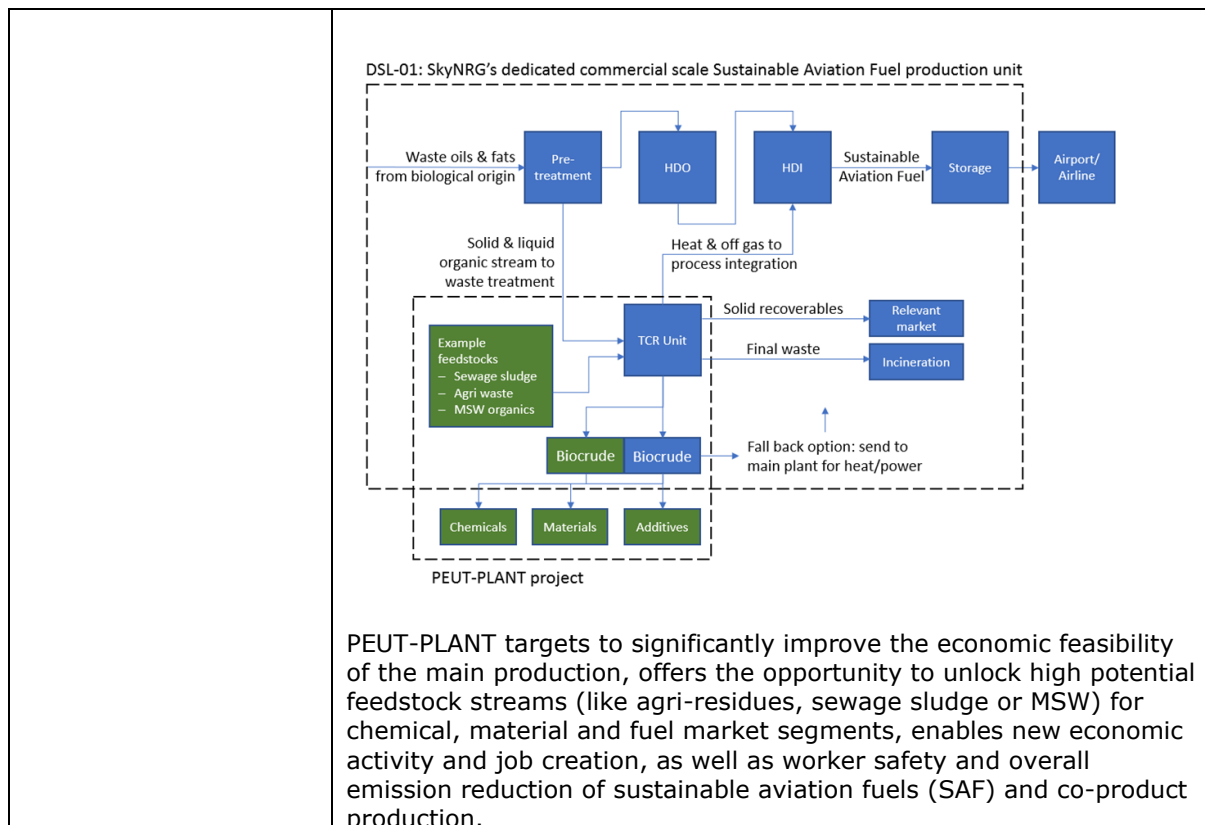



Algemene gegevens	
PPS-nummer	TKI-BBE-1808
Titel	PEUTPLANT
Roadmap	
Uitvoerende kennisinstelling(en)	TU Delft
Projectleider onderzoek (naam + emailadres)	Prof.dr.ir. Luuk AM van der Wielen, l.a.m.vanderwielen@tudelft.nl
Penvoerder (namens private partijen)	Prof. Bram Brouwer, BDS
Contactpersoon overheid (indien relevant)	TKI-BBE
Adres projectwebsite	
Startdatum	1-4-2019
Einddatum	31-12-2023

Goedkeuring penvoerder / consortium	
De jaarrapportage dient te worden besproken met de penvoerder/het consortium. TKI BBE neemt graag kennis van evt. opmerkingen over de jaarrapportage.	
De penvoerder heeft namens het consortium de jaarrapportage	<input checked="" type="checkbox"/> goedgekeurd <input type="checkbox"/> niet goedgekeurd
Evt. opmerkingen over de jaarrapportage:	Due to Covid19 there have been delays in the execution of activities due to (partial) lockdown of laboratory facilities at Partners locations. Therefore, we request TKI-BBE for an extension of the end date of the project with at least 6 months, until 30-6-2024.

