D5.3 Second Yearly WP5 Report and Updated Activity Plan

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Abstract: The main objective of the *WP5 – Dissemination and outreach* is to increase the visibility and impact of the TREND NoE research community at both European and global levels. The dissemination activities follow several directions: *Dissemination of the scientific and technical results of WP1, WP2, WP3 and WP4; technology transfer to the industry; standardization activities; training activities to support and strengthen the dissemination objective; and coordination with other research projects at EU level on concertation and cluster activities and global level. This third deliverable includes the reporting of the main WP5 activities during the second year period from 1 September 2011 to 31 August 2012 and provides an update of the activity plans for the third year.*

Keyword list: *dissemination, publications, seminars, workshops, standardization, training, second yearly report*

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1. Executive Summary

This document compiles a detailed description of the activities and main achievements of the TREND WP5 on dissemination and outreach during the second year period. The activities plan described in the previous deliverables are revised and updated on this document.

The structure of the document is as follow: Section 3 is devoted to the TREND NoE website with a description of the main changes implemented during the second year. Section 4 includes a detailed description of the achievements on organization of conferences, teaching and training, standardization, external relations and editorial activities. Sections 5 and 6 summarize the status of theWP5 deliverables and milestones.

2. Introduction

The main objective of WP5 is to increase the visibility and impact of the TREND NoE research community at both European and global levels. This main objective can be achieved by working into the following directions:

- *Dissemination of the scientific and technical results* of WP1, WP2, WP3 and WP4, and of the Integrated Research Actions (IRAs) and Joint Experimental Activities (JEAs) planned therein. The main instruments are the scientific publications at top conferences and journals, promotion and organization of workshops, conferences, events with the industry and special issues in journals (which will be coordinated by WP5, and possibly implemented within other WPs). Each WP will have specific dissemination activities, and WP5 will integrate all of them by using the TREND website as the main vehicle for dissemination.
- *Technology transfer to the industry* by establishing synergies with the industrial and academic communities.
- *Standardization activities* by liaison and contribution in relevant bodies.
- *Training activities* to support and strengthen the dissemination objective.
- *Coordination with other research projects* at EU level on concertation and cluster activities and global level.

During the second year period covered in this document, the WP5 goal has been to consolidate the main dissemination activities that will be active during the lifetime of the NoE. The following sections describe the second year achievements and revise the status and update the dissemination activity plan.

3.   Project website

During this second year of the NoE, the website (www.fp7-trend.eu) has been a flagship of the project for both the TREND researchers and the research community in general. The website constitutes a key tool where to share our results and highlight them within and outside the TREND NoE. The website has been improved during this second year with the following changes.
There are new sections in the main menu of the public part of the website:

- **TRENDMETER**
  It provides public access to the TREND-METER tool, available at: http://trend.polito.it/. The tool has been developed inside the JEA4.1 of WP4 with the purpose of monitoring and controlling the power consumption of networking infrastructures. The current version of the system implements a live monitoring tool, and a front-end to make queries to the energy-related database. TREND-METER includes measurements from the following partners: PoliTO, CNIT-Genova, CNIT-Roma and IHU. We are currently working to extend the set of measured devices.

- **POWERLIB**
  It provides to an on line public data-base with power consumption values was created within WP1. It is available at the following link: http://powerlib.intec.ugent.be. POWETLIB is a database of power consumption values for ICT network equipment. Its main and initial purpose is to collect and provide this data for use in research towards more power-efficient ICT networks.The database allows both consulting (by everybody) as well as adding (after registration) power values for various network components

- **CALLS FOR PAPERS**
  This section collects CFP of interest for the research community on green networking.

- **@FP7_TREND_NoE**
  There is a link to the TREND twitter user to follow the main news from the TREND consortium, the green networking research community and the global audience in general. It is also available in the following link: https://twitter.com/#!/FP7_TREND_NoE

- **WHO WE ARE**
  In this section we report the key persons involved in the TREND NoE per institution with a picture, short bio a link to personal page.

There is also a new section on the private part of the website:
- **TREND Wiki for Papers on Energy-Efficient Networking** that allows collecting references to the most relevant publications in the field of Green Networking. http://151.97.6.228/project/doku.php?id=start

4. WP5 Dissemination Activities Plan

This section is structured based on the proposed tasks in the first WP5 deliverable D5.1 Detailed WP5 Dissemination Activity Plan. These tasks are the following:

- Task 5.1: Organization of conferences [M01-M36]
- Task 5.2: Teaching and training [M09-M36]
- Task 5.3: Standardization activities [M06-M36]
- Task 5.4: External relations [M03-M36]
- Task 5.5: Editorial activities [M03-M36]

The following subsections described the main actions implemented during this second reporting period and the main achievements and results along the second year of the NoE. The dissemination plans are revisited and updated for the third year.

4.1 Task 5.1 - Organization of Conferences

TREND supports and promotes events and conferences in the area of Green ICT. Four levels of conference support are provided by TREND:

- Advertised Events: These are events that TREND considers interesting for the partners, and hence are advertised on the website.
- Supported Events: These are conferences and events that the NoE has supported with active participation by either contributing a large number of papers or/and by organizing a workshop in conjunction with the event, etc. Organizers may use the NoE logo upon authorization by the Project Office.
- TREND co-organized Events: These are workshops/events co-organized by TREND. The organizer must have the NoE logo on their website and provide the Project Office with a report on the event, highlighting the TREND contribution
- TREND Events: These are stand alone events organized by TREND

During the second year the TREND NoE has continued the reinforcement of the links with the leading networking conferences. The main achievements on this task are below classified by type of events described above:

- Advertised events:
    - **Symposium: "Energy Consumption of the Internet" at ECOC 2012 conference**
      www.ecoc2012.org
      The ECOC 2012 conference was held in Amsterdam (the Netherland) on September 16-20, 2012. A symposium entitled "Energy Consumption of the Internet" has been organized during the conference.

    - **EARTH Training Workshop**
      www.ict-earth.eu
      The EARTH Training Workshop took place in Grenoble on June 13th, 2012.

    - **IEEE ICC 2012 Workshop on Green Communications and Networking**
      http://www.ieee-icc.org

This Workshop on "Green Communications and Networking" provides a forum for discussions of all these most recent developments and brings together industry and academia, engineers and researchers.

- **RELABIRA symposium**
  www.relabira.com/
  The international symposium "Networks and Broadband Internet Fast" (RELABIRA) is organized by the Faculty of Engineering at the Antonine University Baabda Lebanon and covers all aspects of broadband networks: technical and non-technical aspects be they economic, legal and societal. In this third edition hold on 28 and 29 May 2012, the theme is sustainable development and logical recycling. There was a TREND presentation by the Coordinator Prof. Marco Ajmone Marsan.

- **1st IEEE INFOCOM 2012 Workshop: Green Networking and Smart Grid**
  csl.uiuc.edu/smart-grid
  1st IEEE INFOCOM Workshop on Communications and Control for Sustainable Energy Systems (CCSES): Green Networking and Smart Grids was held as part of IEEE INFOCOM 2012 at Orlando, Florida, USA on March 30, 2012.

- Supported events:
  - **ACM Mobicom 2012**
    www.sigmobile.org/mobicom/2012/
    ACM MobiCom 2012 is the 18th in a series of annual conferences sponsored by ACM SIGMOBILE dedicated to addressing the challenges in the areas of mobile computing and wireless and mobile networking. The MobiCom conference series serves as the premier international forum addressing networks, systems, algorithms, and applications that support the symbiosis of mobile computers and wireless networks. MobiCom is a highly selective conference focusing on all issues in mobile computing and wireless and mobile networking at the physical layer and above. MobiCom 2012 was in August 22-26, 2012 in Istanbul, Turkey
    The TREND NoE supported travel grants for PhD students affiliated to TREND for the participation to ACM MOBICOM 2012. All the PhD students presenting their papers at ACM MOBICOM 2012 and belonging to one of TREND's partner institutions had the travel and registration expenses fully reimbursed by TREND itself.

  - **1st ETSI workshop on Energy Efficiency**
    The first ETSI Workshop on Energy Efficiency took place on 20-21 June 2012, in Genoa, Italy, and was hosted by the University of Genoa and supported by ECONET project.
    The workshop emphasized the design and the use of ICT to reduce environmental impact. In addition the workshop enabled the 80 delegates to share views on ongoing work on energy efficiency standards in ETSI and among other SDOs and research projects, identify any potential gaps and overlaps in energy efficiency standardization and analyze future requirements for energy efficiency standardization of ICT equipment and networks.
    Workshop presentations available at:
    http://docbox.etsi.org/Workshop/2012/201206_EEWORKSHOP/

- **Third ACM/IEEE e-Energy 2012**
  e-energy2012.networks.imdea.org
  e-Energy, is the third International Conference on Future Energy Systems, which is organized annually since 2010. It was organized by the Institute IMDEA Networks and the University Carlos III of Madrid in May 9th to 11th, 2012 in Madrid.

