Application of Direct Air Capture towards Aviation sustainability

Centre for Sustainability
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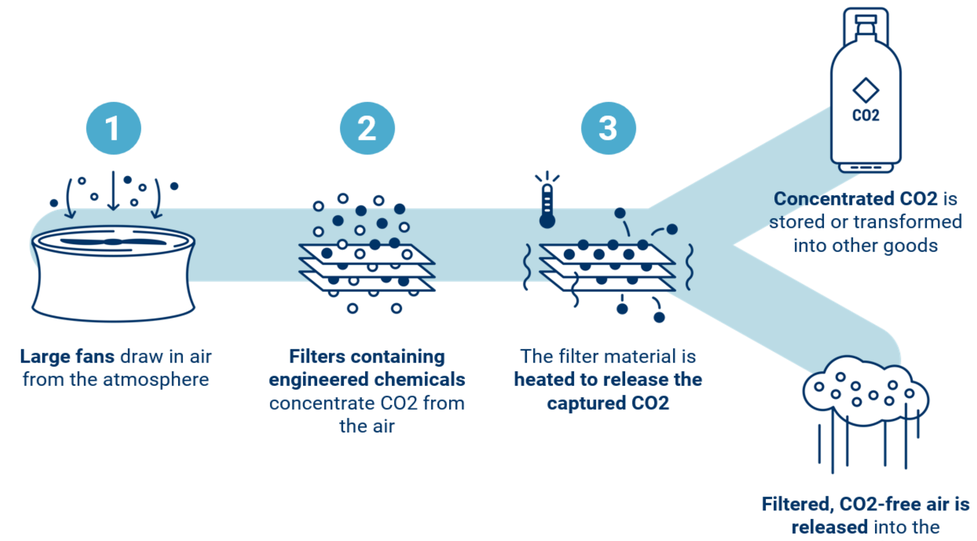
AIRBUS

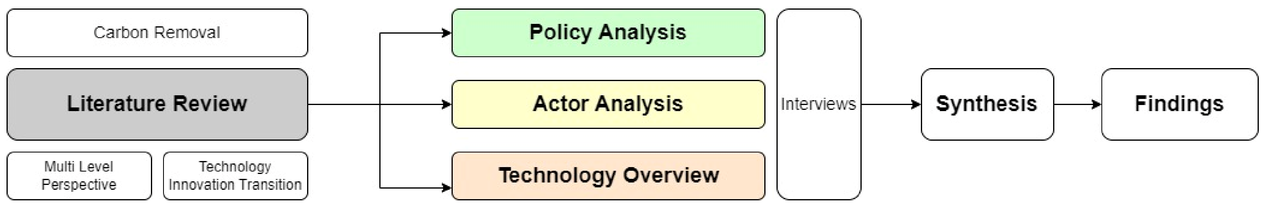
What are the institutional enablers and barriers to the adoption of direct air capture (DAC) towards aviation sustainability?

Problem Context

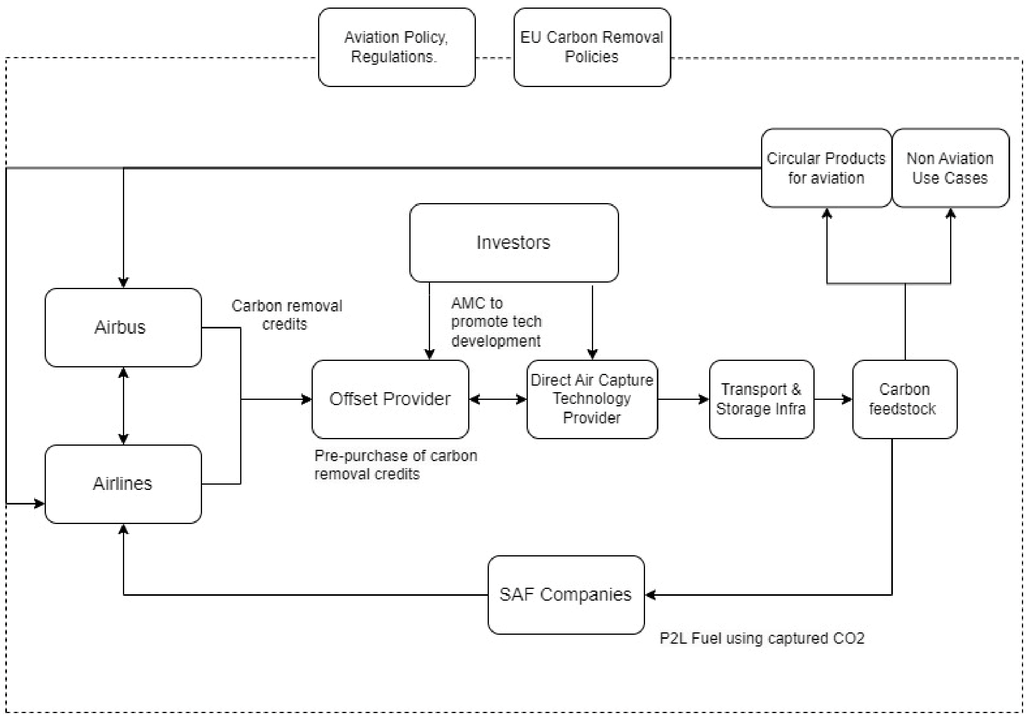
- Aviation sector aims to become “net zero” by 2050
- Hard-to-abate sector, decarbonization alone not sufficient
- Need for Carbon removal to achieve net zero status
- What carbon removals are suited for this purpose?
- Direct Air Capture: A novel niche Carbon Removal Technology

