ISGAN TCP SMART GRIDS ACADEMY

Michele de Nigris – Chair ISGAN TCP

21 September 2016
Paris - France

Accelerating the Transition to Clean Energy Technologies

International Smart Grid Action Network

ADVANCING SMARTER, CLEANER ELECTRICITY GRIDS

ISGAN is a **global network of experts** to advance understanding of smart electricity systems, address gaps in knowledge and tools, improve peer-to-peer exchange, and showcase excellence

Broad Expert Network

Leverages expertise from governments, national laboratories and research institutions, transmission and distribution system operators, power generators, and others from 24 countries across five continents and the European Commission; distributed leadership of activities

Partnerships with Thought Leaders

Engages the International Energy Agency, the IEA Energy Technology Network, Clean Energy Ministerial initiatives and campaigns, national-level grid modernization efforts, and leading private sector initiatives to advance systems approaches for smarter grid modernization

Diverse Portfolio

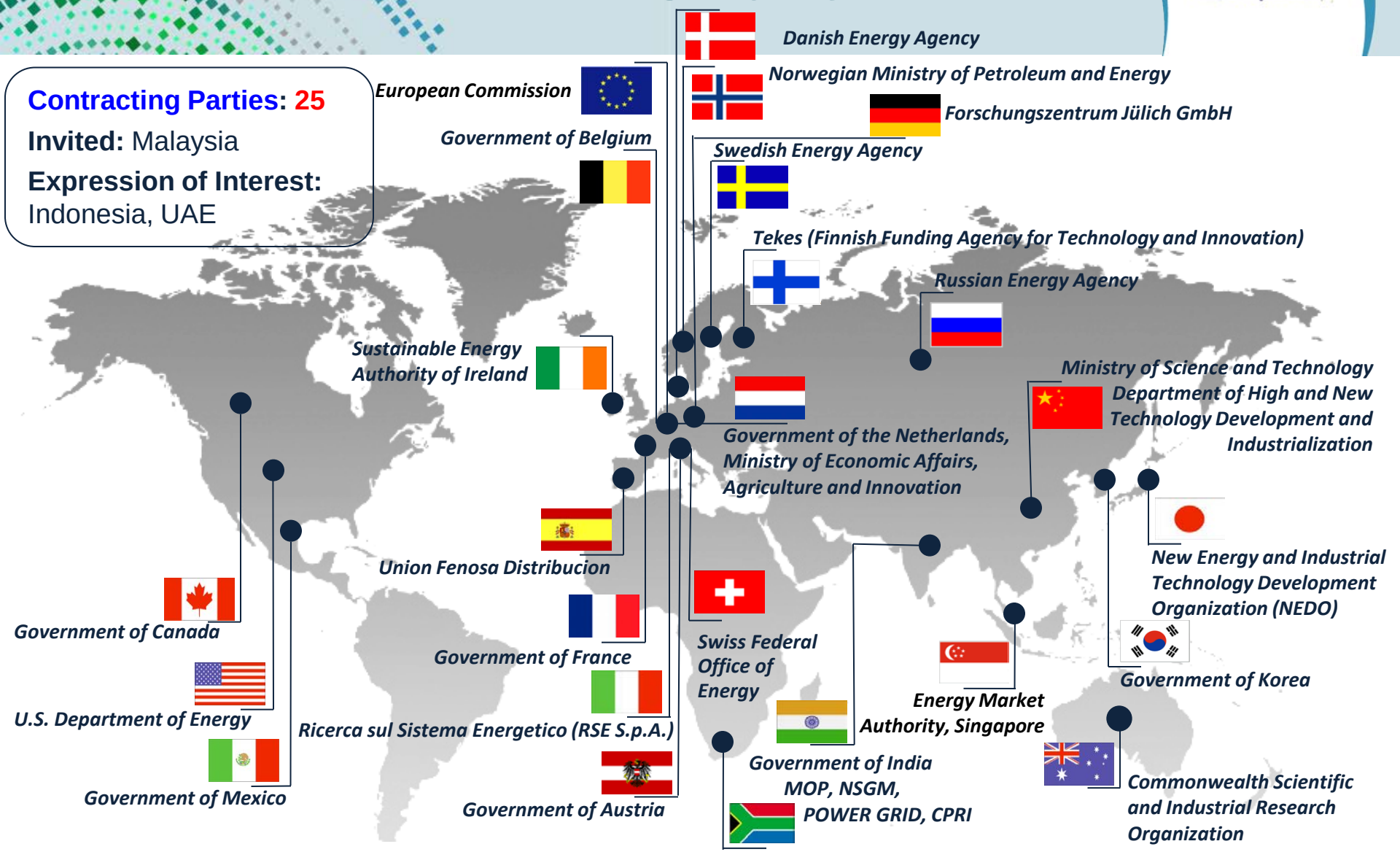
Implements a range of activities and events that span T&D system needs, knowledge synthesis and exchange, case studies, cost-benefit analysis, training, testing and validation, institutional change management, recognition of proven ideas, and more…

