SEESGEN-ICT
An Introduction to WP2

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WP2 Team

- K.U.Leuven: University of Leuven
  - Belgium
- BTH: Blekinge Institute of Technology
  - Sweden
- AIT: Austrian Institute of Technology
  - Austria
- CU: Centre for Integrated Renewable Energy Generation and Supply of Cardiff University
  - United Kingdom
- ECPE: European Center for Power Electronics e-V
  - Germany
- UL: University of Lodz
  - Poland
- ENEL DIST: ENEL Distribuzione S.p.A.
  - Italy
- PPC: Public Power Corporation S.A.
  - Greece
- + seesgen-ict consortium at large
WP 2 - context

- ICT is not much used (yet) for operational management of distribution grid
  - only limited monitoring is available
  - few control elements in distribution grid

- (how) can ICT improve grid management in order to reach better energy efficiency?
  - ICT is not a panacea for smart grids
  - only better view on global state and means for control

- intra grid management
  - (link to WP3 monitoring and WP4 endusers)
Scope: intra-grid management

- specific focus of work
  - to *smart* applications
    - not possible/used in current grids
  - that *manage* the grid
    - not end user, not monitoring
  - at *distribution* level, focused on technical aspects
    - not business, not customer relations…
  - that really require *ICT*
    - not purely local, not purely electrical
  - that *improve energy efficiency*
    - save energy, use energy better
Three intra-grid management applications

- based on 3 representative specific applications

  - voltage control
    - not purely electrical, but where ICT provides specific opportunities

  - adaptive protection
    - if it is distributed and based on ICT solutions

  - distribution grid reconfiguration
    - proactively and reactively
Voltage Control

- Keeping voltage within specified limits
- Entities involved

Controller

OLTC

chosen points in the distribution grid

DGs
Adaptive Protection

- A protection philosophy

- Altering the settings of protective devices to best suit the prevailing conditions
  - Preventive and emergency control
  - Positions the system to be robust
  - Responds to failure events - modifying protection system
  - Identifies developing emergency - responds to diminish its impact
Adaptive Protection Contd...

- Entities involved

  - Sensors
  - Breaker & actuating circuitry
  - Substation Coordination Controller
  - Lines and busbar at the substation
Grid Reconfiguration

- minimizes the power losses
  - normal operating conditions

- prevent the whole or part of the system
  - from going into unsafe conditions - under abnormal operating conditions

- grid reconfiguration – proactively and reactively

- Implemented with the help of ICT
  - ICT to open and close various switches
Grid Reconfiguration Contd...

Entities involved

- Relays
- Breaker & actuating circuitry/ relays
- Controllable loads and Distributed generators
- Switches
## Contribution by WP2 – in terms of deliverables & publications

<table>
<thead>
<tr>
<th>Deliverable No</th>
<th>Deliverable name</th>
<th>Dissemination level</th>
<th>Delivery date (project month) as per SA</th>
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<tr>
<td>D2-1</td>
<td>Detailed Workplan (SA) of WP2</td>
<td>Restricted</td>
<td>Month 3</td>
<td>Month 4 (Oct 2009)</td>
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<td>D2-2</td>
<td>Report on ICT requirements, offers and needs for managing Smart Grids with DER</td>
<td>Public</td>
<td>Month 8</td>
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<td>D2-3</td>
<td>Report on Technical and non-Technical Barriers and Solutions for managing Smart</td>
<td>Public</td>
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<td>Grids with DER</td>
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<td>D2-4</td>
<td>Policy actions and recommendations for intra-grid control applications in smart</td>
<td>Restricted</td>
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### Publications:


2. P. Chittur Ramaswamy, G. Deconinck, “Relevance of Voltage Control, Grid Reconfiguration and Adaptive Protection in Smart Grids and Genetic Algorithm as an Optimization Tool in Achieving their Control Objectives”, *IEEE ICNSC 2011, Apr 11 to 13, 2011, Delft*

Thank you!