- **International Conference on Communications and Electronics 2012 (ICCE2012)**
  www.hut-icce.org/
  Hue, Vietnam, August 1st – 3rd, 2012. The Special Session on Energy-Efficient Networking within this conference is technically co-sponsored by ECONET and TREND. Conference organization: Franco Davoli – CNIT.

- **3rd Symposium on green networking and computing**
  Split, Croatia, September 11 - 13, 2012
  marjan.fesb.hr/SoftCOM/2012/
  Third Symposium on Green networking and computing was held in the frame of the 20th International Conference on Software, Telecommunications and Computer Networks (SoftCOM 2012). Symposium is organized in cooperation with Technical Subcommittee on Green Communications and Computing (TSCGCC) of the IEEE ComSoc and supported by the European Commission FP7 TREND NoE.

- **9th International Conference on Wireless On-demand Network Systems and Services (WONS 2012)**
  wons2012.tlc.polito.it/index.html
  On January 9-11, 2012, the 9th International Conference on Wireless On-demand Network Systems and Services (WONS 2012) was held in Courmayeur, Italy.
  WONS, now in its 9th edition, has established itself as a high-quality forum on Wireless On-Demand Networks. The conference program included a special session devoted to the memory of Prof. Fabio Neri.

- Co-organized events:

  - **TREND NoE Industry Session at the Third ACM/SIGCOMM e-Energy 2012 Conference**
    e-energy2012.networks.imdea.org
    The TREND NoE has organized jointly with the ACM/SIGCOMM e-Energy 2012 conference an Industry Session where several experts from industry gave a view on the field of energy efficient networking. There are representative speakers from a wide range of companies: from operators, devices and equipment manufacturers, data centers and smart grids. The session was scheduled on 10th May 2012. The program is available in the e-Energy 2012 site and the Appendix nº 1.

  - **Workshop on "Green Communications and Networks" at the FutureNetwork Summit 2012 - FUNEMS 2012**
    www.futurenetworksummit.eu/2012/
    The two special sessions are scheduled for 14:15 and 18:15 on Wednesday 04 July in Berlin within the Future Networks and Mobile Summit 2012.
    Conference organization: Stefano Buzzi - CNIT

The workshop proposal was submitted to the European Commission jointly by Stefano Buzzi and Luis Correia (from the EARTH project). The workshop was accepted and it consisted of 2 x 105-minute sessions. The workshop featured contributions from EARTH, ECONET, C2POWER and TREND project. Here is the detailed program:

Workshop 3e: Green Communications and Networks I (14.15)
Chair: Stefano Buzzi, CNIT / University of Cassino, Italy
- *"Network Evolution Steps towards Power Efficiency"*
  Juan Pedro Fernandez-Palacios, TELEFONICA R&D, Spain
- *"Power Consumption in Future Ultra Broadband Networks"*
  Alessandro Valenti, Fondazione Ugo Bordoni, Italy
- *"ECONET Green Abstraction Layer: A Common Interface Proposal for Controlling the Power Management Capabilities of Networking Devices"*
  Leonardo Fialho, Dublin City University, Ireland
- *"A Smart Proxy Architecture for Power Consumption Reduction in the Home Environment"*
  Roberto Bruschi, CNIT, Italy
- *"How to deploy and operate mobile networks in an energy efficient manner?"*
  István Gódor, Ericsson Hungary, Hungary

Workshop 4e: Green Communications and Networks II (18:15)
Chair: Stefano Buzzi, CNIT / University of Cassino, Italy

- *"Greening" Mobile Communication via Mitigation of Traffic Growth*
  Adam Wolisz, Technische Universität Berlin , Germany
- *"Energy efficiency of vertical handovers under different traffic profiles"*
  Jacek Kibilda, Wrocławskie Centrum Badań EIT+, Poland
- *"Energy efficient wireless radio networks: The Greenet approach"*
  Angelos Antonopoulos, CTTC, Spain
- *"Energy Savings with new BS Hardware Solutions"*
  Dieter Ferling, Alcatel-Lucent Deutschland AG, Germany
- *"Holistic energy consumption evaluation of wireless networks using efficient components and systems"*
  Björn Debaillie, imec, Belgium

- **Panel at CCW 2011 ((Hyannis, USA, 11 October 2011**
  The Panel "Energy-efficient Networking: The Views of Leaders of International Research Projects" was organized by TREND (Marco Ajmone Marsan) at CCW 2011 (Hyannis, USA, 08/10/2011-13/10/2011)

- **2011 Joint Workshop with other EU Project in Energy Efficiency (jointly organized with projects ECONET, C2POWER and EARTH)**
  Brussels, 05/10/2011
  In the afternoon of October 5, 2011, the day before the concertation meeting, a joint workshop with other EU projects dealing with energy efficiency in communication networks took place in Brussels. There were eight paper presentations and a final panel. TREND NoE contributed with two paper

presentations and with panelists. More details of the program available at the TREND NoE site.

- TREND events:
    - **TREND & Friends Workshop**
      Gent, Belgium, 14/02/2011
      Hosted by IBBT
      Meeting details and presentations at: http://www.fp7-trend.eu/content/calendar-events/noe-events/trend-friends-workshop-gent-14-february-2012-presentations

    - **TREND Plenary Meeting**
      Gent, Belgium, 14/02/2012 – 15/02/2012
      Hosted by IBBT
      Meeting details at: http://www.fp7-trend.eu/content/calendar-events/noe-events/plenary-meeting-gent-14-15-february-2012

    - **TREND & Friends Workshop**
      Madrid, Spain, 27/09/2011
      Hosted by UC3M
      Meeting details and presentations at: http://www.fp7-trend.eu/content/calendar-events/noe-events/plenary-meeting-madrid-26-27-september-2011

    - **TREND Plenary Meeting**
      Madrid, Spain, 26/09/2011 – 27/09/2011
      Hosted by UC3M
      Meeting details at: http://www.fp7-trend.eu/content/calendar-events/noe-events/plenary-meeting-madrid-26-27-september-2011

    - **TREND 1st Project Review**
      Brussels, 17/11/2011
      Meeting details at the TREND Directory Service

    - **IRA3.1 Joint Working Meeting**
      Location: TUB, Berlin
      Date: 23/04/2012 - 24/04/2012
      Main topics:
        - Challenges
        - Adaptive routing solutions in the WDM layer (and more)
        - Adaptive routing solutions in the IP layer
        - Revision of the deliverable D3.3
        - Preparation/revision of the joint paper

The updated plan for the third year will consist in the continuation in the participation in organization of top networking conferences and workshops. Here is a list of the current planning events for the third year:

- Supported events in Y3
    - **Networks 2012**
      networks2012.fub.it/

It will be held in Rome, Italy, 15-18 October 2012.

- **SustainIT 2012**
  cnd.iit.cnr.it/sustainit2012/
  Sponsored by IEEE and IFIP, SustainIT 2012 will be held in Pisa, Italy, on October 4-5, 2012.

- **2012 IEEE Online Conference on Green Communications**
  General Co-Chair Marco Ajmone Marsan (PoliTO), Michela Meo as Program Co-Chair and several other TREND people involved in the organization. TREND will be present as silver sponsor.
  Date. 26/09/2012 – 28/09/2012

- TREND events in Y3:
  - TREND Plenary meeting in Feb-March 2013 in Catania, Italy, hosted by CNIT.
  - TREND Closing Plenary meeting in Sept 2012 in Berlin, Germany, hosted by TUB (pending for confirmation)

In particular, during the last third year there are plans for organizing two important events: the TREND PhD School and the TREND Scientific Workshop. In order not to contribute to the proliferation of new small conferences of limited impact, the plan for the TREND Scientific Workshop will be to co-locate it within one of the large and well-established international conferences in the area of networking. We are considering now two alternatives: INFOCOM in April 2013 in Torino or e-Energy in May 2013 in Berkeley.

The plans for the TREND PhD School are also considering several alternatives that will finally closed soon.

4.2 Task 5.2 - Teaching and training

The training activity is focused on contributions to teaching "Energy-Aware and Energy-Efficient Networking" topics within the regular courses of academic institution participating in the project and invited talks in key venue and institutions. The main objective is to pave the way toward a greater integration among different post-graduate school systems across Europe, and enhance curricula with topics focusing on energy-aware networking.

The teaching material produced for these courses is collected, reviewed by selected partners, and made available through the project website to the whole consortium in the section Teaching Material that is also publicly open.