Geography of ISGAN

Contracting Parties: 25

Invited: Malaysia

Expression of Interest: Indonesia, UAE



Work Programme

Global Understanding & Tools		Technical Foundations	Other Projects
Annex 2: **Smart Grid Case Studies**	Annex 4: **Synthesis of Insights for Decision Makers**	Annex 5: **Smart Grid International Research Facility Network** (SIRFN)	Annex 7: **Smart Grid Transitions - Institutional Change**
Annex 3: **Benefit-Cost Analyses and Toolkits**	Annex 8: **ISGAN Academy on Smart Grids**	Annex 6: **Power T&D Systems**	**ISGAN Award of Excellence** competition

Typical Activities

Global Understanding & Tools

Annex 2:
- Casebooks
- Biennial drivers & priorities survey
- Practitioner knowledge exchange

Annex 4:
- Outreach and comms strategies
- Support for other Annexes & activities
- Ad hoc discussion papers

Annex 3:
- Methodology comparisons
- Tool to assess grid technology maturity
- Tools to assess value of specific smart grid technologies

Annex 8:
- Online training modules
- Partnership with Leonardo Energy
- Region specific training lessons

Technical Foundations

Annex 5:
- Comparative testing of smart inverter test protocols
- Advanced testing and modeling mthds.
- Technical workshops

Annex 6:
- Discussion papers and briefs
- Best practices case studies
- Knowledge exchange
- Technical workshops

Other Projects

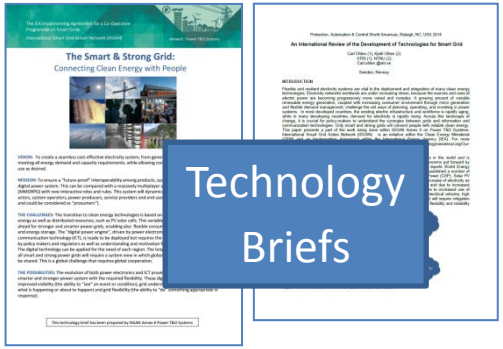
Annex 7:
- Focus on institutional change & consumers
- Online network of social scientists for grids
- Discussion papers

ISGAN AoE:
- Annual competition
- Showcase project excellence for specific theme
- Sharing of project best practice

Typical Outputs

Discussion Papers

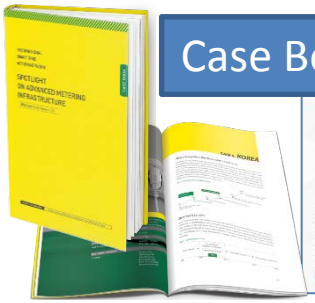
Messages for Policymakers



Technology Briefs

Workshops

Technical Papers



Case Books

Conference Presentations

Webinars

Needs

ENERGY SYSTEM IS CHANGING VERY RAPIDLY

- INTEGRATION OF VARIABLE RENEWABLES
- REDUCTION OF GHG EMISSIONS
- ENERGY EFFICIENCY MEASURES AND SOLUTIONS
- CONSUMER AT THE CENTRE OF THE SYSTEM

