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Advanced Skills Course

"Biofuels, Bioproducts and Biomaterials for the Green Transition"

16–20 February, Tamarind Tree Hotel, Nairobi

WAter enerGy fOod Nexus 2 Africa - WAGON2Africa

Politecnico di Torino

AICAD

Jomo Kenyatta University of Agriculture and Technology

UNIVERSITÀ DEGLI STUDI FIRENZE

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Welcome Note

About the 2026 Advanced Skills Course

We are thrilled to welcome you to the **2026 Advanced Skills Course (ASC) – Biofuels, Bioproducts and Biomaterials for the Green Transition** in Nairobi. This intensive program is a cornerstone of the **TNE Wagon2Africa** project, born from a strategic partnership between the **African Institute for Capacity Development (AICAD)**, the **Jomo Kenyatta University of Agriculture and Technology (JKUAT)**, and an **Italian University Consortium** comprising:

- **Politecnico di Torino**
- **Alma Mater Studiorum - Università di Bologna**
- **Università degli Studi di Bari Aldo Moro**
- **Università degli Studi di Palermo**
- **LUISS Libera Università Internazionale degli Studi Sociali Guido Carli**
- **Università di Foggia**
- **Università degli Studi di Firenze**
- **Università degli Studi di Napoli Federico II**
- **Università di Sassari**
- **Università di Torino**

This course is not just a training program; it is a critical intervention in the **Water-Energy-Food (WEF) Nexus**. By focusing on the "Energy" element of this vital triad, we aim to bridge the gap between technical innovation and sustainable development, fostering a new generation of leaders capable of driving the green transition in Africa and beyond.

Our Vision: Towards Net zero and Beyond via Sustainable Farming

Our 2026 program is built on a bold ambition: transforming marginal lands and urban waste into the building blocks of a circular bioeconomy. We aim to move towards net zero and **carbon-negative** solutions.
Through sustainable agricultural practices and valorization of agroresidues and urban waste we explore how to generate renewable energy in the different end use sectors, close the nutrient cycle and recover not yet used resources. This approach challenges the status quo, promoting soil recovery and creating new economic value from co-products, while addressing the urgent climate challenges of our time.

What to Expect?

In addition to technical deep dives into biomass conversion processes and technologies, as well as carbon accounting, the program also emphasizes the **socio-economic and policy frameworks** necessary to translate these technologies into reality.
The 2026 ASC brings together a curated group of researchers, private sector professionals, and experts from international organisations. Your presence strengthens a growing **network** dedicated to leveraging scientific expertise to co-produce knowledge and challenge imbalances in the global energy discourse.

Together, we will explore:

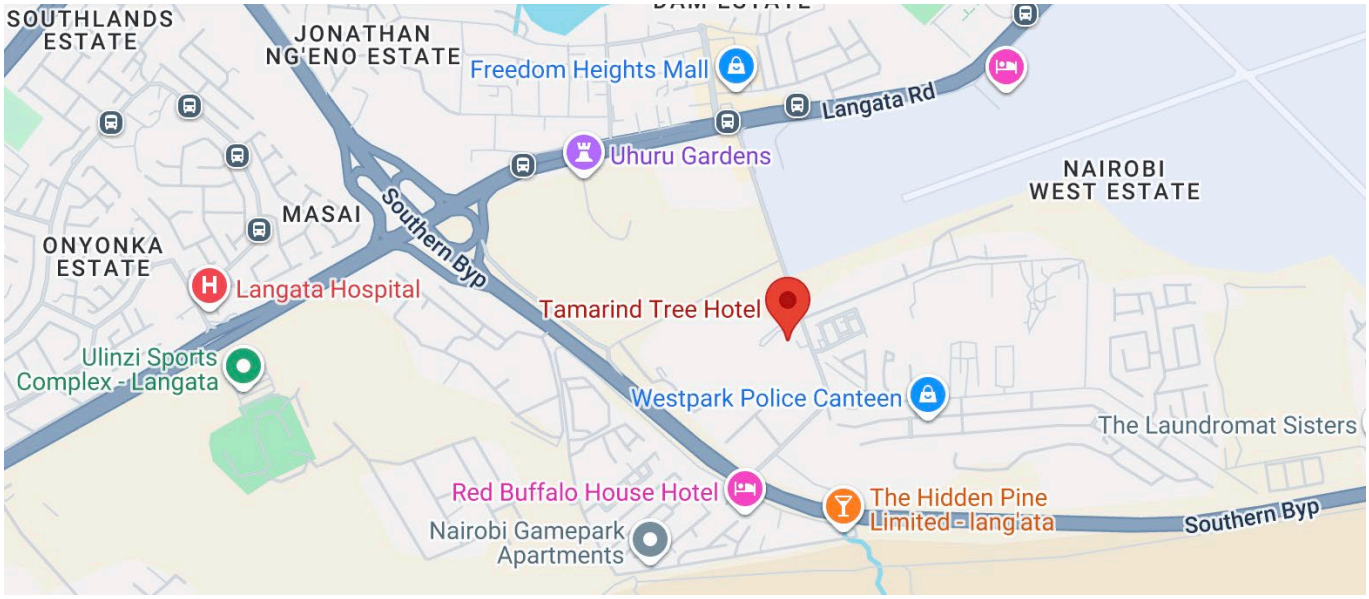
- **The Future of Bio-based Products:** From agricultural applications to road, maritime and aviation end-uses.

