our ambition is to achieve widest possible dissemination of the materials and assets generated by OPTi. Regarding gender aspects we will try to reach both women and men through inclusive communication. We will pay special attention to inclusion in terms of texts, images and symbols on the web site, posters, leaflets etc.

## 2.3 LOG OF DISSEMINATION EVENTS

In the first version of the Dissemination and Communication plan, nine dissemination activities that were performed between April and September 2015 were reported.

Since September 2015 until April 2016, 26 additional dissemination activities have been performed. Hence, in total 35 dissemination activities since the start of the project.

Name of the event	Venue	Date(s)	Participant names
Invited talk on the "Use of Incentives' Mechanisms for Managing Network/Cloud Resources and Energy Goods", HUAWEI France Research Center	Paris, France	2016-03-11	George Stamoulis (AUEB)
Invited speaker on gender equality at the Swedish national network meeting for EU research funding specialists and administrators. Presented OPTi as one of the good examples of how to integrate gender dimension in EU projects.	Borås, Sweden	2016-05-17	Paula Wennberg (LTU)
Presentation and discussion of OPTi Results at the STORM project meeting	Malmö, Sweden	2016-04-15	Wolfgang (LTU)
Company visit from Borlänge Energi (DH Company) where we presented OPTi in a session during their visit. We also handed out some flyers that they brought back to the Company.	Luleå, Sweden	2016-04-20	Fredrik Udén, Håkan Sundberg (LEN)
Article in Luleå Energy's newspaper about the OPTi-project, 44 000 copies	All households in Luleå municipality	2016-04-08	Håkan Sundberg, Fredrik Udén (LEN), Arne Gylling (LTU)
Article in local health news webpage about the OPTi-project ( <a href="http://www.saludediciones.com/">http://www.saludediciones.com/</a> )	Mallorca, Spain	2016-03-24	All partners
Article in local financial news webpage about the OPTi-project ( <a href="http://economiademallorca.com/">http://economiademallorca.com/</a> )	Mallorca, Spain	2016-03-24	All partners
Article in local newspaper about the OPTi-project (El Mundo, local section)	Mallorca, Spain	2016-03-24	All partners
Article in local newspaper about the OPTi-project, 18 000 copies (Diario de Mallorca)	Mallorca, Spain	2016-03-24	All partners
Article in local newspaper about the OPTi-project, 30 000 copies (Última Hora)	Mallorca, Spain	2016-03-24	All partners

Name of the event	Venue	Date(s)	Participant names
Invited to give a seminar on a gender and equal opportunities perspective in research and funding applications at Uppsala University. Presented OPTi as one of the good examples.	Uppsala, Sweden	2016-02-29	Paula Wennberg (LTU)
EU Policy Officer, DG RTD, picked up OPTi's gender dimension to her SwafS presentation at Vinnova, Sweden's Innovation Agency. SwafS stands for Science with and for Society.	Stockholm, Sweden	2016-10-20	Paula Wennberg (LTU)
Presented CDT's initiatives in EU's SSH program and highlighted OPTi's gender efforts. LTU Information Day on Social Sciences and Humanities (SSH) hosted by Granst Office.	Luleå, Sweden	2015-12-17	Paula Wennberg (LTU)
OPTi was presented to a contact from AUDI AG as an example research project	Ingolstadt, Germany	2016-01-14	TWT
Meeting STORM - OPTi presenting and discussing cooperation areas. STORM represented by PM Johan Desmedt	Stuttgart, Germany	2015-12-10	STORM- OPTi project
Inauguration talk of Wolfgang discussed several aspects of OPTi and presented the project to the general public	Vatenskapens hus, Luleå	2015-11-12	Wolfgang Birk (LTU)
<p>Attended and presented 3 papers at the IEEE Smart Grid Communications conference, 2015. Articles relevant to OPTi</p> <p>* Jain, M., Chandan, V., Minou M., Thanos, G., Wijaya, T.K., Lindt, A., Gylling A., "Methodologies for Effective Demand Response Messaging",</p> <p>* Minou M., Stamoulis G., Thanos, G., Chandan, V., "Incentives and Targeting Policies for Automated Demand Response Contract".</p> <p>Link to the venue: <a href="http://sgc2015.ieee-smartgridcomm.org/">http://sgc2015.ieee-smartgridcomm.org/</a></p>	Miami, USA	2015-11-02 to 2015-11-05	Vijay Arya (IBM)

