

CURRICULUM VITAE

PERSONAL DETAILS

Name: Stergios Vakalis

Position: Assistant Professor (tenure-track)

Date of Birth: 21/08/1983

Work address: School of Chemical Engineering, NTUA

Office: H.403b/ Thermodynamics and Transport Phenomena Laboratory

e-mails: svakalis@chemeng.ntua.gr & svakalis@mail.ntua.gr

A. STUDIES

Undergraduate Studies (2010)/ Diploma in Environmental Engineering

School of Environmental Engineering, **Technical University of Crete**

Supervisor: Prof. Vasilios Gkekas

Thesis topic: Thermal Processes of Municipal Solid Waste in Chania Region

Postgraduate Studies (2012)/ MSc Sustainable Resource Management

Studienfakultät Forstwissenschaft und Ressourcenmanagement, **Technische Universität München**

Supervisor: Prof. Doris Schieder

Thesis topic: Assessment of thermochemical conversion technologies of biomass-to-energy

Doctoral dissertation (2016)/ PhD in Sustainable Energy Technologies

Faculty of Science and Technology, **Libera Università di Bolzano**

Supervisor: Prof. Marco Baratieri

Thesis topic: Small scale biomass gasification for energy production

Postdoctoral dissertation (2017)

School of Chemical Engineering, **NTUA**

Postdoctoral Scholarship of Academic Excellence IKY - Siemens

Supervisor: Prof. Maria Loizidou

Thesis topic: Construction of particleboards from organic waste

B. POSITIONS HELD

2025 - present, Faculty member at the rank of Assistant Professor (tenure-track), School of Chemical Engineering, National Technical University of Athens, Subject: Energy Processes (Government Gazette: Γ' 1363/08.04.2025)

2024 - 2025, Faculty member at the rank of Associate Professor, Department of Environment, University of the Aegean, Subject: Energy Management and Low Carbon Technologies (Government Gazette: Γ' 723/04.03.2024) & **Director of the Energy Management Laboratory**

2022 - 2024, Faculty member at the rank of Tenured Assistant Professor, Department of Environment, University of the Aegean, Subject: Energy Management and Low Carbon Technologies (Government Gazette of tenure: Γ' 2785/07.11.2022) & **Director of the Energy Management Laboratory**

2019 - 2022, Faculty member at the rank of Assistant Professor (tenure-track), Department of Environment, University of the Aegean, Subject: Energy Management and Low Carbon Technologies

(Government Gazette of appointment: 379/issue Γ'/19.03.2019)
2018 - 2019, RTD/ A, Assistant Professor of Research , Faculty of Science and Technology, Libera Università di Bolzano, Subject: “Studio dei processi di trasferimento di energia termica e del comportamento termofluidodinamico di sistemi cogenerativi alimentati da fonti rinnovabili, in particolare da biomasse”, Study of thermal energy transfer processes and the thermodynamic behavior of cogeneration systems powered by renewable sources, especially biomass
2017 - 2018, External Teaching Staff , Hellenic Open University, School of Sciences and Technology, MSc Catalysis and Environmental Protection

C. AREAS OF RESEARCH

➤ Waste-to-energy ➤ Bioenergy and Biofuels using Thermochemical Technologies (<i>Gasification, Pyrolysis, Hydrothermal Technologies, Haber-Bosch, Fischer-Tropsch, DMR</i>) ➤ Hydrogen production via reforming processes ➤ Renewable Energy Sources (Technologies, Policy and Management) ➤ Thermodynamic Analysis of Energy Systems (<i>Exergy Analysis, Maximum Entropy Generation, Entropy Dissipation</i>) ➤ Energy Modeling using Cantera-MATLAB, Aspen Plus, HomerPro, RETSCREEN, EnergyPLAN, DWSIM & SuperPro Designer ➤ Life Cycle Analysis of Energy Systems with SimaPro and OpenLCA accounting ➤ Multi-criteria Decision Making (<i>software: Visual PROMETHEE & DIVIS, methods: AHP, PROMETHEE – GAIA, TOPSIS, ELECTREE, Hierarchical-SMAA PROMETHEE</i>) ➤ Analytical methods for biofuel characterization with the development of Gas Chromatography (<i>TCD/ FID/ BID/ ECD</i>), <i>Thermogravimetric Analysis, FT-IR/ ATR, UV-VIS Spectrophotometry</i>

D. RESEARCH PROJECTS

2025 – 2029 , PI in the European HORIZON program: BioFairNet, Project scope: (i) Design, installation and operation of the prototype innovative HYDROPYR system that combines the technologies of hydrothermal carbonization and pyrolysis. (ii) Creation of a Fair Bioeconomy and Circular Economy Network
2025 – 2027 , PI in the European INTERREG program: ADAPTO, Project subject: Implementation and communication of good practices of green transition and Circular Economy in the North Aegean Region
2023 – 2025 , Co-PI in the METRO 16 program: ELAIONAS, Project objective: Utilization of residues from the olive growing and olive production process for environmental protection and increasing soil fertility.
2023 – 2025 , PI in the European Cooperation in Science and Technology (COST) program - PEN@Hydropower, Project objective: The creation of a pan-European network for sustainable, digitalized hydroelectric power contributing to the clean energy transition (CET).
2022- 2025 , Participation in the European program HORIZON 2020 TRINEFLEX, manager of PE4 Project subject: (i) Green energy transition of energy-intensive industries. (ii) Development of the prototype innovative system HYDROMOL.
2019 – 2023 , Co-PI in the European program HORIZON 2020 REACT - Renewable Energy for self-sustainable island CommuniTies, Project subject: Green energy transition on islands, scaling up of RES

