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Date

March 18, 2014

Technical report

EMISIA SA report

No: 14.RE.002.V2

The contribution of biofuels in transport sustainability post-2020



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| Quotation The contribution of biofuels in transport sustainability post-2020 | Call for Tender No: |
| Document Title Technical report | Contract No: |
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| Summary <p>Biofuels have played a significant role in improving the sustainability of road transport and have significantly contributed so that EU reaches its environmental targets. The new 2030 framework on climate and energy does not specify mandatory targets for the share of biofuels in the transport energy mix. This is expected to affect the sustainability of transport. This report provides different scenarios on what the new framework and the loose targets may entail in terms of transport sustainability and CO₂ emissions.</p> | |
| Keywords CO2 emissions, renewables, biofuels, energy and climate package | |

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|--|---------------------|--|--|
| Internet reference No internet reference | | | |
| Version / Date Final version / March 18, 2014 | | Classification statement Confidential | |
| No of Pages 22 | No of Figures 18 | No of Tables 5 | No of References 7 |
| Approved by:  Giorgos Mellios | | |  Emisia is an ISO 9001 certified company |



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1 Introduction and Background

1.1 General

This report summarises the findings of a short study on the prospective effects of different biofuel policies in transport in terms of greenhouse gas emissions and increasing the share of renewables. Biofuels have contributed to increasing the sustainability and energy security of the transport sector and have led to a reduction of greenhouse gas (GHG) emissions. Hence, this study focuses on what the future may bring on the share of biofuels in transport.

1.2 Background

Recently, the European Commission published a policy framework for climate and energy in the period from 2020 to 2030 (COM(2014) 15 final), to complement the current 2020 policy targets. The new framework proposes a global EU strategy based on a 40% reduction in total greenhouse gas emissions in 2030 compared to 1990. This is backed up by the target to reach a 27% indicative share of renewables in the total energy mix. These are challenging targets but aim at improving the energy security and controlling the contribution of Europe to climate change.

The transport sector has been identified as one of the pillars of the new policy package. The transport sector is traditionally powered by liquid fossil fuels. Hence, substitution of these fuels with renewable energy will greatly contribute in reaching the overarching energy and sustainability targets. So far, biofuels have played the most significant role in the substitution of fossil fuels, accounting for 4 % of total energy consumption in transport by 2010 and with their share increasing by each year. Significant investments have already been made regarding production of feedstock, processing and distribution of biofuels. Hence, the whole area has been matured and has been efficiently working for a number of years. As production of biofuels is primarily made domestically, this has had an important impact on the creation of jobs and energy security in Europe.

The advancement of biofuels in Europe has been backed up by two specifically directed policies:

- The "Fuel Quality Directive" - FQD (2009/30/EC) that set sustainability criteria for biofuels and mandated that lifecycle greenhouse gas emissions per unit of energy supplied should be reduced by 6% in 2020, compared to the 2010 average level.
- The Renewables directive – RES (2009/28/EC) mandating the share of energy from renewable sources in all forms of transport in 2020 is at least 10 % of the final consumption of energy in transport, in each Member State.

Moreover, Regulation 443/2009 mandated that new passenger cars sold in Europe should average 130 gCO₂/km in 2015 with an additional 10 gCO₂/km reduction originating from additional policies, including biofuels.

Despite this success story, and the clear benefits and maturity of biofuels, the new policy framework proposed establishes "no new targets for renewable energy or the greenhouse gas



intensity of fuels used in the transport sector after 2020” on the grounds that “first generation biofuels have a limited role in decarbonising the transport sector”.

Therefore, the new loose targets create much confusion not only for the post 2020 era but also until 2020. If no mandating targets exist post 2020, then implementing the 2020 targets will be increasingly difficult. Under the prospect of this development, it is reasonable to assume that, after 2020, even all transport fuel may progressively shift back to a 100% fossil fuel basis, a fact which would seriously jeopardise current environmental efforts and have direct economic implications.

1.3 Objectives

This study aims at identifying different developments related to the sustainability of transport, depending on how the biofuels consumption develops. In particular, the following objectives were set:

- Identification of how much biofuels have already contributed in reaching the environmental targets set for transport.
- Projection of the expected future benefit with biofuels in a business as usual scenario.
- Estimation of the potential of biofuels if a supportive policy framework was decided.

2 Implementation

2.1 Approach

The suggested work refers to the comparison of a variety of penetration scenarios on renewable energy in transport. Then, given that an energy target has been reached, we estimate how much impact this will have on the production of GHG - mainly CO₂ - emissions from transport, so that the ongoing policy shift can be evaluated.