During the second year, two more initiatives have been launched to reinforce the teaching and training activities:

- The creation of the *LinkedIn Group: Green Communication Network* coordinated by Alfio Lombardo – CNIT. www.linkedin.com/groups/Green-Communication-Network-4068715

- The creation of TREND *Wiki for Papers on Energy-Efficient Networking* that allows collecting references to the most relevant publications in the field of Green Networking. http://151.97.6.228/project/doku.php?id=start

During this second year the TREND NoE has reinforced this activity. The main achievements on this task are the following, classified by type of teaching activity:

- PhD/MSc Courses/Seminars:
  - **MSc Course on "Green ICT" at the International Hellenic University in Thessaloniki, Greece by Michela Meo (PoliTO) and George Koutitas (UTH)**
    The Green ICT module includes basic TREND concepts such as energy efficiency in telecommunication networks (wired and wireless) and Green data centers. More precisely, there was a 12 hour lecture by Prof. Michela Meo (PoliTO) in the area of Energy Efficiency in Wireless and Wired Networks. In addition, there was a 3 hour lecture by Dr. George Koutitas (IHU) in the scientific field of Green Data Centers. The module is theoretical and incorporates one assignment and written exams at the end of the term. More info can be found here (http://www.tech.ihu.edu.gr/index.php/en/courses/mastersmscs/msc-in-information-and-communication-technology-ict-systems.html).
    Location: International Hellenic University in Thessaloniki, Greece
    Date: 27/04/2012 - 28/04/2012

  - **MSc Seminar on Electronic Advanced System on "Energy Efficiency in the Future Networks" by Julio Montalvo and Felipe Jiménez (TID)**
    Location: University Carlos III of Madrid – Leganes, Madrid, Spain
    Date: 09/05/2012

  - **Lectures Seminar on Cross-Layer Design and Energy Efficiency in the context of GREENET Marie Curie Project by** Iordanis Koutsopoulos (UTH)
    Location: Barcelona
    Date: 19/09/2012 - 21/09/2012

  - **Seminar: "Green Networking" organized by: Łukasz Budzisz (TUB)**

    The seminar has discussed a huge variety of topics of students´ choice in the area of wireless green networking. The topics covered by the seminar were the following:

    1. Energy efficiency in cellular networks through switching base stations on/off
    2. User-demand based energy-efficient WLANs through switching the APs on/off
    3. Dynamic load balancing for power saving in WLAN
    4. Spatial dependency of user demand in WLAN

    The main objective of this seminar was to develop the skill of critical evaluation of the literature available in the selected research areas. At the end of the course students gave a technical talk resuming the research in the selected area, including a short written technical report.
    Location: TUB
    Date: 12/04/2012 – 23/07/2012

  - **Student project: "Statistical evaluation of sets of traffic matrices"**
    Supervisor: Filip Idzikowski (TUB)
    Traffic in telecommunication networks dynamically varies over time and space. Static backbone networks of today are highly over dimensioned to accommodate

peak traffic demands. The dynamics of traffic can be used to switch off some network components to save energy in low-demand hours. The aim of this project was to evaluate dynamicity of traffic given a set of traffic matrices, where each traffic matrix corresponds to a given period of time, and each element of a traffic matrix corresponds to traffic between a pair of source and target edge routers.

We focused on temporal and spatial statistics of the sets of traffic matrices available at sndlib originating from measurements in the Abilene and Geant networks. We investigated correlation of traffic demands between different node pairs and made an attempt to classify traffic demands into classes of elephants and mice. Moreover, a superficial evaluation of the stationary of the traffic as a stochastic process was performed.

Location: TUB

Date: 13/04/2011 - 08/02/2012

- **Master Thesis: "Design of cost-minimized IP-over-WDM networks with single-path IP routing"**
  Supervisors: Filip Idzikowski (TUB), Michela Meo (PoliTO), Marco Mellia (PoliTO)
  The aim of the Master Thesis project was to compare the IP-over-WDM networks designed with the objectives of CapEx minimization on one hand and power minimization on the other hand under the constraint of single-path routing of IP demands over the logical topology.

  An optimization model covering several network layers (from fibers installed on physical supply links up to routing of traffic demands over the logical topology) was prepared starting from the previous work performed by TUB jointly with atesio GmbH and ZIB.

  Three physical supply network topologies were considered (Abilene, Gèant and Germany17). The focus was set on the smallest topology (Abilene) due to the achieved optimization gaps. The results show that the networks designed with two different objectives are comparable in terms of power consumption, installed routers and established lightpaths. The majority of the power is consumed in the IP layer, even if pessimistic assumptions about the power consumption of Optical Line Amplifiers and WDM terminals are made.

  This is a joint work between TUB and PoliTO.

  Location: TUB, PoliTO

  Date: 02/03/2011 - 08/11/2011

- **MSc Program and Research Seminar on Telematics Engineering at University Carlos III of Madrid**
  Invited talk by Narseo Vallina (Computer Lab, University of Cambridge)
  Title: ErdOS: The Case for Opportunistic Social Computing. Mobile devices are energy-limited. Both industry and the research community proposed solutions to overcome these limitations with relative success at different levels such as hardware, operating system and even applications. However, mobile computing is moving towards a fully centralised world in which mobile operating systems rely on the cloud to assist their local sensors (e.g. A-GPS) or even for offloading computation. Unfortunately, this paradigm is not optimal in many situations both in terms of energy cost and user experience. In this talk, we will overview some of the techniques used to save energy on mobile devices, the cost of accessing hardware resources either locally or remotely, and an alternative and

complementary model based on opportunistic computing concepts to overcome today's limitations.
Related Papers >>
http://ieeexplore.ieee.org/xpls/abs_all.jsp?arnumber=6157576&tag=1
http://www.cl.cam.ac.uk/~nv240/papers/held03k-vallinarodriguez.pdf
Location: UC3M, Madrid, Spain
Date: 22/05/2012

- Invited/Keynote/Tutorial/Panel Talks:
    - **Keynote Lecture: "Content proliferation and caching in future internet architectures" by Leandros Tassiulas (UTH)**
      Location: Medhocnet 2012, Agia Napa, Cyprus
      Date: 19/06/2012 – 22/06/2012

    - **Keynote Lecture: "Cross-layer design approaches in wireless ad-hoc networks with many-to-many information flows" by Leandros Tassiulas (UTH)**
      Location: International Workshop on Cross-Layer Design, Rennes, France
      Date: 30/11/2011 – 01/12/2011

    - **Keynote Lecture: "Effective information delivery through opportunistic replication in wireless networks" by Leandros Tassiulas (UTH)**
      Location: WiOpt 2012, Paderborn, Germany
      Date: 14/05/2012 – 18/05/2012

    - **Keynote Lecture: "Stochastic models and algorithms for cooperative information delivery" by Leandros Tassiulas (UTH)**
      Location: Young European Queueing Theory workshop, EURANDOM, Eindhoven
      Date: 24/10/2011 – 26/11/2011

    - **Keynote: "The key to service efficiency is context awareness" by Adam Wolisz (TUB)**
      Location: 1st IEEE International Conference on Consumer Electronics - Berlin (ICCE-Berlin 2011)
      Date: 06/09/2011

    - **Adam Wolisz (TUB) acted as chair of the session "Consumer Networks 1"**
      Location: 1st IEEE International Conference on Consumer Electronics - Berlin (ICCE-Berlin 2011)
      Date: 06/09/2011

    - **Adam Wolisz (TUB) acted as panel member at the Joint Workshop (Cross Cluster Meeting) on Energy Efficiency which has been co-organised by the EC FP7 Projects EARTH, ECONET, C2POWER and TREND**
      Location: Brussels
      Date: 06/10/2011

    - **Keynote: "Do we have a Vision of the Future Wireless Networks?" by Adam Wolisz (TUB)**

Location: UMIC Day, RWTH Aachen
Date: 18/10/2011

- **Talk: "Greening Mobile Communication via Mitigation of Traffic Growth"**
  by Adam Wolisz (TUB)
  Workshop on Green Communications and Networking in conjunction with
  FUNEMS 2012 Location: Berlin
  Date: 04/07/2012 - 04/07/2012

- **Discussions relevant to TREND – Adam Wolisz (TUB)**
  Location: NEM Summit 2011, Torino
  Date: 22/09/2011 - 29/09/2011
  Location: FIA Poznań
  Date: 24/10/2011 - 24/10/2011

- **Invited talk: "Overview on LTE" by Łukasz Budzisz (TUB)**:
  Location: lesswire AG
  Date: 12/06/2012

- **Invited Talk on Sleep Mode Effectiveness in Cellular Networks by Delia**
  Ciullo (PoliTO) at at Energy in Communication, Information, and Cyber-
  physical Systems (E6) Workshop, in conjuction with Fourth International
  Conference on COMmunication Systems and NETworkS (COMSNETS 2012)
  Location: Bangalore, India
  Date: 04/01/2012

- **Invited Talk on ICT For Energy Sustainability From green networking to**
  ZEN by Marco Ajmone Marsan (PoliTO) at Fourth International Conference
  on COMmunication Systems and NETworkS (COMSNETS 2012)
  Location: Bangalore, India
  Date: 03/01/2012 - 07/01/2012

- **Invited Talk on TREND project presentation by Marco Ajmone Marsan**
  (PoliTO) at "Broadband Networks and Fast Internet" (RELABIRA)
  symposium
  Location: Faculty of Engineering at the Antonine University Baabda, Lebanon
  Date: 28/05/2012 - 29/05/2012

