



Bruce Hillen

Susteen Technologies Canada Ltd., Canada

Thermo-Catalytic Reforming (TCR®) sustainable resources from sewage sludge and organic waste

Technology Platform TCR®: Thermo-catalytic reforming is a three-stage thermo-chemical process combining catalytic pyrolysis, cracking and reforming to decompose organic materials into gas, oil, and char while upgrading these products throughout the process. A carbon-based, organic solid material enters the TCR® reactor through an injection system which is designed to keep oxygen out of the process, avoiding the combustion of the feedstock. The feedstock is heated up in an auger pipe reactor stage to temperatures ranging from 400-500°C. First water contained in the feedstock is evaporated. At higher temperatures, complex organic molecules such as cellulose or lignin are decomposed into carbon, carbon-monoxide, carbon-dioxide, hydrocarbons, and water. Carbon and minerals contained in the feedstock form a solid char while other products form a vapour phase. In other pyrolysis and gasification technologies, the produced hydrocarbons include significant quantities of highly viscous tars with high boiling temperatures. When the product vapours are cooled down these tars coat reactor walls and contaminate the product gas and oil. This results in major problems regarding plant availability and maintenance and requires too complex further product treatment to enable commercial use of the products. Some competing technologies avoid vapour condensation entirely and immediately combust the vapours to produce heat as their only product other than char. Taking this one step further a second stage—called post reforming—was added to the process to make further use of the unique properties of the char. Char and vapour move from the first stage into a vertical reactor stage while being heated up to temperatures ranging 550-700°C. The char forms a fixed bed which is continuously renewed by char coming from the top while char is extracted at the bottom. The vapour is forced to flow through the char bed before being extracted from the post reforming stage.

Biography

Bruce Hillen has held the position of CEO within Susteen Technologies Canada Ltd (STC) since its beginning 3 years ago. STC is a spin-out company of Fraunhofer Umsicht in Germany which he also acts as a consultant for in the area of Thermochemical Conversion of carbon-based organics into renewable fuels for Canada. Previous to this, he had a 25-year career with the Calgary Board of Education in the Department of Facility and Environmental Services. He now considers himself an entrepreneur. He is certified in Advanced Biofuels through McGill University and is a member of the Alberta and International biochar initiatives.

bruce.hillen@susteen-tech.com

Notes: