Option 2 – Fuel Marker along Upstream and Downstream

Description of Technology

The use of a CNF fuel marker additive, a chemical additive that is added to fuels to make them identifiable, often used to combat fraud, allows market participants to introduce climate-neutral fuel with two safety features: Colour and a chemical identifier tag. Fuel markers help identify CNF liquid fuel products, which are easy to dispense and may include additional labelling. As synthetic fuels are similar to the chemical composition of fossil fuels and have no adverse impact on vehicle emissions. However, this technology is not suitable for gaseous fuels. The system must be combined with a vehicle or gas station sensor to ensure compliance, which is a technically complex task that remains unproven, as detection thresholds still require thorough validation. Moreover, the use of a chemical marker to distinguish CN fuel from conventional fossil fuels introduces additional costs and reduces operational flexibility by necessitating a separate infrastructure.

Customer & Retail Perspectives

Advantages:

- Established and familiar system
- Inducement potential
- No major behavioural changes for consumers
- Minimal infrastructure changes needed
- Enhanced safety and fraud prevention
- Potential for integration with digital tracking and authenticity verification systems
- Low implementation costs
- Flexible monitoring capabilities

Disadvantages:

- Limited usability outside the EU
- Binary compliance detection
- Reduced flexibility in inducement mechanisms
- Compatibility issues with gaseous fuels
- Cost implementation for petrol stations or vehicle depending on placement of sensor
- In-vehicle sensors yet to be proven as detection thresholds still require thorough validation
- Risk of sophisticated counterfeiting or neutralization of the chemical marker by malicious actors

Regulatory Assessment

Implications to fuel regulations and standards must be investigated before implementing colour and chemical identifier tags. Potential changes will require substantial lead time to ensure stability, visibility, safety and environmental compliance. Almost all ISO/EN fuel standards allow use of dyes and markers.