

Laboratory Fact Sheet

1 Institution

Name:

ICCS/NTUA

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GR-157 73 Zografou - HELLAS
email: nh@power.ece.ntua.gr
http://www.ece.ntua.gr

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2 Classification

- independent
- accreditation according to IEC 17025
- long-time DG experience (more than 3 years)
- active in standardisation committees

3 Brief historical background

The Institute of Communication and Computer Systems ([ICCS](#)) is a private law body associated with the Department of Electrical and Computer Engineering of the National Technical University of Athens (NTUA). ICCS has been established in 1989 by the Ministry of Education in order to carry research and development activities in the fields of telecommunication systems and computer systems and their applications in a variety of applications, such as electric power systems, software and hardware engineering, control systems and biomedical engineering. The personnel of the ICCS consist of members of staff, research students and fellows of the Department of Electrical and Computer Engineering of NTUA. The active research personnel of ICCS presently consist of 40 members of staff of NTUA, 20 additional senior researchers and 120 research students. The Electric Energy Systems Laboratory (EESL) is one of the Research Groups of the Institute of Communication and Computer Systems (ICCS) and one of the older laboratories of the School of Electrical and Computer Engineering.

4 Mission statement

The Electric Energy Systems Laboratory

The Electric Energy Systems Laboratory (EESL) is associated with the School of Electrical and Computer Engineering of the National Technical University of Athens (NTUA). The Electric Energy Systems Laboratory covers the educational and research activity of the Electrical and Computer Engineering School in the design and the operation electric power systems.

EESL offers various degrees of experimental training for students, as part of the relevant courses of Power System Analysis, Power Generation, Power System Control and Stability, Transmission and Distribution Networks, Power System Protection, Renewable Energy Sources, SCADA and Digital Techniques in Power Systems. Each year the EES Laboratory offers 14 undergraduate courses in the area of electric power systems, 5 courses at postgraduate (PhD) level and numerous professional training and seminar programs. The Laboratory is active in research for more than 20 years now, closely affiliated to the Institute of Communication and Computer Systems (ICCS). It has participated in more than 40 research projects, most of which are collaborative EU funded projects.

5 Institution in brief

- **Associations:** CIGRE, Technical Chamber of Greece, IEEE, CIRED.
- **Accreditations:** None.
- **Number of staff:**
Electric Energy Systems Laboratory: 7 faculty members, 25 senior researchers
- **Main source of funding:** Government, EU, Industry.
- **Any potential conflicts of interest with respect to the cooperation under the NetDERlab e.g. due to source of funding:** NO

6 Brief summary of competences

The Electric Energy Systems Laboratory

The Electric Energy Systems Laboratory of NTUA has been actively involved in research in the areas of Power System Analysis, Planning and Control, since 1978. Research on the Renewable Energy Sources (RES) dates since 1980.

Institution: DG Centre	
Description of competence	Yes/no / list
Involvement in standardisation groups/committees	Yes – CENELEC -IEC -IEEE
Certification expertise	No -
Area of Scientific expertise	<ul style="list-style-type: none"> - Power system Analysis - Security Analysis - Reliability Analysis - Power System Frequency and Voltage Stability - DG integration - Renewable energy sources - Economic Analysis and Deregulation of Power Systems - SCADA systems - Power Quality and custom power - Wind power forecasting - Storage Systems
Involvement in consultancy (e.g. for industry and government)	Yes
DG reference project list	<p>CARE: Advanced Control Advice for Power Systems with Large Scale Integration of Renewable Energy Sources", JOR3-CT96-0119</p> <p>MORE CARE: More Advanced Control Advice for Secure Operation of Isolated Power Systems with Increased Renewable Energy Penetration and Storage": ERK5-CT1999-00019</p> <p>MICROGRIDS : ENK5-CT-2002-00610</p> <p>MORE MICROGRIDS : Advanced Architectures and Control Concepts for More Microgrids, SES6-019864</p> <p>RISE – Renewables for Isolated Systems-Energy Supply and Waste Water Treatment, FP6-509161</p> <p>DISPOWER: Distributed Generation with high penetration of renewable energy sources,Contract ENK5-CT2001-00522</p> <p>ANEMOS– Development of a Next Generation Wind Power Forecasting System for the Large-Scale Integration of Onshore & Offshore Wind Farms, ENK5-CT-2002-00665</p> <p>EU-DEEP The birth of a European Distributed EnErgy Partnership that will help the large-scale implementation of distributed energy resources in Europe.FP6 Project: SES6-CT-2003-503516</p> <p>VBPC-RES: The Virtual Balkan Power Center for Advance of Renewable Energy Sources in Western Balkans: INCO-CT-2004-509205</p> <p>DERLAB: Network of DER Laboratories and Pre-Standardisation :SES6-CT-2005-518299</p> <p>IRED -"Integration of Renewable Energy Sources and Distributed Generation into the European Electricity Grid"</p> <p>DISTRES Promotion and Consolidation of all Research, Technological Development and Demonstration Activities for Renewable Distributed Generation Technologies in the Mediterranean Region INCO-031569</p>

