KAPSARC
مركز الملك عبدالله للدراسات والبحوث البترولية
King Abdullah Petroleum Studies and Research Center

The Role of the Circular Carbon Economy in Fostering a Sustainable Low-Carbon Future

4th International Conference

"Risk Management in Energy 2021"

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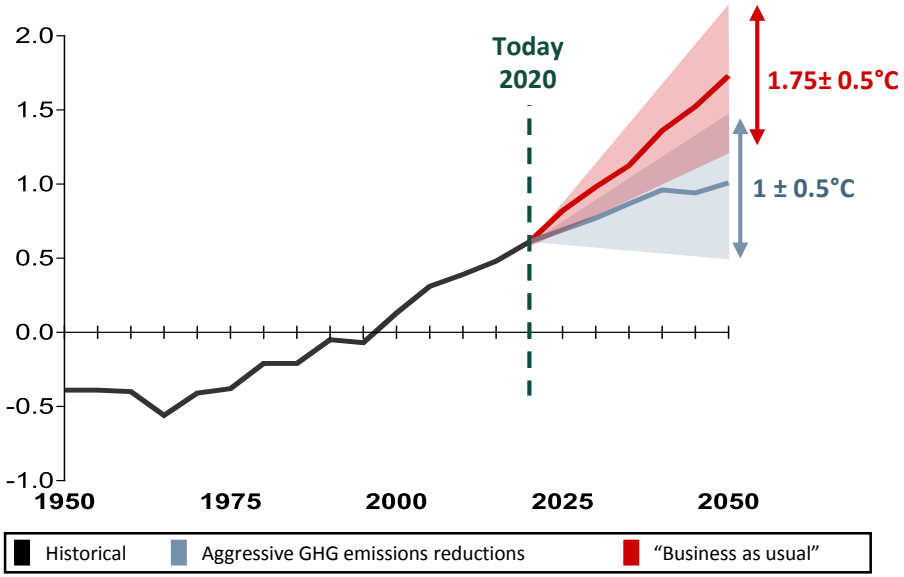
Climate change has become a key area of focus globally as a result of rising temperatures

Temperatures have risen ~1°C since mid-20th century

Scientific community has declared major problems if aggressive emission reductions are not taken

Global leaders have pledged to limit the global temperature rise this century to well below 2°C above pre-industrial levels

Global average surface temperature change (°C)[1]



Narrow focus on only reducing fossil fuels will result in significant socio-economic consequences

Inefficient utilization of existing infrastructure

- Inadequate utilization of **infrastructure investments already committed** e.g.:
  - Ports
  - Pipelines
  - Power plants
- Significant **cost and time in premature switching to new energy sources**