Name of the event	Venue	Date(s)	Participant names
<p>Attended and presented 6 papers at the Innovative Smart Grid Technologies (ISGT), Asia, 2015 conference. Articles relevant to OPTi</p> <p>* Rongali, S., Choudhury A., Chandan, V., Arya, V., "A Context Vector Regression based Approach for Demand Forecasting in District Heating Networks",</p> <p>* Vishwanath, A.,Ghai S. K., Chandan. V., Ganu, T.,Charbiwala, M., Kalyanaraman S., Blake C., "Using Renewables to Reduce Peak Demand: Lessons from an Australian Experience".</p> <p>Link to the venue: <a href="http://www.ieee-isgt-asia-2015.org/home/">http://www.ieee-isgt-asia-2015.org/home/</a></p>	Bangkok, Thailand	2015-11-04 to 2015-11-06	Vikas Chandan (IBM)
<p>In LTU's poster presentation on social innovation at Gender Summit 7 in Berlin highlighted OPTi as a good example of how to integrate a gender dimension in research and innovation content of a project.</p>	Berlin, Germany	2015-11-06-07	Paula Wennberg (LTU)
<p>Attended Embedded Conference Scandinavia talking about OPTi with exhibitor like Arrowhead</p> <p><a href="http://www.embeddedconference.se/">http://www.embeddedconference.se/</a></p>	Stockholm, Sweden	2015-11-03	Håkan Sundberg, Fredrik Udén LEN
<p>Attended the ICT2015 conference in Lisbon organised by EC and presented OPTi in F2F networking meetings as a good example of how a H2020 project can integrate a gender dimension in its core activities.</p>	Lisbon, Portugal	2015-10-20-22	Paula Wennberg (LTU)
<p>Invited talk on the "Use of Incentives' Mechanisms for Managing Network/Cloud Resources and Energy Goods", Department of Computer Science of the National University of Singapore (NUS)</p>	Singapore	2015-09-15	George Stamoulis (AUEB)
<p>Organiser and host of the GENOVATE workshop at LTU. OPTi one of the good examples of projects that integrate a gender perspective in its core activities</p> <p><a href="http://www.ltu.se/centres/cdt/Om-oss/Genus-och-mangfald/Genovate-Learning-Circle">http://www.ltu.se/centres/cdt/Om-oss/Genus-och-mangfald/Genovate-Learning-Circle</a></p>	Luleå, Sweden	2015-06-10	Paula Wennberg (LTU)

Name of the event	Venue	Date(s)	Participant names
<p>Attended and presented two articles at the Multiconference on Systems and Control</p> <p>Articles:</p> <ul style="list-style-type: none"> <li>* Castano, M., &amp; Birk, W. Control Configuration Selection for Integrating Processes Using Weighted Graphs.</li> <li>* Kadhim, A., Castano, M., Birk, W., &amp; Gustafsson, T. (2015). Relative Gain Array of Weakly Nonlinear Systems using a Nonparametric Identification Approach.</li> </ul> <p>Link to the venue: <a href="http://www.msc2015.org/">http://www.msc2015.org/</a></p>	<p>Sydney, Australia</p>	<p>2015-09-20 to 2015-09-23</p>	<p>Wolfgang Birk (LTU)</p>
<p>Attended and presented an article at the European Control Conference. Provided informal information on the projekt.</p> <p>Article:</p> <p>Castano, M., &amp; Birk, W. (2015). Estimation of Gramian-Based Interaction Measures for Weakly Nonlinear Systems.</p> <p>Link to the venue: <a href="http://www.ecc15.at/">http://www.ecc15.at/</a></p>	<p>Linz, Austria</p>	<p>2015-07-15 to 2015-07-17</p>	<p>Miguel Castaño (LTU)</p>
<p>Attended Sustainable Places, provided information about the project informally to conference attendees. In particular, discussed with leads of sister projects STORM and CELSIUS, plans for organizing a joint workshop</p>	<p>Savona, Italy</p>	<p>2015-09-16 to 2015-09-17</p>	<p>Vikas Chandan (IBM)</p>

When classifying the activities into our main target audiences we see that 24 of them (75 %) are towards the Scientific and Technical community while 25 % target the general public. We regard this as a good trade-off between audiences.

### 3 UPDATED PLAN AND PROGRESS ON PUBLIC AND GENERAL DISSEMINATION

This chapter presents an update of the plan for dissemination of information related to our project to the general public for awareness generation and progress made so far.

#### 3.1 UPDATED DISSEMINATION PLAN

The plan for public and general dissemination remains the same as presented in Deliverable 7.3 (Chandan, 2015).

#### 3.2 WEBSITE STATISTICS REPORT

In this section, we describe the progress made in public and general dissemination through statistics related to the project website.