POWER ENGINEER NEEDS TO ADAPT AND UPDATE

- DISTRIBUTED GENERATION AND PLANNING
- USE OF ICT FOR OBSERVABILITY, MONITORING CONTROL
- MARKET AND REGULATION ASPECTS ARE CENTRAL
- CONSUMER RESPONSE AND SOCIETAL TRANSITION

Objectives

THE **OBJECTIVES** OF THE ISGAN ACADEMY ARE TO OFFER THE ISGAN COMMUNITY OF HIGH LEVEL **ENGINEERS** AND **PROFESSIONALS** AND **DECISION MAKERS** A MEANS OF RATIONAL AND EFFICIENT CONTINUOUS TECHNICAL SKILLS COMPLEMENT AND UPDATE IN THE FIELD OF SMART GRIDS.

Basic Concept

SET OF **E-LEARNING MODULES** DEALING WITH DIFFERENT SMART GRIDS ASPECTS – FOCUSSED AND UP-TO-DATE MATERIAL,

FUNDAMENTALS AND FURTHER READING MATERIAL ARE CONSIDERED AS APPENDICES

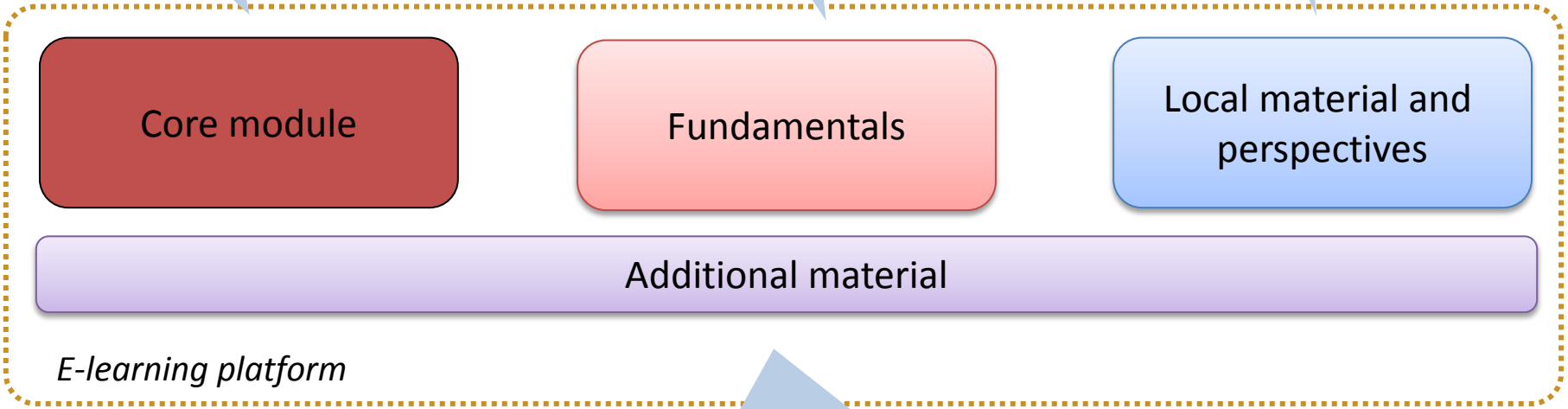
THE ACADEMY CAN ALSO CONTAIN STRUCTURED INFORMATION (PUBLIC MATERIAL) ABOUT RECENT DEVELOPMENTS, BEST PRACTICES, INTERESTING METHODOLOGIES, ETC. ON SMART GRIDS THEORY, APPLICATION, DEPLOYMENT, EVENTS ETC.

