



## Contatti

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# SMART<sup>Lab</sup>

## SMART GRIDS AND SMART CITIES RESEARCH LABORATORY



Scientific Director

**Prof. Pierluigi Siano**

## Breve Curriculum

**Pierluigi Siano** è professore associato di Sistemi Elettrici per l'Energia presso l'Università degli Studi di Salerno. Nel 2013 e nel 2018 ha conseguito l'abilitazione scientifica nazionale alle funzioni di professore di prima fascia. È direttore scientifico del laboratorio "Smart Grids and Smart Cities Laboratory" presso il Dipartimento Management & Innovation Systems, presso l'Università degli Studi di Salerno. Le sue attività di ricerca riguardano principalmente la gestione e la pianificazione delle smart city e delle smart grid, l'economia e la gestione dell'energia, le smart house e gli smart building, la microgenerazione distribuita, i sistemi di generazione da fonti rinnovabili. Ulteriori attività di ricerca sono relative alla safety e alla security nell'ambito delle smart cities e delle smart grid, all'intelligenza artificiale, al trasporto urbano sostenibile, ai veicoli elettrici e alle infrastrutture per la mobilità.

In tali ambiti di ricerca è stato coordinatore di progetti di ricerca internazionali e nazionali tra cui "Sistema per la Razionalizzazione energetica Residenziale con integrazione del Condizionamento Estivo (SIRRCE)" e "Distributed management logics and Devices for electricity savings in active users installations (DEMAND)", finanziati dal Ministero dello Sviluppo Economico (MISE).

È autore di più di 450 lavori scientifici su rivista internazionale, volumi e convegni internazionali che hanno ricevuto oltre 7620 citazioni e un H-index pari a 44 su Scopus.

È editor delle riviste internazionali Smart Cities, Editor of IEEE Access PES Section, IEEE Transactions on Industrial Informatics, IEEE Transactions on Industrial Electronics e IET Renewable Power Generation.

Ha fatto parte di decine di comitati scientifici di importanti internazionali, ricoprendo più volte i ruoli di General Chairman, Technical Program Chairman, Track Chairman, Special Session Chairman.

È stato Keynote Speaker, Invited Speaker, Plenary Speaker, Panel Speaker, in numerose conferenze ed università internazionali.

È spesso membro di comitati di valutazione di progetti internazionali e per università ed enti di ricerca internazionali.

Nel 2019 e nel 2020 è stato inserito nella "Highly Cited Researchers List" from Clarivate Analytics. Tale classifica comprende l'1% degli autori degli articoli scientifici più citati negli ultimi undici anni nel settore scientifico di appartenenza.

È nella classifica degli scienziati più prolifici e citati nel mondo pubblicata da John P.A Ioannidis, professore a Stanford, nella rivista scientifica Plos Biology, statunitense, fortemente accreditata.

L'articolo, rilevato nelle banche dati Scopus e WoS, di cui è co-autore "P. Siano, D. Sarno (2016). Assessing the benefits of residential demand response in a real time distribution energy market. Applied Energy, vol. 161, p. 533-551" ha ricevuto dall'Editor della rivista l'Award (Prize) of Highly Cited Original Papers della rivista internazionale Applied Energy per l'anno 2016 e il riconoscimento come ESI (Essential Science Indicators) della Thomson Reuters Web of Science Hot paper.

L'articolo, rilevato nelle banche dati Scopus e WoS, di cui è autore "P. Siano, Demand response and smart grids - A survey Volume 30, Issue , January 2014, Pages 461-478:" risulta il "most Cited Article published since 2012 in the journal Renewable & Sustainable Energy Reviews, Articles extracted from Scopus."

Le recenti attività di ricerca di Pierluigi Siano riguardano principalmente le seguenti tematiche:

- Metodologie per la pianificazione di reti elettriche intelligenti (smart grids) in presenza di generazione distribuita anche da fonte rinnovabile
- Metodologie di energy management per la gestione delle smart grids
- Metodologie di energy management per la gestione delle smart homes

Le competenze scientifiche e attività di ricerca di Pierluigi Siano riguardano principalmente le seguenti tematiche:

- Metodologie per la pianificazione di reti elettriche intelligenti (smart grids) in presenza di generazione distribuita anche da fonte rinnovabile

Partendo dal ruolo sempre più importante che la Generazione Distribuita (GD) e le fonti rinnovabili vanno assumendo nelle reti elettriche, l'attività di ricerca ha esaminato dapprima le attuali metodologie di pianificazione delle reti elettriche di distribuzione, che si sono rivelate non adeguate a considerare tutti gli aspetti concernenti la GD e l'evoluzione delle reti elettriche. Sono state, quindi, ricercate nuove metodologie di pianificazione idonee a favorire la diffusione della GD e le opportunità da essa offerte.

