# ANNEX 8- ISGAN Academy

**January 31st, 2017**

**IEA TCPS JOINT WORKSHOP**

ISGAN
international smart grid action network

CLEAN ENERGY
MINISTERIAL
Accelerating the Transition to Clean Energy Technologies

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# IIT team profile

## Pablo Frías

- PhD on Power Systems (2008)
- Senior Researcher at Institute for Research in Technology, Comillas
- Associate Professor at Engineering School Power System Dep.

- **Major research projects on RES and SmartGrids European and national (48):**
  - SUSPLAN, TWENTIES, ADRESS, …
  - GRID4EU, SUSTAINABLE, ADVANCED, PVGRID, …
- **Academic course management:**
  - Graduate/postgraduate Smart-grids subjects
  - Collaboration with MIT, FSR and EES-UETP
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## José Pablo Chaves

- PhD on Sustainable Energies Technologies and Strategies (2014)
- Researcher at Institute for Research in Technology, Comillas University

- **Major research projects on RES and Smart Grids:**
  - Utility of the Future Project – Project with Massachusetts Institute of Technology
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# Members of the Academic Committee

## Members already confirmed

| Name | Country | Institution | Area of expertise |
|---|---|---|---|
| Dr. Hubert Fechner | Austria | Austria's Technical University of Applied Sciences | Renewable integration & urban planning |
| Dr. Yannick Pérez | France | CentraleSupélec & ESSEC Business School | Energy Economics & Electric vehicles integration |
| Dr. Delfanti Maurizio | Italy | Politecnico di Milano | Power system modeling, regulation |
| Dr. César Ángeles Camacho | México | Universidad Nacional Autónoma de México | Power systems modeling |
| Dr. Laurens de Vries | Netherlands | Delft University of Technology | Energy Markets regulation & modeling |
| Msc. Cyril Draffin | United States of America | Massachusetts Institute of Technology Energy Initiative | Cyber security |

## Potential members

| Name | Country | Institution | Area of expertise |
|---|---|---|---|
| Dr. Minnesh Bipath | South Africa | Centre for Energy Systems Analysis and Research | Smart grids data management |
| Dr. Turhan Hilmi Demiray | Switzerland | ETH Zurich | Power system modeling & DSM |

# Background & administrative issues

# Context: background

- – Current situation on Smart grids knowledge:
  - • Basic knowledge for many engineers
  - • Minimum knowledge for policy makers
- – Need for improving current understanding of Smart grids potential:
  - • Basic operation of power systems and current challenges
  - • New advanced technologies to improve system efficiency
  - • International experiences
- – Position
  - • ISGAN Annex 4 and other annexes
  - • Universities, Technical Schools, other disseminations activities

# Context: objectives

- **The objectives of the ISGAN academy are to offer the ISGAN community of high level engineers and decision makers a means of rational and efficient continuous technical skills <span style="color:red">complement</span> and <span style="color:red">update</span> in the field of smart grids.**

- **Channel: e-learning platform**
  - <span style="color:red">Topics:</span> power system fundamentals to more specialised courses on breakthrough smart grids solutions
  - <span style="color:red">Structure information</span> (public material) about recent developments, best practices, interesting methodologies, etc. on smart grids theory, application, deployment, events, etc.

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# Context: contents

-Technology and ICT
-Integration in system operation
-Smart regulation and policy
-Standards and interoperability
-Business models

-Fundamentals of power systems
-Introduction to Smart grids
-Technology fundamentals

-Awards
-National experience
-Workshops

Core module

Fundamentals

Local material and perspectives

Additional material

*E-learning platform*

-Mandatory references
-Events
-Workshops

# Course program

# Course Program

- **Admission:**
  - **target audience/profile**: technicians, researcher community, policy makers
  - **target number/country**: 50 per webinar, all
  - **Requirements**: background, language, …: English / national
  - **Marketing channels**: ECI mailing list of 25,000 + ISGAN. Mobilize ECEEE and IEADSM, mailing…
- **Curriculum:**
  - Draft module **structure**: core, fundamentals, additional and local material
  - **Pathways** to get the Certificate
  - **Communication** alternatives: <u>slides</u>, video (WS), papers, case studies (fun.), etc.
  - **Length:** <u>1</u>-2 hours
- **Evaluation:**
  - ISGAN Course Certificate options: generalist vs. specialization
  - Methods and grading criteria
  - Credits
  - Student achievement visualization
- **Course academic/technical support:** Academic Committee/ECI
- **Course satisfaction & impact of skills developments:** surveys to students at the end of the course & some months after asking for the use of the knowledge developed

# Preliminary list of contents

## Theme 1. Fundamentals

- The structure of power systems: transmission and distribution
- The structure of power systems: generation and supply
- Regulatory economics, monopolistic activities: network businesses
- Regulatory economics, competitive activities: generation and retailing
- Introduction to smart grids
- Smart devices for smart grids

## Theme 2. Technical aspects: technologies, devices and system operation

- Integration of RES in power systems: transmission networks issues
- Integration of DER in distribution networks
- Electric mobility and the impact in power systems
- The role of storage in power systems and networks
- The active participation of demand: DSM
- Smart devices & technologies for transmission networks
- Smart devices & technologies for distribution networks
- Communication systems in distribution networks: operation and control
- Communication systems in distribution networks: metering
- Cybersecurity and resiliency

## Theme 3: Economics and regulation

- Tariff designs in the Smart grid context
- Cost and benefit analysis of smart grids functionalities
- Scalability and replicability of smart grids
- The use of reference network models
- Economics and business models
- Regulation of network activities
- Standards & interoperability
- Sustainability policies
- Social aspects and consumer involvement
- TSO-DSO coordination

## Theme 4: International case studies and perspectives

- Jeju Island Smart Grid Project
- GRID4EU project, innovation for energy networks
- PRICE project, integrating Smart grids from two major distribution utilities in Spain

- **Overview of the platform**

- **Participants & roles**

- **Course short example**

# ISGAN Academy web platform

# Participants & roles

- **Operating Agent (IIT-Comillas)**
  - Annex planning, scheduling and communications.
  - **Program Committee** leader
  - Preparing and summarizing Annex-related calls, meetings and workshops.
  - Reporting to the ISGAN Executive Committee.
  - Facilitate publication of reports, tools, and other materials, in coordination with Annex 4.
  - Marketing channels
- **E-learning infrastructure (Leonardo Energy)**
  - Set up the general e-learning platform and configure the tool according to the requirements defined by the Program Committee
  - Assist after/during/before the e-learning unit the participant.
  - Report to the OA main KPIs of the unit.
- **The "National Experts":**
  - Propose and produce e-learning units (Local modules).
  - Take the lead responsibility on an individual national basis for the sourcing and integration of any information inputs to the Annex.
  - Attend and participate in relevant calls, workshops, and meetings, as organized by the Operating Agent in coordination with the Task leaders.

# Example

- **Title & Description:** *Reference Network Models: an essential tool for smart grid evaluation*
- **Goal and motivation:** *large-scale optimization models for distribution networks planning & compute DERs' impacts on network costs.*
- Rehearsal
  - Course materials: recording & slides
  - Q&A forum
  - Further reading materials
  - Test
  - Feedback survey
- Badge
  - Viewing the lecture
  - Downloading the slides
  - Viewing the further readings
  - Participate to the Q&A forum
  - Completion of the test
  - Completion of the feedback survey

# Preliminary work plan: 1st year 2017

- **March- July 2017 (subject to changes):**
    - March 2017: 1 core webinar: *Reference Network Models: an essential tool for smart grid evaluation*
    - April 2017: 1 fundamental webinar: *Distribution network operation and control*
    - May 2017: 1 add webinar: *GRID4EU project*
    - *July 2017:* 1 core webinar: Cybersecurity, Resiliency and Reliability

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