- **Systemic Sustainability:** Integrating technical data with socio-economic impact assessments.
- **Collaborative Innovation:** Building bridges between academia and public institutions to shape the regulatory frameworks of tomorrow.

Useful Information

Venue & Accommodation To foster networking and ensure a seamless experience, all participants will be accommodated at the same venue where the course will be held:

Tamarind Tree Hotel Langata Link Road, Nairobi, 00200, Kenya.
https://maps.app.goo.gl/RwM24wC2Ng9eu8Yr8



The hotel is located within the quiet and secure grounds of the **Carnivore estate**, offering state-of-the-art conference facilities and a comfortable environment for collaboration.

Further Resources For logistical information, travel advice and additional details regarding the program, faculty, and updates, please

consult the official course webpage: 👉 Wagon2Africa - AICAD Website

Certification A formal **Certificate of Attendance** will be awarded upon successful completion of the course.

Programme Overview

16-20/02/2026	WAGON2AFRICA ADVANCED SKILLS COURSE: BIOFUELS, BIOPRODUCTS AND BIOMATERIALS FOR THE GREEN TRANSITION				
Time	**MON**	**TUE**	**WED**	**THU**	**FRI**
10:00-11:00		Defossilization of Aviation: Sustainable Aviation and Maritime Fuels (Matteo Prussi, PoliTO)	Biomass and Biology for Energy (Meshack Hawi,JKUAT)	Infrastructure for bioenergy (Hiram Ndiritu, JKUAT)	Energy Markets and Policies for Africa (Carlo Cambini, PoliTO)
11:00-11:30		***Break***			
11:30-12:30		Bioenergy and Biofuel: Business Opportunities for Africa (Raffaele Marchetti, LUISS)	Sustainable Agriculture in Kenya (John Kinyuru, JKUAT)	Amendment and Fertilizer from Biomass (Andrea Salimbeni, RE-CORD)	Transport as a Key Driver for Defossilization (Michel Noussan, PoliTO)
12:30-14:00	***Lunch***				*12:30-13:00 School Closure*
14:00-15:00	Opening. Intro to the Advanced Skiils Course and to the Topic (David Chiaramonti, PoliTO & Hiram Ndiritu, JKUAT)	Biomass and Social Aspect in Africa (Giuseppe Pignataro, UniBO)	Integrated Agriculture for Food and Bioenergy Production (Enrico Lucca and Giulia Galli, UniFI)	Natural Capital, Ecosystem Services and the Economic Valuation of the Environment (Giovanni Barozzi Reggiani, UniSS)	
15:00-16:00	Policies, the Global Dimension, Carbon Removal and Carbon Markets (David Chiaramonti, PoliTO)	Biomass and Social Aspect in Africa (Giuseppe Pignataro, UniBO)	Integrated Agriculture for Food and Bioenergy Production (Enrico Lucca and Giulia Galli, UniFI)	Climate-Related Litigation and the Protection of the Interests of Future Generations (Giovanni Barozzi Reggiani, UniSS)	
16:00-16:30	***Break***				
16:30-17:30	Road and Heavy-duty Transport – the Global, EU and African Dimension (Giacomo Talluri, PoliTO)	Transport Fuel Production via Thermochemical and Biochemical Conversion (Andrea Maria Rizzo, RE-CORD)	Biogas and Biomethane (Viviana Negro, PoliTO)	Biopolymers for the Green Economy (Tonia Tommasi, PoliTO)	
17:30-18:00	***Recap of the day***				