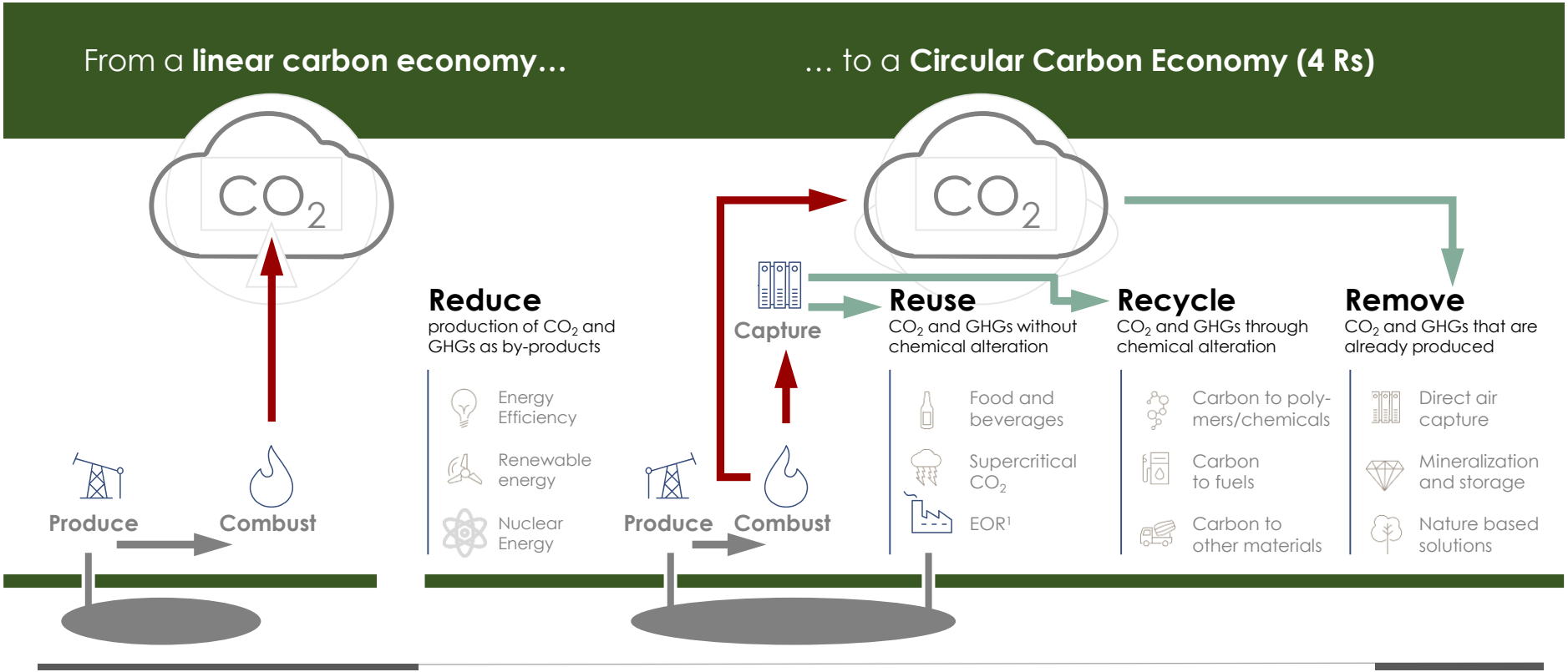
Reduced energy access and reliability

- **Increase in overall energy costs** since renewable energy and low carbon fuel sources are not always commercially viable
- **Deterioration of energy reliability** as a result of depending heavily on renewable sources
- **Major impact on developing countries** that require affordable and reliable energy access

No practical solutions for hard to abate sectors

- Few cost efficient **emissions reduction solutions** for energy-intensive, **hard to abate sectors** e.g.:
  - Aviation
  - Shipping
  - Cement
  - Aluminum

CCE is a holistic approach, that utilizes all available levers to address CO2 emissions while generating value



Note: [1] EOR: Enhanced Oil Recovery

Guide to the Circular Carbon Economy www.cceguide.org

- KAPSARC engaged **leading International Organizations** to write a series of reports on carbon management that form the CCE Guide
- The CCE Guide series provides **practical information for policymakers** to understand the **challenges and opportunities** presented by each element within the CCE
- The Guide illustrates the **degree to which each CCE element can contribute to climate goals** while also pursuing an improved quality of life

Carbon capture is a critical technology to enable reaching the climate goals

Carbon capture recognized as a critical technology to address climate change

"2 degrees, let alone 1.5 degrees, **cannot be met without carbon capture** and the best climate science available was continuing to support that fact"

ipcc
INTERGOVERNMENTAL PANEL ON climate change

"Reaching net zero will be virtually impossible without CCUS"

iea

"[…], **without CCUS** technologies the cost of **meeting** ambitious **climate change targets** will **increase by ~140%** worldwide"

UNITED NATIONS

Key benefits

- Reduces **process emissions** not **addressable** by other measures (e.g., energy efficiency and renewables)
- Reduces emissions from **hard-to-abate sectors**; for some sources, carbon capture is the only technological option to tackle emissions
- **Enables sustainable economic development** by ensuring **continued use of low-cost energy sources** without adversely impacting the environment

Summit Leaders from the Group of 20 countries (G20) endorsed the "Circular Carbon Economy" 4 Rs platform to reduce carbon emissions

- We endorse the Circular Carbon Economy (CCE) Platform, with its 4Rs framework (Reduce, Reuse, Recycle, and Remove), recognizing the key importance and ambition of reducing emissions, taking into account system efficiency and national circumstances.

- The CCE is a voluntary, holistic, integrated, inclusive, pragmatic, and complementary approach to promote economic growth while enhancing environmental stewardship through managing emissions in all sectors.

- We acknowledge, in this context, the various voluntary opportunities and their acceleration highlighted by the CCE Guide. We acknowledge the Presidency Reports of the Climate Stewardship Working Group that can be utilized as a toolbox in addressing sustainability.