- **Invited Talk on Green Networking by Michela Meo at Workshop "Green**
  ICT in Italy: Networks, Cloud and Power Grid"
  Location: Milano, Italy
  Date: 01/12/2011

- **Panel on Energy-efficient Networking: The Views of Leaders of International**
  Research Projects organized by Marco Ajmone Marsan (PoliTO) at CCW
  2011
  Location: Hyannis, USA
  Date: 11/10/2011

- **Keynote on Energy Efficiency and Resilience by Piet Demeester at the 8th International Workshop on Design of Reliable Communications Networks - DRCN 2011**
  Location: Krakow, Poland
  Date: 12/10/2011

- **Tutorial on "Green Networking"by Franco Davoli (CNIT)**
  A 4-hour tutorial jointly organized with the ECONET project during the 4th International Conference on Communications and Electronics – ICCE 2012
  Location: Royal City of Hue, Vietnam
  Date: 01/08/2012 – 03/08/2012
  More info available at: http://www.hut-icce.org/Tutorials.html

4.3 Task 5.3 - Standardization activities

Individual TREND partners are very active at different levels at relevant standardization bodies. Besides that, the TREND NoE has conducted during the second year the initiative of invited several speakers from standardization to the NoE events, mainly during the plenary meetings with the goal of spreading the standardization activities on green networking to the TREND consortium.
The main achievements on this task during the second year are the following:

PoliTO

- **ITU**

  Bilel Jamoussi (ITU) was invited at the plenary meeting in Gent (February 2012). More details in the agenda and presentations of that meeting available in the TREND website.

- **ETSI**

  Poster presentation on TREND project by Marco Ajmone Marsan (PoliTO) at ETSI Workshop on Energy Efficiency in Genoa Italy from 20/06/2012 – 21/06/2012

A-LBLF

- Alberto Conte (ALBLF) co-authored a book chapter in the book "Green Radio Communication Networks" (Cambridge University Press). The book chapter *"Standardisation, fora, and joint industrial projects on green radio networks"* provides an extensive overview of energy saving activities in the main standardization bodies worldwide. It has been written in association with Alcatel-Lucent representative in different standardization fora. It also provides an overview of main joint projects such as FP7 EARTH, GreenTouch and NGMN Alliance.

- Alcatel-Lucent (ALU) participates to the major standardization fora (e.g. 3GPP), and is active on the thematic related to "improvement of energy efficiency of telecommunication networks". ALBLF provides support as internal consulting to ALU representatives at 3GPP and other standardization fora. In particular, in the case of 3GPP, ALU is active in working items related to Energy Savings (REL-11 Energy

Savings WID): (i) Basic inter-RAT mechanism: CRs agreed for basic inter-RAT energy saving (LTE hotspot cell autonomous switch-off) and (ii) Selective cell switch-on: Several methods were proposed during the Rel-10 study item (TR 36.927). The UE measurements / BS probing solution has been proposed for the Rel-11 work item by KPN with support from ALU and others. More details can be found on the meeting minutes of the meetings RAN3 #76 in Prague, 21-25 May 2012 and meeting RAN3 #77 in Qingdao (China), 13-17 August 2012.

TID

- ITU-T started on December 2011 a standardization work of subwavelenght technologies, FT being involved on the issue. Both FT and TID have worked on a new version of the initial report, which comprise contributions from major equipment providers.

- FT and TID have actively collaborated in the elaboration of this ITU-T contribution about sub-wavelength technologies. This contribution is entitled as "Terms and definition for Sub-Lambda Photonically Switched Networks (SLPSN)" and tries to establish common criteria when working on optical burst switching aimed at potential power savings achievements. It is a compilation of terms and abbreviations that could be used in Sub-Lambda Photonically Switched Networks (SLPSN) Recommendations. Some of the terms that are defined for SLPSN are: the types of nodes and their functionality, different technologies that can be used, the types of implementation, different mechanisms for content resolution and so on.
This work will be presented on September 2012 in the ITU-T. Once the contribution is agreed on ITU-T, further work in the IETF regarding the control plane for sub-wavelength technology is planned. This work will extend an IETF draft (draft-gonzalezdedios-subwavelength-framework-00).

FT

- FT has initiated a document on sub-lambda photonic switching networks at ITU T (SG 15, contribution 1527) Standardization of optical switching (photonic sub-lambda switching).

- FT has initiated a document "Proposals of common requirements for low power consumption in Optical Access Networks" at FSAN (linked to ITU-T Q2 SG15) where the intention would be to i) show the operators interest in that direction, ii) Edict guidelines for implementers so that they know the conditions for being acceptable, iii) publish our performance spreadsheet in order to be able to predict the consumption whatever the use cas, iv) gives rules for easy common testing

- FT contributed to the organization of the first ETSI Workshop on Energy Efficiency, which took place on 20-21 June 2012, in Genoa, Italy.

TUB

- IETF-draft:
T. Ayar, B. Rathke, L. Budzisz, A. Wolisz (TUB):

A Transparent Performance Enhancing Proxy Architecture To Enable TCP over Multiple Paths for Single-Homed Hosts, February 17, 2012.
http://tools.ietf.org/html/draft-ayar-transparent-sca-proxy-00
Presented at the 83rd IETF meeting in Paris.

UTH

- Participation to **ITU-T Standardization** activities in the area **of M2M Service Layer for Smart Grids**

4.4 Task 5.4 – External relations

TREND external relations are built on several directions. One of them is within the 7th FP of the EC where there are several projects in the area of green networking (EARTH, GREENET, ECONET, C2POWER…). TREND NoE has established strong links with these projects by inviting and key researchers from them to the plenary meeting and workshops. Several presentation of TREND NoE took place in the meeting of other projects.

Other example of external relations are based in the Collaborative Institutions that have been actively joining the TREND consortium, the links with the Industry and with other research projects at national and international levels.

The detailed list of external relations for each TREND partner is the following:

PoliTO

- Interaction with **GreenTouch** (Michela Meo participated in the GreenTouch plenary meeting in Seattle, USA from 15/11/2011 to 17/11/2011 and she gave a Talk online to the GreenTouch meeting held in Dallas from 04/06/2012 to 04/06/2012.

- Flavio Cucchietti from **Telecom Italia** was invited at the plenary meeting in Gent (Feb.2012) and gave the following talk: Efficient and sustainable ICT - Time for coordinated action.

- Interactions with **EARTH, ECONET, C2POWER, CHRON, STRONGEST, FIT4Green, IC0804, GREENET, EFFICIENT** have been established. Representatives from STRONGEST and GREENET attended the Plenary Meeting in Gent (Feb 2012). Some interactions were established with the project EFFICIENT (national project funded by the Italian Ministery of Education and Research). It involves five Italian University, incl. PoliTO.

- Michela Meo participated in the **Future Networks 8th FP7 Concertation meeting** and Workshop on "Green Networks" (cross cluster meeting) in Bruxelles from 06/10/2011 to 07/10/2011.

- **IEEE Computer Society Special Technical Community on Sustainable Computing**

Links were established with the IEEE STCSC (http://stc-sustainable-computing.ieee.net/) and with the **Technical Subcommittee on Green Communications and Computing (TSGCC).**

A-LBLF

- Alberto Conte presented the Green 3G Femtocell prototype (experimental platform developed with the support of TREND project) to **Orange**. Presentation to CMCC planned during Q3 2012.
- Alberto Conte presented the Green 3G Femtocell prototype (experimental platform developed with the support of TREND project) to **Telefonica**.

HWDU

HWDU has been actively involved in **GreenTouch** activities. For instances: participation to the GreenTouch working groups conference calls and discussions, GreenTouch member meetings in Seattle (Nov. 2011) and Dallas (Jun. 2012).

TUB

- TUB discussed with **Enterasys** power saving schemes for dense WLAN environments, as well as mechanisms for dynamic channel allocation for WLAN APs.
- Invited talk on LTE in the **Lesswire** company that covered also aspects of energy saving in LTE networks. Possible future cooperation in this area was discussed.
- TREND relations with Collaborative Institutions (CI): Dr. Christoph Lange from Deutsche Telekom Laboratories acted as reviewer for D3.3 edited by TUB.

EPFL

- **IBM China** / Low Power Designs and Implementation for IOT Wireless Networks:
  This is a project with IBM SUR department in China. The objective is to develop methods for saving energy on mobiles and on the radio access part of wireless networks. This collaboration will focus on developing and implementing methods for saving energy on mobiles and on the radio access part of wireless networks, such as wireless telecommunications networks and oil pipelines equipped with wireless sensors. Specifically, to develop low power strategies for controlling the simultaneous use of multiple connections and at the same time prevent undesirable global effects. EPFL will implement the corresponding algorithms on the IBM developed Wireless Network Cloud POC system.