Programme Details

📅 Monday, Feb 16th

12:30 – 13:00 | Welcoming Lunch

14:00 – 15:00 | **Opening: Intro to the Advanced Skills Course and the Topic** *Prof. David Chiaramonti (Politecnico di Torino) & Prof. Hiram Ndiritu (Jomo Kenyatta University of Agriculture and Technology)*

15:00 – 16:00 | **Policies, Global Dimension, Carbon Removal and Carbon Markets** *Prof. David Chiaramonti (Politecnico di Torino)*

The lecture will address the global dimension of Bioeconomy, and in particular Sustainable Biofuels. The most recent IEA report on market and demands will be discussed, as well as the current and future International and EU policies in the sector, examining both production and end uses, such as road, aviation and maritime. The role of Carbon in sustainable biofuel production as well as Carbon Dioxide Removals will be presented, together with the future perspectives of Carbon Markets. The most recent legislative acts in the EU, such as the Carbon Removal and Carbon Farming initiative, will also be shortly reported.

16:00 – 16:30 | Break

16:30 – 17:30 | **Road and Heavy-Duty Transport – Global, EU and African Dimensions** *Dr. Giacomo Talluri (Politecnico di Torino)*

This lecture explores the role of road and heavy-duty transport in the global energy transition, with a comparative focus on global, European, and African contexts. It examines why heavy-duty transport remains a hard-to-abate sector and discusses the technological options available for decarbonisation.

Particular attention is given to biofuels as a mature and scalable solution, highlighting their policy drivers in the EU and their strategic potential for African countries.

17:30 – 18:00 | Recap of the day

📅 Tuesday, Feb 17th

10:00 – 11:00 | **Defossilization of Aviation and Maritime: the role of Sustainable Fuels** *Prof. Matteo Prussi (Politecnico di Torino)*

The lecture addresses the role of sustainable fuels in the defossilization of hard-to-abate transport sectors, with a focus on aviation and maritime transport modes. It provides an overview of alternative fuel pathways, including sustainable aviation fuels (SAF) and renewable marine fuels, discussing feedstocks, conversion technologies and current maturity levels. The session also highlights key challenges related to scalability, sustainability, costs and policy frameworks, with particular attention to their relevance for Africa and global energy transition strategies.

11:00 – 11:30 | Break

11:30 – 12:30 | **Bioenergy and Biofuel: Business Opportunities for Africa** *Prof. Raffaele Marchetti (Libera Università Internazionale degli Studi Sociali Guido Carli)*

The lecture will examine the business and political dimension of biofuel in emerging economies. The focus will be on the business opportunities and risk as well as on the political constraints of such energy policies.

12:30 – 14:00 | Lunch

14:00 – 16:00 | **Biomass and Social Aspect in Africa** *Prof. Giuseppe Pignataro (Alma Mater Studiorum – Università di Bologna)*

This session investigates the economic links between biomass reliance and poverty and inequality in Africa, with a focus on clean cooking as a 'just transition' challenge. The lesson will map the main distributional channels through which biomass shapes welfare: time poverty and gendered labor burdens, health damages from household air pollution, and local environmental externalities, alongside the political economy of charcoal value chains (rents, informality, and selective enforcement). Building on this, we are going to discuss how to evaluate policies using empirical evidence and causal tools, and we compare alternative interventions -- targeted subsidies and appliance finance, results-based financing, standards and market regulation, sustainable governance, and complementary social protection. The goal is to derive actionable criteria to design and assess policies that reduce energy poverty without shifting costs onto the poorest households.

