



AUN/SEED-Net



8th **AUN/SEED-Net** REGIONAL CONFERENCE ON ELECTRICAL AND ELECTRONICS ENGINEERING

Envision, Enable, and Empower
Smarter and Resilient Societies

co-located with

11th **ERDT Conference** on Semiconductor and Electronics, Information and Communications Technology and Energy

16-17 November 2015
Metro Manila, Philippines



**Proceedings of the 8th AUN/SEED-Net RCEEE 2015 and 11th ERDT Conference
on Semiconductor and Electronics, Information and Communications Technology, and Energy**

Editors:

Dr. Joel Joseph S. Marciano Jr.

Dr. Jhoanna Rhodette I. Pedrasa

Dr. Rhandley D. Cajote

© Copyright 2015 by the Electrical and Electronics Engineering Institute, College of Engineering, University of the Philippines Diliman, Engineering Research and Development for Technology, and ASEAN University Network/Southeast Asia Engineering Education Development Network (AUN/SEED-Net).

All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted in any form without the consent of the editors of the Proceedings of the 8th AUN/SEED-Net RCEEE 2015 and 11th ERDT Conference on Semiconductor and Electronics, Information and Communications Technology, and Energy.

ISBN: 978-616-406-075-3

Published by: ASEAN University Network / Southeast Asia Engineering Education Development Network
(AUN/SEED-Net) JICA Project
Faculty of Engineering, Bldg. 2
Chulalongkorn University, Bangkok
Thailand 10330

Printed in the Philippines by: ERZALAN PRINTING PRESS
45 Cotabato Street, Luzviminda Village, Batasan Hills, Quezon City, Philippines

8th AUN/SEED-Net Regional Conference on Electrical and Electronics Engineering 2015

co-located with

11th ERDT Conference on Semiconductor and Electronics, Information and Communications Technology, and Energy

Envision, Enable and Empower Smarter and Resilient Societies

Published by: ASEAN University Network / Southeast Asia Engineering Education Development Network (AUN/SEED-Net) in partnership with Engineering Research and Development for Technology (ERDT) and University of the Philippines Diliman.

© Copyright 2015

No part of this publication may be reproduced without the consent of the editors of the Proceedings of the 8th AUN/SEED-Net Regional Conference on Electrical and Electronics Engineering 2015 and 11th ERDT Conference on Semiconductor and Electronics, Information and Communications Technology, and Energy.

ISBN: 978-616-406-075-3

HIERARCHICAL MULTI-AGENT-BASED DEMAND-SIDE MANAGEMENT WITH USER COMFORT AS A COMBINATION OF THERMAL AND OTHER SERVICES

Alberto B. de Villa* and Michael Angelo A. Pedrasa

Electrical and Electronics Engineering Institute, University of the Philippines Diliman, PHILIPPINES.

*E-mail: abdevilla@upd.edu.ph

ABSTRACT

With increasing load on the existing electric power system, demand-side management (DSM) has been implemented to help maintain system stability, among other objectives. Since DSM programs, implemented as-is, are bound to cause customer inconveniences and/or losses, research has been done to consider customer comfort when implementing DSM programs.

The typical approach uses a single “value” of comfort metric for all customers, and decision-making is centralized. This method has two main drawbacks. First, in practice no two people will have identical criteria regarding comfort levels. Second, centralized decision-making is impractical for a large system due to the data size/processing power required.

To alleviate these problems, a multi-agent-based system would be developed that features distributed decision-making, and integrates individual user comfort metrics as a set of service valuations. The agent-based system will be implemented in the C/C++ programming language on the Linux platform, and tested with data based on real-life consumption patterns. Figure 1 shows the proposed agent-based system for DSM.

Being an on-going work, the intention is to implement a DSM system, utilizing agent-based systems, that maximizes user comfort while minimizing the energy consumption of a facility. A facility may be a group of related commercial buildings, or a subdivision of residential households.

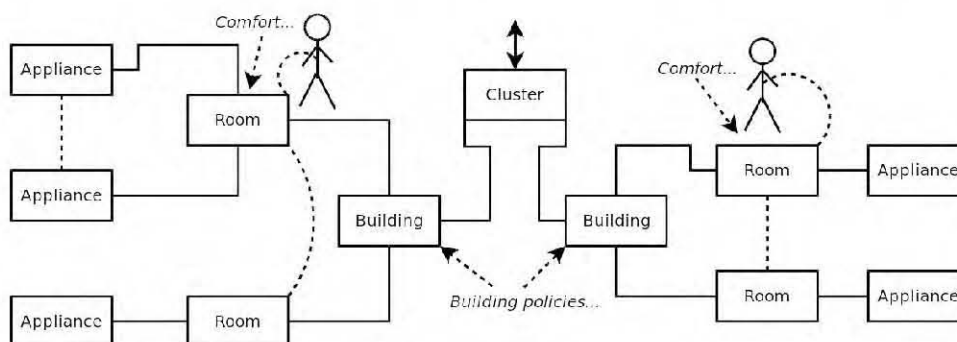


Figure 1. The agent-based system for demand-side management.

Keywords: Agent-based System, Demand-side Management, Smart Grid

Acknowledgment: Mr. de Villa would like to acknowledge the scholarship given by the Engineering Research and Development for Technology (ERDT) program as part of his MS EE studies.

References

- [1] E. H. Et-Tolba, M. Maaroufi, and M. Ouassaid, “Demand side management in smart grid by multi-agent systems technology,” proceedings from *IEEE International Conference on Multimedia Computing and Systems*, Marrakech, Morocco, April 14-16 2014, pp. 1042–1045.
- [2] A. Molderink, V. Bakker, M. G. C. Bosman, J. L. Hurink, and G. J. M. Smit, “Management and control of domestic smart grid technology,” *IEEE Transactions on Smart Grid*, vol. 1, no. 2, pp. 109–119, September 2010.