Initially, Emisia developed a list of probable scenarios in collaboration with the European Biodiesel Board. The different scenarios mainly include a number of assumptions on:

- Biofuels and other renewables penetration estimations;
- Greenhouse Gases saving development;
- Renewable electricity level and development.

The emphasis on the scenario development was placed on biodiesel usage. The scenario formulation process considered the current policy framework (EC, 2011), the upcoming policy change, and probable technology pathways.

2.2 Coverage and Metrics

The scenario evaluation was conducted for the whole of the EU-28 region, in terms of:

- Energy consumption per fuel type (fuel barrel) highlighting total renewables and total biofuels.
- CO₂ emissions as a total for each scenario.
- CO₂ per source type (fossil/renewables/biofuels, downstream/lifecycle).
- CO₂ emission sector level impact (Road transport, Transport, Total).

Moreover, since the emphasis of this report focuses on transport and more specifically, road transport, the relative and absolute comparison of the different scenarios will delineate the effect on these fields in more detail.

The Road transport analysis includes emissions from:

- Passenger cars
- Light Commercial Vehicles
- Heavy duty vehicles
- Mopeds and motorcycles

The Transport sector considers the following sources:

- Road transport (detailed above)
- Inland waterways
- Rail
- Domestic Aviation

Finally, total CO₂ includes all energy – related sources.



2.3 Scenarios

2.3.1 General Assumptions

Three different scenarios were developed, assuming different targets for the contribution of biofuels in transport. All three scenarios were based on the general activity and energy projections used for the new framework on climate and energy, as described in the new “Trends to 2050” manuscript (EC, 2013).

In the “Trends to 2050” manuscript, the detailed energy and CO₂ emissions per fuel were not separate available for transport. Hence, in our scenarios, the transport energy mix for the historic years was based on available published data (EU, 2012) and also our results on the basis of the TRACCS¹ data. Then, reasonable projections were made in order to meet on one hand the energy projection of the Trends to 2050 development and, on the other hand, the total transport-related CO₂ emissions calculated in that report. The fuel split for road vehicles was based on the projections of the SIBYL² model. This constituted the reference scenario. Variations to the reference scenario led to the two alternative scenarios, as outlined below.

The FQD calls for estimation of the GHG benefit of biofuels considering the lifecycle emissions of fuels. For biofuels we considered the GHG savings for ethanol and biodiesel estimated by USDA (2011), using the 2014 forecast. For fossil fuels, we considered the upstream contribution for the various fuel grades, as defined in the JEC study (JRC, 2011). Hence, the values used for the fuel production part were set to 0.59 tCO₂/toe for gasoline, 0.67 tCO₂/toe for diesel, and 0.36 tCO₂/toe for kerosene (jet fuel).

2.3.2 Reference scenario (REF)

These average GHG savings of biofuels were considered constant up to 2010, for the reference scenario (referred to as REF in the remainder of this report). The biodiesel GHG saving projection was then increased to reach 65% by 2020 (see Table 1). This improvement has to do both with the improvement in the production of biofuels and the increased penetration of biofuels with an improved sustainability index, such as biodiesel from used frying oil.

Table 1: Biofuel GHG savings in the reference scenario.

| | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|-------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Bioethanol | 66.16% | 66.16% | 66.16% | 66.16% | 66.16% | 66.16% | 66.16% | 66.16% | 66.16% | 66.16% | 66.16% |
| Biodiesel | 54.88% | 54.88% | 54.88% | 59.94% | 65.00% | 65.00% | 65.00% | 65.00% | 65.00% | 65.00% | 65.00% |

The share of carbon free gross electricity generation from renewable energy forms was based on the results of the Trends to 2050 study (EC, 2013) and its evolution over the years is depicted in Table 2. All these trends are graphically illustrated in Figure 1.

¹ TRACCS research project, more information at traccs.emisia.com.

² SIBYL computer model, more information at <http://www.emisia.com/sibyl/general.html>

Table 2: Share (%) of renewables in electricity generation in the REF scenario.

| | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|-------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Renewables | 14.4% | 14.4% | 21.0% | 27.1% | 36.1% | 40.7% | 44.5% | 47.5% | 49.3% | 50.2% | 51.6% |

This scenario was forced to be compatible with the Transport White Paper (EC, 2011) in terms of activity, the renewable targets described by Directive 2009/28/EC, and the GHG benefits of the Fuel Quality Directive 2009/30/EC. These directives require a 10% renewable energy content by 2020 in transport and a 6% CO₂ reduction from 2010 – 2020 due to biofuels in road transport, respectively.