- Metodologie di energy management per la gestione delle smart grids

La prevista penetrazione della GD dei prossimi anni determinerà una situazione in cui i distributori (DSOs), sottoposti a sempre più richieste di connessione di nuovi impianti di generazione alla rete, dovranno affrontare nuove problematiche non solo di pianificazione ma anche di gestione e controllo delle reti elettriche. Un'elevata penetrazione di GD richiederà lo sviluppo di nuove soluzioni tecnologiche riguardanti i dispositivi d'interconnessione e le relative logiche di controllo; i sistemi di protezione; i sistemi di telecomunicazione; l'automazione, la riconfigurazione, il monitoraggio, il controllo e la diagnostica della rete; la gestione ottima dell'energia elettrica da fonte rinnovabile. L'attività di ricerca ha riguardato, pertanto, lo studio e la messa punto di metodologie per la gestione di reti elettriche di distribuzione in presenza di GD.

- Metodologie di energy management per la gestione delle smart homes

Ulteriori ricerche, svolte nell'ambito del coordinamento scientifico dei progetti di ricerca dal titolo "Sistema per la Razionalizzazione energetica Residenziale con integrazione del Condizionamento Estivo (SIRRCE)" e "Distributed management logics and Devices for electricity savings in active users installations (DEMAND)", finanziati dal Ministero dello Sviluppo Economico (MISE) riguardano la realizzazione di un sistema di energy management per la gestione dell'energia soprattutto in ambito residenziale (smart homes).

Le competenze scientifiche e attività di ricerca, anche recenti, riguardano, più in generale le seguenti tematiche di ricerca:

- Sistemi elettrici interconnessi
- Integrazione dei mercati
- Architetture e modalità per i servizi di rete

- Sicurezza del sistema elettrico
- Reti di trasmissione
- Reti di distribuzione
- Tecnologie ICT per la rete elettrica
- Smart cities e smart communities
- Sicurezza e monitoraggio smart district
- Sistemi di accumulo innovativi
- Gestione di sistemi di accumulo integrati con sistemi di produzione e/o consumo
- Analisi di consumi energetici degli edifici nei settori economici
- Sistemi di controllo per l'efficienza energetica
- Monitoraggio e misure energetiche di edifici
- Tecnologie e infrastrutture di ricarica di veicoli elettrici
- Sicurezza dei veicoli elettrici
- Domotica