installations
2020 – 2023 , Participation in the Regional Excellence program "Aegean Bioeconomy - Center for Sustainable and Circular Bioeconomy", Project objective: Installation of high-value and state-of-the-art laboratory equipment in the Energy Management Laboratory.
2021- 2023 , Participation in the HORIZON 2020 project COMPAIR - Competition for Air Traffic Management, Project objective: Development of a Citizen CO2 calculator
2021- 2025 , Participation in the HORIZON 2020 project ZeroPM - Zero pollution of Persistent, Mobile substances, Project subject: Destruction of PFAS in sludge by hydrothermal carbonation
2020 – 2022 , Researcher in the project funded by National and European funds (Government Gazette 4482B/ 19-12-2019, Project subject: Construction of a pilot municipal waste gasification unit in the Prefecture of Heraklion.
2019 – 2021 , Funded project by the State Scholarships Foundation following a national competition and submission of proposals. Currently being implemented by a funded Postdoctoral Fellow position (fund – €26.4 thousand). Project title: “Design and development of a decision support tool for the management of residues from biomass-to-energy technologies: A multi-criteria analysis approach”.
2018 – 2019 , Co-Principal Investigator in the RTD 2018 call - "Biochar recirculation for improving conversion efficiencies in fixed bed biomass gasification systems", project selected and fully funded by the Faculty of Science and Technology, Libera Università di Bolzano
2016 – 2017 , Collaborator in two European LIFE+ projects, Department of Chemical Engineering, National Technical University of Athens: (i) PAYT - Tool for Waste Reduction in Southern Europe, (ii) LIVE-WASTE - Sustainable management of animal waste for nutrient removal/recovery

E. TEACHING ACTIVITY

2019 – 2025 , Supervision of four (4) doctoral researchers in the following topics: (i) Power – to – X , (ii) Green fuels and RES in Shipping , (iii) Hydrothermal gasification for micropollutant destruction and green hydrogen production , (iv) Hydrothermal liquefaction and pyrolysis for biofuel production from organic waste
2019 – 2021 , Supervision of a postdoctoral researcher on the topic: Development of multi-criteria analysis tools for holistic hydrocarbon management
2019 – 2025 , Supervision of 30 Diploma/ BSc theses and 28 MSc theses .
2019 – 2025 , Teaching undergraduate courses: ENERGY AND ENVIRONMENT, RENEWABLE ENERGY SOURCES, WASTE-TO-ENERGY TECHNOLOGIES, ENERGY ANALYSIS, INTRODUCTION TO ENVIRONMENTAL ENGINEERING, MASS AND ENERGY TRANSPORT LABORATORY
2019 – 2025 , Teaching of postgraduate courses: BIOFUELS AND BIOPRODUCTS, ENERGY MANAGEMENT AND DECISION MAKING

F. ADDITIONAL EDUCATIONAL & TRAINING

LANGUAGE SKILLS: Greek (native), English (C2), German (B2), Italian (A2)
2011 , Technical Analyst Trainee (Stagiaire), Confederation of European Waste-to-Energy Plants, Brussels – Belgium
2008 – 2009 , Military Service in the Navy, Administration Office (Souda Naval Base)

G. OTHER ROLES

Editorial Board member of the academic journals Nature Scientific Reports (Springer) & Circular Economy and Sustainability (Springer)
Research Associate of the Global Council for Waste to Energy WtERT , Earth Engineering Center - Columbia University & City College of New York
Proposal reviewer of the General Secretariat for Research and Innovation (GSRI) & the Hellenic Foundation for Research and Innovation (HFRI)
Organizational Committee of: 3 rd to 12 th International Conference on Sustainable Solid Waste Management
Scientific Committee of: (i) 7 th to 12 th International Conference on Sustainable Solid Waste Management (ii) 4 th International Conference on Low Carbon Asia & Beyond (ICLCA 18) , (iii) SUSTENG2022 , (iv) CEST2021 & CEST2023
Reviewer for 22 international academic journals (14 Elsevier, 2 Taylor & Francis, 4 Springer, 1 SAGE, 1 MDPI).
Awards for “Outstanding Contribution in Reviewing” from the following journals: Journal of Cleaner Production (Elsevier), Renewable Energy (Elsevier), Journal of Environmental Management (Elsevier), Energy (Elsevier), Waste Management (Elsevier), Journal of Analytical and Applied Pyrolysis (Elsevier)
Member of the Hellenic Solid Waste Management Association (EEDSA)

H. PUBLICATION METRICS

PEER-REVIEWED PUBLISHED ARTICLES	70
h – index Scopus	15
h – index/ i10-index (Google Scholar)	17/ 32
CITATIONS Scopus	909
CITATIONS Google Scholar	1179
AUTHOR POSITION (FIRST/ LAST)	29/ 18
PUBLICATIONS IN CONFERENCE PROCEEDINGS	33
INVITED LECTURES	15
PRESENTATIONS IN INTERNATIONAL CONFERENCES (ORAL + POSTER)	102

