Ms. Donna Cappo
Director of SIG Services
ACM

October 4, 2017

Dear Ms. Cappo,

We are writing to you to request that the ACM SIG Governing Board consider the formation of a new ACM Emerging Interest Group on Energy (tentatively named EIG-ENERGY).

The generation, distribution, and consumption of energy lie at the foundations of modern civilization. Traditional energy systems are centralized and carbon-intensive, with highly-controllable generation, minimal energy storage, infrequent monitoring, and wasteful consumption by energy-unaware end users. With the global push towards societal de-carbonization, we are in the midst of a revolutionary transformation, where energy systems have already incorporated tens of millions of decentralized, stochastic, carbon-free renewable-energy sources and soon will have vastly more storage. However, due to the intermittent and uncontrollable nature of power generation from renewable sources, there will be a need for demand flexibility, which can only be achieved by an intelligent use of information and communication technologies, as exemplified below:

- Low-cost sensor technologies, embedded systems hardware, and communications using the Internet of Things are critical to allow large-scale monitoring, control, and actuation of energy systems

- Data analytics and computational algorithms are necessary for the design of efficient energy systems

- Future energy systems are likely to have an architecture that resembles the Internet: large-scale, loosely-coupled, distributed, and heterogeneous. Thus, there are important lessons to be learned from the design of the Internet.

These observations motivate the emerging discipline of **Energy Informatics**, which studies the design and efficient operation of future energy systems. Energy Informatics emphasizes the crucial role of information and communication technologies in energy systems.

We note that the role of computing in energy systems is well-recognized and has led to the cre-

ation of numerous energy-focused conferences and workshops across multiple SIGs. These include ACM eEnergy conference (held since 2010, and sponsored by SIGCOMM for the last five years), ACM BuildSys conference (held since 2015, sponsored by SIGCOMM, SIGMOBILE, SIGARCH, SIGBED, SIGMETRICS, and SIGOPS), GreenMetrics workshop (held since 2012, sponsored by SIGMETRICS). Energy and power-aware computing have also been studied for a number of years in many established conferences within SIGOPS, SIGCOMM, SIGMOBILE, and SIGARCH. However, these venues emphasize traditional energy issues for computer hardware and software, rather than energy issues more broadly.

Given this widespread interest, and the need to bring together researchers from a variety of computing disciplines who share an interest in Energy Informatics, we would like to request ACM to consider the formation of a new EIG in this area. Please find below further details about this proposed EIG:

- *Primary focus of this emerging interest group:* The primary focus of EIG-ENERGY is to provide a discussion forum for researchers and practitioners who study computational methods and technologies for designing and optimizing energy systems. The EIG will provide a common forum for an inter-disciplinary group of computer scientists with diverse backgrounds in sensing, modelling, optimization, control, network and systems design, and experimentation to discuss and address key challenges in future energy systems. The EIG will seek to cover a broad range of topics in energy informatics, energy system design, analysis, and operation ranging from building energy management, renewable energy modelling and integration, energy storage system analysis, electric vehicle modelling and optimal operation, and data-center energy management.
  Specific topics that are of interest to the EIG include:
    - Monitoring and control of energy systems and smart buildings
    - Energy-efficient computing and communication, including data centers
    - Electric vehicles and energy-efficient transportation systems
    - Sensing technologies and embedded systems hardware energy systems
    - Microgrid and distributed generation management and control
    - Management of distributed energy resources, including storage resources
    - Smart grid communication architectures and protocols
    - Privacy and security of smart grid infrastructure
    - Demand-side management, including innovative pricing and incentive design
    - Data analytics for the smart grid and energy-efficient systems
    - Software architectures and design processes for energy information systems
- *Primary audience and primary need to be served:* The primary audience for the proposed EIG will be academic researchers, students, and industry practitioners in computing, information and communication technologies pursuing fundamental research as well as experimentation, and with an interest in Energy Informatics. Since current SIGS do not specialize in energy, the EIG will address a key unmet need.
- *Initial activities to be undertaken by the group:* The initial activities of the proposed EIG are as follows:
    - To disseminate information in the area of Energy Informatics by means of a web-site for the EIG as well as a periodic email newsletter.

- To organize an annual conference in this area. The ACM Conference on Future Energy Systems (ACM e-Energy) is a successful and financially stable conference on this topic that has been held for the past five years under the sponsorship of ACM SIGCOMM. One possibility is for the conference to become the flagship annual conference for the proposed EIG (after approval by the SIGCOMM leadership).