16:00 – 16:30 | Break

16:30 – 17:30 | **Transport Fuel Production via Thermochemical and Biochemical Conversion** *Dr. Andrea Maria Rizzo (RE-CORD)*

This lecture addresses advanced routes for renewable transport fuel production from biomass and residues, focusing on conversion pathways where fuel properties are defined at process level. The first part discusses biomass gasification followed by synthesis, comparing Fischer–Tropsch hydrocarbons and alcohol routes (methanol and ethanol), and highlighting the role of syngas quality, gas cleaning and synthesis selectivity on overall efficiency. The lecture then examines pyrolysis-based pathways, including catalytic upgrading of bio-oils and co-feeding strategies in existing FCC units, together with hydrothermal liquefaction (HTL) for wet biomass, emphasizing upgrading requirements to achieve fuel-grade stability.
Finally, syngas fermentation is introduced as a biochemical alternative to catalytic synthesis, enabling the conversion of low-quality or impurity-tolerant syngas into fuels and intermediates. The lecture concludes with a comparison of these routes in terms of feedstock flexibility, upgrading severity and

integration into existing fuel infrastructures, outlining realistic deployment pathways.

17:30 – 18:00 | Recap of the day

🗓️ Wednesday, Feb 18th

10:00 – 11:00 | **Biomass and Biology for Energy** *Dr. Meshack Hawi (Jomo Kenyatta University of Agriculture and Technology)*

The global transition toward low-carbon and sustainable energy systems has renewed interest in biomass and biological processes as critical enablers of the green transition. This presentation explores the role of biomass resources and biological pathways in the production of sustainable energy, with emphasis on their contribution to energy security, climate change mitigation, and circular bio-economy development. The presentation will examine major biomass feedstock, conversion technologies, and biological processes used in biofuels production, including thermochemical and biochemical routes, and their integration into existing energy systems. Special attention will be given to challenges and opportunities associated with scaling bioenergy technologies, particularly in emerging and developing economies. The session will conclude by discussing future research directions and policy-relevant considerations for advancing biomass-based energy solutions as part of a sustainable and resilient green transition.

11:00 – 11:30 | Break

11:30 – 12:30 | **Sustainable Agriculture in Kenya** *Dr. John Kinyuru (Jomo Kenyatta University of Agriculture and Technology)*

This training module will explore how sustainable agricultural practices can strengthen the Water–Energy–Food (WEF) Nexus in Kenya while supporting

biofuel production that does not compete with food systems. It introduces the WEF Nexus framework as an integrated approach to managing water, energy, and food resources in the context of climate change and resource scarcity. The module highlights the potential of degraded and marginal lands for bioenergy crops that restore soils and enable carbon-neutral or carbon-negative fuels. Emphasis is placed on local capacity building, knowledge transfer, and inclusive policies to enhance resilience and ensure equitable benefits for farming communities.

12:30 – 14:00 | Lunch

14:00 – 16:00 | **Integrated agriculture and water management for food and energy production** *Dr. Enrico Lucca & Dr. Giulia Galli (Università degli Studi di Firenze)*

This session examines how integrated frameworks — such as the Water–Energy–Food–Ecosystems (WEFE) Nexus — can guide the management of land, water and crop systems to address trade-offs and create synergies across sustainability goals in the water, energy and food sectors. It highlights how climate change, biophysical constraints and socio-economic conditions jointly shape agricultural systems, resource use and development pathways. Building on this system's perspective, the session shows how a WEFE Nexus approach can inform the selection of integrated technologies and management practices, and support more coherent, evidence-based policy making.