<p>List of recent publications (say last 3 - 5 years)</p>	<p>Wind power development in Europe <i>Hatziargyriou, N.; Zervos, A.</i>; Proceedings of the IEEE, Volume: 89 Issue: 12, Dec 2001, Page(s): 1765 -1782.</p> <p>Online preventive dynamic security of isolated power systems using decision trees <i>Hatziargyriou, N.D.; Karapidakis, E.S.</i>, Power Systems, IEEE Transactions on, Volume: 17 Issue: 2, May 2002, Pp: 297 -304.</p> <p>Environmental Benefits of Distributed Generation With and Without Emissions Trading, A.G. Tsikalakis, N.D. Hatziargyriou, Energy Policy Volume 35, Issue 6, June 2007, pp 3395-3409.</p> <p>Management Of Microgrids In Market Environment, A.G. Tsikalakis, A.Dimeas, N. D. Hatziargyriou, J.A. Pecas Lopes, G.Kariniotakis, J.Oyarzabal, Int. J. of Distributed Energy Resources, Vol. 2 No 3 July - September 2006, pp171-193. (also in the Special Issue for Microgrids).</p> <p>Impact Of Energy Storage In The Secure And Economic Operation Of Small Islands, A.Tsikalakis, I.Tassiou, N.Hatziargyriou Proc. of MedPower04, Lemessos, Nov 2004, MED04/CH33</p> <p>Stability Algorithm for the Dynamic Analysis of Inverter Dominated Unbalanced LV Microgrids Sultanis, N. L.; Papathanasiou, S. A.; Hatziargyriou, N. D.; Power Systems, IEEE Trans. on Vol. 22, Iss. 1, Feb. 2007 pp:294 - 304</p> <p>A new methodology for nodal load forecasting in deregulated power systems <i>Hatziargyriou, N., Tsoukalas, L.H., Wang, X.</i>, IEEE Power Engineering Review, Volume: 22 Issue: 5, May 2002 Pp: 48 -51</p> <p>An Advanced Statistical Method for Wind Power Forecasting <i>Sideratos, G.; Hatziargyriou, N. D. Volume 22, Iss. 1, Feb. 2007 pp:258 – 265</i></p> <p>N.G. Boulaxis, S.A. Papathanassiou, M.P. Papadopoulos, «Wind turbine effect on the voltage profile of distribution networks». <i>Renewable Energy, Vol. 25, No. 3, March 2002, Pages 401-415.</i></p> <p>S.A. Papathanassiou, A.G. Kladas, J.A. Tegopoulos, "Applications of Artificial Intelligence Techniques in Wind Power Generation" (invited paper). <i>Journal of Integrated Computer-Aided Engineering, Vol. 8, No 3, 2001, pp. 231 - 242.</i></p> <p>S.A. Papathanassiou, M.P. Papadopoulos, "Dynamic characteristics of autonomous wind-diesel systems". <i>Renewable Energy, Vol. 23, No. 2, June 2001, Pages 293-311.</i></p>
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7 Laboratory facilities

For the educational and research tasks, the laboratory is equipped with suitable hardware and software packages. The laboratory equipment for large power systems, as well as for small isolated power systems (microgrids).

The Electric Energy Systems Laboratory

Facilities	Capabilities
Simulation	<ul style="list-style-type: none"> • State-state and dynamic analysis of power systems • Custom analysis software • Commercial software: Eurostag, PSS/E, PSCAD-EMTDC, ,MATLAB, CYME, Analog Grid Simulator
Real Time Digital Simulator (RTDS)	Protection relay testing
Micro machines and load control	DC machine 110W, Synchronous Machine 175W, PLC,DAQ equipment, Relay Panel
Laboratory Microgrid	Wind Turbine 2.5 kW PV Panel 10x110W/12V with 1100W Inverter Battery Bank 30x2V,375Ah with inverter 3.3kVA Controllable Loads
PQ measurements	Power analyzers, measurement analysis
Consulting services	<ul style="list-style-type: none"> • Public, industrial & commercial power systems • Grounding systems • RES exploitation - Small autonomous systems • Power quality studies

8 Standardisation activities

Members of the lab are actively involved in groups and committees of several international and local study bodies.

Prof. Hatziargyriou is the President of IEEE Greek Section, a Senior Member of the Power Engineering Society of IEEE, Greek Member of CIGRE Study Committee C6 "Dispersed Generation" and member of various CIGRE Task Forces and of the Technical Chamber of Greece.

9 Testing activities

- Power generation system energy measurements.
- Power electronic equipment measurement and testing, regarding efficiency measurements and power quality analysis.
- Protection relay testing

10 Table of Staff Members to be involved in the Project**The Electric Energy Systems Laboratory**

no	Name	Status
1.	Nikos Hatziargyriou	Professor
2.	Evangelos Dialynas	Professor
3.	Costas Vournas	Professor
4.	George Korres	Ass. Professor
5.	Stavroula Kavatza	Lecturer
6.	Stavros Papathanassiou	Lecturer
7.	John Prousalidis	Lecturer
8.	Maria Lorentzou	Ph. D. degree
9.	Fotis Kanellos	Ph. D. degree
10.	Kyriakos Papadogiannis	Ph. D. degree
11.	Elias Zafiroopoulos	Ph.D. degree
12.	Irene Leonidaki	Ph.D. degree/Researcher
13.	Marios Mosxakis	Ph.D. degree/Researcher
14.	Aris Dimeas	Ph.D. degree
15.	Nikos Soultanis	PhD student
16.	Antonis Tsikalakis	PhD student
17.	Erietta Zountouridou	PhD student