- To promote workshops with an energy focus (e.g., on emerging topics such as electric vehicles) at conferences run by existing SIGS.

- Development of a model curriculum in Energy Informatics, either as a complete Master's program or as a specialization for existing Master's programs in related disciplines.

- *Goals for affiliating with ACM:* There are two strong reasons for affiliating with ACM. First, the Energy Informatics community has grown out of existing ACM SIGs, with the core group identified below having many years of affiliation with ACM (including one Fellow, one Distinguished Member, and one Senior Member). Second, the EIG's area of interest overlaps heavily with computing, and is therefore a natural fit with ACM's mission.

- *Overlap issues with other ACM SIGS:* Presently SIGCOMM organizes the ACM e-Energy conference, which overlaps with the proposed activities of the EIG. However we are hopeful that SIGCOMM will be open to "spinning out" the conference to the new EIG . As noted earlier, many current ACM SIGS have a varying levels of interest in energy and power issues. These include SIGOPS, SIGMETRICS, SIGMOBILE, SIGBED, and SIGARCH. However, they have mainly focuses on energy and power-aware issues for computing hardware and software, while the proposed SIG seeks to focus on energy issues for systems that go beyond computing systems (e.g., built environments, buildings, transportation).
One topic that does overlap with both SIGMETRICS and SIGCOMM is data center energy consumption. The EIG will coordinate with both SIGs to address this overlap.

- *Listing of the core group of volunteer leaders that would lead the EIG:* Several senior members within this emerging field have agreed to form a core group to lead the EIG. These include senior members of the community with a strong leadership track-record and are listed below in alphabetical order:
  - Prof. Hermann de Meer (University of Passau)
  - Prof. Sebastian Lehnhoff (University of Oldenburg)
  - Prof. S. Keshav (University of Waterloo). ACM Fellow
  - Prof. Hartmut Schmeck, (Karlsruhe Institute of Technology), ACM Senior Member
  - Prof. Prashant Shenoy (Univ of Massachusetts), ACM Distinguished Member

Sincerely,

Prof. Hermann de Meer (University of Passau)
Prof. Sebastian Lehnhoff (University of Oldenburg)
Prof. S. Keshav (University of Waterloo)
Prof. Hartmut Schmeck, (Karlsruhe Institute of Technology)
Prof. Prashant Shenoy (Univ of Massachusetts)

List of prominent researchers who can provide letters of support.
Industry Letters

- Dr. Shivkumar Kalayanaraman (IBM Research - India Research Lab)
- Ramesh Sitaraman (get Akamai letter)
- Partha Ranganathan (Google)
- Dane Christensen (National Renewable Energy Laboratory, USA)
- Michael R. Brambley (Pacific Northwest National Laboratory, USA)

Academic Letters

- Prof. Krithi Ramamritham (IIT Bombay)
- Prof. Dave Culler (UC Berkeley)

List of Signatories to the letter (in alphabetical order)

- Prof. Hermann de Meer (University of Passau)
- Prof. Sebastian Lehnhoff (University of Oldenburg)
- Prof. S. Keshav (University of Waterloo) ACM Fellow
- Prof. Hartmut Schmeck, (Karlsruhe Institute of Technology)
- Prof. Prashant Shenoy (Univ of Massachusetts) ACM Distinguished Member

Draft of Support Letter

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To
  SIG Governing Board,
  Association for Computing Machinery
  New York, NY
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Dear Members of SIG Governing Board,
I am writing to strongly support the proposed Special Interest
Group on Energy issues.
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** Brief paragraph on why your group or institution has a
strong interest in Energy issues**
For example:
My [institution| research group] has been working in the area of
[insert areas of interest.] [Add few sentences on specific
interests of your group or institution  in this area.]
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** Brief paragraph on why the proposed is important to you and
how it might help your group/institution or society ***
For example:
There is growing interest in applying computational methods /
informatics / data-driven approaches  to energy topics. The
proposed SIG will bring together Computer Science researchers
and practitioners  and provide a forum to exchange ideas and
learn from different sub-disciplines with energy interests.
Such a forum will directly benefit my [research group |
institution ] given our interests in [list energy topics].
Since energy is a topic of growing societal importance and
computational methods have a key role to play, the SIG will
be relevant to the community for foreseeable future.
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** Closing **
In closing, I strongly support the proposed SIG on energy issues
and look forward to [my group | institution] participating
in its activities.

Sincerely,

Your name and affiliation

** Optional: append brief bio **