16:00 – 16:30 | Break

16:30 – 17:30 | **From Biomass to Energy and Nutrients: the Role of Anaerobic Digestion** *Dr. Viviana Negro (Politecnico di Torino)*

This lecture assesses the role of biogas and biomethane as key examples of biorefinery systems, capable of converting biomass and biowaste into multiple value streams. Through anaerobic digestion, organic residues are transformed into a gaseous fraction (biogas) and a solid fraction (digestate), enabling both

energy production and nutrient recovery. Particular attention is given to the role of biomethane in supporting energy system flexibility and defossilization of the energy systems. Furthermore, the valorization of digestate is discussed, highlighting ongoing research related to nitrogen recovery, nutrient recycling, and soil amendment, in line with circular economy principles.
By relying on locally available biomass and organic waste streams, biogas and biomethane contribute to energy resilience, reduce the environmental burden associated with waste disposal, and create local economic opportunities.

17:30 – 18:00 | Recap of the day

📅 Thursday, Feb 19th

10:00 – 11:00 | **Infrastructure for Bioenergy** *Prof. Hiram Ndiritu (Jomo Kenyatta University of Agriculture and Technology)*

This topic provides learners with an integrated understanding of the infrastructure required to support sustainable bioenergy systems across the entire value chain. It addresses feedstock logistics and supply chains. The topic also examines processing facilities such as biorefineries, downstream processing and separation technologies. In addition, it explores regulatory and market frameworks, covering harmonized standards, certification, supportive policy instruments. Overall, the course equips learners with the knowledge needed to plan, evaluate, and implement scalable, efficient, and sustainable bioenergy infrastructure solutions.

11:00 – 11:30 | Break

11:30 – 12:30 | **Amendment and Fertilizer from Biomass** *Dr. Andrea Salimbeni (RE-CORD)*

This lecture presents key technologies that convert diverse biomass residues into valuable fertilisers and soil conditioners, supporting circular nutrient management and sustainable agriculture. It covers advanced methods for phosphorus extraction from sludge, highlighting safe recovery routes that

transform wastewater solids into high-quality P-fertilisers. The role and the potentials of the biochar from residual biomasses is explored, emphasizing its carbon-rich structure, soil-improving properties, and long-term environmental benefits. The session also examines processes for producing nitrogen-rich fertilisers from wastewater and manure, including innovative recovery and concentration techniques. Traditional organic amendments such as compost and digestate are discussed in terms of nutrient content, stability, and soil health contributions. Finally, the lesson reviews the potential agronomic use of ashes from biomass combustion, focusing on their mineral fractions and conditions for safe application. Together, these topics provide a comprehensive view of sustainable nutrient recovery from bio-based residues.

12:30 – 14:00 | Lunch

14:00 – 15:00 | Natural Capital, Ecosystem Services and the Economic Valuation of the Environment *Prof. Giovanni Barozzi Reggiani (Università degli Studi di Sassari)*

The session is composed of two lectures.

The first lecture explores the concepts of Natural Capital and ecosystem services, and examines how the economic valuation of the environment can contribute to the design of environmental policies and actions aimed at environmental protection.

15:00 – 16:00 | Climate-Related Litigations and the Protection of the Interests of Future Generations.

Prof. Giovanni Barozzi Reggiani (Università degli Studi di Sassari)

The second lecture addresses a topic that is widely debated at the global level and within the European continent: climate change and the actions to combat it. This issue has given rise to significant climate-related litigation, also concerning the protection of the interests of future generations. The lecture presents the state of the art and examines how climate-related litigation can contribute to the development of effective climate change

mitigation policies, including for the purpose of safeguarding the interests of future generations.

16:00 – 16:30 | Break

16:30 – 17:30 | **Biopolymers for the Green Economy** *Prof. Tonia Tommasi (Politecnico di Torino)*

This lecture introduces biopolymers as sustainable alternatives to polymers, starting from the role of conventional plastics and the need for improved end-of-life solutions. The main classes of bioplastics are presented, with a focus on bio-based origin, biodegradability, and compostability, clarifying definitions and frequently confused concepts. Selected examples illustrate different bioplastic categories and applications. The lecture concludes with an overview of a bio-composite case study analyzed their environmental sustainability across the entire life cycle, highlighting the importance of a holistic approach to sustainable polymer design.