## List of some selected journal papers in the last five years

1. M. Vahedipour-Dahraie, H. Rashidizadeh-Kermani, M. Shafie-Khah and P. Siano, "Peer-to-Peer Energy Trading Between Wind Power Producer and Demand Response Aggregators for Scheduling Joint Energy and Reserve," in IEEE Systems Journal. doi: 10.1109/JSYST.2020.2983101, Early Access
2. M. Ghorbanian, S. H. Dolatabadi and P. Siano, "Game Theory-Based Energy-Management Method Considering Autonomous Demand Response and Distributed Generation Interactions in Smart Distribution Systems," in IEEE Systems Journal. doi: 10.1109/JSYST.2020.2984730, Early Access
3. C. Shao, Y. Ding, P. Siano and Y. Song, "Optimal Scheduling of the Integrated Electricity and Natural Gas Systems Considering the Integrated Demand Response of Energy Hubs," in IEEE Systems Journal. doi: 10.1109/JSYST.2020.3020063, Early Access
4. R. Hemmati, H. Mehrjerdi, M. Shafie-khah, P. Siano and J. P. S. Catalao, "Managing Multitype Capacity Resources For Frequency Regulation In Unit Commitment Integrated With Large Wind Ramping," in IEEE Transactions on Sustainable Energy. doi: 10.1109/TSTE.2020.3017231, Early Access
5. M. Khorasany, R. Razzaghi, A. Dorri, R. Jurdak and P. Siano, "Paving the Path for Two-sided Energy Markets: An Overview of Different Approaches," in IEEE Access. doi: 10.1109/ACCESS.2020.3040391, Early Access
6. A. Younesi, H. Shayeghi, A. Safari and P. Siano, "A Quantitative Resilience Measure Framework for Power Systems Against Wide-Area Extreme Events," in IEEE Systems Journal. doi: 10.1109/JSYST.2020.3001222, Early Access
7. A. K. Gangwar, O. P. Mahela, B. Rathore, B. Khan, H. Haes Alhelou and P. Siano, "A Novel K-Means Clustering and Weighted K-NN Regression Based Fast Transmission Line Protection," in IEEE Transactions on Industrial Informatics. doi: 10.1109/TII.2020.3037869, Early Access
8. M. Jadidbonab, B. Mohammadi-Ivatloo, M. Marzband and P. Siano, "Short-term Self-Scheduling of Virtual Energy Hub Plant within Thermal Energy Market," in IEEE Transactions on Industrial Electronics. doi: 10.1109/TIE.2020.2978707, Early Access
9. B. Rathore, O. P. Mahela, B. Khan, H. Haes Alhelou and P. Siano, "Wavelet-Alienation-Neural Based Protection Scheme for STATCOM Compensated Transmission Line," in IEEE Transactions on Industrial Informatics. doi: 10.1109/TII.2020.3001063, Early Access
10. P. Siano and M. Dolatabadi, "A MILP optimization model for assessing the participation of distributed residential PV-battery systems in the ancillary services market," in CSEE Journal of Power and Energy Systems. doi: 10.17775/CSEEJPES.2020.01170, Early Access
11. S. Hacopian Dolatabadi, M. Ghorbanian, P. Siano and N. D. Hatziargyriou, "An Enhanced IEEE 33 Bus Benchmark Test System for Distribution System Studies," in IEEE Transactions on Power Systems. doi: 10.1109/TPWRS.2020.3038030, Early Access
12. N. B. P, J. M. Guerrero, P. Siano, R. Peesapati and G. Panda, "A Novel Modified Control Scheme in Grid-tied Photovoltaic System for Power Quality Enhancement," in IEEE Transactions on Industrial Electronics. doi: 10.1109/TIE.2020.3031529, Early Access
13. R. Kaushik et al., "Recognition of Islanding and Operational Events in Power System With Renewable Energy Penetration Using a Stockwell Transform-Based Method," in IEEE Systems Journal. doi: 10.1109/JSYST.2020.3020919, Early Access
14. M. K. Arpanahi, M. E. H. Golshan and P. Siano, "A Comprehensive and Efficient Decentralized Framework for Coordinated Multiperiod Economic Dispatch of Transmission and Distribution Systems," in IEEE Systems Journal. doi: 10.1109/JSYST.2020.3009750, Early Access
15. N. Babu P, J. M. Guerrero, P. Siano, R. Peesapati and G. Panda, "An Improved Adaptive Control Strategy in Grid-Tied PV System With Active Power Filter for Power Quality Enhancement," in IEEE Systems Journal. doi: 10.1109/JSYST.2020.2985164, Early Access
16. M. Nasr, E. Nasr-Azadani, H. Nafisi, S. H. Hosseinian and P. Siano, "Assessing the Effectiveness of Weighted Information Gap Decision Theory Integrated With Energy Management Systems for Isolated Microgrids," in IEEE Transactions on Industrial Informatics, vol. 16, no. 8, pp. 5286-5299, Aug. 2020.