We have set a target KPI of 1500 visits per year on our website. The current statistics, after removing Ghost Spam referrals, show that we have 586 visits over 8 months, which corresponds to 73 visits per month or 879 visits over one year. Therefore, we still need to increase the traffic to reach our goal.



Figure 1. Traffic to [www.OPTi2020.eu](http://www.OPTi2020.eu), sept 2015 – apr 2016, total

When further analysing the sources of the traffic we see that most of it, 74 %, is Direct, i.e. the user has entered the URL in the address field, 11 % is Referral (links on other webpages), 8 % is from Search engines and finally 6 % is from Social websites.

Default Channel Grouping	Acquisition			Behaviour		
	Sessions <sup>?</sup> ↓	% New Sessions <sup>?</sup>	New Users <sup>?</sup>	Bounce Rate <sup>?</sup>	Pages/Session <sup>?</sup>	Avg. Session Duration <sup>?</sup>
<b>OClean Data</b>	<b>586</b> <small>% of Total: 36.53% (1,604)</small>	<b>40.10%</b> <small>Avg for View: 71.45% (-43.87%)</small>	<b>235</b> <small>% of Total: 20.51% (1,146)</small>	<b>67.58%</b> <small>Avg for View: 87.59% (-22.85%)</small>	<b>1.87</b> <small>Avg for View: 1.32 (41.25%)</small>	<b>00:02:19</b> <small>Avg for View: 00:00:55 (152.29%)</small>
1. <a href="#">Direct</a>	<b>435</b> (74.23%)	<b>36.55%</b>	<b>159</b> (67.66%)	<b>66.90%</b>	<b>1.89</b>	<b>00:02:28</b>
2. <a href="#">Referral</a>	<b>67</b> (11.43%)	<b>44.78%</b>	<b>30</b> (12.77%)	<b>61.19%</b>	<b>1.78</b>	<b>00:01:57</b>
3. <a href="#">Organic Search</a>	<b>46</b> (7.85%)	<b>34.78%</b>	<b>16</b> (6.81%)	<b>73.91%</b>	<b>1.91</b>	<b>00:01:23</b>
4. <a href="#">Social</a>	<b>38</b> (6.48%)	<b>78.95%</b>	<b>30</b> (12.77%)	<b>78.95%</b>	<b>1.68</b>	<b>00:02:25</b>

Figure 2. Traffic to [www.OPTi2020.eu](http://www.OPTi2020.eu), sept 2015 – apr 2016, by source

A plan of actions to achieve this has been set. The plan is to increase the traffic from Referral by promoting partners to include a link on their website. Since 84 % of the traffic from Social websites is from LinkedIn we intend to focus on that network to disseminate and generate traffic to our website.

Direct traffic and from Search engines will increase as we continue with other dissemination activities.

We have also set a target that at least 20 % of the visits should have duration of more than 2 minutes, and since the average session duration is more than 2 minutes (2:19), we reached that goal.

## 4 UPDATED DISSEMINATION PLANS FOR SCIENTIFIC ACTIVITIES AND PROGRESS

This section presents:

- a) An updated list of candidate conferences, related events and journals for dissemination of OPTi results (Section 4.1) as part of the –continuously updated- project’s dissemination plan as well as
- b) An updated list of project publications up to the time of the submission of this deliverable (Section 4.2), illustrating the progress towards this plan as well as meeting the associated Key Performance Indicators for project dissemination of scientific results.

It is worth noted that even though the project is currently in the phase of the OPTi framework implementation and the evaluation has not been initiated, the partners have already produced 13 publications in highly reputable (in academic metrics) conferences’ proceedings and journals.