17:30 – 18:00 | Recap of the day

🗓️ Friday, Feb 20th

10:00 – 11:00 | **An Economic Analysis of Carbon Markets** *Prof. Carlo Cambini (Politecnico di Torino)*

This lecture examines the role of markets as policy instruments in managing international economic relations and climate change. The lecture analyzesEmissions Trading Systems (ETS) as a core tool of climate policy, discussing their legal foundations, governance structures, cap-setting processes, compliance mechanisms, and distributional implications. Particular attention is given to the role of public authorities in designing effective carbon markets and ensuring environmental integrity. The final part addresses voluntary carbon markets from a policy perspective, exploring their interaction with regulated systems, the role of standards and transparency, and the

challenges related to credibility, additionality, and alignment with national and international climate goals. The lecture highlights how well-designed market mechanisms can support public policy objectives when embedded in robust regulatory and institutional frameworks.

11:00 – 11:30 | Break

11:30 – 12:30 | **Transport as a key driver for defossilization** *Dr. Michel Noussan (Politecnico di Torino)*

This session explores how sustainable transport acts not only as a target for decarbonization but also as a catalyst for wider energy and infrastructure transitions. Participants will examine the potential of sustainable fuels to replace oil-based fuels across transport modes, while also considering systemic changes such as smart urban planning and improved public transit. Policy frameworks, economic incentives, and technological innovation will be discussed, with case studies from Europe, Africa, and beyond. The session will also analyze how bioenergy can be integrated into mobility value chains, highlighting its role in fostering a circular economy, enhancing energy security, and creating local economic opportunities.

12:30 – 13:00 | School closure

Speakers Biographies

David Chiaramonti, PhD, is Scientific Coordinator of the Advanced Skills Course and Scientific Lead of the WAGON2Africa project.
Full professor of “Energy Economics” as well as “Bioeconomy and bioenergy for the Mediterranean area and third Countries” at the Politecnico di Torino and chairs the Renewable Energy COnsortium for R&D (RE-CORD). Former Vice Rector for International Affairs at Politecnico di Torino (2021-2024), he authored >180 journal publications and coordinated or participated to many EU projects on biofuels, biochar and bioeconomy. On biofuels, he focuses on innovative solutions to Advanced Biofuels, process and sustainability modelling, and policy analysis and scenario modelling. On pyrolysis and biochar, he focuses on production technologies, reactor design and innovative processes, product characterization, carbon permanence and use in soil, biochar applications in energy and non-energy sectors (as steel and cement), integration of biochar in the GHG balance of biofuels, and EU-International policies. Former member of IEA-Bioenergy TCP, he is member of the UN-ICAO task force on Alternative Fuels for aviation (WG5), EU ETIP-Bioenergy, and Board member of the Italian Cluster SPRING on green Chemistry. He coordinated the DG ENER ART Fuel industrial Forum on sustainable biofuel production and use, and formerly the EU European Sustainable Biofuel Forum. He provides technical support to various EC DGs and Italian Ministries on sustainable biofuels studies and assessments (MASE and MIT), as well as ICAO. He is member of the Expert Group on Carbon Removal and Carbon Farming by EC DG Clima. He was awarded the Linneborn Prize at EUBCE-2017 in Stockholm, and is included in the Stanford University list of 2% most cited scientist. Since June 2025 he chairs the Biofuture Platform, a Clean Energy Ministerial (CEM) global initiative of 25 Countries, with IEA acting as facilitator.

Hiram Ndiritu holds a PhD in Mechanical Engineering and is an Associate Professor in the Department of Mechanical Engineering at Jomo Kenyatta University of Agriculture and Technology (JKUAT), where he coordinates and teaches Thermo-fluids Engineering. He also serves as an Adjunct Scientist at the African Institute of Capacity and Development (AICAD) and has previously served as a Visiting Professor at the Warsaw University of Technology (WUT), Poland, where he taught Fundamentals of Combustion. His research interests focus on energy systems design and modeling for performance optimization of systems such as gasifiers and heat exchangers as well as renewable energy technologies such as biofuels, biogas,among others. He has over 20 years of research experience spanning academia and industry.