Design

-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



-Mandatory references
-Events
-Workshops

Collaborations

STRUCTURE AND PROGRAMME
COMMITTEE

ICT PLATFORM
E-LEARNING ENVIRONMENT

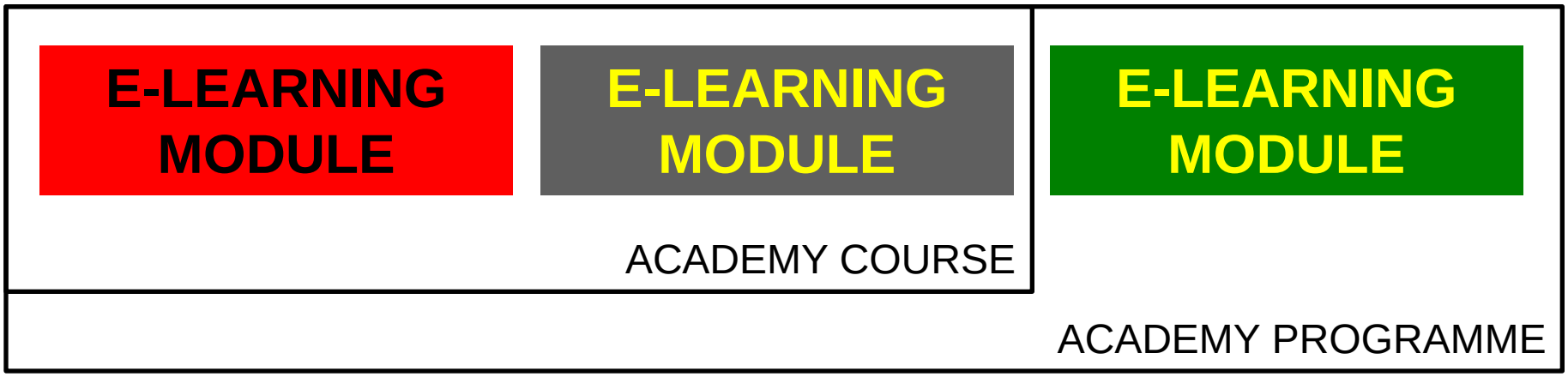



UNIVERSITIES, RESEARCH CENTRES, NETWORK OPERATORS, TECHNOLOGY PROVIDERS - DELIVER **CONTENTS, EXPERIENCE, KNOWLEDGE, BEST PRACTICES, UPDATES, USE CASES** ETC.

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, ISGAN presentations, …
- Curriculum:
  - Draft module **structure**: core, fundamentals, additional and local material
  - **Communication** alternatives: slides, video (WS), papers, case studies (fun.), etc.
  - **Length:** 1-2 hours
- Evaluation:
  - ISGAN Course Certificate options: generalist vs. specialization
  - Methods and grading criteria
  - Credits
  - Student achievement visualization

Structure



DISCUSSION FORUMS

TESTS & CERTIFICATION

COURSE MATERIAL

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 net works
- Communication systems in distribution networks: operation and control
- Communication systems in distribution networks: metering