I. LIST OF PUBLICATIONS

SCOPUS – INDEXED PUBLICATIONS

1. Liakos, D., Altiparmaki, G., Malamis, S., Vakalis, S. (2025) Hydrothermal Liquefaction for Biofuel Synthesis: Assessment of VFA (Volatile Fatty Acid) and FAME (Fatty Acid Methyl Ester) Profiles from Spent Coffee Grounds. *Energies*, 18 (8), art. no. 2094.
2. Arvaniti, O.S., Fountoulakis, M.S., Gatidou, G., Kalantzi, O.-I., Vakalis, S., Stasinakis, A.S. (2024) Perfluoroalkyl and polyfluoroalkyl substances in sewage sludge: challenges of biological and thermal treatment processes and potential threats to the environment from land disposal. *Environmental Sciences Europe*, 36 (1), art. no. 207.
3. Kalampokidis, A., Klontza, E., Vakalis, S., Naddeo, V., Lekkas, D.F. (2024) Is it possible to produce

polyhydroxyalkanoate (PHA) bioplastics of consistent composition from organic wastes? A review. *Circular Economy and Sustainability*, 4 (4), pp. 2775–2797.

4. Liakos, D., Altiparmaki, G., Moustakas, K., Malamis, S., Vakalis, S. (2024) The fate of volatile fatty acids (VFAs) during the thermodynamic transition from hydrothermal carbonization to hydrothermal liquefaction: HtC-to-HtL. *Sustainable Chemistry and Pharmacy*, 41, art. no. 101683.

5. Agu, N.L., Pillai, G., Abi Ghanem, D., Vakalis, S., Crosbie, T., Haralambopoulos, D., Chen, X.H. (2024) The socio-economic impact of decarbonising geographical islands' energy systems. *International Journal of Sustainable Energy Planning and Management*, 40, pp. 8–25.

6. Kelmalis, A., Dimou, A., Lekkas, D.F., Vakalis, S. (2024) Cold ironing and the study of RES utilization for maritime electrification on Lesbos Island Port. *Environments*, 11 (4), art. no. 84.

7. Isigonis, P., Corrente, S., Vakalis, S. (2024) A framework for assessing hydrochars from hydrothermal carbonisation of agrowaste with the use of MCDA: application with the hierarchical SMAA-PROMETHEE method. *Sustainability*, 16 (1), art. no. 410.

8. Mastoras, P., Zkeri, E., Panara, A., Dasenaki, M.E., Maragou, N.C., Vakalis, S., Fountoulakis, M.S., Thomaidis, N.S., Stasinakis, A.S. (2023) Application of a pilot-scale solar still for wine lees management: characterization of by-products and valorization potential. *Journal of Environmental Chemical Engineering*, 11 (6), art. no. 111227.

9. Kelmalis, A., Lekkas, D.F., Moustakas, K., Vakalis, S. (2023) Assessing the emissions of short sea international shipping: a case study of the Mytilini–Ayvalik route. *Environmental Science and Pollution Research International*, 30 (54), pp. 115496–115505.

10. Liakos, D., Altiparmaki, G., Kalampokidis, A., Lekkas, D.F., Vakalis, S. (2023) The role of hydrochar on the production of biogas and volatile fatty acids during anaerobic digestion of cheese whey wastewater. *Sustainable Chemistry and Pharmacy*, 35, art. no. 101153.

11. Barney, A., Polatidis, H., Vakalis, S., Grondin, D., Benne, M., Salces, F.S., Haralambopoulos, D. (2023) Energy transition awareness: can it guide local transition planning on islands? *Heliyon*, 9 (9), art. no. e19960.

12. Orfanou, A., Vakalis, S., Karelis, C., Alexopoulos, C., Charalabidis, Y., Lekkas, D.F. (2023) Assessing the correlation between citizen science and carbon footprint: introduction of COMPAIR's CO₂ calculator. *Energies*, 16 (17), art. no. 6228.

13. Xypolias, P., Vakalis, S., Daskaloudis, I., Lekkas, D.F. (2023) Hydrothermal carbonization of dry anaerobic digestion residues derived from food and agro wastes in Lesbos Island. *Energies*, 16 (12), art. no. 4619.

14. Dimou, A., Moustakas, K., Vakalis, S. (2023) The role of hydrogen and H₂ mobility on the green transition of islands: the case of Anafi (Greece). *Energies*, 16 (8), art. no. 3542.

15. Vakalis, S., Ail, S.S., Moustakas, K., Castaldi, M.J. (2023) Operation and thermodynamic modeling of a novel advanced hydrothermal reactor: introduction of the novel 3-step evolution model. *Energies*, 16 (4), art. no. 2032.

16. Altiparmaki, G., Vasileiadou, M.A., Vakalis, S. (2022) The effect of excess water on the hydrothermal carbonization of anise waste from ouzo production on Lesbos Island. *Sustainable Chemistry and Pharmacy*, 29, art. no. 100831.