Giacomo Talluri holds a PhD in Information Engineering with a focus on renewable energy sources, energy markets, smart grids, and power plants. His expertise lies in the field of biofuels and renewable energy, with a focus on regulatory frameworks and value chains modelling and assessments. Giacomo has many years of experience as a researcher in the field of renewable energies, policy and biofuels; he participated in several tenders from European Commission and has also been involved in various Horizon 2020 research projects, on biofuels and renewable energies topics.

Matteo Prussi is Associate Professor at the Department of Energy of the Polytechnic University of Turin (POLITO). He is an industrial engineer with nearly 15 years of experience in alternative fuels, bioenergy, and sustainable transport, with a strong focus on life-cycle assessment (LCA) and environmental impact evaluation. He has held senior scientific roles at the European Commission Joint Research Centre (JRC), contributing to the development of LCA methodologies for EU and international policy frameworks, including RED II, ICAO

CORSIA, and the JEC Well-to-Wheels studies. His expertise spans aviation, maritime, and road transport, with particular emphasis on sustainable aviation fuels and low-carbon marine fuels. He currently serves as co-leader of the Core-LCA subgroup of the ICAO Fuel Task Group and as a nominated expert supporting the European Commission at the International Maritime Organization.

Raffaele Marchetti is professor of International Relations at the Department of Political Science and the School of Government of LUISS, where he is also the Director of the Center for International and Strategic Studies-CISS. His research interest concerns global politics and governance, hybrid and city diplomacy, transnational civil society, (cyber-)security and political risk, and democracy.

Giuseppe Pignataro is an Associate Professor of Economics at the University of Bologna. His teaching and research focus on inequality, development, and public policy evaluation, with a strong emphasis on applied microeconomics and distributional analysis. He works on how institutions and policy design shape welfare outcomes, especially when market failures and externalities affect vulnerable groups. His recent interests include the analysis of inequality and poverty of opportunities aspect in different context, with a focus on African contexts and the political economy of resource-based value chains. He regularly engages with multidisciplinary audiences, translating technical evidence into policy-relevant insights for practitioners and researchers.

Andrea Maria Rizzo holds a PhD in Industrial Engineering and serves as Technical Director at RE-CORD (Renewable Energy Research & Demonstration Consortium) and Contract Professor at the University of Florence, where he teaches a course on Processes for bioenergy and bioeconomy.

His activity focuses on thermochemical conversion technologies, including gasification and pyrolysis-based routes, hydrothermal liquefaction, and syngas-based processes, with experience spanning process design, pilot-scale operation and system integration.

Meshack Hawi holds a PhD in Energy Resources Engineering, and he serves as Lecturer at the Department of Mechanical Engineering, Jomo Kenyatta University of Agriculture and Technology. His research activities are in the areas of Biofuels production and application in internal combustion engines, combustion systems analysis and pollution control, and computational fluid dynamics (CFD). He serves also as Director, Directorate of Intellectual Property Management and University-Industry Liaison. He has more than 10 years of experience as a researcher in Biofuels and internal combustion engines related projects.

John Kinyuru is a Senior Lecturer at Jomo Kenyatta University of Agriculture and Technology at the Department of Food Science and Technology. He also an Adjunct Research Scientist at the African Institute for Capacity Development. He is a food systems and development researcher with extensive experience at the intersection of sustainable agriculture, food systems, and capacity development in Africa. For 20 years, he has led and contributed to multidisciplinary research and training initiatives focused on climate-resilient agriculture, sustainable protein systems, and value-chain innovation, with particular emphasis on resource-efficient production models suited to low- and middle-income contexts.

Giulia Galli holds an MSc in Sustainable Agriculture. She has gained experience in integrated pest management at the University of Padova and in sustainable apple production at the Free University of Bozen-

Bolzano. Since 2023, she has been a research fellow within the agronomy group at the University of Florence - DAGRI Department. Additionally, she collaborates with the Foundation for Climate and Sustainability, where she is involved in research projects, science communication, and public engagement initiatives.

Enrico Lucca is a researcher at the Water Harvesting Lab, University of Florence. With a background in environmental engineering, he holds a PhD in Sustainable Management of Agricultural, Forestry and Food Resources. His research focuses on water resources management, the Water–Energy–Food Nexus, and climate risk. Drawing on experience in international organisations and the private sector, he works at the interface between science and practice, with a strong commitment to engaging non-academic actors in transdisciplinary research.

