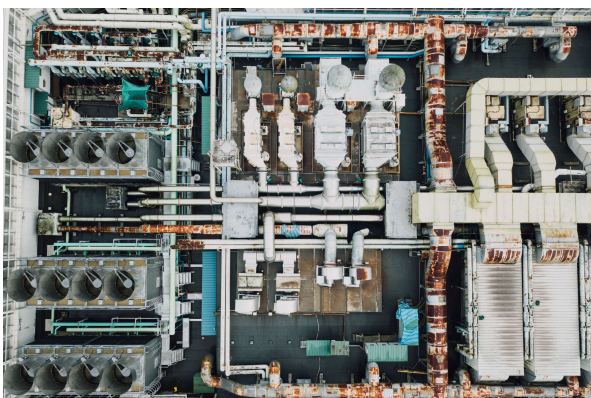




WINTER SCHOOL

Process Decarbonization and Energy Transition



October 13th to October 28th
2022



Aims

Climate change calls for the reduction of greenhouse gas emissions. CO₂ formed in fossil fuels combustion for the production of heat and electric power plays a major role in this framework. For over one century, the Chemical and Process industry has based most of its production processes on raw materials derived from fossil fuels. Thus, energy transition and decarbonization require an epochal change in the production processes and energy supplies used in industrial chemical processes and, more generally, in the manufacturing industry. Several alternative processes are rapidly coming available for the production of renewable energy and energy vectors, as well as for the decarbonization of industrial processes. However, the societal call for a rapid implementation of the transition to renewables poses a number of challenges concerning the technological maturity, the economic viability, and the overall sustainability and safety of decarbonized technologies.

This distance learning school, organized by the Italian Association of Chemical Engineering (AIDIC) and by the Association of Researches in Chemical Engineering of Italian Universities (GRICU) aims at providing the fundamentals needed to understand the general context of energy transition and decarbonization in the chemical and process industry, framing the state of the art and introducing to technologies and tools able to support this global change.

The program aims at addressing the needs of Master's and Ph.D. students and young professionals to develop new knowledge in this field, and to cope with decommissioning programs and opportunities.

All lessons and teaching material will be in English

How to participate

The course is mainly intended for **young professionals, Ph.D. students, Master's students with a background in chemical engineering interested to the energy transition and process decarbonization framework.**

Academics, professionals and personnel of regulatory authorities are also warmly invited.

Admission Criteria

Participation to DaET school is free of charge, but registration is required. A certificate of attendance will be issued to participants on request. Based on the capacity of the online platform used to deliver the seminars in distance mode, participation will be limited to 500 persons, selected on a first arrived first served criteria.

Deadline for registration is September 30th, 2022.

Registration

If interested, please book a seat in the course at the following link:

www.aidic.it/daet

Organizing Committee:

Fabrizio Bezzo (University of Padova, Italy)
Valerio Cozzani (University of Bologna, Italy)
Debora Fino (Polytechnic of Turin, Italy)
Alessio Frassoldati (Polytechnic of Milan, Italy)
Alessandro Galia (University of Palermo, Italy)
Fabrizio Scala (University of Naples Federico II, Italy)

AIDIC: <https://www.aidic.it/>

GRICU: <https://www.gricu.it/>

Program

Day 1 – October 13th, 2022

Transition to new Energy Vectors

- 14:00** Welcome and presentation of the initiative (GRUCU, AIDIC and organizing committee)
- 14:10** Introduction to Day 1 (A. Galia, University of Palermo)
- 14:15** Hydrogen: processes and technologies (S. Bensaid – Polytechnic of Turin)
- 15:10** Ammonia: processes and technologies (M. De Joannon – CNR-STEMS)
- 16:10** Salinity gradient power technologies for energy production, conversion and storage (A. Cipollina – University of Palermo)
- 17:10** Hydrogen distribution (P. Ercoli – SNAM)
- 18:00** Conclusion of day 1 (A. Galia – University of Palermo)