A-LBLF

- ALBLF presented the TREND NoE to the GREENET 2nd Plenary Meeting on November 21st in Elancourt (France). GREENET is an Initial Training Network (ITN) Marie Curie project that is focused on the analysis, design, and optimization of energy efficient wireless communication systems and networks. We also took the chance to discuss possible TREND+GREENET joint activities. The first priority would be to co-

organize an industry event (workshop, school...) during 2012.

- **IEEE Technical SubCommittee on Green Communications & Computing (TSCGCC)**:
  Alberto Conte and Chung Shue Chen have joined the IEEE TSCGCC.
- **TSCGCC - SIGGCN**
  Chung Shue Chen joined the TSCGCC SIG on Green Cellular Networks (SIGGCN)
- **TREND NoE was present at the Bell Labs Open Days 2012.** Bell Labs Open Days is the annual event organised by Bell labs (France) open to internal and external (selected) visitors such as MNOs. The 2012 event took place in Villarceaux, France, 23/05/2012 - 25/05/2012. The Green 3G Femto (TREND protoytpe) was demoed and a poster of TREND project was also shown and presented. The TREND NoE was represented by: Veronique Capdevielle, Chung Shue Chen, Alberto Conte, Ivaylo Haratcherev

HWDU

- HWDU is also a partner of EU CHRON project. Research results from TREND project have been presented and discussed at CHRON project meetings.

FT

- Energy focus group of the **French Laboratory of Excellence Comin-labs**:
  Esther Le Rouzic has presented TREND to the Energy focus group the French Laboratory of Excellence Comin-labs. 30 researchers from Brittany (ENSSAT, Télécom Bretagne, INSA Rennes, mines Nantes, INRIA) participated to this meeting.

UC3M

- UC3M was representingTREND consortium in the **4th EU-JapanSymposium the "New Generation Network" and the "Future Internet"** in Tokio on 19 January 2012. Carmen Guerrero gave the keynote on Green Content Distribution.

- **MEDIANET** - Integration of Next Generation Multimedia Services in the Internet of the Future - www.medianet-cm.es. Project funded by the Department of Education, Regional Government of Madrid (Consejería de Educación, Comunidad de Madrid). The partners involved in the project are: NETCOM Research Group from University Carlos III of Madrid, DSA Research group from Universidad Complutense de Madrid, Institute IMDEA Networks, GIST Research Group from Universidad de Alcalá de Henares. Duration: January 2010 - December 2013.

- **Energy-Efficiency Content Distribution.** University Carlos III of Madrid (UC3M) and the Institute IMDEA Networks are collaborating in a new project funded by the Ministery of Science and Innovation in 2011 with a total duration of three years. The collaboration is in the field of energy efficiency in content distribution.

CNIT

- CNIT is the coordinator of the **ECONET project**, a 3-year IP project (Oct 2010 - Sep 2013) co-funded by the European Commission under the Framework Programme 7 (FP7). ECONET aims at studying and exploiting dynamic adaptive technologies (based on standby and performance scaling capabilities) for wired network devices that allow saving energy when a device (or part of it) is not used. Cross-fertilization activities between TREND and ECONET have been constantly carried out by CNIT.
- **Workshop on "Green Networks" (cross cluster meeting).** Raffaele Bolla and Stefano Buzzi attended the cross cluster meeting organized by the European Commission in Brussels on 06/10/2011 - 06/10/2011.

- Raffaele Bolla and Stefano Buzzi attended both the Future Networks 8th FP7 Concertation meeting in Bruxelles on 06/10/2011 and the 9th meeting in Bruxelles from 13/02/2012 to 14/02/2012.

IBBT
- Interaction with **GreenTouch** at the plenary meetings in Seattle (November 2011) and Dallas (June 2012).
- Participation in the **STRONGEST** FP7 project, with a focus on energy-efficiency.

4.5 Task 5.4 – Editorial activities

TREND partners play important roles in the editorial boards of the most prestigious journals and magazines, and in the technical program and steering committees of the best conferences covering networking topics. These editorial activities can significantly contribute to improve the visibility of TREND in the international technical community. On a regular basis, the TREND project will disseminate to key publication venues including the top international journals and conferences in the field. Appendix 2 includes a full list of second year TREND publications.

One of the main achievements in the editorial task is the final publication of the **Special Issue on Energy-Efficient Networking of the IEEE Internet Computing Magazine officially published by February 2013.**

During the second year, other main achievements in the editorial task are the followings:

PoliTO
- **IEEE Globecom 2012**
  Orlando, Florida, 03/12/2012 – 07/12/2012
  TPC: Luca Chiaraviglio, TPC Member - Symposium on Selected Areas in Communications - Track on Green Communication Systems and Networks

- **IEEE ICC 2012 Workshop on Green Communications and Networking**
  Ottawa, Canada, 10/06/2012 - 15/06/2012
  TPC: Michela Meo (TPC member)

- **IEEE ICC 2012 Workshop on Cognitive Radio and Cooperation for Green Networking**

Ottawa, Canada, 10/06/2012 - 15/06/2012
TPC: Michela Meo (PoliTO), TPC member

- **e-energy conference**
Madrid, 09/05/2012 - 11/05/2012
TPC: Michela Meo (PoliTO), TPC member

- **IEEE INFOCOM 2012 Workshop: Green Networking and Smart Grid** Online
Orlando, USA, 30/03/2012 - 30/03/2012
TPC: Michela Meo (PoliTO) (TPC co-chair) and other TREND people involved in
TPC

- **2011 IEEE Online Conference on Green Communications**
Online Conference, 26/09/2011 - 29/09/2011
TPC: Michela Meo (PoliTO), TPC member and TPC Co-chair; Marco Ajmone,
General Co-Chair

A-LBLF

- **IEEE GLOBECOM 2012**
Anaheim, CA, USA, 03/12/2012 - 07/11/2012
TPC: Chungshue Chen TPC member

- **ICCT 2012 ()**
Chengdu, 09/11/2012 - 11/11/2012
TPC: Chungshue Chen TPC member

- **2012 IEEE Online Conference on Green Communications**
online, 25/09/2012 - 28/09/2012
TPC: Alberto Conte, TPC member

- **2012 IEEE Online Conference on Green Communications**
online, 25/09/2012 - 28/09/2012
TPC: Ivaylo Haratcherev TPC member

- **Future Network & Mobile Summit 2012**
Berlin, 04/07/2012 - 06/07/2012
TPC: Alberto Conte, TPC member

- **IEEE VTC 2012**
Yokohama, Japan, 06/05/2012 - 09/05/2012
TPC: Chungshue Chen, TPC member

- **IEEE WCNC 2012**
Paris, France, 01/04/2012 - 04/04/2012
TPC: Chungshue Chen, TPC member

- **IEEE ICNC 2012**
Maui, Hawaii, USA, 30/01/2012 - 02/02/2012
TPC: Chungshue Chen, TPC member)

- **IEEE CCNC 2012**
  Las Vegas, NV, USA, 14/01/2012 - 17/01/2012
  TPC: Chungshue Chen, TPC member

- **IEEE Globecom2011**
  Houston, USA, 05/12/2011 - 09/12/2011
  TPC: Chungshue Chen, TPC member

HWDU

- **IEEE Globecom 2012**
  Orlando, Florida, 03/12/2012 - 07/12/2012
  TPC: Yabin Ye, TPC member of Optical Networks and Systems Symposium

- **IEEE International Conference on Communications (ICC 2012) workshop on Telecommunications: From Research to Standards**
  Ottawa, Canada, 10/06/2012 - 11/06/2012
  TPC: Yabin Ye, TPC member

- **IEEE Globecom2011**
  Houston, USA, 05/12/2011 - 09/12/2011
  TPC: Yabin Ye (TPC member of Optical Networks and Systems (ONS) Symposium)

FT

- **European Conference on Optical Communications ECOC 2012**
  Amsterdam, The Netherlands, 15/09/2012 - 20/09/2012
  TPC: Philippe Chanclou (TPC member)

- **Photonics in Switching 2012**
  Ajaccio, France, 11/09/2012 - 14/09/2012
  TPC: Esther Lerouzic (General chair)

- **2012 IEEE Conference on High Performance Switching and Routing (HPSR 2012)**
  Belgrade, Serbia, 24/06/2012 - 27/06/2012
  TPC: Esther Lerouzic (TPC member)

- **IEEE ICC 2012 Optical Networks and Systems Symposium**
  Ottawa, Canada, 10/06/2012 - 15/06/2012
  TPC: Esther Lerouzic (TPC member)

- **Symposium on Broadband Networks and Fast Internet**
  Baabda, Lebanon, 26/05/2012 - 27/05/2012
  TPC: Esther Lerouzic (Steering committee and TPC member)

- **Symposium on Broadband Networks and Fast Internet**
  Baabda, Lebanon, 26/05/2012 - 27/05/2012
  TPC: Yvon Gourhant (TPC member)