Theme 3: Economics and regulation

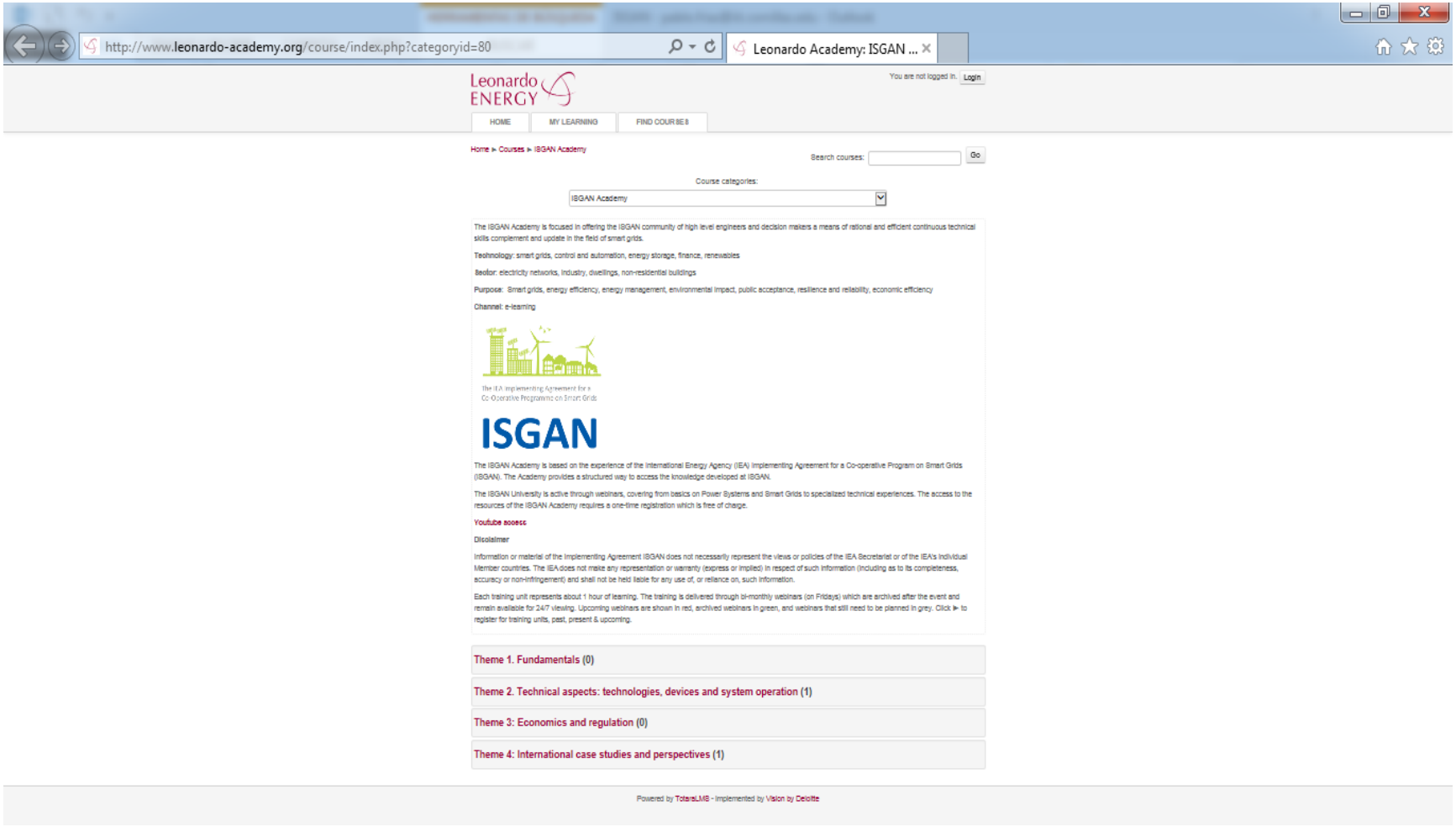
- Tariff designs in the Smart grid context
- Cost and benefit analysis of smart grids functiona lities
- Scalability and replicability of smart grids
- The use of reference network models
- Economics and business models
- Regulation of network activities
- Standards & interoperability
- Sustainability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

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

Log-in page

- http://www.leonardo-energy.org/resources
- http://www.leonardo-academy.org/course/index.php?categoryid=80



How: E-learning platform example

- The Leonardo Energy (LE)
  - http://www.leonardo-energy.org/
- E-learning course of 1-2 hours
- It consists of 6 parts:
  - Title & Description
  - Recording & slides (45')
  - Q&A forum (optional-10')
  - Test (optional-5')
  - Feedback survey (standard-1')
  - Further reading (optional)

Next steps

- October 2016:
  - Setting up Program Committee
  - Complete National Experts per committed partner
  - Setting up the Annex: procedures, templates, guidelines, KPIs, marketing, …
- November 2016:
  - Match national experts & topics > draft program schedule
  - Coordination with other Annexes
  - Setting up the Annex: complete tasks
- December 2016:
  - Final 1 & 2 year program schedule
  - Setting up the web platform
- January- July 2017:
  - January 2017: 1 fundamental webinar: *Distribution network operation and control*
  - March 2017: 1 core webinar: *CBA assessment of Smart grid alternatives: reference network models*
  - May 2017: 1 core webinar: *Tariff designs in the Smart grid context*
  - *July 2017:* 1 add webinar: *GRID4EU project*

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 – Joint Project with Massachusetts Institute of Technology
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