Day 2 – October 14th, 2022

Biofuels and Biomass

- 14:00** Introduction to Day 2 (F. Scala – University of Naples Federico II)
- 14:05** From oil and gas to biofeedstocks: availability, conversion processes, the biorefinery concept (P. Salatino – University of Naples Federico II)
- 15:00** Biomass, biofuels, and biorefineries: biochemical processes (M. Majone – University of Rome La Sapienza)
- 16:00** Biomass, biofuels, and biorefineries: thermochemical processes (L. Tognotti – University of Pisa)
- 17:00** PROESA®: Break-through Technology for Producing Advanced Bio-Fuels and Renewable Chemicals (F. Mantovani – Versalis)
- 18:00** Conclusion of Day 2 (F. Scala – University of Naples Federico II)

Day 3 – October 20th, 2022

Decarbonization and integration of renewable energy in existing processes

- 14:00** Introduction to Day 3 (D. Fino – Polytechnic of Turin)
- 14:05** Power-to-X: Heat to Fuels (M. Antonini - Hysytech)
- 15:00** Solar heat/power for industrial processes (A. Giaconia - ENEA)
- 16:00** Decarbonization of hard-to-abate industrial sectors: overview on economical constraints and opportunities (D. Chiaramonti - Polytechnic of Turin)
- 17:00** Navigating the energy transition: technology solutions to decarbonise the petrochemical value chains (D. Winch - JM Low Carbon Solutions)
- 18:00** Conclusion of Day 3 (D. Fino – Polytechnic of Turin)

Day 4 – October 21st, 2022

Carbon capture, utilization and storage

- 14:00** Introduction to day 4 (F. Bezzo – University of Padova)
- 14:05** Carbon capture and sequestration: technologies, opportunities and challenges (F. Bezzo - University of Padova)
- 15:00** CO₂ to platform molecules - thermo/electrical routes (S. Hernandez - Polytechnic of Turin)
- 16:00** CO₂ to platform molecules - biochemical routes (T. Tommasi - Polytechnic of Turin)
- 17:00** The role of CCUS in the decarbonization of the cement industry: technologies, challenges, perspectives (M. Romano - Polytechnic of Milan)
- 18:00** Conclusion of Day 4 (F. Bezzo – University of Padova)

Day 5 – October 27th, 2022

Safety and sustainability of decarbonization technologies

- 14:00** Introduction to day 5 (V. Cozzani – University of Bologna)
- 14:05** Risk management and trade-off in the framework of technologies for energy transition (V. Cozzani – University of Bologna)
- 15:00** The importance of life cycle assessment for the early sustainability assessment of emerging energy technologies (S. Cucurachi – University of Leiden)
- 16:00** Life Cycle Assessment of conventional and innovative waste-to-energy technologies (U. Arena – University of Campania L. Vanvitelli)
- 17:00** Safe Hydrogen Fuel Handling and Use for Efficient Implementation - SH2IFT project (N. Paltrinieri - NTNU)
- 18:00** Conclusion of Day 5 (V. Cozzani – University of Bologna)

Day 6 – October 28th, 2022

Chemical recycling and Carbon-negative processes

- 14:00** Introduction to day 6 (A. Frassoldati – Polytechnic of Milan)
- 14:05** Waste recovery and recycling by pyrolysis and gasification processes: state of the art, open issues and future directions (M. Pelucchi – Polytechnic of Milan)
- 15:00** The role of CCS and CCU in delivering negative emissions for a climate neutral society (M. Mazzotti – ETH Zurich)
- 16:00** Store&Go Project (D. Trimis – Karlsruhe Institut of Technology)
- 17:00** An outlook on future directions of Process Decarbonization (G. De Santi, Politecnico di Torino / past director EC JRC)
- 17:30** A holistic perspective on Energy Transition (A. Tilche, Strategic Committee - Italian Ministry of Infrastructure)
- 18:00** Conclusion of the School (G. Veronesi, EFCE President)