17. M. Vahedipour-Dahraie, H. Rashidzadeh-Kermani, A. Anvari-Moghaddam and P. Siano, "Flexible stochastic scheduling of microgrids with islanding operations complemented by optimal offering strategies," in *CSEE Journal of Power and Energy Systems*, vol. 6, no. 4, pp. 867-877, Dec. 2020.
18. A. Ahmadi, A. Esmaeel Nezhad, P. Siano, B. Hredzak and S. Saha, "Information-Gap Decision Theory for Robust Security-Constrained Unit Commitment of Joint Renewable Energy and Gridable Vehicles," in *IEEE Transactions on Industrial Informatics*, vol. 16, no. 5, pp. 3064-3075, May 2020.
19. S. Liu, P. Siano and X. Wang, "Intrusion-Detector-Dependent Frequency Regulation for Microgrids Under Denial-of-Service Attacks," in *IEEE Systems Journal*, vol. 14, no. 2, pp. 2593-2596, June 2020.
20. V. N. Kumar, N. Babu P., R. Kiranmayi, P. Siano and G. Panda, "Improved Power Quality in a Solar PV Plant Integrated Utility Grid by Employing a Novel Adaptive Current Regulator," in *IEEE Systems Journal*, vol. 14, no. 3, pp. 4308-4319, Sept. 2020.
21. S. Talari, M. Shafie-Khah, N. Mahmoudi, P. Siano, W. Wei and J. P. S. Catalão, "Optimal management of demand response aggregators considering customers' preferences within distribution networks," in *IET Generation, Transmission & Distribution*, vol. 14, no. 23, pp. 5571-5579, 4 12 2020.
22. V. Hosseinezhad, M. Shafie-Khah, P. Siano and J. P. S. Catalão, "An Optimal Home Energy Management Paradigm With an Adaptive Neuro-Fuzzy Regulation," in *IEEE Access*, vol. 8, pp. 19614-19628, 2020.
23. O. P. Mahela, B. Khan, H. H. Alhelou and P. Siano, "Power Quality Assessment and Event Detection in Distribution Network With Wind Energy Penetration Using Stockwell Transform and Fuzzy Clustering," in *IEEE Transactions on Industrial Informatics*, vol. 16, no. 11, pp. 6922-6932, Nov. 2020.
24. M. Dolatabadi and P. Siano, "A Scalable Privacy Preserving Distributed Parallel Optimization for a Large-Scale Aggregation of Prosumers With Residential PV-Battery Systems," in *IEEE Access*, vol. 8, pp. 210950-210960, 2020.
25. A. Ramezani, M. Ghiasi, M. Dehghani, T. Niknam, P. Siano and H. H. Alhelou, "Reduction of Ripple Toothed Torque in the Internal Permanent Magnet Electric Motor by Creating Optimal Combination of Holes in the Rotor Surface Considering Harmonic Effects," in *IEEE Access*, vol. 8, pp. 215107-215124, 2020.
26. K. Mahmud, M. S. H. Nizami, J. Ravishankar, M. J. Hossain and P. Siano, "Multiple Home-to-Home Energy Transactions for Peak Load Shaving," in *IEEE Transactions on Industry Applications*, vol. 56, no. 2, pp. 1074-1085, March-April 2020.
27. H. Rashidzadeh-Kermani, M. Vahedipour-Dahraie, M. Shafie-Khah and P. Siano, "A Regret-Based Stochastic Bi-Level Framework for Scheduling of DR Aggregator Under Uncertainties," in *IEEE Transactions on Smart Grid*, vol. 11, no. 4, pp. 3171-3184, July 2020.
28. H. Hui, Y. Ding, Z. Lin, P. Siano and Y. Song, "Capacity Allocation and Optimal Control of Inverter Air Conditioners Considering Area Control Error in Multi-Area Power Systems," in *IEEE Transactions on Power Systems*, vol. 35, no. 1, pp. 332-345, Jan. 2020.
29. G. Rigatos, N. Zervos, K. Busawon, P. Siano and M. Abbaszadeh, "Differential flatness theory-based approach to the control of gas-turbine electric power generation units," in *IET Control Theory & Applications*, vol. 14, no. 2, pp. 187-197, 29 1 2020.
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32. M. Eskandari, L. Li, M. H. Moradi, P. Siano and F. Blaabjerg, "Optimal Voltage Regulator for Inverter Interfaced Distributed Generation Units Part I: Control System," in *IEEE Transactions on Sustainable Energy*, vol. 11, no. 4, pp. 2813-2824, Oct. 2020.
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35. V. Suresh et al., "Stochastic Economic Dispatch Incorporating Commercial Electric Vehicles and Fluctuating Energy Sources," in *IEEE Access*, vol. 8, pp. 216332-216348, 2020.

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38. A. Jafari, H. Ganjeh Ganjehlou, T. Khalili, B. Mohammadi-Ivatloo, A. Bidram and P. Siano, "A Two-Loop Hybrid Method for Optimal Placement and Scheduling of Switched Capacitors in Distribution Networks," in *IEEE Access*, vol. 8, pp. 38892-38906, 2020.
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