Inhoudelijke samenvatting van het project	
Probleemomschrijving	<p>Sustainable Aviation Fuels (SAF) are becoming a reality in The Netherlands through a consortium led by the Dutch SME SkyNRG targets the construction of a commercial scale production unit of SAF based on proven technology and (organic waste & residue) feedstocks.</p> <p>This so-called Direct Supply Lines (DSL) investment is flanked by a critical development project, PEUT-PLANT, that targets the development, testing, and demonstration of a multi-feed production technology for the valorisation of residue streams into high added value products such as chemical building blocks and fuel additives.</p> <p>In the base SAF-plant design, a thermal conversion unit is projected, essentially operating as waste-to-energy treatment unit, but the PEUT-PLANT project will focus on further valorisation and utilisation of towards higher value end products/markets.</p>
Doelen van het project	<p>The purpose of the project is to (re)evaluate the original plans for integrating TCR-(thermal conversion reactor) technology producing 'biocrude' versus relevant (high TRL) alternatives such as gasification and others; see rough process block diagram below. This includes progressing insights in competing conversion technologies and availability/ sustainability of realistic feedstocks available for DSL 1.0, to ensure latest state of art.</p> <p>Depending on outcome, the project targets further technology development/ adaptation for commercial biobased production, product characterisation and application and LCA-profiling (TU Delft-contribution) and analysing safety profile of the process streams with reference to REACH-compliance (BDS - contribution). SkyNRG is responsible for the integration of these insights in the design of DSL 1.0 where possible leading to an improved version (DSL 1.1).</p>



Resultaten	
Beoogde resultaten 2019	<ul style="list-style-type: none"> • Report on design requirements • Dissemination strategy • Both feeding the GO/NO GO decision, planned for Q3 2019. • • Kick off meeting (SkyNRG, TUD, BDS) • Determine potential design requirements for optimal PEUT-PLANT project execution (on the TCR unit) to take along in the main SAF unit design (SkyNRG, TUD) • Ensure requirements are taken along in FEED study (SkyNRG) • Initiate LCA and process design guidance by TU Delft PDEng / Process design trainee in 2018-2019 (TUD, SkyNRG) • Develop dissemination strategy (TUD) • PEUT-PLANT Project management (TUD)
Behaalde resultaten 2019	<p>Design requirements. In Q2 2019 SkyNRG closed round A financing and publicly announced project DSL-01(main SAF processing unit).This milestone enabled SkyNRG to initiate the front-end engineering design (FEED) of main SAF production unit (i.e. design phase) towards Q3 2019 . Initial results from the FEED are expected mid 2020. During the year, TUD had several meetings with SkyNRG on project status with respect to advancement of technology that can process suitable co-feedstocks (MSW, agri/forestry waste) for the thermal conversion unit, in addition to the solid/liquid waste effluents of the main kerosene manufacturing line. The initial focus was on the TCR technology but potential alternatives have been identified as well that could offer a shorter time to market/improved economic viability. Relevant feedstocks have now been identified from a market perspective, and thus the most likely composition of the 'liquid and solid organic stream to waste treatment' (see block diagram) has been determined. For the identification of feedstocks the latest developments on the eligible feedstocks under the RED II (annex IV part a and b) were closely monitored.</p>

	<p>This was also extended to other locations and situations as shown below, supporting the international business ambitions of the industry players.</p> <p>Dissemination. Preparing of a dissemination of results while still at the very beginning of the project, we decided focus on the business community (mostly via SkyNRG) and enabling implementation, scale-up and suitability for the international market of the general DSL concept</p> <p>Since the DSL 1.0 plant was to be replicated at other locations in Europe and worldwide, it was decided to explore the DSL concept also in another air transport-heavy location (Republic of Ireland) where TUD has firm links with the Bernal Institute based at the University of Limerick. Based on earlier contact (joint White Paper in 2017) of SkyNRG, TUD/UL, and Shannon Airport Group to the Irish Presidents Office and several Departments (Transport, Climate, Agriculture), several meetings have followed, and have led to an MoU to explore the DSL concept in Ireland. The MoU signing in Dublin in June 2019, was overseen by Minister Sigrid Kaag of International Trade and was facilitated by The Netherlands' Embassy in Dublin. It had significant media exposure (below, as well as Irish Times 13/6/2020) with Irish and Dutch government and industry, and led to significant national and international dissemination of the DSL concept and its potential contribution to greening air travel.</p>  <p>Picture showing Maarten van Dijk, MD of SkyNRG, with Minister for Foreign Trade and Development Cooperation Sigrid Kaag and Dr Puneet Saidha, Director Research Office, University of Limerick, taken from https://www.rte.ie/news/business/2019/06/13/1055210-ul-signs-deal-to-explore-sustainable-aviation-fuel/ (RTE is leading national Irish television/internet media).</p> <p>Having gone through these preparations and the clear international opportunities, the project partners proposed to determine design requirements for optimal PEUT-PLANT project execution (on the central thermal conversion unit) more in detail in Q1/2 2020, based on more in depth TEEs, to be considered in the main SAF unit design (SkyNRG, TUD). This will also provide valuable inputs for the FEED study.</p>
<p>Beoogde resultaten 2020</p>	<ul style="list-style-type: none"> • Execute TEEs of the base concept (TCR-based) and alternatives on domestic and international feedstocks (Q1,2 2020 – executed and finalised at COVID-delayed completion of this report). • Initiate LCA and process design guidance by TU Delft PDEng / Process design trainee group in Q3 2020 (initiated Q3 2020). • Go/No-go moment Q4 2020, related to the main SAF plant moving into the EPC phase. • Extension of project to international market opportunities (initiated Q1 2020). This also included potentially leveraging PEUTPLANT project with international resources, and build on international dissemination successes of 2019.

