

Plenary Keynote: Neven Duić

Professor dr. sc. Neven Duić at the University of Zagreb conducts research into energy policy and planning, energy economics, sustainable development and climate change mitigation. He has published more than 200 papers in journals referenced in SCI.

Neven Duić is coordinating lead author of the IPCC 7th Assessment Report (WGIII Chapter 14), vice-president of the Croatian Academy of Engineering, Deputy Editor-in-Chief of the journal Energy and Editor-in-Chief of the Journal of Sustainable Development of Energy, Water and Environment Systems – JSDEWES. He is organising the SDEWES conference series.

Neven Duić has been the coordinator of over 40 international research projects. He has been recognised as one of the world's top 2% most cited scientists by the research team at Stanford University.

Process carbon emissions – storing, utilizing or offsetting within global carbon emission constraints

Abstract

The transition to a decarbonised energy systems is becoming more attractive with the fall of investment costs of renewables and volatile prices and political insecurity of fossil fuels. The renewable energy resources are bountiful, especially wind and solar, while integrating them into current energy systems is proving to be a challenge. The limit of cheap and easy integration for wind and solar has been reached in many countries and we are entering a new phase of electrification of nearly everything. While most of the energy use can

be electrified, we will still need some feedstocks and fuels, and some of them will need carbon. Since recycling fossil carbon has generally too low carbon efficiency, most of the carbon needed will come from biomass and maybe direct air carbon capture. Still, some process fossil carbon may be unavoidable, like in cement, lime and bricks industries. While we could change construction to use more steel and less cement, like North America, and find innovative ways how to make concrete absorb carbon, still, mitigation of construction material industries is a daunting task. The most difficult to abate carbon will probably be in agriculture, forestry, and other land use (AFOLU) sectors, so there will be pressure to efficiently abate process emissions. Since recycling with carbon capture and utilisation (CCU) has low efficiency, carbon capture and storage (CCS) is an option, potentially higher efficiency, but still not perfect. While CCS is an industry standard solution, one should also consider offsetting emissions from cement with Bioenergy with Carbon Capture and Storage (BECCS) or Carbon Dioxide Removal (CDR), since it may be a less costly solution.