7.5.6 How are emissions allocated across the co-products?

There are a few different allocation approaches. According to ISO 14044, the allocation approach should be avoided by further sub-dividing the system to isolate co-products, or by using the system boundary expansion approach. If allocation cannot be avoided, an allocation method based on physical causality (e.g. mass or energy content) or other relationships (e.g. economic value) should be used. [31] The Mass-based method allocates emissions based on the mass of each co-product. The economic method allocates emissions based on the market value of each product, where a product generating greater revenue takes on a greater share of the emissions [32]. For Energy-based allocation, emissions are divided based on the energy content of each co-product. The World Biogas Association Methodology suggests that the energy-based allocation is the most appropriate where the main product is used as an energy source. The Canadian Clean Fuel Regulations (CFR) Fuel life cycle assessment model methodology apply a default Energy Allocation approach also. The Canadian CFR LCA states "RNG and biogas production does not produce any co-products that must be accounted for in the CI value calculations."REDcert is a globally leading RNG REC scheme in the EU Renewable Energy Directive. This certification system, recognized by the European Union, ensures that biomethane production or its use as fuel or electricity is sustainable according to EU requirements. [33]

REDcert states "*If other products ("co-products") are produced during a fuel production process in addition to the fuel, the total greenhouse gas emissions from the process are allocated between the biofuel, liquid biofuel and biomass fuel or intermediate product and the co-products according to their energy content (lower heating value)*." (Sect. 4.10, pg. 43.)

Based on the research it is recommend that this methodology applies an energy based allocation to the biomethane product based on the assumption that this is the only energy related product in the system and is the key focus of the intended users of this methodology. In this scenario, digestate production and CO2 gas production outputs of the AD process are considered byproducts vs. coproducts. Byproducts are incidental and have less economic value relative to the main product whereas coproducts are intentional and create value alongside the main product. In the energy allocation method, all the carbon impacts of the byproducts such as Digestate and CO2 are applied to the biomethane.

The advantage of energy based allocation for New Zealand is that it focuses the economic value and environmental impact on the RNG product which holds the majority of the economic and decarbonisation value.

[31] Environment and Climate Change Canada, Fuel life cycle assessment model methodology.

[32] International Anaerobic Digestion Certification Scheme, Life Cycle Assessment STANDARD METHODOLOGY GUIDANCE, World Biogas Association

[33]Environment and Climate Change Canada, Fuel life cycle assessment model methodology. A2.5.3.4 Co-Products Produced