

IEEE Technical Committee on Smart Grids
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SUMMARY

Activities of the TC-SG during this period (January- June 2012) include:

MEMBERSHIP

- **Outreach and invitation for participation:** Contacted over 450 members of the IEEE CSS, PES, and affiliated societies and invited their participation. To date 122 colleagues have joined the TC-SG. Membership is growing steadily from the genesis of this TC in June 2010: From 58 members in December 2010, to 72 in June 2011, to 93 in November 2011, and to 122 in May 2012.

The first in-person meeting was held on Thursday December 16, 2010 at the IEEE CDC'10 in Atlanta. 58 colleagues participated and we received terrific feedback and a very high level of enthusiasm from all participants.

- Considered and discussed technical areas that our community can contribute to and that the TC-SG will cover.
- Discussed the next steps for a potential collaborations for vision/roadmap for control systems for smart grids. This might be the kind of deliverable our TC could take on, map out, and execute.
- Sought participants in organizing sessions, tracks and activities, including special issues/sections in the upcoming IEEE journals and in the IEEE workshops/conferences.

The 2nd in-person meeting was held at the IEEE ACC'11 in San Francisco with 34 attendees on June 30, 2011, and discussed the following:

- SG tracks and invited sessions at the ACC, IFAC, and CDC/ECC.
- IEEE Smart Grid Vision Project for Control Systems.
- Coordination and planning to prepare a concise summary of challenges and opportunities for dynamical systems and controls in SG.

The 3rd in-person meeting was held at the IEEE CDC/ECC'11 in Orlando with 29 attendees on 13 December 2011 (attached please find the minutes of the meeting)

Activities/progress during January- June 2012:

- IEEE Smart Grid Vision Project for Control Systems:
 - Under Dr. Anu Annaswamy's leadership, as the Editor In Chief for the IEEE Smart Grid Vision for Control System, the project is on track and we've made considerable progress since our last report.
 - This project is sponsored by the IEEE Standards Association and focuses a long-term vision of what the smart grid will look like 20 to 30 years out what can the control systems community contribute.
 - Charter: "The SG Vision Project will be chartered with creation of a rich set of forward looking use cases, applications scenarios for SG, and corresponding enabling technologies for SG of the future snapshots of years 2015, 2020, 2030, and beyond that will characterize the SG paradigm and should be the world's beacon for SG paradigm and relevant to it technologies. It should be targeted to produce publishable products (long term vision, reference architecture model(s), and a technology roadmap). The SG vision should be a pie in the sky globally optimal scenario for the SG with minimal to no boundary conditions. In other words the vision should not be bounded by existing technological, regulatory, business paradigms, standards projects, or product plans."

- Deliverable: Develop a vision/roadmap for control systems for smart grids. This is a kind deliverable our TC has taken on to map out and execute.
- The kick-off meeting was successfully held in Atlanta at the GE facilities on November 21, with participation of 25 colleagues from the CSS. Working teams formed, final outline noted below was prepared, section assignment accepted, and efforts underway to prepare the final report (drafts that were due in March and May 2012 were successfully delivered, and the final report is due on September 15, 2012).
- The final report outline is as follows:
 - 1) Executive Summary
 - 2) Introduction
 - i. Vision for smart grids, role of control, and the IEEE role (including the intended audience and how each can read this).
 - 3) Current Practice (10-15 pp.; Chris DeMarco)
 - a. Typical and differentiating characteristics of power grids—constraints, policy, regulation, reliability
 - b. Markets, Generation, Transmission, Substation, Distribution, Consumers, and End-use
 - 4) Drivers for Change (10-15 pp.; Massoud Amin)
 - a. Emissions, Environmental and Economic Sustainability, reliability, security
 - b. Trends and advances in supporting technologies (measurement, semiconductors, control, communication, and computation)
 - c. Nation-wide and world-wide issues
 - 5) Scenarios (c. 2050) (25-30 pp.; Tariq Samad)
 - a. Six scenarios (5 pages each with figures) – request sent out early April
 - b. By mid-May, a first draft should be ready
 - c. Top-down and bottom-up approaches
 - d. Dimensions/axes for visualizing scenarios—multiple versions with different dimensions, for different areas
 - e. Paradigm changes (large % of renewables possibly with some trade-offs)
 - f. Should support the next generation of smarter power production and delivery systems which meets societal and consumer needs, barriers/pinchpoints, and opportunities/pathways forward.
 - g. Plug & Play architectures
 - 6) Game Changers and Research Challenges /Tools (35- 40pp.; Anu Annaswamy)
 - a. Loci of Control
 - b. Control Architectures and Algorithms
 - c. Emerging Control Themes
 - 7) Conclusions: Short-term and Long-term Moves and Recommendations
 - a. Assessments and evaluation
 - 8) Appendices (roadmap & reference model):