### 4.1 UPDATED LIST (PLAN) OF OPTi-RELATED CONFERENCES AND JOURNALS

#### 4.1.1 Conferences and events

<p><a href="#"><u>IEEE International Conference on Smart Grid Communications (SmartGridComm)</u></a>. Developing the Smart Grid has become an urgent global priority, promising economic, environmental, and societal benefits.</p>
<p><a href="#"><u>IEEE PES Innovative Smart Grid Technologies (ISGT) Europe</u></a>. Platform for the participants from the academia, electric utilities and industry to discuss the cutting-edge innovations in the smart grid and associated technical developments to transform the existing grid into a smart grid including an increasing number of distributed energy resources and storage facilities.</p>
<p><a href="#"><u>IEEE Conference on Decision and Control (CDC)</u></a>. The CDC annually brings together an international community of researchers and practitioners in the field of automatic control to discuss new research results, perspectives on future developments, and innovative applications relevant to decision making, automatic control, and related areas.</p>
<p><a href="#"><u>IEEE International Energy Conference (ENERGYCON)</u></a>. IEEE EnergyCon is dedicated to experts carrying out research focused to energy and power systems. It has already become one of the premier IEEE forums for the application of electronics, instrumentation, information and communication technology to the electricity industry.</p>
<p><a href="#"><u>IEEE Energytech</u></a>. This conference surveys promising technologies in power and energy to address the growing demand for sustainable energy.</p>
<p><a href="#"><u>International Conference on Integration of Renewable and Distributed Energy Resources</u></a>. This conference aims at knowledge-sharing among North American, European, and Asian practitioners and researchers in the fields of renewable energy (RE) and distributed energy resources (DER). The conference is focused on the technical, market, and regulatory issues that challenge the integration of these sources into the grid.</p>
<p><a href="#"><u>European Utility Week</u></a> (Former Metering Europe). This conference brings together the co-located Metering Billing/CRM Europe, Smart Homes, Transmission &amp; Distribution/Smart Grids Europe.</p>
<p><a href="#"><u>International Conference on Smart Grids, Green Communications and IT Energy-aware Technologies, ENERGY</u></a>. Collocated with other events as aprt of InfoSys, addresses several topics as Fundamentals in Smart Grids, Green Communications, Green computation and Energy efficiency planning.</p>
<p><a href="#"><u>International Conference on Smart Grids and Green IT Systems</u></a>. The purpose of SMARTGREENS is to bring together researchers, designers, developers and practitioners interested in the advances and applications</p>

<p>in the field of Smart Grids, Green Information and Communication Technologies, Sustainability, Energy Aware Systems and Technologies.</p>
<p><b><u><a href="#">International Association of Energy Economists (IAEE) Conferences.</a></u></b> IAEE Conferences attract delegates from the most influential government, corporate and academic energy decision-making institutions. Conference programs address critical issues of vital concern and importance to governments and industries and provide a forum where policy issues are presented, considered and discussed at both formal sessions and informal social functions.</p>
<p><b><u><a href="#">ACM Conference on Future Energy Systems e-Energy.</a></u></b> Aims to be the premier venue for researchers working in the broad areas of computing and communication for smart energy systems (including the smart grid), and in energy-efficient computing and communication systems.</p>
<p><b><u><a href="#">The Smart Grids Summit.</a></u></b> The Smart Grids Summit brings together Europe's leading electricity grid distribution specialists, investors and regulators to share insights into the immediate challenges and projects now started to realise the smart grid roll-out.</p>
<p><b><u><a href="#">International Conference on Energy &amp; Environment (ICEE).</a></u></b> Aims to bring together leading academic scientists, researchers and research scholars to exchange and share their experiences and research results about all aspects of Energy and Environment.</p>
<p><b><u><a href="#">EU Energy Week (Brussels).</a></u></b> Launched in 2006 as an initiative of the European Commission, the EUSEW has become a reference point for public authorities, energy agencies, private companies, NGOs and industry associations engaged in helping to meet the EU's energy and climate goals.</p>
<p><b><u><a href="#">Green week.</a></u></b> The biggest annual conference on European environment policy, to be held in Brussels. Energy saving and efficiency are also topics to deal with.</p>
<p><b><u><a href="#">Info days.</a></u></b> Related to energy savings and efficiency, smart grid, H2020 and TICs calls celebrated in Brussels and organized by the European Commission to explain call details and provide project presentations.</p>
<p><b><u><a href="#">IEEE Multi-Conference on Systems and Control (MSC).</a></u></b> MSC provides an opportunity for researchers and practitioners from different areas to formulate new challenges, to discuss the state-of-the-art and the future directions in advanced control technology and intelligent systems</p>
<p><b><u><a href="#">The European Control Conference (ECC).</a></u></b> The conference aims to bring together academic and industrial professionals in the field of systems and control, and to promote scientific cooperation and exchanges within the European Union and between Europe and other parts of the World.</p>
<p><b><u><a href="#">World Congress of the International Federation of Automatic Control.</a></u></b> The IFAC World Congress is the forum of excellence for the exploration of the frontiers in control science and technology. This Congress is attended by a worldwide audience of scientists and engineers from academia and industry. It offers the most up-to-date and complete view of control and automation techniques, with the widest coverage of application fields.</p>
<p><b><u><a href="#">International Conference on Smart Energy Systems and 4th Generation District Heating.</a></u></b> Presentations involve subjects such as <i>Smart Energy Systems; Future district heating production and systems; Energy planning and planning tools; Low-temperature district heating grids; Low-temperature district heating and buildings, and Organisation, ownership and institutions</i></p>
<p><b><u><a href="#">Sustainable Places.</a></u></b> It aims at covering all the topics of interest in the Energy-efficient Buildings Public-Private Partnerships e.g. renewable production, energy storage, construction materials, retrofitting, renewal etc.</p>