Viviana Negro holds a PhD in Chemical Engineering and is an Assistant Professor at the Department of Energy, Politecnico di Torino, where she teaches courses in Industrial Energy Systems, Bioeconomy for Mediterranean and Third Countries, and Agricultural Waste Management. Her research focuses on the development of bioenergy and biofuels within the bioeconomy framework.
She has previous experience in research and optimization of industrial renewable energy plants, as well as in mechanical design for civil and industrial applications.

Andrea Salimbeni, PhD Industrial engineering, is Head of the Unit: "Raw Materials & Carbon Recycling" at RE-CORD.
With more than 10 years experience in thermochemical conversion processes, his works focuses on the extraction of nutrients, carbon and inorganic elements from biogenic residues. In particular, he focuses his research on the production of biochar, and of P-rich inorganic fertilisers. He is author of more than 15 peer reviewed publications

and of a EU patent on Phosphorus extraction from biowaste and sludge. From 2020 he is HAS consultant of the European Commission for the harmonization of CEN standards for soil conditioners within the Fertiliser Products Regulation EU 1009/2019.

Giovanni Barozzi Reggiani holds a PhD in public law, and he serves as a researcher in public law at the University of Sassari. He has also served for four years (between 2017 and 2021) as a consultant for the Italian Ministry of the Environment. His research activities are in the areas of public law and environmental law. In the past three years he has also served as a consultant for the president of the Italian Communication Authority (AGCOM).

Tonia Tommasi is an Associate Professor at Politecnico di Torino. Her research focuses on biotechnologies for converting waste and wastewater into energy and valuable resources within a circular economy framework. Her work includes anaerobic digestion for renewable energy production (biogas and biohydrogen), the use of digestate as an alternative fertilizer and added-value products recovery. These activities are supported by environmental and energy sustainability assessments of the investigated processes.

Carlo Cambini is Full Professor of Applied Economics at the Politecnico di Torino. He has an extensive background in industrial economics, regulatory economics and competition policy with a strong background in telecommunications, energy markets and transportation. He won the award as best Young Economist at the International meeting of the European Association of Researcher in Industrial Economics – EARIE (Lausanne, 2000). His work has been published in leading scientific journals. He has been invited as Keynote Speaker on regulation and competition issues in conferences

organized by market and regulatory institutions around the world. Finally, he was appointed as Chief Economist at the Italian Transport Authority until April 2021, and then as economic expert at the Italian Presidency Office during the Draghi Government. He is also providing economic support to Italian Authorities, such as the National Regulatory Authority on Energy.

Michel Noussan, scientific co-coordinator of the Advanced Skills Course**,** holds a PhD in Energy Engineering, and he serves as Associate Professor at Politecnico di Torino, Department of Energy, where he is in charge of the course on Industrial Energy Systems. He serves also as Adjunct Professor at SciencesPo – Paris School of International Affairs, teaching the course on Sustainable Transport. His research activities are in the areas of energy systems analysis and modelling, transport and bioenergy. Michel has more than 10 years of experience as a researcher and as a consultant in the domains of energy and transport, as he worked both in academia and in the private sector.

Acknowledgements

This course is made possible through the collaboration and funding of the **TNE Wagon2Africa** project. We would like to extend our deepest gratitude to the **African Institute for Capacity Development (AICAD)** and **Jomo Kenyatta University of Agriculture and Technology (JKUAT)** for their steadfast commitment to fostering green innovation and academic exchange between Europe and Africa.

A special thanks goes to **Politecnico di Torino** and the entire **Italian University Consortium** for their invaluable support and coordination.

We would like to express our particular appreciation to the partners who directly contributed their expertise through the presence of their faculty and researchers: **Università degli Studi di Firenze (UniFI)**, **Alma Mater Studiorum – Università di Bologna (UniBO)**, **Università degli Studi di Sassari (UniSS)**, **LUISS Libera Università Internazionale degli Studi Sociali Guido Carli**, and the **RE-CORD** research centre.