

<b>IEEE CSS Technical Committee on Smart Grids (TC-SG)</b>
--

TC Chair: Massoud Amin [amin@umn.edu](mailto:amin@umn.edu)  
TC Co-Chair: Jakob Stoustrup [jakob.stoustrup@pnnl.gov](mailto:jakob.stoustrup@pnnl.gov)

## SUMMARY

The next semi-annual meeting of the CSS TC-SG will be held during 2:00-4:00 p.m. on Monday 15 December 2014 at the 53rd IEEE Conference on Decision and Control (CDC) in room Gold 2, at the J.W. Marriott Hotel, Los Angeles, CA.

A summary of activities of the TC-SG during May - December 2014 includes:

During the semi-annual meeting on June 5, 2014 at the ACC, 11 members of the TC-SG participated (Massoud Amin, Anu Annaswamy Dennice Gayme, Michael Polis, Amro M. Farid, Jakob Stoustrup, Scott Moura, Javad Mohammadpour, Sahika Genc, and Qing-Chong Zhong). They discussed the activities and plans for the four subcommittees under TC-SG:

- 1) Integration of Renewable Energy  
Lead: Prof. Amro Farid <[afarid@masdar.ac.ae](mailto:afarid@masdar.ac.ae)>
- 2) Energy Storage & Electrified Transportation Subcommittee  
Lead: Prof. Scott Moura, UC Berkeley, [smoura@berkeley.edu](mailto:smoura@berkeley.edu)  
Co-Lead: Prof. Javad Mohammadpour, University of Georgia, [javadm@uga.edu](mailto:javadm@uga.edu)
- 3) Microgrids  
Leader: Prof. Nicanor Quijano, [nquijano@uniandes.edu.co](mailto:nquijano@uniandes.edu.co)
- 4) Net Zero Building (Smart Buildings)  
Lead: Prof. John James, [john.james@usma.edu](mailto:john.james@usma.edu)

The renewed IEEE vision for Technical Committees was discussed, as it was presented by Dr. Frank Allgower at the June 2014 TAB meeting.

Dr. Jakob Stoustrup gave a presentation on the Joint IFAC/IEEE CSS Wikipedia project. This is a project to update pages on Wikipedia for accurate and relevant information in relation to control systems engineering and science.

Discussed/created the content for the new CSS TC-SG website (please see: <http://smart-grids.ieeecss.org/>, and <http://www.ieeecss.org/technical-activities/smart-grids>), as a part of the efforts discussed at the CSS TAB meeting and led by Dr. Maria Prandini.

A discussion on why the TC-Smart Grid exists followed, which led to a subsequent mission statement for TC-SG, and creation of material for the website:

***"Mission Statement: To understand, anticipate, and respond to current and future Smart Grids' control needs and opportunities in a broad array of areas, including:***

1. *TC on Smart Grids (TC-SG) convenes and works with systems and controls colleagues on the greatest smart grid challenges by providing technical resources, collaboration opportunities, and partnerships for numerous researchers worldwide, who are engaged in smart grids, in academic institutions, government laboratories, and industrial companies.*

2. *We exist to highlight controls activities and opportunities in smart grids to the controls community:*
  - *The power grid 2.0 presents the greatest potential opportunity for the controls community to make a significant societal contributions across the world. Challenges faced by the power grid are much more systems problems than they are traditional power problems.*
  - *Control systems are needed across broad temporal, geographical, and industry scales—from devices to power-system-wide, from fuel sources to consumers, from utility pricing to demand response, and so on.*
  - *With increased deployment of feedback and communication, opportunities arise for reducing consumption, for better exploiting renewable sources, and for increasing the reliability and performance of the transmission and distribution networks. At the same time, however, closing loops where they have never been closed before, across multiple temporal and spatial scales, creates control challenges as well.*
3. *We exist to be ambassadors of controls to the large energy and power systems communities*
  - *Feedback, optimization, estimation, dynamics, stability... these and other control system concepts are core to smart grid technology. In many ways, the smart grid is a control problem!"*

Updates from Subcommittees:

**1) Integration of Renewable Energy Subcommittee**

Lead: Prof. Amro Farid <[afarid@masdar.ac.ae](mailto:afarid@masdar.ac.ae)>

The IEEE TC on Smart Grids continues to be active in the area of Renewable Energy Integration. At the 2014 American Control Conference, an Invited Technical Session entitled: "Control Strategies for Renewable Energy Integration into the Smart Grid" was organized by Prof. Amro M. Farid and Dr. Sahika Genc and then successfully held. Since then another invited session of the same title has been planned for the 2015 ACC. The subcommittee on Renewable Energy Integration recognizes that this topic is of high interest in the CSS noting that several ACC & CDC sessions are often organized outside of this TC's invited sessions. Therefore, the subcommittee sees part of its role as a catalyst for cooperation and collaboration in the CSS as well as other IEEE society's such as PES, IES, and SMC.

**2) Energy Storage & Electrified Transportation Subcommittee**

Lead: Prof. Scott Moura, UC Berkeley, [smoura@berkeley.edu](mailto:smoura@berkeley.edu)

Co-Lead: Prof. Javad Mohammadpour, University of Georgia, [javadm@uga.edu](mailto:javadm@uga.edu)

The Energy Storage & Electrified Transportation Subcommittee has organized an invited session for the 2015 ACC, entitled "Control & Optimization for Vehicle-Grid Integration (VGI)". The session proposal is attached. To date we have received 7-8 abstracts in total, which is a good start. For the 2016 ACC, Prof. Moura plans a tutorial session on the same topic. In August 2014, there was another special session on Renewable Energy Integration Subcommittee on Energy Storage & Electrification of Transportation, along with another special session on Transportation Electrification.