Smart Grid Vision for Control Systems (SGV-CS) Team:

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- **Next Steps for the SGV-CS report:**

- June 28, 2-4 p.m. An upcoming meeting of the working group will be held at the ACC in Montréal. Chapter leads will present a status of the whole document.
- July 13-14, working session of chapter leads at the University of Minnesota in Minneapolis. A second draft of Chapter 3-6 will be ready on July 15.
- September 15: Final draft of the whole document including Executive Summary (Chapter 1), Introduction (Chapter 2), Recommendations (Chapter 7) and Appendices (Reference Model, Road-Map).

- The 8th IFAC Symposium on Power Plants and Power Systems Control will be held in Toulouse, France during September 2-5, 2012:

- Thanks to the Professors Kwang Lee and István Erlich who are organizing a smart grid track and several sessions on 1) Sustainable energy solutions, 2) Smart Grid Technologies, 3) Operation, Planning and Analysis of Power Systems, 4) HVDC transmission systems, FACTS, control of wind and solar power converters, 5) Deregulated Power Markets, 6) Instrumentation and Control Systems, Information Processing, Networking, and Communication, and 7) Modeling, Simulation, Control Methods, and Real Time Operation. Prof. Massoud Amin will be delivering the keynote address.

Other:

- The Chair of the TC-SG gave 15 invited presentations and 4 keynote addresses at various conferences and workshops during January- June 2012; presentations included discussion of cross-disciplinary areas/subjects and mathematical underpinnings in Smart Grids, Sensing and Controls (and their application to automation and increased reliability, efficiency and security of power and energy infrastructure). Highlighted the CSS TC-SG and invited participants to join.

Next Steps:

- Develop technical areas that our community can contribute to and that the TC will cover.
- Increase CSS' leadership role and visibility in smart grid education, RD&D
- Development and delivery of CSS-focused webinar series as a vehicle to give virtual seminars on smart grids: Thanks to efforts of Dr. Rajeev Verma ([Eaton Innovation Center and IEEE SEM GOLD chair](#)) along with Prof. Aranya Chakraborty of NCSU and Prof. Alireza Sayedi of University of Rochester are developing a series. They have secured 3 speakers for the conference, Dr. Dejan Sobajic (<http://www.neny.org/neny/Events/TVEnergyForum/403.aspx>), Dr. Douglas Dillie of Eaton and Prof. Massoud Amin. They are planning the series to be held in 2012.
- Participate in the organization of pertinent activities, including special issues/sections in the upcoming IEEE journals and in the IEEE workshops/conferences.
- **IEEE Smart Grid Newsletter:** Invitation to submit articles to the IEEE Smart Grid Newsletter, on which Massoud Amin serves as chairman of this newsletter. The June 2012 issue marked the 18th monthly newsletter, which continues to be very well received (more details are provided below). To access the June 2012 issue and earlier articles in the Newsletter please visit <http://smartgrid.ieee.org/june-2012> where you can get a sampling of 72 posted articles (for January 2011- June 2012), for content and ideas on which to base your article.

Thanks to our colleagues at IEEE who gathered the data/information, here is a summary of the inaugural year of the IEEE Smart Grid Newsletter:

- Over its inaugural year in 2011, 48 articles (in 12 issues) published in 2011 and the SG Newsletter garnered 3,218 subscribers (from over 70 nations) by December 2011.
 - The membership is increasing at a rate of approximately eight people per day who sign up to receive the IEEE Smart Grid Newsletter.
 - The Newsletter consistently pulls a 34% open rate, which is significantly higher than that of other non-profit newsletters.
 - The “click-through rate,” at which subscribers open the Newsletter is 13%, markedly higher than the average rate of just 3%.
 - The newsletter is by far the most popular content on the IEEE Smart Grid Portal, the only exception being the front page of the Web site.
 - To date the IEEE Smart Grid Newsletter published 72 articles of fresh content authored by the broad expertise within the worldwide IEEE member community in including the CSS. The IEEE membership shared its expertise relating real world experience, case studies, as well as progress and insights on technology, business, and standards. The newsletter has been receiving terrific feedback and the IEEE would love to have your contribution.
- Next meeting of the CSS TC-SG:
 - 4-5 p.m. on Thursday 28 June 2012 at the 2012 American Control Conference (ACC), in the Ramezay room at the Fairmont Queen Elizabeth hotel in Montréal.