- **OFC/NFOEC 2012**
  Los Angeles, California, 04/03/2012 - 08/03/2012
  TPC: Esther Lerouzic (Esther Le Rouzic is member of the 2012 OFC/NFOEC

Technical Program Committee)

TUB

- **1st International Conference on Smart Grids and Green IT Systems (SMARTGREENS 2012)**
  Porto, Portugal, 19/04/2012 - 20/04/2012
  TPC: Filip Idzikowski (TUB)

- **IEEE ICC 2012 Workshop on Green Communications and Networking**
  Ottawa, Canada, 15/06/2012 - 15/06/2012
  TPC: Adam Wolisz (TUB)

- **2nd International Workshop on Green Computing and Renewable Energy (GCRE 2012)**
  Niagara Falls, Canada, 27/08/2012 - 29/08/2012
  TPC: Adam Wolisz (TUB)

- **2012 IEEE Online Conference on Green Communications (IEEE greencom)**
  online, 25/09/2012 - 28/09/2012
  TPC: Filip Idzikowski (TUB)

- **Planned:**
  CCNC 2013 - Green Communications and Computations (The 10th Annual IEEE CCNC- Green Communications and Computations Track)
  Las Vegas, Nevada, USA, 11/01/2013 - 14/01/2013
  TPC: Adam Wolisz (TUB)

- **2nd International Conference on Smart Grids and Green IT Systems (SMARTGREENS 2013)**
  Aachen, Germany, 09/05/2013 - 10/05/2013
  TPC: Filip Idzikowski (TUB)

UC3M

- **The Third International Conference on Energy-Efficient Computing and Networking 2012 - e-Energy 2012**
  Madrid - Spain, 09/05/2012 - 11/05/2012
  TPC: Ruben Cuevas (Publicity Co-Chair) - Conference hosted by Institute IMDEA Networks and University Carlos III of Madrid (UC3M)

- **WONS 2012 - 9th International Conference on Wireless On-demand Network Systems and Services**
  Courmayeur, Italy, 09/01/2012 - 11/01/2012
  TPC: Ruben Cuevas (TPC Member) -

- **COMSNET Workshop on Energy in Communication, Information, and Cyber-physical Systems - E6 Workshop 2012**
  Bangalore - India, 04/01/2012 - 04/01/2012
  TPC: Carmen Guerrero (TPC Member)

- **The Fourth International Conference on COMmunication Systems and NETworkS - IEEE COMSNETS 2012**

Bangalore - India, 03/01/2012 - 07/01/2012
TPC: Carmen Guerrero (TPC Member, Ruben Cuevas Publicity Co-Chair

- **17th International Conference on Computer Networks - IEEE ICON 2011**
  Singapore, 14/12/2011 - 16/12/2011
  TPC: Ruben Cuevas (UC3M), TPC member
- **2nd IEEE Workshop on Pervasive Group Communication - IEEE PerGroup 2011**
  Houston, USA, 05/12/2011 - 09/12/2011 (co-located with Globlecom 2011
  TPC: Ruben Cuevas (UC3M) TPC member

IBBT

- **The Second IFIP Conference on Sustainable Internet and ICT for Sustainability, (SustainIT)**
  Pisa, Italy, 04/10/2012 - 05/10/2012
  TPC: Bart Lannoo, TPC member

- **The Second IFIP Conference on Sustainable Internet and ICT for Sustainability, (SustainIT)**
  Pisa, Italy, 04/10/2012 - 05/10/2012
  TPC: Mario Pickavet, TPC member

- **4th International Workshop on Reliable Networks Design and Modeling (RNDM) RNDM 2012**
  St. Petersburg, Russia, 03/10/2012 - 05/10/2012
  TPC: Mario Pickavet, TPC member + co-chair

- **ECOC 2012**
  Amsterdam, The Netherlands, 16/09/2012 - 20/09/2012
  TPC: Mario Pickavet, TPC member

- **17th European Conference on Network and Optical Communications (NOC 2012) and 7th Conference on Optical Cabling and Infrastructure (OC&I 2012)**
  Vilanova i la Geltru, Spain, 20/06/2012 - 22/06/2012
  TPC: Didier Colle, TPC member

- **16th International Conference on Optical Networking Design and Modeling - ONDM 2012**
  Colchester, UK, 17/04/2012 - 20/04/2012
  TPC: Mario Pickavet, TPC member

- **IEEE Globecom2011**
  Houston, USA, 05/12/2011 - 09/12/2011
  TPC: Mario.pickavet and Piet Demeester, PC member Green Communication Systems and Networks

- **ECOC 2011**
  Geneva, Switzerland, 18/10/2011 - 22/10/2011
  TPC: Mario Pickavet and Piet Demeester, TPC member

- **8th International Workshop on Design of Reliable Communication Networks (DRCN 2011)**

Krakow, Poland, 10/10/2011 - 12/10/2011
TPC: Didier Colle, TPC member

- **3rd International Workshop on Reliable Networks Design and Modeling (RNDM)**
  Budapest, Hungary, 05/10/2011 - 07/10/2011
  TPC: Mario Pickavet, TPC member

- **IEEE Online Conference on Green Communication**
  Online, 26/09/2011 - 29/09/2011
  TPC: Mario Pickavet, TPC member

CNIT
- **Workshop on Flexible Optical Networks (FON) - Colocated with Globecom 2012**
  Anaheim, CA, USA, 03/12/2012 - 03/12/2012
  TPC: Massimo Tornatore (TPC member)

- **IEEE GLOBECOM 2012**
  Anaheim, CA, USA, 03/12/2012 - 07/11/2012
  TPC: Stefano Bregni (Technical Program Vice-Chair)

- **Executive Committee IEEE GLOBECOM 2012**
  Houston, USA, 07/12/2011 - 07/12/2011
  Attended by: Stefano Bregni

- **TPC Meeting IEEE GLOBECOM 2012**
  Houston, USA, 08/12/2011 - 08/12/2011
  Attended by: Stefano Bregni

- **Organizing Committee IEEE ICC 2016**
  Kuala Lumpur, Malaysia, 18/01/2012 - 18/01/2012
  Attended by: Stefano Bregni

- **Organizing Committee IEEE LATINCOM 2012**
  Guayaquil, Ecuador, 08/02/2012 - 08/02/2012
  Attended by: Stefano Bregni

- **Organizing Committee IEEE ENERGYCON 2012**
  Roma, Italy, 23/12/2012 - 23/12/2012
  Attended by: Stefano Bregni

- **CloudNet**
  Paris, 28/11/2012 - 30/11/2012
  TPC: Massimo Tornatore (TPC member)

- **CloudNet**
  Paris, 28/11/2012 - 30/11/2012
  TPC: Antonio Cianfrani (TPC member)

- **4th International Workshop on Reliable Networks Design and Modeling (RNDM) RNDM 2012**
  St. Petersburg, Russia, 03/10/2012 - 05/10/2012
  TPC: Massimo Tornatore (TPC member)

- **2012 IEEE Online Conference on Green Communications**
  online, 25/09/2012 - 28/09/2012
  TPC: Stefano Buzzi, Antonio Cianfrani and Carla Panarello (TPC member) -

- **Photonics in Switching 2012**
  Ajaccio, France, 11/09/2012 - 14/09/2012
  TPC: Achille Pattavina (TPC member)

- **IEEE ENERGYCON 2012**
  Florence, Italy, 09/09/2012 - 12/09/2012
  TPC: Stefano Bregni (Vice-Chair for the Technical Program) -

- **The Ninth International Symposium on Wireless Communication Systems**
  Paris (France), 28/08/2012 - 31/08/2012
  TPC: Stefano Buzzi (TPC member)

- **2012 European Signal Processing Conference (EUSIPCO-2012)**
  Bucharest, 27/08/2012 - 31/08/2012
  TPC: Stefano Buzzi (TPC member)

- **2012 IEEE Conference on High Performance Switching and Routing (HPSR 2012)**
  Belgrade, Serbia, 24/06/2012 - 27/06/2012
  TPC: Achille Pattavina (TPC member)

- **IEEE ICC 2012 Optical Networks and Systems Symposium**
  Ottawa, Canada, 10/06/2012 - 15/06/2012
  TPC: Stefano Bregni (TPC member)

- **IEEE ICC 2012 Optical Networks and Systems Symposium**
  Ottawa, Canada, 10/06/2012 - 15/06/2012
  TPC: Massimo Tornatore (TPC member)

- **Workshop on "New Trends in Optical Networks Survivability" - Colocated with ICC 2012**
  Ottawa, Canada, 10/06/2012 - 10/06/2012
  TPC: Massimo Tornatore (TPC member)

- **IEEE INTERNATIONAL CONFERENCE ON COMMUNICATIONS - ICC 2012**
  OTTAWA, CANADA, 10/06/2012 - 15/06/2012

TPC: Stefano Bregni (TPC member, Symposium on Selected Areas in Communications, Access Systems and Networks Track)

