Commercializing Conventional and Advanced Transport Biofuels from Biomass and Other Renewable Feedstocks

Task 39
IEA Bioenergy

Inside This Issue

From the Task

By Mahmood Ebadian, Jack Saddler and Jim McMillan

Since publishing our last Newsletter, IEA Bioenergy Task 39 has continued its work to advance the commercialization of sustainable, lower carbon transport biofuels to decarbonize the multi-faceted transport sector.

Task 39's first business meeting of the 2019-2021 triennium was held May 15-17 at the European Commission's Joint Research Centre (JRC) in Ispra, Italy. The JRC is the European Commission's in-house science and knowledge service that provides independent scientific advice and support to EU policymakers, and has been contributing its expertise to the activities of IEA Bioenergy Task 39 over the past few triennia.

The first day of the meeting (Wednesday, 15 May 2019) was devoted to internal task business and primarily attended by Task 39 representatives as well as a few members of the IEA Bioenergy Executive Committee (ExCo). The focus was reviewing the Task's ongoing and recently completed work and proposed activities for the new triennium. In addition, Task member country representatives presented updates on recent developments on biofuels policies, production and use in their respective countries.

The second and third days of the meeting comprised a joint JRC-Task 39 workshop on "Biofuels Sustainability - Focus on Lifecycle Analysis," in which many representatives of the biofuels industry also participated (companies/institutions included UPM, Neste, ISCC, REG, LBST, IFPEN, ENI, and Haldor Topsoe). The purpose of the workshop was to review and discuss recent work and future work needs with top experts to inform additional Task 39 LCA modeling comparison work. The Task's previous work shows that leading LCA models function properly and can be harmonized with one another. Apparent differences in model results are due primarily to using differently defined system boundaries or different allocation approaches as well as different assumptions to better represent regional situations and to fill in data gaps.

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We welcome your feedback. Please direct your comments to Mahmood Ebadian

Workshop discussions extended to include uncertainty in LCA and taking a broader view of biofuels sustainability as well as on-going concerns about the availability of sustainable feedstocks and progress on co-processing and developing a ^{14}C-based method for tracking the bio-component in fuels. Below are some of the takeaways from the workshop.

Trends

In recent years, policies that promote further decreases in the carbon intensity (CI) of renewable fuels such as low carbon fuel standards (LCFS) are proving to be powerful instruments for decarbonizing the transportation sector. Due to the success of LCFS policies in California increasing the market value and economic viability of low-carbon biofuels, there is great interest among biofuel producers to further reduce their fuels' CIs and to market their fuels in California. (Note: California's LCFS is a fuel agnostic low carbon fuels program, not pro biofuels per se.)

For advanced alternative fuels including all biofuels, electrofuels and recycled carbon fuels, cost reduction of production systems remains a chief objective. For biomass-to-liquid (BTL) fuels pathways, areas where further technological improvements are necessary include process integration, gas clean-up systems and new catalysts, along with development of systems capable of operating economically at smaller scales. For fast pyrolysis and hydrothermal liquefaction, lots of work is underway to try to co-process these types of bio-crudes along with crude oils to produce transportation fuels.

With lower carbon advanced fuels production needing to rapidly ramp up to meet transport sector decarbonization targets, the economic stakes and opportunities for fraud are mounting. Recognizing this, California's LCFS will soon start requiring third party validation of submitted information. Similarly, Brazil's RenovaBio program will also require third party vetting of applications or submitted data. In the EU, the RED II legislation foresees development of a "traceability" database to come into force in 2021 to ensure their renewable fuels are meeting the EU's sustainability criteria.

Drop-in biofuels production remains primarily based on oleaginous feedstocks and there are growing concerns over future availability. Greater capture of used/waste oleaginous feedstocks is needed, as is further agronomic progress to make oil seed/lipid crops more efficient and productive. Encouragingly, the biofuels industry is increasing its use of waste-based feedstocks for biofuels. For example, in the EU between 2016 and 2018, the share of waste feedstock being used increased from 11% to 15%. In terms of existing crops, palm remains by far the most productive terrestrial oil seed crop. However, use of palm oil as a feedstock for biofuels is increasingly being avoided due to sustainability (deforestation) concerns. This is unfortunate and unfair to those palm producers who have achieved or are pursuing sustainability certification, and it greatly exacerbates the problem of limited oleaginous feedstock supply. Companies in Asia and Indonesia and Malaysia that are trying to foster greater sustainability within the industry, including implementing methods to avoid methane emissions and deforestation, are being faced with the putative phase out of palm oil. It is wrong and counterproductive to penalize them; the companies who are pursuing unsustainable production of palm should be the ones penalized. Beyond oleaginous feedstocks, advanced bio-oil feedstocks based on pyrolysis or hydrothermal liquefaction of lignocellulosic biomass and carbonaceous wastes (e.g., forest and agricultural residues, municipal solid wastes, etc.) are in development but technically more challenging and not yet commercialized. There is global interest in this area, with policy/legislation driving progress.