**International Trade Fair and Congress for Heating, Cooling and CHP.** The following products, services, and topics are usually presented: Heat generation, CHP installations, Refrigeration, Bio heat installations, Renewable energies, Heat transfer and distribution (Construction/assembly included), Connection and consumer installations, Heat measurement, Local heat, Heating services, contracting, Facility Management, Planning/Consulting, Decentralised energy systems, Research and material testing, Energy suppliers (particularly renewables), Training

**International Symposium on District Heating and Cooling.** This offers a great opportunity to learn about the latest research from leading international experts from Europe, Asia and North America. It is also an arena for interesting discussions with researchers, industry leaders and other DHC experts.

**Nordic District Heating Fair.** Trade fair for the district heating sector since 1982

**International Conference on Software Engineering (ICSE).** This is the premier software engineering conference, providing a forum for researchers, practitioners and educators to present and discuss the most recent innovations, trends, experiences and concerns in the field of software engineering. It also includes interesting Workshops:

- BIG Data Software Engineering (BIGDSE)
- Software Engineering for High Performance Computing in Science
- Software Engineering for Smart Cyber-Physical Systems (SEsCPS)

**MODELS.** This is the premier conference on systems and software modelling. Including interesting Workshops:

- Component-Based Systems (MODCOMP)
- MDE On and For the Cloud (CloudMDE)
- Modeling in Enterprise Architecture (MEA)

**IEEE/ACM International Conference on Automated Software Engineering.** The IEEE/ACM International Conference on Automated Software Engineering will bring together researchers and practitioners to share ideas on the foundations, techniques, tools and applications of automated software engineering.

#### 4.1.2 Academic magazines and journals

**IEEE Transactions on Smart Grid.** The IEEE Transactions on Smart Grid is intended to be a cross disciplinary and internationally archival journal aimed at disseminating results of research on smart grid that relates to, arises from, or deliberately influences energy generation, transmission, distribution and delivery.

**IEEE Power and Energy Magazine.** IEEE Power & Energy Magazine is a bimonthly magazine dedicated to disseminating information on all matters of interest to electric power engineers and other professionals involved in the electric power industry.

**IEEE Transactions on Automatic Control.** The theory, design and application of Control Systems. It shall encompass components, and the integration of these components, as are necessary for the construction of such systems.

**IEEE Transactions on Energy Conversion.** The Transactions on Energy Conversion includes in its venue the analysis, control, planning, and economics of sources of electrical energy, distributed and cogeneration power plants, central station grid connection, and equipment for generation and utilization of electric power, including electric machinery and energy storage systems.

<p><b><a href="#">IEEE Transactions on Sustainable Energy</a></b>. The IEEE Transactions on Sustainable Energy is intended to be a cross disciplinary and internationally archival journal aimed at disseminating results of research on sustainable energy that relates to, arises from, or deliberately influences energy generation, transmission, distribution and delivery.</p>
<p><b><a href="#">IEEE Control Systems</a></b>. IEEE Control Systems Magazine is the largest circulation technical periodical worldwide devoted to all aspects of control systems. The Magazine publishes tutorial and expository articles on all areas of control system design and applications.</p>
<p><b><a href="#">IEEE Transactions on Communications</a></b>. IEEE Transactions on Communications focuses on all telecommunications including telephone, telegraphy, facsimile, and point-to-point television by electromagnetic propagation.</p>
<p><b><a href="#">IEEE Networks</a></b>. IEEE Network covers topics which include: network protocols and architecture; protocol design and validation; communications software; network control, signaling and management; network implementation (LAN, MAN, WAN); and micro-to-host communications.</p>
<p><b><a href="#">Springer Energy, Sustainability and Society Journal</a></b>. Energy, Sustainability and Society is a peer-reviewed open access journal published under the brand SpringerOpen. It covers topics ranging from scientific research to innovative approaches for technology implementation to analysis of economic, social and environmental impacts of sustainable energy systems.</p>
<p><b><a href="#">Elsevier Energy Policy</a></b>. Energy Policy is established worldwide as the authoritative journal addressing those issues of energy supply, demand and utilization that confront decision makers, managers, consultants, politicians, planners and researchers.</p>
<p><b><a href="#">Elsevier Energy Economics</a></b>. This journal provides a serious forum for research papers concerned with the economics and econometric modelling and analysis of energy systems and issues.</p>
<p><b><a href="#">Elsevier Energy and Buildings</a></b>. Energy and Buildings is an international journal publishing articles with explicit links to energy use in buildings. The aim is to present new research results, and new proven practice aimed at reducing the energy needs of a building and improving indoor environment quality.</p>
<p><b><a href="#">Elsevier The International Journal of Electrical Power &amp; Energy Systems</a></b>. The journal covers theoretical developments in electrical power and energy systems and their applications.</p>
<p><b><a href="#">Elsevier Journal of Environmental Economics and Management</a></b>. The Journal of Environmental Economics and Management publishes theoretical and empirical papers devoted to specific natural resource and environmental issues.</p>
<p><b><a href="#">Springer International Environmental Agreements: Politics, Law and Economics</a></b>. A peer-reviewed, multi-disciplinary journal that focuses on the theoretical, methodological and practical dimensions of cooperative solutions to international environmental problems.</p>
<p><b><a href="#">Green Building Magazine</a></b>. Green Building magazine is the UK's premier eco-building magazine and always features a wide range of eco-building projects from across the UK.</p>
<p><b><a href="#">International Journal of Distributed Energy Resources and Smart Grids</a></b>. It publishes experimental, theoretical and applied results in both the science and the engineering for distributed energy resources in electrical grids.</p>
<p><b><a href="#">Journal of Process Control</a></b>. This international journal covers the application of control theory, operations research, computer science and engineering principles to the solution of process control problems.</p>

