



Energy Sustainability Working Group (ESWG)

Parallel Session: Energy Systems for the New Era How do we grow and develop in a sustainable way?

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Projections vary by 50 mb/d, representing a widening gap between business-as-usual and sustainable development



TENTH IEA IEF OPEC SYMPOSIUM ON ENERGY OUTLOOKS A COMPARISON OF RECENT IEA AND OPEC OUTLOOKS



The Planning Fallacy in Behavioral Economics

Douglas Hofstadter's Law (1979):

"It always takes longer than you expect, even when you take into account Hofstadter's Law"

Daniel Kahneman and Amos Tversky (1979)

"projections on how much time will be needed to complete a future task display an optimism bias and underestimate the time needed"



Past trends and behavioral economics predict the gap will widen



GLOBAL ENERGY SECURITY THROUGH DIALOGUE



The Circular Carbon Economy How do we grow and develop in a sustainable way?

Recycle

Reuse





The Circular Carbon Economy **Towards Rational and Sustainable Resource Solutions**

Recycle Reuse Chemically transforming CO₂ Using CO₂ without into products using renewables changing its molecular form Removal of CO₂ All options that reduce CO₂ entering the atmosphere from the atmosphere

Reduce



The Circular Carbon Economy Towards Rational and Sustainable Resource Solutions

Recycle

Biofuels Polymers Synthetic Fuels Building Materials Fertilisers and urea Methanol and chemicals

Capture from all sources Energy efficiency Fuel switching Renewables Nuclear **Reduce**



Reuse

Enhanced oil recovery Super critical generation Enhanced water recovery Water energy food Nexus Hydrogen and storage

Direct air capture with storage Natural sinks; forests, soil, oceans Bioenergy with carbon capture Sequestration ineralisation



Collaboration on innovation and technologies Laboratory R&D focus guided by the demands of CCE





The Circular Carbon Economy

Inclusive dialogue on the IEF platform helps make it happen

Recycle

Reuse



Reduce





The stellar rise of renewables, or hydrogen in future, is widely supported but will not change reliance on hydrocarbons

Synergies between sectors can accelerate affordable and inclusive energy transformations for all

Technology neutral dialogue on circular carbon models creates a more predictable investment environment for inclusive growth

Reduce barriers through dialogue on technology transfer, investment, and trade to the scale the New Era requires







KNOWLEDGE GENERATION Through Dialogue ENERGY ENERGY SECURITY TRANSITION Through Dialogue Through Dialogue