- **16th International Conference on Optical Networking Design and Modeling - ONDM 2012**
  Colchester, UK, 17/04/2012 - 20/04/2012
  TPC: Achille Pattavina (TPC member)

- **IEEE Globecom2011**
  Houston, USA, 05/12/2011 - 09/12/2011
  TPC: Stefano Bregni (TPC member) - Symposium on Selected Areas in Communications, Green Networks and Systems Track

- **Selected Areas in Communications Symposium Green Communication Systems and Networks Track at GLOBECOM 2011**
  Houston, TX, 05/12/2011 - 09/12/2011
  TPC: Achille Pattavina (TPC member)

- **IEEE LATINCOM 2011**
  Belém, Pará, Brazil, 24/10/2011 - 26/10/2011
  TPC: Stefano Bregni (Technical Program Co-Chair)

- **2011 IEEE Online Conference on Green Communications**
  Online Conference, 26/09/2011 - 29/09/2011
  TPC: Stefano Buzzi and Raffaele Bolla, TPC member

EPFL
- **The 31st Annual IEEE International Conference on Computer Communications - IEEE Infocom 2012**
  Orlando, Florida, 25/03/2012 – 30/03/2012
  TPC: Ramin Khalili

- **The 3rd SIGCOMM/ACM E-Energy 2012**
  Madrid, 09/05/2012 – 11/05/2012
  TPC : Prof. Le Boudec

- **IEEE INFOCOM workshop: green networking and smart green 2012**
  Orlando, Florida, 25/03/2012 – 30/03/2012
  TPC: Prof. Le Boudec

- **The Third IEEE SmartGridComm 2012**
  Taiwan, 05/11/2012 – 08/11/2012
  TPC: Prof. Le Boudec

UTH

- **The Third IEEE SmartGridComm 2012**
  Taiwan, 05/11/2012 – 08/11/2012
  TPC: L. Tassiulas, TPC Co-Chair, I. Koutsopoulos, G. Koutitas, TPC member

- **IEEE GreenComm 2012**
  Online, 26/09/2012 – 28/09/2012
  TPC: G. Koutitas, TPC member

5. List of WP5 deliverables

Deliverable Nº	Deliverable Title	Leader	Estimated indicative person-months	Nature	Dissemination Level	Delivery date
D5.1	Detailed WP5 dissemination activities plan	UC3M	5	R	PU	M3
D5.2	First yearly WP5 report and updated activity plan	UC3M	10.00	R	PU	M12
D5.3	Second yearly WP5 report and updated activity plan	UC3M	10.00	R	PU	M24
D5.4	Final WP5 report, including a roadmap towards energy-efficient networks	UC3M	12.00	R	PU	M36

6. List of WP5 milestones

Deliver able Nº	Milestone name	Leader	Delivery date	Comments
MS1	Kickoff meeting; consolidation of the first set of IRAs and JEAs to be activated	PoliTO	M1	Status: closed, done. Kickoff meeting organized in October (M2).
MS5	Project technical meeting; with presentation of action plans for all WPs.	PoliTO	M6	Status: closed, done. 2nd project meeting on March 2011 hosted by FT in Paris.
MS8	First-year plenary meeting; technical presentations by all WPs; plans for Y2; definition of SJRPs- JEAs	PoliTO	M12 (1)	Status: closed, done. 3rd project meeting on September 2011 hosted by UC3M in Madrid. (1) M13
MS11	Project technical meeting, with presentations of completed JSRP results	PoliTO	M18	Status: closed, done. 4th project meeting on Feb 2012 hosted by IBBT in Gent..
MS12	Submission of proposal for feature topic on Green Communications to the IEEE Communications Magazine (2)	UC3M	M20 (3) (4)	Status: closed, done. (2) IEEE Internet Computing Magazine (3) M8 (4) Final publication by Feb 2013
MS13	TREND Industrial Workshop, broadly targeted at Industry	UC3M	M21 (6)	Status: closed, done. (6) Co-located with e-Energy 2012
MS14	Second-year plenary meeting; technical presentations by all WPs; plans for the next year	PoliTO	M24 (7)	Status: open, in progress. (7) 5th Plenary Meeting in Sept 2012 hosted by UTH in Volos, Greece
MS16	TREND Winter School, coordinated with all FP7 Projects active on energy-efficiency networking	UC3M	M28	Status: open, in progress.
MS17	Project technical meeting, with presentations of IRA and JEA results	PoliTO	M30	Status: open, in progress.
MS19	Organization of the TREND Scientific Workshop	UC3M	M35	Status: open, in progress.
MS20	Final meeting with presentation of major project achievements and coordination of final reporting	PoliTO	M36	Status: open, in progress.

APPENDIX 1. TREND NoE Industry Session at e-Energy 2012

Thursday, May 10th at 14:00 – TREND NoE Industry Session

The TREND NoE (www.fp7-trend.eu/) has organized jointly with the ACM e-Energy 2012 conference this Industry Session where several experts from industry are going to give a view on the field of energy efficient networking. There are representative speakers from a wide range of companies: from operators, devices and equipment manufacturers, data centers and smart grids.

Insomnia in the Access or How to Curb Access Network Related Energy Consumption

Nikolaos Laoutaris (Senior Researcher, Telefonica Research, Barcelona, Spain)

Nikolaos Laoutaris is a senior researcher at the Internet research group of Telefonica Research in Barcelona. Prior to joining the Barcelona lab he was a postdoc fellow at Harvard University and a Marie Curie postdoc fellow at Boston University. He got his PhD in computer science from the University of Athens in 2004. His general research interests are on system, algorithmic, and performance evaluation aspects of computer networks and distributed systems. Current projects include: Efficient inter-datacenter bulk transfers, energy-efficient distributed system design, content distribution for long tail content, transparent scaling of social networks, pricing of broadband services and ISP interconnection economics.

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Aspects of Energy-Efficient Operation of Telecommunication Networks

Christoph Lange (Project Manager R&D, Deutsche Telekom, Telekom Innovation Laboratories, Berlin, Germany).

Christoph Lange received the Dipl.-Ing. degree (diploma) in electrical engineering and the Dr.-Ing. degree (Ph. D.) in communications engineering from the University of Rostock, Germany, in 1998 and 2003, respectively. Currently, he is with Deutsche Telekom, Telekom Innovation Laboratories, in Berlin. His work is focussed on broadband access networks and on the energy efficiency of telecommunication networks.

GreenTouch: increasing network energy efficiency by a factor of 1000

Tom Bostoen (Senior Researcher at Bell Labs, Belgium)

Tom Bostoen obtained his M.Sc. degree in Physical Engineering from Ghent University in Belgium in 1998. Since then, he has been with Alcatel-Lucent in Antwerp, Belgium. There, he, currently, works as researcher in the Network Systems department of Bell Labs pursueing a Ph.D. in collaboration with the DistriNet research group of KU Leuven. His research targets energy-efficient distributed file and storage systems. Prior to his current appointment, he was product manager of Alcatel-Lucent's Network Analyzer, head of Alcatel's DSL research, and DSL research engineer.

Conserving platform energy in a systematic way

Ren Wang (Senior Research Scientist, Intel Labs, USA)

Ren Wang received her Ph.D degree in Computer Science at UCLA in 2004, where her research areas include network analysis and modeling, and high performance TCP protocol design and evaluation. Currently she is a senior research scientist at Intel Labs working on reducing power consumption and improving user experience and performance for processors, platforms and networks. Before joining Intel in 2007, she was a research

Scientist in Rockwell Scientific, where she pursued research projects on MAC, network and transport protocol design and optimization for directional wireless communications.

FIT4Green - Federated data centres for a sustainable environmental impact

María Pérez Ortega (Programme Manager, GFI Benelux, Luxemburg)

María Pérez Ortega, computer engineer, has focused her knowledge and research in new technologies. She joined GFI, through GFI Spain, in 2003 as IT Consultant and starting to work in EC funded projects in 2004. After 4 years she moved to GFI Benelux for being the GFI manager of R&D EC funded projects at international level. She is in charge of selecting and executing GFI's opportunities in R&D EC funded projects. Her experience includes the current coordination of projects related to sustainable development like the STREPs FIT4Green and All4Green, and the IP SUPERHUB.

Personal Energy Management & the Smart Grid

David Boundy (Director of the SAP-Intel Collaboratory, Ireland)

David is a Research Manager with Intel Labs Europe whose mission is to advance Intel research and innovation in Europe while partnering to enable European competitiveness. David is currently leading a variety of research and applied research initiatives in the area of mobility and Manages Intel System Innovation programme. David also leads Intel's engagement in the SAP - Intel Collaboratory, a joint research centre based in Belfast. The centre focuses its research on the role of ICT in driving sustainability with specific emphasis on smart grids and cloud computing. Previously David has held a number of Management and Programme Management positions for Intel, most recently leading Intel IT's Service Management transformation

APPENDIX 2. Y2 TREND PUBLICATIONS

An updated version of this list can be found in the Publications Section of the TREND website: http://www.fp7-trend.eu/content/publications

1. L. Gkatzikis (UTH), G. Paschos (UTH), I. Koutsopoulos (UTH), *Medium Access Games: The Impact of Energy Constraints*, NETGCOOP, **to be published**.