**Control Engineering Practice.** It publishes papers which illustrate the direct application of control theory and its supporting tools in all possible areas of automation. As a result, the journal only contains papers which can be considered to have made significant contributions to the application of advanced control techniques.

**IEEE Transactions on Control Systems Technologies.** The IEEE Transactions on Control Systems Technology publishes high-quality papers on technological advances in the design, realization, and operation of control systems.

## 4.2 UPDATED LIST OF OPTi PUBLICATIONS

1. Bhattacharya S., Chandan V., Arya V., Kar K., "Thermally-fair demand response for district heating and cooling networks". ACM International Conference on Future Energy Systems (e-Energy 16), 2016. Accepted for publication.
2. Anastopoulou, I. Koutsopoulos, G. D. Stamoulis, "OPTimal Contract Design for Load Curtailment in Nega-Watt Markets". IEEE Transactions on Control of Network Systems, 2016. Accepted for publication.
3. Jain, M., Singh, A., Chandan, V., "Non-Intrusive Estimation and Prediction of Residential AC Energy Consumption", In proceedings of IEEE International Conference on Pervasive Computing and Communications, 2016. Accepted for publication.
4. Castano, M., & Birk, W. (2015). Control Configuration Selection for Integrating Processes Using Weighted Graphs. In Proceedings of the 2015 IEEE International Conference on Control Applications (CCA 2015): Sydney, Australia, September 21-23.
5. Castaño, M., & Birk, W. (2015). Estimation of Gramian-Based Interaction Measures for Weakly Nonlinear Systems. In Proceedings of the IEEE European Control Conference 2015. Linz (Austria).
6. Birk, W., & Dudarenko, N. (2015). Reconfiguration of the air control system of a bark boiler. IEEE Transactions on Control Systems Technology
7. Kadhim, A., Birk, W., & Gustafsson, T. (2015). Relative Gain Array Estimation Based on Non-parametric Process Identification for Uncertain Systems. Poster presented at the Nordic Process Control Workshop 2015, Trondheim, Norge.
8. Kadhim, A., Castano, M., Birk, W., & Gustafsson, T. (2015). Relative Gain Array of Weakly Nonlinear Systems using a Nonparametric Identification Approach. In Proceedings of the 2015 IEEE International Conference on Control Applications (CCA 2015): Sydney, Australia, September 21-23. IEEE.
9. Kadhim, A., Birk, W., & Gustafsson, T. (2015). Relative Gain Array Variation for Norm Bounded Uncertain Systems. In Proceedings of the 2015 IEEE Conference of Decision and Control, Osaka, Japan.
10. Rongali, S., Choudhury A., Chandan, V., Ayra, V., "A Context Vector Regression based Approach for Demand Forecasting in District Heating Networks", In proceedings of IEEE PES Innovative Smart Grid Technologies in Asia (ISGT Asia), 2015. Accepted for publication.
11. Chandan, V., Vishwanath, A., Zhang, M., Kalyanaraman, S., "Data Driven Pre-cooling for Peak Demand Reduction in Commercial Buildings". In proceedings of the 2nd International Conference on Embedded Systems for Energy Efficient Built Environments (BuildSys' 15), 2015. Accepted for publication.
12. Jain, M., Chandan, V., Minou M., Thanos, G., Wijaya, T.K., Lindt, A., Gylling A., "Methodologies for Effective Demand Response Messaging", IEEE International Conference on Smart Grid Communications, 2015, Accepted for publication.

