



## Technical Brief 3: Co-product Recovery & Mitigation

### Overview

Sustainable aviation fuel (SAF) production through biomass gasification and Fischer-Tropsch synthesis generates multiple co-products, byproducts, and residuals. CarbonCore's system is designed to recover value, minimize environmental impact, and reinforce its carbon-negative performance through thoughtful handling of each output stream.

### 1. Water Recovery and Reuse

Water is produced both as a chemical byproduct in FT synthesis and as condensate during gas cooling. CarbonCore recovers, purifies, and reuses this water internally to reduce freshwater demand. An on-site reservoir provides long-term supply resilience, while advanced treatment systems ensure compliance with environmental discharge standards where applicable.

### 2. Heat Recovery and Integration

High-temperature stages of gasification and syngas cleanup release significant thermal energy. Heat recovery units (HRUs) capture this energy and redirect it to preheat feedstock, generate steam, or power auxiliary systems. This integration improves energy efficiency and reduces net fuel consumption across the platform.

### 3. Carbon Dioxide Management

CarbonCore's syngas cleanup and FT upgrading stages produce concentrated CO<sub>2</sub> streams, which are captured and prepared for utilization or storage. Options include:

- On-site reinjection or mineralization
- Utilization in industrial processes
- Off-site sale to regional gas markets

Captured CO<sub>2</sub> reduces lifecycle emissions and strengthens eligibility for credits under 45Q and similar regulatory regimes.

### 4. Solid Byproducts and Ash Handling

Solid residues from gasification, including char and inert ash, are separated and analyzed for safe disposal or beneficial reuse. Potential applications include:

- Soil amendments (if metals are within regulatory limits)
- Cement or aggregate blending
- Controlled landfill or containment

Ash handling is automated, monitored, and designed to meet federal and state environmental safety standards.

### **5. Tar and Light Hydrocarbon Residuals**

Low levels of tars and light hydrocarbons are captured during syngas cleanup. These streams are routed to internal combustion or reformed into syngas. This minimizes hazardous waste generation and contributes to thermal efficiency.

### **6. Circular Resource Strategies**

CarbonCore continuously evaluates co-product streams for potential circular economy applications. This includes:

- Valorizing captured CO<sub>2</sub>
- Recycling treated water and heat
- Exploring long-term co-located industries for byproduct use

These strategies reduce environmental liability while creating additional value streams.

### **Conclusion**

CarbonCore's co-product recovery and mitigation systems are designed not only to meet regulatory standards, but to set a higher bar for circularity and low-carbon operations. Through comprehensive planning and integration, the platform delivers both operational efficiency and environmental responsibility.