Leaders' Declaration
G20 Riyadh Summit
November 21 - 22, 2020

Several ongoing and planned initiatives in the Kingdom across all 4R levers: Reduce, Reuse, Recycle, Remove

Reduce

- Hydrogen production and e-fuels
- NEOM Innovation & Commercialization Hub
- Liquid fuel displacement

Reuse

- Enhanced oil recovery
- CO_2 to cement products
- Composting Facilities

Recycle

- CO_2 to feedstock (urea and methanol)
- CO_2 to Olefins
- Converge Polypropylene Carbonates

Remove

- Cost effective carbon capture
- Tree plantation drive
- Mobile Carbon Capture

Net-Zero Producers Forum

Canada, Norway, Qatar, Saudi Arabia, and the United States, collectively representing 40 percent of global oil and gas production, are establishing a new international forum dedicated to developing long-term strategies to reach global net-zero emissions

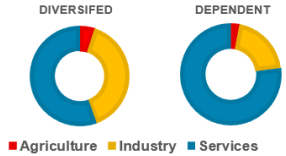
Develop pragmatic net-zero emission strategies

Development of methane abatement strategies

Circular Carbon Economy

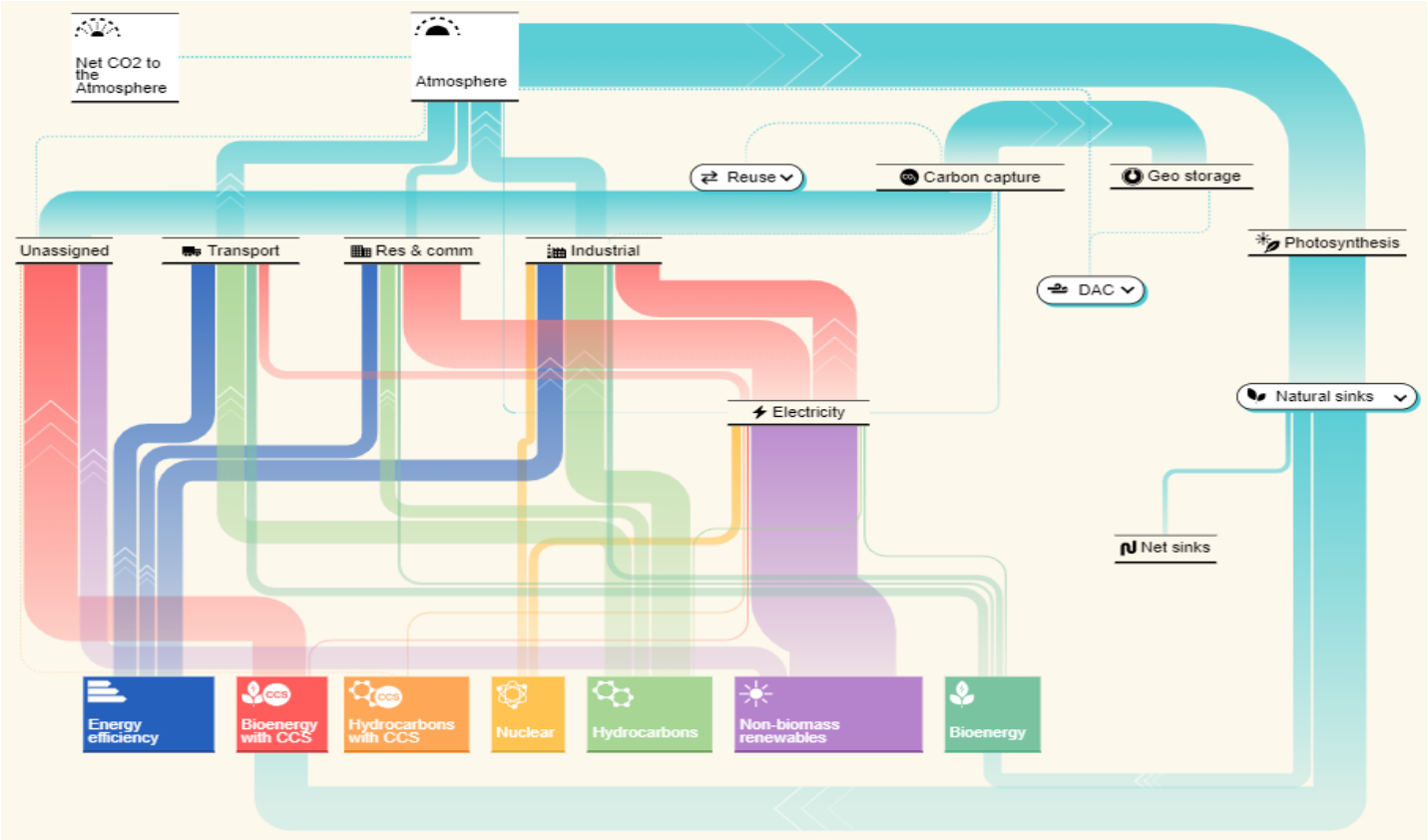
Advance the circular carbon economy approach

Develop and deploy clean-energy and carbon capture and storage technologies



Diversify from reliance on hydrocarbon revenues

Thank You



CCE Visualizer
www.cceguide.org