- 13.** M. Minou, G. D. Stamoulis, G. Thanos and V. Chandan, (2015). Incentives and Targeting Policies for Automated Demand Response Contracts. In 2015 International Conference on Smart Grid Communications (SmartGridComm) (pp. 557–562). IEEE.

## 5 UPDATED PLAN AND PROGRESS ON DISSEMINATION WITH WORKSHOPS AND SYMPOSIA

### 5.1 PLANNED ACTIVITIES

Apart from an active participation in scientific events and the publication of OPTi results on these occasions, the OPTi consortium itself will organise at least two workshops or symposia with the goal to:

- **advertise** the OPTi project,
- **create awareness** for OPTi ideas and concepts,
- **disseminate** results from the OPTi project,
- enable **scientific exchange** between leading experts in the field and
- identify and utilize **synergy effects** with related H2020 projects.

We will host a first workshop in summer/autumn 2016. By then, the initialization phase of the project will be completed and first results will be available. A second event will be organised in 2017, when results from the OPTi pilots will be available. In particular, the following events are planned:

#### Joint workshop in collaboration with related projects (2016)

We plan to organise a joint workshop with the H2020 sister project on DHC “STORM<sup>1</sup>” and the FP7 project “CELSIUS<sup>2</sup>”. The workshop will be held within the framework of an international conference such as the “Sustainable places<sup>3</sup>” annual event.

#### OPTi workshop (2017)

A second workshop will be organised by the OPTi consortium in the context of a relevant international conference such as “ACM e-Energy 2017”, the “2017 Euroheat & Power Congress” or “IEEE International Conference on Smart Grid Communications 2017”.

### 5.2 STATUS OF ACTIVITIES

As planned, we are hosting a joint workshop with the H2020 sister project on DHC “STORM” in the context of the 7th IEEE International Conference on Smart Grid Communications<sup>4</sup> (SmartGridComm 2016) in November 2016. The workshop is entitled “Efficient, Intelligent and Economic District Heating and Cooling Systems (DHC)”<sup>5</sup>.

#### Workshop goals:

The goal of the workshop is to bring together speakers and an audience from academia and industry to highlight the challenges and opportunities for inter-disciplinary research in the area of DHC systems. We hope this will continue to foster the growth of an emerging topic area in which the IEEE Communications Society can play a leadership role in determining technical directions. The papers will address various topics relevant to DHC systems, with a special emphasis on innovations and achievements in technical solutions for thermal management of buildings and OPTimization of DHC systems, the inclusion of renewable resources

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<sup>1</sup> STORM – Self-Organizing Thermal Operational Management, H2020 GA 649743, [www.storm-dhc.eu](http://www.storm-dhc.eu)

<sup>2</sup> CELSIUS – Combined Efficient Large Scale Integrated Urban Systems, FP7 314441, [www.celsiuscity.eu](http://www.celsiuscity.eu)

<sup>3</sup> [www.sustainable-places.eu](http://www.sustainable-places.eu)

<sup>4</sup> <http://sgc2016.ieee-smartgridcomm.org/>

<sup>5</sup> [eie-dhc.opti2020.eu](http://eie-dhc.opti2020.eu)

and emerging markets with their actors. Collectively, the papers will elaborate on challenges regarding the modelling, management and OPTimization of DHC systems, as well as consumer engagement and demand response algorithms and schemes.

A good balance between theory and application of solutions in the chosen set of papers is expected. This will enable the development of a network of researchers with diverse backgrounds and expertise, but with a common vision and focus on advancing the current state of R&D efforts in DHC systems. We anticipate this workshop to be well attended and highly successful.

The proposed workshop involves an international array of speakers.

**Workshop topics:**

- Monitoring and control solutions in DHC
- OPTimization of DHC systems
- Energy and resource efficiency
- Intelligent systems in DHC systems
- Modelling of DHC system, including production units, distribution networks
- Data modelling and management for large scale DHC
- Consumer behavioural modelling
- Economic modelling
- Automated DR algorithms and schemes
- Consumer engagement and incentive
- New business models
- Integration with Smart grids and renewable energy sources
- Intelligent thermal management of buildings
- Use of distributed energy resources (DERs) to offset building thermal loads

**Workshop profile:**

We anticipate the following profile for the proposed workshop:

- Number of anticipated submitted papers: 30
- Number of accepted papers: 8
- Attendees: 30
- Keynotes will be given by technical coordinators of the H2020 research projects on efficiency in DHC systems. 2 Keynotes.
- Paper sessions: 2 paper sessions with 4 papers each and 30min presentation slots.
- Panel discussion with policy makers, innovators and scientists on the future of operation and integration of DHC systems in smart grids and smart cities concepts.
- Award: Best Innovation Paper

## 6 STAKEHOLDER INVOLVEMENT AND FEEDBACK PLAN

### 6.1 PLANED ACTIVITIES

Apart from the earlier plans where the intended audience could be broad or general, we have created a plan for targeting specific stakeholders who have either a direct or an indirect role to play in the eco-system of Demand Response Systems. We will strive for gender balance when engaging stakeholders. We will pay special attention to how to communicate with consumers and final users in terms of texts, images and symbols from the gender perspective. The aim is to include and motivate stakeholder participation and consumer interaction as well as to boost inclusion and innovation.

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Our objective in creating this plan is to provide a jump-starter for exploitation of the results of our project by concerned stakeholders. Below, we provide a step-by-step plan to disseminate the results of OPTi to stakeholders.

### 6.2 UPDATE ON PHASE 1: PARTNER SELECTION

During the creation of the OPTi consortium, our objective was to ensure having one or two stakeholders involved as partners in the project. They would be providing the domain knowledge and also perform the work of exploiting the result generated by the project. These partners have been identified prior to the project submission and they are directly involved in the project execution. For OPTi, the partners having a direct stake with DHC are SAMPOL and Luleå Energy AB. The models will help them OPTimise their coming production and upcoming investments. They will have a direct use of the tools developed and investigated in the OPTi project. Other partner that has indirect stakes in the project is OPTimation and TWT which are industrial companies. They will be able to use mainly models and the co-simulation framework developed in the OPTi project in other work.

### 6.3 UPDATE ON PHASE 2: STAKEHOLDER LIST GENERATION

Within the project, the partners have create a list of potential stakeholders taking into account all the interested parts in ADR and passive storage, as users or active parts of this technology.

The stakeholders interested of OPTi framework have been classified in the following categories:

- **Energy provider/utility companies**
- **Energy network operators**
- **Energy service providers**
- **Engineering companies**
- **Control system tool provider**
- **Housing companies**
- **Policy makers/ regulators**

We have split up these stakeholders in seven different categories to get a better understanding of which the stakeholders are.

Examples of companies/stakeholders that we have identified from each category are outlined in Table 1 below.

Table 1: Examples of stakeholder organizations for each category of stakeholders identified.

Stakeholder categories	Examples for stakeholders in category
Energy providers / utility companies	VEAB, Pite Energi, Bodens Energi etc.
Energy network operators	Mijnwater, VEAB, Pite Energi, Bodens Energi etc
Energy service providers	EnergyVille /VITO, Riksbyggen, HSB, Noda etc
Engineering companies	AB Energy GmbH, PEWO GmbH, Bosch KWK Systeme GmbH, Vitec, Ramböll etc
Control system tool providers	NODA Intelligent Systems AB (SE), Abelko, Schneider, OProVAT EF etc
Housing companies	Lulebo AB, Lulea municipality, HSB Norr etc
Policy makers / regulators	Lulea municipality, City council, Svensk Fjärrvärme, Svensk Energi etc

## 6.4 UPDATE ON PHASE 3: FRAMEWORK FOR FEEDBACK COLLECTION

To collect stakeholder's opinion, we will request both a questionnaire as well as conduct market analysis with technical experts at the end of the project. The questioner will provide us an indication of a possible interest in our OPTi Assets as well as lead us in the direction of future work. The template for the questioner will be developed later in the project as well as the extent of how large group will be asked.

The questionnaire however will cover some of the following topics:

- Interest of the stakeholders in Passive storage
  - Consumers: Interest in increasing the temperature span in what is considered comfort temperature due to accumulation of heat in buildings. . We will collect this data by gender and age to be able to analyse and better understand men and women's needs and behaviour.
    - Interest in compensation for such actions
- Interest of the stakeholders in ADR
  - Information about current energy usage in the grid delivered to consumers
    - Information platform as an app or similar
    - Interest in taking actions according to balance in grid given in the app, by example lowering heat input to the building if the grid suffers from high energy uptake

With the answers of this questionnaire we will later on identify the areas of most interest for the stakeholders and paying attention to the whole chain from energy supplier to final users.

## REFERENCES

Chandan, V. (2015). *D7.3 Dissemination and communication plan (Ver. 1)*, OPTi Consortium, European Commission GA number 649796, available at [www.OPTi2020.eu](http://www.OPTi2020.eu)