**3) Microgrids Subcommittee**

Leader: Prof. Nicanor Quijano, [nquijano@uniandes.edu.co](mailto:nquijano@uniandes.edu.co)

During 2014, the subcommittee on Microgrids helped organize the "Workshop on Control Systems and Energy Efficiency in Latin America." This workshop was supported in part by the IEEE CSS Outreach Fund, where Prof. Jorge Sofrony and Prof. Quijano were the PIs of the proposal (Prof. Eduardo Mojica-Nava and Diego Patiño were Co-PIs, and their institutions helped with the organization of the event). They invited four distinguished researchers from the CSS (Tariq Samad, Ricardo Sánchez-Peña, Carlos Ocampo-Martínez, and Guillermo Jiménez) in the areas of microgrids and autonomous monitoring and large-infrastructure (details are provided in the attached file). In addition, several researchers from academia and industry who attended the

workshop (free of charge). In this two and a half day workshop we had several activities (e.g., plenary lectures, PhD poster sessions), with round tables and discussions as the main focus of the event. The main conclusions were presented on the last day of the event, and the conclusions are being summarized in a white paper that will be published/circulated in 2015. Plans for next year will be discussed during the CDC in LA.

Additional areas discussed and delivered include:

- Sought participants in organizing sessions, tracks, and activities, including special issues/sections in IEEE journals and workshops/conferences, including Smart Grid tracks and invited sessions at the ACC, IFAC World Congress, and CDC.
- **Collaboration and LinkedIn** – The LinkedIn group open to everyone on the TC-SG roster. Social media CSS and TC-SG on LinkedIn are at [www.linkedin.com/groups?gid=1514847](http://www.linkedin.com/groups?gid=1514847) and CSS group members can join the TC-SC subgroup at: [www.linkedin.com/groups?gid=3723696](http://www.linkedin.com/groups?gid=3723696)
- **CSS and PES Collaboration and Coordination** – Questions were asked regarding CSS and PES interfacing. It was noted that PES organizes in a 'Working Groups' structure. The PES main thrust is to create sessions. In some cases, a PES paper can only be four pages long. In general, there can be productive contributions by individuals through both IEEE streams.
- **IEEE SG Newsletter** – Articles of from 800 – 1,200 words on topics are solicited for this widely-read publication. The December 2014 issue marks the 48<sup>th</sup> monthly newsletter, which continues to be very well received. To access the 2014 issues and earlier articles (4 articles are published each month), please visit <http://smartgrid.ieee.org/november-2014> where over 190 posted articles (for January 2011- December 2014) are available.
- **Smart Grid Vision Project for Control Systems** – As was reported in 2013 TC-SG progress report, under Dr. Anu Anaswamy's leadership, the IEEE Smart Grid Vision for Control Systems (SGV-CS) was successfully completed. It includes a Roadmap. Our main challenges, opportunity and responsibility are to now 'take chunks of it and operationalize it'. In addition, we may wish to validate and iteratively optimize certain portions through pilot projects. The next meeting will be held on June 5 at noted above.
- **Webinars:** Thanks to IEEE Smart Grid Initiative. Six pertinent IEEE webinars, in close partnership with the IEEE CSS TC-SG, were delivered during June-December 2014 (<http://smartgrid.ieee.org/resources/ieee-smart-grid-webinars/past-ieee-smart-grid-webinars>). The kickoff webinar was given by Massoud Amin on June 11, 2014 (<http://smartgrid.ieee.org/resources/ieee-smart-grid-webinars/webinar-overviews/1160-technological-leadership-local-to-global-strategy-with-massoud-amin2>). Five more were given during July-December. On average over 520 registrants from throughout the world participated. In addition, as discussed in past TC-SG meetings, we'll develop and deliver additional CSS-focused webinars.

#### **Next Steps:**

- Increase CSS' leadership role and visibility in smart grid education, RD&D:
  - Development of TC-SG website
  - High-visibility events, publications and activities
  - Participate in the organization of pertinent activities, including special issues/sections in the upcoming IEEE journals and in the IEEE workshops/conferences.
- Change in leadership of the CSS TC-SG in January 2015:
  - Massoud Amin and Tariq Samad together proposed this TC in May 2010, which was approved, and served as its co-chairs. The first meeting of the TC-SG took place in Atlanta at the 2010 CDC. For background information, please see regular progress

- reports at every ACC and CDC since then, as well as a coverage of the TC-SG activities published on pages 19-21 in the December 2013 issue of the Control Systems Magazine.
- We had planned to transition the leadership of this timely TC to other colleagues in the CSS community after 3-4 years of smooth operation. To plan for this transition (the chair of this committee in consultation with Drs. Annaswamy and Samad, and with committee members noted in attachments in our last two TC meetings), we are pleased to recommend/nominate Dr. Jakob Stoustrup (who assumed the co-chair role earlier this year) for the CSS VP-TAB consideration.
  - Dr. Stoustrup was approved by the CSS leadership and will be the incoming chair of the CSS TC-SG effective January 1, 2015. His contact information is:
    - Dr. Jakob Stoustrup
    - Chief Scientist/Advanced Controls, Pacific Northwest National Laboratory
    - Pacific Northwest National Laboratory
    - Electricity Infrastructure and Buildings Division
    - 902 Battelle Boulevard
    - P.O. Box 999, MSIN K1-85
    - Richland, WA 99352, USA
    - Tel: 509-375-5916
    - Email: [jakob.stoustrup@pnnl.gov](mailto:jakob.stoustrup@pnnl.gov)
    - LinkedIn: <https://www.linkedin.com/in/stoustrup>

**2015 ACC in Chicago, July 1-3, 2015**

- The next semi-annual meeting of the IEEE CSS TC-SG will be held in Chicago (<http://acc2015.a2c2.org>).