It is also noteworthy that only about 1% of agricultural land is now used to produce feedstocks for biofuels (and bioplastics), with approximately 70% used for cattle. A small change in diet (i.e., eating less meat) and thus in the number of animals being raised can free up a lot of agricultural land. In Brazil, for example, 0.5% of the national territory is used for sugarcane-based ethanol production, with 4% for cattle grazing.

LCA and Sustainability Assessment

Concerns about sustainability are hampering the development of the bio-based economy. A new Task (Task 45) within the IEA Bioenergy TCP has been formed to help address these concerns. The new Task 45 has 13 members and a program of work split across 3 work packages focused on metrics, methods and tools for assessing climate change effects and sustainability effects of bioenergy as well as implementation approaches. (This new Task 45 is an extension and expansion of the previous Task 38.) One of the new Task's chief concerns will be how to deal with uncertainties in sustainability assessment and to explore the use of multiple metrics to compensate for this. Task 39's on-going LCA work will take its methodological direction from Task 45.

While conventional LCA is a fine as an approach for the present, "prospective LCA" that incorporates the time dimension is better suited for examining emerging technologies which are not yet established.

LCA results can vary with location and allocation choice making harmonized LCA modeling tools considerably distant from the realities they aim to represent. Moreover, each certifier and company are likely to prefer developing/using their own LCA modelling tool/calculator rather than using "closed" tools developed by others that require specific training and reliance on restricted expertise.

In additional to the choice of system boundaries, some of the main parameters causing significant deviations in LCA results are soil properties, land use change (LUC), global warming potential (GWP) factors, and allocation methods, e.g., for handling non-energy coproducts or other energy sources used for producing Power to X type fuels (e.g., CO_2 to methanol).

There is also considerable variability in avoided emissions credits available in different jurisdictions. For example, tallow emissions for rendering are considerably different in different countries, and California has about a 400 g methane emissions credit for avoided emissions when the manure is used in anaerobic digestion (AD) systems.

Sustainability encompasses much more than GHGs emissions reduction. Carbon in the soil is not the same as CO_2 stored in the ground. However, achieving certification of sustainable production can be complicated. For example, some existing certifications schemes for agriculture require 90 to 95 sustainability criteria to be addressed. Farmers need incentives to incorporate such criteria into their agricultural practices. Regulators and companies are trying to motivate farmers to be more sustainable, however without compensating them there is little motivation to change.

Co-processing

Many petroleum refiners in Europe, North America, Latin America and Asia are thinking about upgrading bio-feedstocks using existing infrastructure. Approximately 40 refineries around the world have so far implemented or tested some type of hydroprocessing of mixed petroleum and bio-intermediate feedstocks, co-processing these feeds at bio-intermediate levels ranging from 2 vol% to 40 vol%. In Scandinavia, 2 units are processing crude tall oil (CTO). In the US, 1 unit had been studying pyrolysis oil upgrading (100% pyrolysis oil) however this has stopped.

In addition to the challenge of bio-crudes typically containing higher level of oxygen than are found in petroleum feedstocks, problematic contaminating elements for fossil fuel refiners include sulphur, nitrogen, phosphorous and sodium.

The two primary approaches so far investigated are co-processing in fluid catalytic cracking (FCC) units or in hydrotreatment units, and they differ with respect to both product yield and product quality.

Tracing of bio-components/biogenic (vs. fossil) content is a key aspect for coprocessing albeit the way recycled carbon fuels are evaluated is of high importance as well.

Potential difficulties with co-processing include: 1) increasing pressure drop across the system due to exacerbated coking; 2) catalyst deactivation; 3) equipment corrosion due to high bio-oil acidity; 4) hydrogen consumption; and 5) exotherms. The changing composition of recycled gases can also create challenges. The typical catalysts are Cobalt–Molybdenum (CoMo) or nickel–molybdenum (NiMo), and CoMo catalyst are affected by presence of CO. Coprocessing at more than 10% of bio-content can increase the cloud point of the fuel. For some feedstocks, the upper limit for coprocessing may be between 5-10%.

The many possible pathways for producing lower carbon fuels using mixed petroleum/biogenic feeds, e.g., by coprocessing bio-oils with fossil feedstocks in existing petroleum refineries, require validated analytical methods to qualify the biogenic content of the final fuels. Methods for tracking bio-carbon must be accurate and thus have to be 'real' and verifiable (as opposed to calculated) or everyone in the industry will suffer from poor perception from the outside. For this reason, the biofuel industry recommends directly measuring the renewable content of any co-processed fuels. Concerning measurement of bio-carbon content, a recent study evaluating an ASTM D6866 standard method showed radiocarbon analysis by accelerator mass spectrometry (AMS) to be accurate and reliable for quantifying the biobased carbon content of hydrocarbon fuels. This method was able to measure absolute biogenic carbon content to an accuracy of ±0.26% at the 95% confidence level.

More details on the workshop are available at the Task 39 website: http://task39.sites.olt.ubc.ca/files/2019/07/T39-WorkshopReport-JRC-Sustainability-LCA_final.pdf

Recent Task 39 publications from Task 39 on LCA modeling, drop-in biofuels, and co-processing include the following:

- Paper: Comparison of biofuel life-cycle GHG emissions assessment tools: The case studies of ethanol produced from sugarcane, corn, and wheat (Read here):
- Paper: Potential synergies of drop-in biofuel production with further co-processing at oil refineries (Read here)
- Report: Comparison of Biofuel Life Cycle Analysis Tools (Read here)
- Report: Executive Summary of Drop-in Biofuels: The key role that co-processing will play in its production (Read here)
- Report: Executive Summary of Assessment of likely technology maturation pathways for biojet production from forest residues (Read here)
- Brief: IEA Bioenergy Summary Series: Comparison of international life cycle assessment (LCA) biofuels models (Read here)

IEA Bioenergy Task 39 members attending the workshop. Left to right: Rubens Maciel Filho (Brazil), Adrian O'Connell (European Commission), Hiroyuki Asano (Japan), Steve Rogers (Australia), Don O'Connor (Canada), Alex MacLeod (Canada), Paul Bennett (New Zealand), Tomas Ekbom (Sweden), Henning Jorgensen (Denmark), Jack Saddler (Canada), Stephen Dooley (Ireland), Laura Lonza (European Commission), Jim McMillan (US), Franziska Müller-Langer (Germany), Jin-Suk Lee (South Korea), Antonio Maria Bonomi (Brazil), Yuta Shibahara (Japan) and Duncan Akporiaye (Norway).

In closing, we are grateful to Paul Sinnige and Timo Gerlagh, the Netherlands's lead representatives to the Task, for co-authoring this newsletter's feature article on biofuels-related developments in the Netherlands.

As always, we appreciate your readership and value your input and feedback on this newsletter. Please email us any ideas or suggestions for increasing its value.

Thanks for reading and participating in the IEA Bioenergy Task 39 network.

Jim, Jack, and Mahmood

"Poldering" a new Climate Agreement in the Netherlands

Paul Sinnige and Timo Gerlagh, Netherlands Enterprise Agency

To paraphrase the introduction to a July 9, 2019 article in the Economist magazine on the Netherlands new climate agreement, the reclaimed marshlands comprising most of the Netherlands' agricultural lands are referred to as "polders." This word has more recently also been used to describe the Dutch style of governance, the so-called "polder model", in which different competing societal stakeholders negotiate with one another on how to tackle common cross-sectoral problems like mitigating increasing climate disruption and sea level rise. The "polder model" resembles the way Dutch nobles and farmers historically negotiated to reach agreements about how to keep their polders above water and how to divide up the costs for doing this.

The latest round of this type of Dutch "poldering" about how best to address exacerbating climate change and rising sea levels has resulted in the government recently releasing a new National Climate Agreement. This new agreement represents the product of over a year of bargaining between industry, consumer groups and politicians over how to best meet the Netherlands' ambitious targets for reducing carbon emissions; under the global climate agreement signed in Paris in 2016, the Netherlands committed to cut its CO_2 / greenhouse gas (GHG) emissions by 49% by 2030 and by 95% by 2050. The thorny issues were how to do this and who would pay for it.

The "poldering" discussions took place in five groups, each dealing with a separate key energy consuming or producing sector: electric power generation, the built environment, industry, agriculture and mobility (transport). Each of these sectors has a distinctive decarbonization path and specific opportunities for considering cross-sectoral cooperation and leveraging, e.g., on aspects such as systems integration, circular economy material flows, residual heat usage/management, and economic development/employment). The main governmental priorities for the outcome of these "poldering" negotiations were that whatever measures were to be taken would be affordable, feasible and fair to the Dutch society.

The infographic below (Figure 1) shows the main scope and elements of the agreement.

Mobility

For the classification and analysis of measures aimed at realizing cleaner, smarter and different mobility solutions, the mobility system is broken down into its various layers.

1. Physical infrastructure: Measures that affect the foundation of the mobility system, both to increase sustainability in the short term through tendering processes and over the longer term to allocate the right investments for future mobility.
2. Traffic services: Measures that optimize the use of infrastructure.
3. Transport services: Measures that make both passenger and freight transport more sustainable by utilising sustainable energy carriers. This affects the transport itself and also its associated refuelling and charging infrastructure.
4. Mobility services: Measures that make personal mobility more sustainable, such as behavioural measures to motivate people to travel in a different way. Examples include providing better insight into the various modes of travel available, giving employers a key role in their employees' choice of transport and promoting concepts such as the "new-driving style", the best tyres and car sharing.

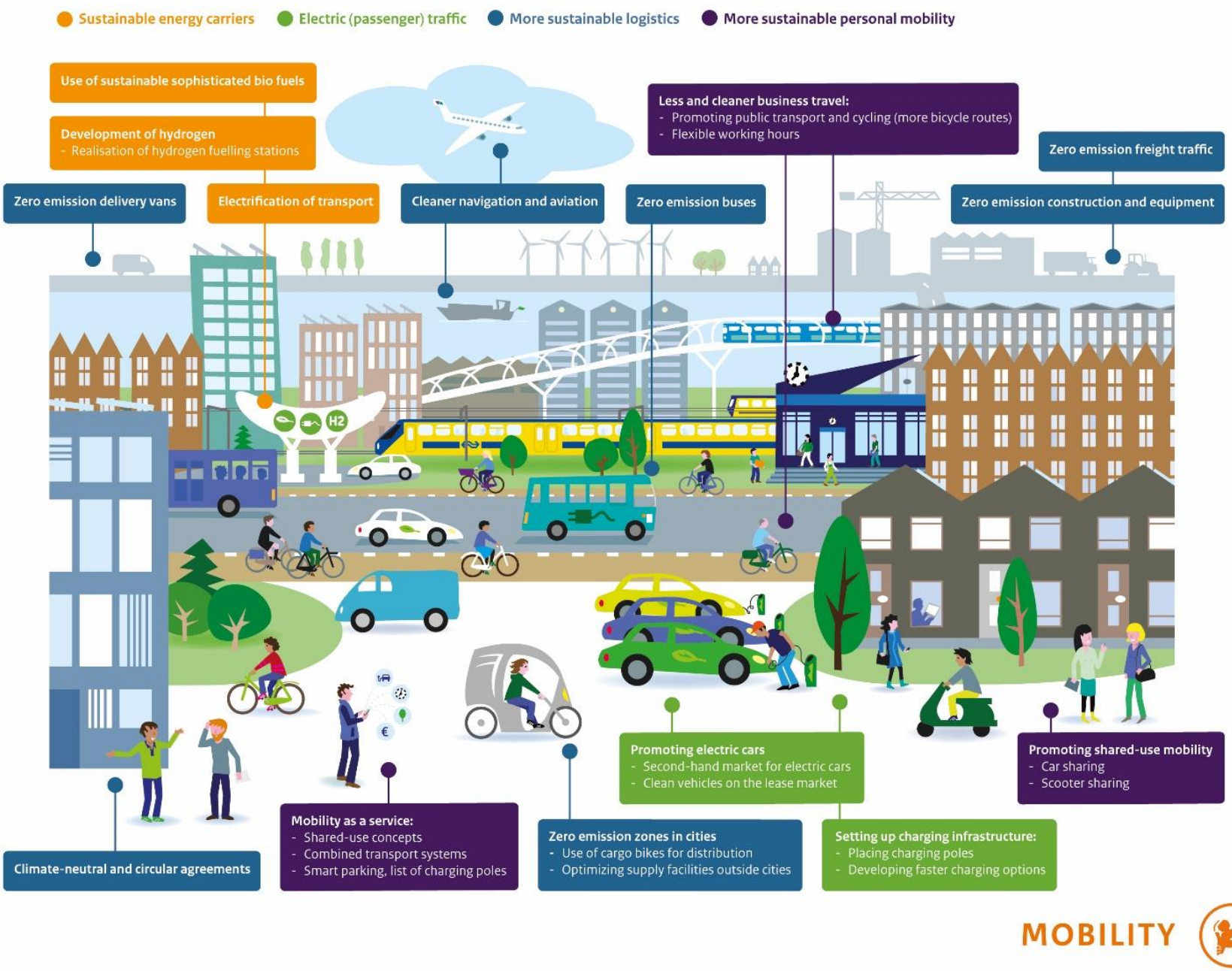

Figure 1. Illustration of the scope and main elements of the Netherlands' new National Climate Agreement

After examining mobility from these different points of view, the focus group on mobility concluded that while it is certain mobility needs will remain more or less the same and be significant in the coming decades, the methods used to meet them will change.

With a strong focus on passenger transport and recognising that transport is responsible for a quarter of all emissions, one of the main goals of the agreement is an ambition for all new passenger cars sold in the Netherlands to be emission free by 2030 at the latest. Another is to place a strong emphasis on promotion of hydrogen and electricity-powered vehicles because such vehicles produce zero tailpipe GHG emissions, helping to keep air clean and also causing less noise pollution. The government sees an important role for itself in enabling conditions that support the development of driving hydrogen-fueled and electric cars, and has already announced measures like supporting development of an electric car charging system that's "as easy as charging your mobile phone." The same applies to hydrogen.

Regarding existing vehicles with internal combustion engines, and realizing that heavy duty transport for shipping and aviation will continue to depend on combustion motors, parties to the agreement concluded that there is still a need to reduce emissions through the use of innovative biofuels. However, the European opinion against the use of biomass feedstocks that raise indirect land use issues coupled with the Netherlands' strong food-based agri-economy means that there is strong opposition to increased production of biomass, which motivates an ever stronger focus on the use of residues and wastes as feedstocks for biofuels as well as on the development of synthetic fuels from residual renewable power. For these reasons, the parties have agreed that for achieving the renewable energy target for transport, no additional biofuels from food and feed crops in excess of 2020 levels should be used in the Netherlands.

The government will also initiate the development of an integrated sustainability framework for all biomass types in order to ensure a consistent approach across the different sectors in which biomass is used. However, biofuels for transport are subject to the EU sustainability framework published in December 2018 (Renewable Energy Directive 2018/2011) and this will be the basis of the new regulation, to be implemented in all EU countries during the next 2 years. This framework will be taken into consideration in the development of the integrated sustainability framework for the Netherlands. How is still to be discussed.

Zero emission mobility

The logistics sector and municipalities together with the Dutch government have the ambition to reduce bus, lorry and delivery van emissions to zero in 30 to 40 of the Netherlands' city centres by 2025. Achieving this will make a significant contribution towards reducing air pollution and improving air quality in locations where many people will directly benefit. A major future role for hydrogen is envisioned, both as an energy carrier in public transport buses and as a potential replacement fuel for diesel trains. As hydrogen is also expected to play a role as an energy carrier for all sustainably generated energy, an additional agreement with the energy and industrial sectors will be entered into in 2020 in order to achieve the targets. It is expected that progress will accelerate, particularly in the second half of the next decade, due to falling battery prices, an increased supply of hydrogen and stronger competition.

Employers and public transport agencies will collaborate in taking further measures to reduce carbon / GHG emissions from commuting by promoting more easily accessible travel using shared cars, public transport and bicycles. This will likely lead to an increasing shortage of good bicycle parking facilities, and therefore the government has promised to set aside additional funding for the co-financing of bicycle parking facilities.

To make electric vehicles attractive and affordable for everyone in the long term a change in approach is needed that takes better advantage of the market dynamics of reducing the per-car incentive. The government must also adjust to excise duty tax revenue reductions coming with the transition to zero-emission transport. To avoid a situation in which a dwindling number of people generate excise duty tax revenues, an overhaul of the motor vehicle tax system will be needed in due time. A pay-as-you-go system will therefore be explored.

Leased cars are a key component of the Netherlands' second-hand vehicle market. Encouraging the business segment to increase its focus on cars that will remain attractive to the future Dutch market will be an important factor to ensure an increasing share of electrical passenger cars in the Netherlands. In order to foster a thriving second-hand market in

electric cars for private individuals, the government has announced it will develop a scheme to reimburse credit charges and provide purchase subsidies or battery guarantees to make it easier for private individuals to afford a second-hand electric car.

Hydrogen is seen as an important energy carrier in future mobility and will require the development of an expanded production and use infrastructure. Additional measures are required, however specifics depend on future market developments. In passenger transport, 15,000 fuel cell vehicles (FCEV = Fuel Cell Electric Vehicles) are assumed to be operating in 2025, possibly growing to 300,000 in 2030, with a projected hydrogen requirement of 141 million kg per year. Therefore, an ambitious agreement will be reached with the sector in 2020 in order to be able to achieve the goals in the Climate Agreement.

Renewable fuels

A large fraction of the biofuels being used in the Netherlands are produced from wastes and residues. In 2018, the Netherlands reached a share of approximately 4.5% (excluding double counting) renewable fuels in road and rail transport, with 72% of this production based on wastes and residues biofuels. Including double counting the obligation for 2020 will be 16.4%, which greatly exceeds the EU's 10% target.

Parties in the Climate Agreement consider sustainability a qualitative and quantitative condition for the use of renewable fuels to achieve the European target for renewable energy in transport. To guarantee the sustainability of renewable fuels to be used, the Netherlands will follow the sustainability requirements of the EU's new Renewable Energy Directive (RED II, Article 29). This includes the European Commission's criteria on avoiding use of feedstocks posing a high risk of indirect land use change (ILUC). In a broader context, the Dutch government will develop an integrated sustainability framework for all biomass, ensuring a consistent framework across the various sectors where biomass is used, with special attention paid to assurance, feasibility and enforceability. This framework is expected to become available in 2020.

The implementation process for RED II is underway and must be completed before July 1, 2021. In order to achieve the Climate Agreement's objectives, 60 PJ of renewable fuels, including biofuels will be part of the Dutch fuel mix for road transport. Further use of electricity and hydrogen in transport will be supported by other measures. This means that by 2030, 60 PJ of renewable fuels will be part of the Dutch fuel mix for road transport. On top of this, renewable fuels for the inland shipping sector will add another 5 PJ. The Climate Agreement is based on emission reduction measures and the increased use of renewable fuels will contribute about 2 Mton of CO_2 / GHG emissions reduction.

To ensure the targets are met, parties to the Climate Agreement have agreed to support the additional use of renewable fuels in the Dutch transport system by increasing obligations for renewable energy in transport beyond what is already being used to meet the current RED obligation. The new legislation needed for this will also include provisions for how CO_2 emissions will be controlled along the renewable fuel supply chain. The integral sustainability framework to be developed for biomass feedstocks will determine how CO_2 emissions caused by ILUC will be included when calculating the CO_2 emissions across the biomass / biofuels supply chain.

Besides enlarging the renewable fuels obligation, parties are exploring the possibility of introducing a Green Truck Fuel. A pre-condition for this is that projected CO_2 reductions will actually be achieved, and that the fuel meets the sustainability framework's sustainability requirements.

Support

To support this transition, the government has budgeted 200 million euros to increase innovation on sustainable production of advanced biofuels and renewable synthetic fuels in the Netherlands. The central government is currently assessing which policy instruments will be most suitable for this, and will not use these funds until 2020. Parties must ensure that only stimuli that the Netherlands is eligible for within EU state aid rules are used to supplement the

European obligation for renewable energy. Beyond this, all supplemental production must abide by the sustainability framework.

Another important driver for improving related infrastructure is the European Alternative Fuels Infrastructure Directive (AFID), which regulates the roll-out of fuel tank and fuel distribution/loading infrastructure. The central government and local and regional authorities will prepare an integrated plan for the Netherlands' projected needs for alternative tank and loading infrastructure including storage. A key objective is to accelerate the implementation of greater refueling and charging infrastructure for sustainable energy carriers for transport at petrol stations underpinning the road network.

Cross-sectoral use of sustainable biomass

For cross-sectoral cooperation, the parties joining the Climate Agreement have agreed to work towards the highest possible use of sustainable biomass. Joint opinion is that until 2030 biomass will serve as a transition fuel for multiple applications. In the longer term, the aim is to use sustainable biomass for its highest-value applications in economic sectors where there are few alternatives, for example as a raw material in industry and as a feedstock for fuel for heavy duty vehicle applications including aviation and shipping.

By 2030, cross-sectoral use should already be happening to the extent that specific applications are encouraged or discouraged. This is also expressed in concrete terms in the efforts of the parties to focus, among other things, on knowledge and innovation agendas to develop and upscale biomass-free alternatives for all applications. For instance, by making agreements to increase the production and supply of sustainable advanced gaseous and liquid fuels from non-biomass circular economy feedstocks.

Feedstock

It is important to note that a significant amount of current production is based on using Used Cooking Oil and animal fat feedstocks, feedstock categories that are limited under the RED II to a maximum share of 1.7% of final consumption. Parties to the Climate Agreement have agreed that no additional biofuels produced from food and feed crop feedstocks will be used (beyond the level used in 2020) to achieve the renewable energy target for transport. One may conclude that the Netherlands has set has a large ambition to find other waste and residue feedstocks to enable increased production of advanced renewable biofuels, together with the development of renewable fuels of non-biological origin as well as recycled carbon-based fuels. This is consistent with the government's objective to use biomass as much as possible and to further develop the circular economy programme that was launched in September 2016.

In the News

Reports and Research

- May 2019 - A new type of combustion chamber presents a potential win-win for alternative fuels to be used in internal combustion engines. Researchers working with NASA on alternative fuel technologies have found a way to more precisely control the ratio of air to fuel inside the combustion chamber — a critical variable that governs emissions, efficiency and safety (Read more).

- June 2019 – The Renewable Energy Division of the International Energy Agency (IEA) released its latest report on Tracking Clean Energy Progress (TCEP) on Transport Biofuels. This report showcases the latest developments in transport biofuels and contrasts progress against 2030 needs as outlined in the IEA's Sustainable Development Scenario (SDS). It also includes technology analysis and policy recommendations on what is required to get on track with the SDS (Read more). This report forms part of the wider TCEP analysis which assesses the whole energy system. For further information see: https://www.iea.org/tcep/. (There is also a page on bioenergy for power: https://www.iea.org/tcep/power/renewables/bioenergy/.)

- July 2019 - IEA Bioenergy released its first edition of IEA Bioenergy News, which includes an article on Bioenergy in The Netherlands, news from the ExCo83 meeting and a Task Focus on IEA Bioenergy Task 39 (Read more).

- July 2019 - IEA Bioenergy Task 42 published its latest report, "Technical, Economic and Environmental Assessment of Biorefinery Concepts — Developing a Practical Approach for Characterisation," which provides an overview on biorefinery assessments methods and results. Currently, there are two main challenges related to assessing the environmental and economic components of biorefining processes: data availability and stakeholder participation. To address these issues, IEA Bioenergy's Task 42, Biorefining in a Circular Economy, examined assessments currently underway to highlight the potential of biorefineries to enhance the use of biomass to generate both energy and bio-based products (Read more).

- July 2019 - Two new academic studies provide further evidence of grain-based ethanol's potential to significant reduce greenhouse gas (GHG) emissions. These studies also call into question the reliability of recent analyses of land use change, which apparently have been based on flawed satellite imagery-based methodologies (Read more).

Policy and Regulatory Developments

- May 2019 - The US Environmental Protection Agency (EPA) provided guidance on how to demonstrate that an analytical method for determining the cellulosic converted fraction of corn kernel fiber co-processed with starch at a traditional ethanol facility satisfies the applicable regulatory requirements. Public confidence in the volumes of cellulosic ethanol produced under the Renewable Fuel Standard (RFS) program is important to the integrity of the program (Read more).

- May 2019 - New 2018 data from the California Air Resources Board (CARB) indicates that the Low Carbon Fuel Standard (LCFS) continues to drive production of a growing volume of cleaner transportation fuels for California consumers. To date, almost 3.3 billion gallons of petroleum diesel have been displaced by lower carbon alternatives. The 2018 data also shows 100% compliance by fuel producers with LCFS requirements (Read more).

- May 2019 - In the absence of objections by the European Parliament and Council on the proposed text within the given two-month scrutiny period, the European Commission has published in the Official Journal the Delegated Act on the determination of high indirect land-use change-risk feedstock and the certification of low indirect land-use change-risk biofuels (Read more).

- May 2019 - New data from the California Air Resources Board's (CARB) Low Carbon Fuel Standard (LCFS) programme reveal that biodiesel and renewable diesel have delivered the largest-ever reduction in transport-related greenhouse gas (GHG) emissions in the state. According to the figures for 2018, California's use of biodiesel

and renewable diesel reduced carbon dioxide emissions (CO_2) by 4.3 million tons, which was higher than the reductions made through the use of ethanol fuel (Read more).

- June 2019 - A new regulation, signed recently by Brazil's Ministry of Mines and Energy, is expected to help Brazil's ethanol sector receive investment close to R$ 12 billion per year. The measure, part of Brazil's new RenovaBio national biofuel policy, will regulate conditions for issuing infrastructure debentures for petroleum, natural gas and biofuel projects (Read more).

- June 2019 - The U.S. Department of Energy's (DOE) Co-Optimization of Fuels and Engines (Co-Optima) initiative is accelerating the introduction of efficient, affordable, and scalable high-performance fuels and engines. It focuses on fuels and engines research and development to maximize light-, medium-, and heavy-duty vehicle fuel economy and performance, while mapping lower-cost pathways to reduce emissions, leveraging diverse domestic fuel resources, boosting U.S. economic productivity, and enhancing national energy security. To showcase the Co-Optima initiative's achievements in Fiscal Year 2018, DOE released the Co-Optima FY18 Year in Review (Read more).

- July 2019 - the US EPA issued proposed volume requirements under the Renewable Fuel Standard program for cellulosic biofuel, advanced biofuel, and total renewable fuel for calendar year 2020. EPA also proposed biomass-based diesel volume standards for calendar year 2021 (Read more).

- July 2019 – The United States risks lagging internationally on fuel economy. As the US moves closer to finalizing light-duty vehicle fuel economy and emissions standards, the EPA may be considering a small increase in required improvements, rather than an outright freeze on standards as previously proposed (Read more).

- July 2019 - A new report issued by the USDA Foreign Agricultural Service's Global Agricultural Information Network predicts China will miss its goal to implement E10 by 2020 by a wide margin, likely only achieving a blend rate of 3% to 3.5% in 2020 (Read more).

- August 2019 - A 2019 annual report on EU biofuels issued by the USDA's Foreign Agricultural Service notes that the region is no on track to meet the 10% target set for renewable energy use in the transport sector for 2020, with biofuels only accounting for 7.1% of energy use in 2018 and a forecast 0.2% increase to 7.3% this year (Read more).

Industry News

- May 2019 - In Germany, VERBIO Diesel Canada Corporation, a wholly owned subsidiary of VERBIO Vereinigte BioEnergie AG, signed a contract with Atlantic Biodiesel Corporation to purchase a biodiesel plant located in Dain City, Ontario, Canada. The plant has an annual production capacity of approximately 150,000 tons of biodiesel and 18,000 tons of raw glycerin (Read more).

- May 2019 - BP, Nouryon (formerly AkzoNobel Specialty Chemicals), and the Port of Rotterdam have joined forces to explore the opportunity of making 'green hydrogen' via water electrolysis for BP's refinery in Rotterdam, the Netherlands, which has the potential to significantly reduce CO_2 emissions. The refinery currently uses hydrogen made from hydrocarbons to desulphurize products. Replacing this entirely with green hydrogen produced from water using renewable energy could potentially result in a reduction of 350,000 tons of CO_2 emissions per year based on current circumstances (Read more).

- May 2019 - In California, Edeniq announced that CARB has approved its first two Intellulose 2.0 techology customers for cellulosic ethanol production from corn kernel fiber. Siouxland Ethanol, a 90 million gallon per year (MGPY) corn ethanol plant located in Jackson, Nebraska, was certified on May 6 with a carbon intensity ("CI") rating of 26.67. Elite Octane, a 150 MGPY corn ethanol plant located in Atlantic, Iowa was certified on May 7 with a CI rating of 30.32. Using Intellulose 2.0 technology, the two plants achieved average corn kernel fiber ethanol production of 3% of total production, nearly triple the average performance traditionally associated with the benefits of Intellulose 1.0 that regulatory agencies had previously approved (Read more).

- May 2019 - In the UK, Air BP announced it has offered sustainable aviation fuel to general and business aviation customers and aircraft manufacturers at Stockholm's Arlanda (ARN/ESSA) airport in Sweden as well as at the Caen Carpiquet (CFR/LFRK) airport in France. This latest fuel offering supports the industry's Sustainable Alternative Jet Fuel (SAJF) initiative, launched one year ago, which aims to encourage operators and aircraft manufacturers to use sustainable aviation fuels (Read more).

- May 2019 - In Norway, starting from 1 January 2020, 0.5% of aviation fuel sold in Norway will be advanced biofuels, and the necessary regulatory changes will be introduced in the Product Regulation. Norway is one of the first countries in the world to introduce such a requirement within its the aviation sector (Read more).

- July 2019 - French energy company Total has started up production at its La Mède biorefinery in southeastern France, with the first batches of biofuel coming off the line. It is the final step in converting this former oil refinery into a new energies complex. Launched in 2015, the project represents a capital expenditure of €275 million (Read more).

- July 2019 - In Denmark, Maersk is rolling out a flagship project with Switzerland-based RSB to transfer emissions savings from its use of alternative fuels to its clients, with retail giant H&M among the first to benefit. RSB is developing a 'book and claim' system that will allow Maersk to reliably and credibly pass on greenhouse gas savings to customers as part of its drive to reach carbon neutrality (Read more).

- July 2019 - In Sweden, a new report from the Swedish fuel and biofuels agency SPBI says the volume of biofuels in the transport sector including work machines amounted to approximately 1.7 million cubic meters in 2018. The biggest in the market is HVO drop-in, followed by HVO 100 (Read more).

- July 2019 - The Netherlands is on track to reach the European target for renewable energy for transport of 10% in 2020. In 2018, the Netherlands was well above the European average at 8.9%. This is apparent from the total report on the deployment and origin of renewable energy for transport, which the Dutch Emissions Authority (NEa) reports annually (Read more).

- July 2019 - Experts suggest much of the diesel fuel on the market today is not suitable for tomorrow's diesel engines, but whether this is because fuel specifications are inadequate or because supply management techniques are insufficient depends on who you ask (Read more).

- July 2019 - Following a recent policy change by the Japanese Government, the country has received its first shipment of ethyl tert-butyl ether (ETBE) made from US corn-based ethanol (Read more).

- July 2019 - Energy giant BP PLC is doubling down on biofuels with a joint venture with agricultural trader Bunge Ltd. in Brazil, betting that the global movement to reduce carbon emissions will boost demand for low-carbon fuels (Read more).

- July 2019 - Aries Clean Energy completed environmental permitting for a large-scale biosolids gasification facility to be built in New Jersey. The company also launched retail sales of its Aries Green biochar product (Read more).

- August 2019 - Golden Grain Energy received the approval of the California Air Resources Board to produce cellulosic ethanol made from corn kernel fiber at its plant in Mason City, Iowa, according to Edeniq, a biotech company that supplies the advanced technology being used at the facility (Read more).

Upcoming Meetings & Conferences

2019

August

- Asia Palm Oil Conference (APOC) - August 22-23, 2019 - Pattaya, Thailand
- ACS National Meeting & Expo - August 25 - 29, 2019 - San Diego, USA
- 14th World Congress on Biofuels and Bioenergy - August 26-27, 2019 - Vienna, Austria

September

- International Conference on Biofuels and Bioenergy - September 23-25, 2019 - Barcelona, Spain
- 5th Advanced Biofuels Conference - September 17-19, 2019 - Stockholm, Sweden

October

- GTI TC Biomass Plus 2019 - October 7-9, 2019 - Rosemont, USA
- Global Experts Meeting on Frontiers in Biofuels and Bioenergy - October 14-16, 2019 - Rome, Italy
- Advances in Biofuels and Bioenergy - October 21-22, 2019 - Toronto, Canada
- ABLC Next - October 30-November 1, 2019 - San Francisco, USA
- Lignofuels America - October 30-31, 2019 - Omaha, USA

November

- 2019 ASA-CSSA-SSSA International Annual Meeting, Embracing the digital environment, November 10-13, San Antonio, USA
- 2019 AIChE Annual Meeting - November 10-15, 2019 - Orlando, USA
- Sustainable Aviation Fuel Symposium - November 14-15 2019 - New Orleans, USA
- 10th Annual Conference on Bioenergy and Biofuels - November 18-19, 2019 - Abu Dhabi, UAE

2020

March

- Brazilian Bioenergy Science and Technology Conference - March 30-April 1 - São Paulo, Brazil

IEA Bioenergy Task 39 Meetings

IEA Bioenergy Task 39 is holding its second business meeting of 2019 in Stockholm, Sweden on September 16-17 in conjunction with Sweden's 2019 Advanced Biofuels Conference being held 17-19 September.

In 2020, IEA Bioenergy Task 39 plans to hold its first business meeting in São Paulo, Brazil in conjunction with The Brazilian Bioenergy Science and Technology Conference being held on March 30- April 1, 2020.

Please contact us for more detailed information about the Task's future business meetings.