17. Mastoras, P., Vakalis, S., Fountoulakis, M.S., Gatidou, G., Katsianou, P., Koulis, G., Thomaidis, N.S., Haralambopoulos, D., Stasinakis, A.S. (2022) Evaluation of the performance of a pilot-scale solar still for olive mill wastewater treatment. *Journal of Cleaner Production*, 365, art. no. 132695.

18. Isigonis, P., Moustakas, K., Vakalis, S. (2022) Multicriteria analysis as a supporting decision tool for expanding the use of the 3T method for waste-to-energy technologies and biorefineries. *Sustainable*

Chemistry and Pharmacy, 28, art. no. 100715.

19. Dimou, A., Vakalis, S. (2022) Techno-economic analysis of green energy transitions in isolated grids: the case of Ai Stratis – Green Island. *Renewable Energy*, 195, pp. 66–75.
20. Vasileiadou, M.A., Altiparmaki, G., Moustakas, K., Vakalis, S. (2022) Quality of hydrochar from wine sludge under variable conditions of hydrothermal carbonization: the case of Lesvos Island. *Energies*, 15 (10), art. no. 3574.
21. Altiparmaki, G., Kourletakis, P., Moustakas, K., Vakalis, S. (2022) Assessing the effect of hydrothermal treatment severity on the fate of nitrates and phosphates in dairy wastewater. *Fuel*, 312, art. no. 122866.
22. Vakalis, S., Georgiou, A., Moustakas, K., Fountoulakis, M. (2022) Assessing the effect of hydrothermal treatment on the volatile solids content and the biomethane potential of common reed (*Phragmites australis*). *Bioresource Technology Reports*, 17, art. no. 100923.
23. Orfanou, A., Vakalis, S. (2022) Wind-based hybrid systems for increased RES penetration in isolated grids: the case study of Anafi (Greece). *AIMS Energy*, 10 (5), pp. 1046–1058.
24. Ahmad, J., Vakalis, S., Patuzzi, F., Baratieri, M. (2021) Effect of process conditions on the surface properties of biomass chars produced by means of pyrolysis and CO₂ gasification. *Energy and Environment*, 32 (8), pp. 1378–1396.
25. Vakalis, S., Moustakas, K. (2021) Modeling the co-combustion of coal and biocoal from the novel process of frictional pyrolysis for reducing the emissions of coal plants. *Biomass Conversion and Biorefinery*, 11 (6), pp. 2937–2945.
26. Vakalis, S., Dermatas, D., Panagiotakis, I., Moustakas, K. (2021) Beyond the R1: a viable pathway for waste-to-energy in the circular economy framework. *Waste Management and Research*, 39 (10), pp. 1215–1217.
27. Patuzzi, F., Basso, D., Vakalis, S., Antolini, D., Piazzzi, S., Benedetti, V., Cordioli, E., Baratieri, M. (2021) State-of-the-art of small-scale biomass gasification systems: an extensive and unique monitoring review. *Energy*, 223, art. no. 120039.
28. Menin, L., Vakalis, S., Benedetti, V., Patuzzi, F., Baratieri, M. (2021) Techno-economic assessment of an integrated biomass gasification, electrolysis, and syngas biomethanation process. *Biomass Conversion and Biorefinery*, 11 (2), pp. 445–459.
29. Moustakas, K., Sotiropoulos, D., Vakalis, S. (2021) Evaluation of the biogas potential of agricultural biomass waste for energy applications in Greece: a case study of the western Greece region. *Waste Management and Research*, 39 (3), pp. 438–447.
30. Vakalis, S., Kyriakidis, K., Patuzzi, F., Baratieri, M. (2021) Ethanothermal and hydrothermal extraction of tar from char produced in commercial gasifiers and comparison with conventional tar extraction methods. *European Biomass Conference and Exhibition Proceedings*, pp. 1000–1003.
31. Daskaloudis, I., Lekkas, D.F., Vakalis, S. (2021) Introduction of the “pre-ranking” approach as a multicriteria analysis method for assessing the suitability of composts. *European Biomass Conference and Exhibition Proceedings*, pp. 1229–1233.
32. Chatzimaliakas, P.F., Iliopoulou, A., Vakalis, S. (2021) The effect of acidic pretreatment on the hydrothermal carbonization of cheese whey wastewater (CWW) – the case study of Lesvos Island. *European Biomass Conference and Exhibition Proceedings*, pp. 108–112.
33. Vakalis, S., Kaffas, K., Moustakas, K. (2020) The water-energy-climate nexus concept of “Hydrobattery”: storing excess variable renewable energy at the Canyon Ferry Dam. *Renewable Energy*, 155, pp. 547–554.
34. Moustakas, K., Parmaxidou, P., Vakalis, S. (2020) Anaerobic digestion for energy production from

agricultural biomass waste in Greece: capacity assessment for the region of Thessaly. *Energy*, 191, art. no. 116556.

35. Vakalis, S., Moustakas, K., Benedetti, V., Cordioli, E., Patuzzi, F., Loizidou, M., Baratieri, M. (2019) The “COFFEE BIN” concept: centralized collection and torrefaction of spent coffee grounds. *Environmental Science and Pollution Research*, 26 (35), pp. 35473–35481.