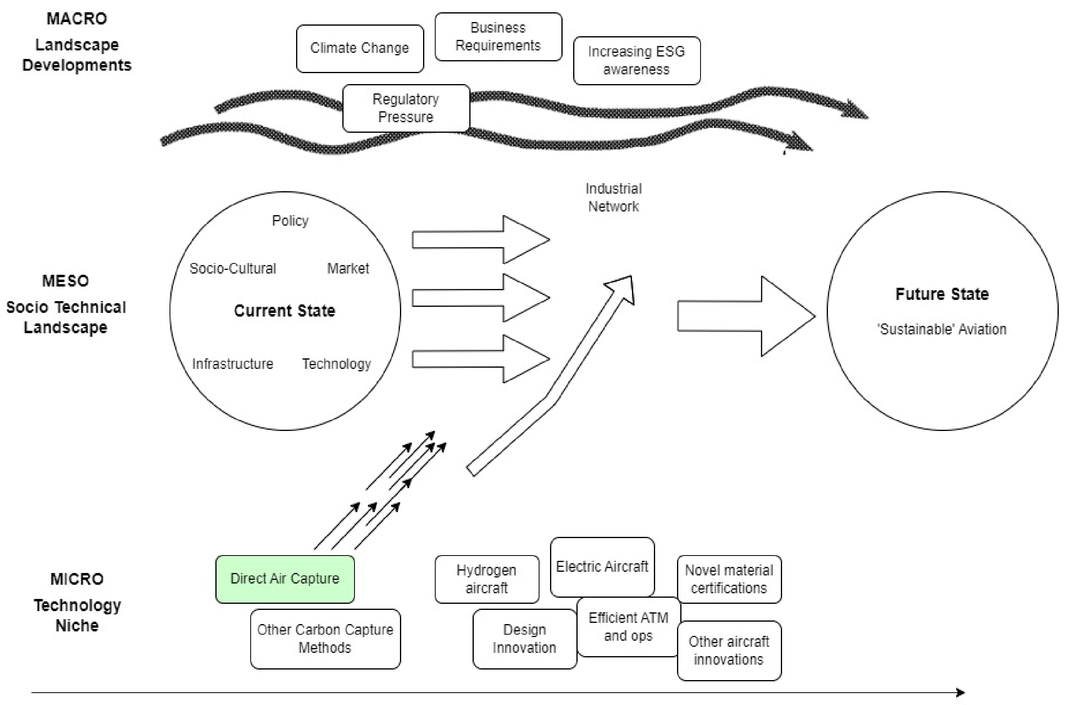


Approach



- Multi Level Perspective (Geels) on socio-technical transition
- Focus on the interplay of actors, institutions and technology innovation in the development of a roadmap





Challenges

Scale: SAF for all flights originating in Europe by 2050 would require 365 Mt CO_2 / Year to be captured

Energy: 3 EJ to capture ~365 Mt

(~8% of annual EU energy consumption)

Cost: Existing €500/t CO_2
Expected : < €100/t CO_2

Land Requirement- Low compared to other CDR methods (flexible)

Source: E4Tech study commissioned by Transport & Environment (T&E)

Preliminary Insights

- Use Cases – DAC CO_2 and green hydrogen can be used to produce e-kerosene. Use cases for non-critical cabin materials/ ancillary products have limited study
- Infancy in business models to support deployment
- Limited availability of dedicated renewable energy
- No dedicated policy pathways for direct air capture
- Possibility of carbon lock in, making the transition more expensive

Proposed Deliverable

Development of a socio-technical roadmap for inclusion of direct air capture and related carbon removal technologies in the aviation sustainability pathway.

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Direct Air Capture (How it Works) Image Source: https://www.cbinsights.com/research/direct-air-capture-corporate-carbon-reduction/