2. I. Koutsopoulos (UTH), L. Tassiulas (UTH), *Control and Optimization meet the Smart Power Grid: Scheduling of power demands for optimal energy management*, Proceedings of 2nd International Conference on Energy-Efficient Computing and Networking (E-Energy), **to be published**.

3. C. Comito (ICAR-CNR), D. Falcone (ICAR-CNR), D. Talia (ICAR-CNR), P. Trunfio (ICAR-CNR), *Energy Efficient Task Allocation over*, International Conference on Cloud and Green Computing (CGC 2011), pp. 380-387, Australia, **to be published**.

4. F. Musumeci (CNIT), M. Tornatore (CNIT), G. Fontana (University of Trento, Italy), M. Riunno (FW), A. Pattavina (CNIT), *Energy-efficiency of all-optical transport through time driven switching*, IET Optoelectronics, **to be published**.

5. J. L. Vizcaíno (HWDU), Y. Ye (HWDU), V. Lopez (TID), F. Jimenez (TID), R. Duque (TID), P. Krummrich (TU Dortmund), F. Musumeci (CNIT), M. Tornatore (CNIT), A. Pattavina (CNIT)*, Traffic and Power-Aware Protection Scheme in Elastic Optical Networks, Networks 2012*, **to be published.**

6. **S. Aleks**ic (TUWien), W. Van Heddeghen (IBBT), M. Pickavet (IBBT), *Scalability and Power Consumption of Static Optical Core Networks*, Globecom 2012, Annaheim, USA, **to be published**.

7. J. L. Vi*zcaíno (HWDU), Y. Ye (HWDU), V. Lopez (TID), F. Jimenez (TID), R. D*uque (TID), P. K*ummrich* **(TU Dor**tmound), *Cost Evaluation for Flexible-Grid Optical Networks*, IEEE Globecom 2012 workshop on Flexible Optical Networks, **to be published**.

8. G. Koutitas (UTH), *Control of Flexible Smart Devices in the Smart Grid*, Transactions Smart Grids, Vol. 3, No. 3, 3, **to be published**.

9. I. Haratcherev (A-LBLF), A. Conte (A-LBLF), *Practical energy efficiency in 3G femtocells*, INFOCOM 2013, **to be published**.

10. C. S. Chen (A-LBLF), *An Energy-Aware Protocol for Self-Organizing Heterogeneous LTE Systems*, IEEE Journal on Selected Areas in Communications (JSAC), **to be published**.

11. G. Koutitas (UTH), A. Karousos (Aircom), L. Tassiulas (UTH), *Deployment strategies and energy efficiency of cellular networks*, IEEE Transactions Wireless Communications, Vol. 11, No. 11, **to be published**.

12. S. Kokkinogenis (UOWM), G. Koutitas (UTH), *Dynamic and static base station management schemes in cellular networks*, IEEE GlobeComm, USA, December 2012.

13. M. Ajmone Marsan (PoliTO), S. Buzzi (CNIT), L. Chiaraviglio (PoliTO), M. Meo (PoliTO), C. Guerrero (UC3M), F. Idzikowski (TUB), Y. Ye (HWDU), J. López Vizcaíno (HWDU), TREND: Toward Real Energy-efficient Network Design, Second IFIP Conference on Sustainable Internet and ICT for Sustainability (SustainIT 2012): On-going Projects Track, Pisa, Italy, October 2012.

14. J. L. Vizcaíno (HWDU), Y. Ye (HWDU), V. Lopez (TID), F. Jimenez (TID), R. Duque (TID), P. Krummrich (TU Dortmound), *On the Energy Efficiency of Survivable Optical Transport Networks with Flexible-grid*, ECOC2012, pp. P5.05, Amsterdam, The Netherlands, September 2012.

15. F. Musumeci (CNIT), M. Tornatore (CNIT), J. L. Vizcaino (HWDU), Y. Ye (HWDU), A. Pattavina (CNIT), *Power-Aware Design of Protected IP-over-WDM Networks with Sleep-mode Devices*, IEEE GreenCom2012, September 2012.

16. W. Van Heddeghem (IBBT), F. Idzikowski (TUB), E. Le Rouzic (FT), J. Y. Mazeas (FT), H. Poignant (FT), S. Salaun (FT), B. Lannoo (IBBT), D. Colle (IBBT), *Evaluation of Power Rating of Core Network Equipment in Practical Deployments*, Greencom 2012, online conference, September 2012.

17. L. Chiaraviglio (PoliTO), A. Cianfrani (CNIT), *On the Effectiveness of Sleep Modes in Backbone Networks with Limited Configurations*, Proceedings of the 20th International Conference on Software, Telecommunications and Computer Networks (SoftCOM 2012), Split, Croatia, September 2012.

18. E. Bonetto (PoliTO), A. Triki (FT), E. Le Rouzic (FT), B. Arzur (FT), P. Gavignet (FT), *Circuit Switching and Time-domain Optical Sub-wavelength Switching Technologies: Evaluations on the Power Consumption*, Proceedings of the 20th International Conference on Software, Telecommunications and Computer Networks (SoftCOM 2012), Split, Croatia, September 2012.

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25. R. Khalili (EPFL), N. Gast (EPFL), M. Popovic (EPFL), J. Le Boudec (EPFL), *Performance Issues with MPTCP*, INTERNET-DRAFT, MPTCP working group, July 2012.

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39. S. Wiethölter (TUB), M. Emmelmann (Fraunhofer FOKUS, Berlin), Y. Chen (TUB), A. Wolisz (TUB), *On the analysis of WiFi communication and WiMAX network entry over single radios*, Proc. of Workshop on Convergence among Heterogeneous Wireless Systems in Future Internet (ICC), Ottawa, Canada, June 2012.

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41. A. Conte (A-LBLF), *Standardization, fora, and joint industrial projects on green networks*, Green Radio Communication Networks, Cambridge University Press, pp. 383-408, June 2012.

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43. G. Koutitas (UTH), L. Tassiulas (UTH), A delay based optimization scheme for peak load reduction in the smart grid, ACM e-Energy2012, Madrid, Spain, May 2012.

44. . Chiaraviglio (PoliTO), I. Matta (BU), Energy-Aware Network Management and Content Distribution, Green Communications: Theoretical Fundamentals, Algorithms, and Applications, CRC Press / Taylor & Francis Group, May 2012.

45. L. Chiaraviglio (PoliTO), M. Mellia (PoliTO), *Energy-Efficient Management of Campus PCs*, Green Communications: Theoretical Fundamentals, Algorithms, CRC Press / Taylor & Francis Group, May 2012.

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52. D. Cuda (FT), R. Indre (FT), E. Le Rouzic (FT), J. Roberts (INRIA), *Getting routers out of the core: building an all-optical network with "multipaths"*, ONDM2012, April 2012.

53. F. Musumeci (CNIT), M. Tornatore (CNIT), R. Fiandra (FW), A. Pattavina (CNIT), *The role of network topology on the energy efficiency of IP-over-WDM architectures*, Proceedings of ONDM 2012, Colchester, April 2012.

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55. G. Alfano (PoliTO), Z. Chong (TUD), E. Jorswieck (TUD), *Energy-efficient Power Control for MIMO channels with partial and full CSI*, WSA 2012, Dresden, March 2012.

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58. W. Van Heddeghem (IBBT), F. Idzikowski (TUB), W. Vereecken (IBBT), D. Colle (IBBT), M. Pickavet (IBBT), P. Demeester (IBBT), *Power consumption modeling in optical multilayer networks*, Photonic Network Communications, January 2012.

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61. D. Siracusa (POLIMI), V. Linzalata (POLIMI), G. Maier (POLIMI), A. Pattavina (POLIMI), Y. Ye (HWDU), M. Chen (HWDU), *Hybrid Architecture for Optical Interconnection based on Micro Ring Resonators*, Proc. of GLOBECOm 2011, pp. 1-5, Houston, December 2011.

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63. A. Zappone (CNIT), G. Alfano (PoliTO), S. Buzzi (CNIT), M. Meo (PoliTO), *Non-cooperative resource allocation in multi-cell OFDMA systems with multiple base station antennas*, Proc. of the 8th International Symposium on Wireless Communication Systems (ISWCS 2011), Germany, November 2011.

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65. A. Conte (A-LBLF), A. Feki (A-LBLF), L. Chiaraviglio (PoliTO), D. Ciullo (PoliTO), M. Meo (PoliTO), M. Ajmone Marsan (PoliTO), *Cell Wilting and Blossoming for Energy Efficiency*, IEEE Wireless Communications Magazine, Vol. 18, No. 5, pp. 50-57, IEEE Communications Society, October 2011.

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