36. Vakalis, S., Moustakas, K., Heimann, R., Loizidou, M. (2019) The renewable battery concept via conversion of agricultural waste into biocoal using frictional pyrolysis. *Journal of Cleaner Production*, 229, pp. 1183–1188.

37. Sotiropoulos, A., Xydis, G., Kontogianni, N., Vakalis, S. (2019) Results on the implementation of an innovative dehydrated biological waste to ethanol management scheme. *International Journal of Environmental Science and Technology*, 16 (8), pp. 4967–4974.

38. Panaretou, V., Vakalis, S., Ntolka, A., Sotiropoulos, A., Moustakas, K., Malamis, D., Loizidou, M. (2019) Assessing the alteration of physicochemical characteristics in composted organic waste in a prototype decentralized composting facility. *Environmental Science and Pollution Research*, 26 (20), pp. 20232–20247.

39. Vakalis, S., Moustakas, K. (2019) Energy efficiency of waste-to-energy plants with a focus on the comparison and the constraints of the 3T method and the R1 formula. *Renewable and Sustainable Energy Reviews*, 108, pp. 323–329.

40. Balaskonis, A., Vakalis, S., Sotiropoulos, A. (2019) Comparison of three household food-waste dryers in the context of food-waste prevention and bioeconomy. *SN Applied Sciences*, 1 (6), art. no. 648.

41. Vakalis, S., Moustakas, K. (2019) Modelling of advanced gasification systems (MAGSY): simulation and validation for the case of the rising co-current reactor. *Applied Energy*, 242, pp. 526–533.

42. Vakalis, S., Moustakas, K. (2019) Applications of the 3T method and the R1 formula as efficiency assessment tools for comparing waste-to-energy and landfilling. *Energies*, 12 (6), art. no. 1066.

43. Sotiropoulos, A., Xydis, G., Yard, M., Vakalis, S. (2019) Domestic biowaste drying as a pretreatment method to produce a stabilised biological resource. *International Journal of Environment and Waste Management*, 24 (3), pp. 237–249.

44. Antolini, D., Ail, S.S., Vakalis, S., Patuzzi, F., Baratieri, M. (2019) Enhancement of the load modulation capability of a pilot-plant gasifier by means of secondary-air control. *European Biomass Conference and Exhibition Proceedings*, pp. 802–806.

45. Patuzzi, F., Antolini, D., Bonzi, G., Vakalis, S., Baratieri, M. (2019) Char recirculation for improving the conversion yields in fixed-bed gasification systems. *European Biomass Conference and Exhibition Proceedings*, pp. 527–532.

46. Alatzas, S., Moustakas, K., Malamis, D., Vakalis, S. (2019) Biomass potential from agricultural waste for energetic utilization in Greece. *Energies*, 12 (6), art. no. 1095.

47. Vakalis, S., Caligiuri, C., Moustakas, K., Malamis, D., Renzi, M., Baratieri, M. (2018) Modeling the emissions of a dual-fuel engine coupled with a biomass gasifier—supplementing the Wiebe function. *Environmental Science and Pollution Research*, 25 (36), pp. 35866–35873.

48. Vakalis, S., Moustakas, K., Semitekolos, D., Novakovic, J., Malamis, D., Zoumpoulakis, L., Loizidou, M. (2018) Introduction to the concept of particleboard production from mixtures of sawdust and dried food waste. *Waste and Biomass Valorization*, 9 (12), pp. 2373–2379.

49. Vakalis, S., Heimann, R., Ahmad, J., Patuzzi, F., Baratieri, M. (2018) The case of frictional torrefaction and the effect of reflux condensation on the operation of the rotary compression unit. *Bioresource Technology*, 268, pp. 91–96.

50. Vakalis, S., Moustakas, K., Loizidou, M. (2018) Introduction of the trapezoidal thermodynamic

technique method for measuring and mapping the efficiency of waste-to-energy plants: a potential replacement for the R1 formula. *Waste Management and Research*, 36 (9), pp. 810–817.

51. Talley, A., Heimann, R., Vakalis, S. (2018) Development and application of the compression-frictional treatment method for sterilizing and valorizing organic waste. *Environmental Technology*, 39 (13), pp. 1650–1657.

52. Vakalis, S., Malamis, D., Moustakas, K. (2018) Thermodynamic modelling of an onsite methanation reactor for upgrading producer gas from commercial small-scale biomass gasifiers. *Journal of Environmental Management*, 216, pp. 145–152.

53. Vakalis, S., Patuzzi, F., Moustakas, K., Sotiropoulos, A., Malamis, D., Baratieri, M. (2018) Analysis of tar compounds and quantification of naphthalene from thermal treatment of household biowaste. *Journal of Environmental Management*, 216, pp. 153–159.

54. Vakalis, S., Moustakas, K., Sénéchal, U., Schneider, R., Salomo, B., Kurz, M., Malamis, D., Zschunke, T. (2018) Development of a two-phase model for the calculation of potassium, gaseous products and char yields in the after-burner of a small-scale biomass gasifier. *Journal of Cleaner Production*, 170, pp. 70–75.

55. Vakalis, S., Sotiropoulos, A., Moustakas, K., Malamis, D., Vekkos, K., Baratieri, M. (2017) Thermochemical valorization and characterization of household biowaste. *Journal of Environmental Management*, 203, pp. 648–654.