<p>Opgeleverde producten in 2019 (geef de titels en/of omschrijvingen van de producten / deliverables of een link naar de producten op de projectwebsite of andere openbare websites)</p>
<p><u>Wetenschappelijke artikelen:</u></p> <p>None – too early stage</p>
<p><u>Externe rapporten:</u></p> <p>None – too early stage</p>
<p><u>Artikelen in vakbladen:</u></p> <p>None – too early stage</p>
<p><u>Inleidingen/posters tijdens workshops, congressen en symposia:</u></p> <ul style="list-style-type: none"> • <u>Bernal Lectures Series seminar. Sustainable Aviation Fuels. Misha Valk at Bernal Institute, University of Limerick, may 2019.</u> • <u>ECCE/ECAB Conference, Florence, lecture on need for bioprocess intensification in biobased manufacturing., by Luuk van der Wielen, sept 2019.</u> • <u>Biobased Industries Day (organised by JU BBI and EI/IDA) at Bernal Institute, University of Limerick, lecture of SAF production ecosystem, Luuk van der Wielen, 22/5/2019</u> • <u>Lecture for SFI (national) Centre for Marine and Renewable Energy Innovation MaREI , at UCC in Cork, Ireland, Luuk van der Wielen, 26/11/2020</u> •
<p><u>Social media, newspapers, websites</u></p> <ol style="list-style-type: none"> 1. https://www.irishtimes.com/business/energy-and-resources/university-of-limerick-partners-with-dutch-company-to-develop-sustainable-aviation-fuel-1.3924624 The Irish Times 13.06.2019 2. https://www.rte.ie/news/business/2019/0613/1055210-ul-signs-deal-to-explore-sustainable-aviation-fuel/ RTE digital news 13.06.2019 3. https://www.rte.ie/radio/radioplayer/html5/#/radio1/11047775 RTE Radio 1 Drivetime 2:14:10 13.06.2019 4. https://www.linkedin.com/company/bernal-institute-university-of-limerick/?viewAsMember=true Bernal Institute LinkedIN 13.06.2019 5. https://www.linkedin.com/company/university-of-limerick University of Limerick LinkedIN 13.06.2019 6. https://twitter.com/ul UL Twitter 13.06.2019 7. https://twitter.com/BernalNews Bernal Institute Twitter 13.06.2019 8. https://twitter.com/SKYNRG SkyNRG Twitter 14.06.2019 9. https://www.limerickleader.ie/news/home/424239/ul-to-explore-the-development-of-sustainable-aviation-fuel.html Limerick Leader 15.06.2019 10. https://skynrg.com/press-releases/skynrg-and-ul-sign-deal-during-dutch-royal-visit-to-explore-development-of-sustainable-aviation-fuel-in-ireland/ SkyNRG website 11. https://bioenergyinternational.com/research-development/30143 Bio Energy publication and online 12. https://twitter.com/BioenergyIntl Bio Energy Twitter 13. https://www.live95fm.ie/news/ul-signs-deal-to-explore-development-of-sustainable-aviation-fuel/ Live 95Fm 13.06.2019 14. https://www.pressreader.com/ Irish Examiner 14.06.2019 15. https://www.biofuelsdigest.com/bdigest/2019/06/17/skynrg-teams-with-university-of-limerick-to-explore-development-of-irish-aviation-biofuel-production/ BioFuels Digest. 17.06.2019
<p><u>Overig (Technieken, apparaten, methodes etc.):</u></p> <p>none</p>