56. Vakalis, S., Moustakas, K., Malamis, D., Sotiropoulos, A., Malamis, S. (2017) Assessing the removal of heavy metals in industrial wastewater by means of chemical exergy. *Desalination and Water Treatment*, 91, pp. 146–151.

7. Vakalis, S., Boschiero, M., Moustakas, K., Sotiropoulos, A., Malamis, D., Zerbe, S., Baratieri, M. (2017) Assessing the suitability of biomass ashes from combustion in boilers as soil fertilizers: statistical entropy analysis and introduction of the potassium utilization potential factor. *Waste and Biomass Valorization*, 8 (5), pp. 1569–1576.

58. Vakalis, S., Patuzzi, F., Baratieri, M. (2017) Reply and closure to comments on “Introduction of an energy efficiency tool for small-scale biomass gasifiers – a thermodynamic approach” by M.M. Awad. *Energy Conversion and Management*, 138, pp. 700–702.

59. Vakalis, S., Moustakas, K., Sénéchal, U., Schneider, R., Salomo, B., Kurz, M., Malamis, D., Zschunke, T. (2017) Assessment of potassium concentration in biochar before and after the after-burner of a biomass gasifier. *Chemical Engineering Transactions*, 56, pp. 631–636.

60. Vakalis, S., Patuzzi, F., Baratieri, M. (2017) Introduction of an energy efficiency tool for small-scale biomass gasifiers – a thermodynamic approach. *Energy Conversion and Management*, 131, pp. 1–9.

61. Sotiropoulos, A., Vourka, I., Erotokritou, A., Novakovic, J., Panaretou, V., Vakalis, S., Mamma, D., Alamanou, D., Thanos, A.G., Moustakas, K., Malamis, D. (2016) Corrigendum to “Combination of decentralized waste drying and SSF techniques for household biowaste minimization and ethanol production”. *Waste Management*, 56, p. 600.

62. Patuzzi, F., Prando, D., Vakalis, S., Rizzo, A.M., Chiaramonti, D., Tirler, W., Mimmo, T., Gasparella, A., Baratieri, M. (2016) Small-scale biomass gasification CHP systems: comparative performance assessment and monitoring experiences in South Tyrol (Italy). *Energy*, 112, pp. 285–293.

63. Vakalis, S., Sotiropoulos, A., Moustakas, K., Malamis, D., Vekkos, K., Baratieri, M. (2016) Characterization of hotel bio-waste by means of simultaneous thermal analysis. *Waste and Biomass Valorization*, 7 (4), pp. 649–657.

64. Prando, D., Boschiero, M., Campana, D., Gallo, R., Vakalis, S., Baratieri, M., Comiti, F., Mazzetto, F., Zerbe, S. (2016) Assessment of different feedstocks in South Tyrol (Northern Italy): energy potential

and suitability for domestic pellet boilers. *Biomass and Bioenergy*, 90, pp. 155–162.

65. Vakalis, S., Heimann, R., Talley, A., Heimann, N., Baratieri, M. (2016) Introduction to frictional pyrolysis – an alternative method for converting biomass to solid carbonaceous products. *Fuel*, 175, pp. 49–56.

66. Vakalis, S., Sotiropoulos, A., Moustakas, K., Malamis, D., Baratieri, M. (2016) Utilisation of biomass gasification by-products for onsite energy production. *Waste Management and Research*, 34 (6), pp. 564–571.

67. Sotiropoulos, A., Vourka, I., Erotokritou, A., Novakovic, J., Panaretou, V., Vakalis, S., Thanos, T., Moustakas, K., Malamis, D. (2016) Combination of decentralized waste drying and SSF techniques for household biowaste minimization and ethanol production. *Waste Management*, 52, pp. 353–359.

68. Vakalis, S., Patuzzi, F., Baratieri, M. (2016) Thermodynamic modeling of small-scale biomass gasifiers: development and assessment of the “Multi-Box” approach. *Bioresource Technology*, 206, pp. 173–179.

69. Sotiropoulos, A., Bava, N., Valta, K., Vakalis, S., Panaretou, V., Novakovic, J., Malamis, D. (2016) Household food-waste dehydration technique as a pretreatment method for food-waste minimisation. *International Journal of Environment and Waste Management*, 17 (3-4), pp. 273–286.

70. Vakalis, S., Baratieri, M. (2015) State-of-the-art of small-scale biomass gasifiers in the region of South Tyrol. *Waste and Biomass Valorization*, 6 (5), pp. 817–829.

NON SCOPUS – INDEXED PUBLICATIONS

1. A. Sotiropoulos, N. Bava, K. Valta, S. Vakalis, V. Panaretou, J. Novakovic and D. Malamis. Household food waste dehydration technique as a pre-treatment method for food waste minimisation. *Int. J. Environment and Waste Management* 17, Nos. 3/4, 2016.

2. S. Vakalis, A. Sotiropoulos, K. Moustakas, D. Malamis, M. Loizidou (2017). Assessing the potential of particleboard production from food waste: analysis of the input materials. *Sci Revs Chem Commun.* 7(1). ISSN: 2277-2669

CONFERENCE PROCEEDINGS

1. S. Vakalis. Advancing Circular Bioeconomy in the GCC Region through Hydrothermal Treatment: Insights from BioFairNet's Pilot Site. 2025 Gulf Research Meeting. Cambridge, United Kingdom.

2. D. Liakos, S. Vakalis. The Role of Process Intensification on Hydrothermal Technologies: Applications at the BioFairNet Pilot Site. 9th European Process Intensification Conference (EPIC). 4 - 6 June 2025, Athens, Greece. A. Dimou, A. Kelmali, S. Vakalis. Variolization of the Curtailed Electricity from VRE with the Technology of Frictional Pyrolysis. Solar Technology Institute - 13^o National Conference On Low Carbon Energy Technologies, 15 -17 May 2024, Athens

3. D. Liakos, S. Malamis, S. Vakalis. Design and Modeling of a Prototype Pyrogasification Unit for the Production of Biodiesel from Industrial Waste. Solar Technology Institute - 13^o National Conference On Low Carbon Energy Technologies, 15 -17 May 2024, Athens

4. I. Papamichael, I. Voukkali, P. Loizia, M. Stylianou, I. Vardopoulos, E. Klontza, D.F. Lekkas, S. Vakalis, A. Zorpas. Measuring Circularity: Tools for monitoring a smooth transition to Circular Economy. International Conference on Sustainable Built Environments: Paving the Way for Achieving the Targets of 2030 and beyond (SBE23-Thessaloniki), 22 – 24 March 2023, Thessaloniki, Greece.

5. S. Vakalis, A. Barney, H. Polatidis, D. Haralambopoulos. Assessing the effect of the green energy transition of islands on the decarbonization of the building sector: Experiences from pilot studies of the REACT project. ASHRAE – International Building Decarbonization 2022 Conference, 6 – 7 October 2022, Athens, Greece.

6. N. Perivolari, A. Dimou, S. Vakalis. Production of green hydrogen on Non-Interconnected Islands (NIIs) and combination with LNG: a modelling analysis of Lesvos (Greece). 1st International Conference on Sustainable Chemical and Environmental Engineering, 31 Aug – 04 Sep 2022, Rethymno, Crete, Greece.
7. A. Artikopoulos, G. Altiparmaki, D. Liakos, S. Vakalis. 1st International Conference on Sustainable Chemical and Environmental Engineering, 31 Aug – 04 Sep 2022, Rethymno, Crete, Greece.
8. D. Liakos, G. Altiparmaki, A. Kalampokidis, S. Vakalis. The role of hydrochar on the production of biogas and volatile fatty acids during anaerobic digestion of cheese-whey wastewater. 1st International Conference on Sustainable Chemical and Environmental Engineering, 31 Aug – 04 Sep 2022, Rethymno, Crete, Greece.
9. P. Mastoras, S. Vakalis, M.S. Fountoulakis, A. Xenaki, D. Haralambopoulos, A.S. Stasinakis. 1st International Conference on Sustainable Chemical and Environmental Engineering, 31 Aug – 04 Sep 2022, Rethymno, Crete, Greece.
10. A. Kelmali, D.F. Lekkas, S. Vakalis. Assessing the environmental impact of maritime transport for the Port of Mytilene with a focus on the emission accounting of the port of arrival. CEST 2021 – 17th International Conference on Environmental Science and Technology, 1 – 4 September 2021, Athens, Greece.
11. A. Dimou, S. Vakalis. Assessing the utilization of fuel cells for the valorization of produced excess energy in isolated grids – the green transition of Agios Efstratios. CEST 2021 – 17th International Conference on Environmental Science and Technology, 1 – 4 September 2021, Athens, Greece.
12. P. Isigonis, S. Vakalis. Comparing the effectiveness of three outranking multicriteria methods as analytical tools for the efficiency assessment of biorefineries/waste-to-energy technologies. CEST 2021 – 17th International Conference on Environmental Science and Technology, 1 – 4 September 2021, Athens, Greece.
13. P.F. Chatzimaliakas, S. Vakalis. Modelling the hydrothermal carbonization of cheese-whey wastewater on Lesvos Island: an application of the 3-step evolution model. CEST 2021 – 17th International Conference on Environmental Science and Technology, 1 – 4 September 2021, Athens, Greece.
14. S. Vakalis, K. Kyriakidis, F. Patuzzi, M. Baratieri. Ethanothermal and hydrothermal extraction of tar from char produced in commercial gasifiers and comparison with conventional tar extraction methods. 29th European Biomass Conference & Exhibition (EUBCE), 26 – 29 April 2020, Marseille & Online.
15. P.F. Chatzimaliakas, A. Iliopoulou, S. Vakalis. The effect of acidic pretreatment on the hydrothermal carbonization of cheese-whey wastewater (CWW) – The case study of Lesvos Island. 29th EUBCE, 26 – 29 April 2020, Marseille & Online.
16. I. Daskaloudis, D.F. Lekkas, S. Vakalis. Introduction of the “pre-Ranking” approach as a multicriteria analysis method for assessing the suitability of composts. 29th EUBCE, 26 – 29 April 2020, Marseille & Online.
17. S. Vakalis. Chapter 6 – Applications of the 3T Method as an efficiency-assessment tool for waste-to-energy facilities and numerical comparisons with the R1 formula. In Proceedings of the 2018 EEC/WTERT Conference (2019). ASME, New York. DOI: 10.1115/1.861950.
18. F. Patuzzi, D. Antolini, S. Vakalis, M. Baratieri. Char recirculation for improving the conversion yields in fixed-bed gasification systems. 27th EUBCE, 27 – 30 May 2019, Lisbon, Portugal.
19. D. Antolini, S.S. Ail, S. Vakalis, F. Patuzzi, M. Baratieri. Enhancement of the load-modulation capability of a pilot-plant gasifier by means of secondary-air control. 27th EUBCE, 27 – 30 May 2019, Lisbon, Portugal.

20. D. Basso, S. Vakalis, F. Patuzzi, A. Gasparella, W. Tirler, S. Dal Savio, A. Rizzo, D. Chiaramonti, M. Baratieri. The “NEXT GENERATION” project: valorization alternatives for char from small-scale gasification systems in South Tyrol. 5th International Conference on Sustainable Solid Waste Management, 21 – 24 June 2017, Athens, Greece.
21. S. Vakalis, C. Caligiuri, K. Moustakas, D. Malamis, M. Renzi, M. Baratieri. Modelling the emissions of a dual-fuel engine coupled with a biomass gasifier – Supplementing the Wiebe model. 5th International Conference on Sustainable Solid Waste Management, 21 – 24 June 2017, Athens, Greece.
22. S. Vakalis, K. Moustakas, D. Malamis, M. Loizidou. Introduction to the concept of particleboard production from mixtures of sawdust and dried food waste. 5th International Conference on Sustainable Solid Waste Management, 21 – 24 June 2017, Athens, Greece.
23. S. Vakalis, K. Moustakas, M. Loizidou. Assessing the 3T method as a replacement for the R1 formula in measuring the efficiency of waste-to-energy plants. 5th International Conference on Sustainable Solid Waste Management, 21 – 24 June 2017, Athens, Greece.
24. V. Panaretou, S. Vakalis, A. Ntolka, A. Sotiropoulos, K. Moustakas, D. Malamis, M. Loizidou. Study of carbon balances from organic waste in a decentralised composting facility on Tinos Island. 5th International Conference on Sustainable Solid Waste Management, 21 – 24 June 2017, Athens, Greece.
25. R. Heimann, S. Vakalis, A. Talley, N. Heimann, M. Baratieri. Valorization of organic waste by means of compression-frictional treatment. WasteEng '16 – 6th International Conference on Engineering for Waste and Biomass Valorisation, 23 – 26 May 2016, Albi, France.
26. S. Vakalis, D. Prando, F. Patuzzi, M. Baratieri. Monitoring und Analyse von repräsentative kleintechnischen Biomassevergaser in Südtirol. In Tagungsband “Biomass to Power and Heat”, Hochschule Zittau/Görlitz (eds.), 2015, pp. 42-51. ISBN 978-3-941521-22-3.
27. S. Vakalis, A. Sotiropoulos, K. Moustakas, D. Malamis, M. Baratieri. Utilization of char from biomass gasification for onsite energy production – Introduction and modelling of a secondary reactor. 3rd International Conference on Sustainable Solid Waste Management, 2 – 4 July 2015, Tinos, Greece.
28. S. Vakalis, D. Prando, F. Patuzzi, T. Mimmo, A. Gasparella, W. Tirler, S. Dal Savio, D. Chiaramonti, A. Rizzo, M. Pettorali, M. Prussi, D. Andreasi, M. Baratieri. Experience in biomass gasification in South Tyrol: The “GAST” project. 21st EUBCE, 3 – 7 June 2013, Copenhagen, Denmark.
29. S. Vakalis, D. Prando, F. Patuzzi, and M. Baratieri. Measuring the performance of biomass small-scale gasification plants by implementing mass and energy balances. 4th Central European Biomass Conference, 15 – 18 January 2014, Graz, Austria.
30. S. Vakalis, D. Prando, F. Patuzzi, and M. Baratieri. Thermodynamic modelling of biomass downdraft gasifiers: Introduction to the “Multi-Box” concept. 22nd EUBCE, 23 – 26 June 2014, Hamburg, Germany.
31. S. Vakalis, D. Prando, F. Patuzzi, T. Mimmo, A. Gasparella, W. Tirler, K. Mair, G. Voto, D. Chiaramonti, A. Rizzo, M. Pettorali, M. Prussi, S. Dal Savio, D. Andreasi, M. Baratieri. Assessment of a test methodology suitable for small-scale biomass gasifiers. 22nd EUBCE, 23 – 26 June 2014, Hamburg, Germany.
32. S. Vakalis, M. Baratieri. Technological advancements in small-scale biomass gasification: Case study of South Tyrol. 2nd International Conference on Sustainable Solid Waste Management, 12 – 14 June 2014, Athens, Greece.
33. S. Vakalis, M. Baratieri. Calculating the overall efficiency of polygeneration plants – Introducing an integrated thermodynamic decision tool for biomass gasification. SYMBIOSIS International Conference 2014, 19 – 21 June 2014, Athens, Greece.