Hence, the REF scenario can be considered as a business-as-usual type of scenario where the 2020 targets are reached and the momentum of biofuels continues in a normal pace to the future.

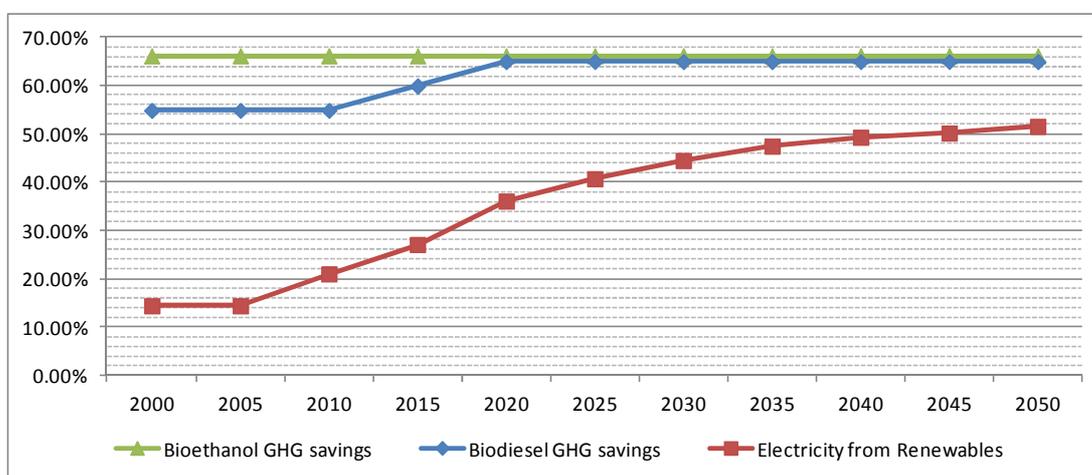


Figure 1: GHG savings of biofuels and share of renewables in electricity in the REF scenario.

2.3.3 No Biofuels scenario (NOBIOF)

The No Biofuels scenario (hereinafter also denoted as NOBIOF) attempts to present how transport sustainability may look like in the future without the contribution of biofuels. This is the potential result of removing any specific targets regarding renewables and GHG benefits in transport.

Under this perspective, the NOBIOF scenario assumes the same development of energy consumption in transport, as in the REF scenario. Up to 2015, the energy mix also follows the REF scenario mix. However, this changes in the future. The 2020 biofuel contribution becomes 3% in terms of GHG lifecycle reduction (as opposed to 6% in the REF scenario) on account of the reasonable assumption that the 2020 targets will become practically irrelevant in view of the absence of post-2020 targets. Therefore, all transport liquid fuel gradually shifts back to a 100% fossil fuel basis and a 0% of biofuels content is assumed from 2025 onward for all transport modes.



Otherwise, the GHG savings from biofuels follow the Reference scenario assumptions for the entire time series. The carbon free gross electricity generation from renewable energy forms is also the same as the REF scenario, i.e. the values presented in Figure 1 are used.

As a summary, the NOBIOF scenario modifies the REF scenario assumptions so as to demonstrate a plausible projection if no post-2020 targets exist for renewable/biofuels in transport and no additional measures are considered at all.

2.3.4 Dynamic Biofuels scenario (DYNAM)

The Dynamic Biofuels scenario (hereinafter also denoted as DYNAM) is generally formulated to demonstrate the technical potential of biofuels, if biofuel friendly policies are adopted. In this scenario, the GHG savings from biofuels are assumed to follow a more optimistic development reaching a 80% sustainability index in 2040, as a result of additional improvements to the production of biofuels and the share of highly sustainable biofuel components, such as used frying oil. The overall time-series development is depicted in Table 3 and Figure 2.

Table 3: Biofuel GHG savings in the DYNAM scenario

| | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|-------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Bioethanol | 66.16% | 66.16% | 66.16% | 66.16% | 66.16% | 69.11% | 72.05% | 75.00% | 80.00% | 80.00% | 80.00% |
| Biodiesel | 54.88% | 54.88% | 54.88% | 59.94% | 65.00% | 68.33% | 71.67% | 75.00% | 80.00% | 80.00% | 80.00% |

The projected sustainability levels of biofuels in the Dynamic Biofuels scenario could be achieved by aiming for a different feedstock use. For example, the 65% GHG saving in biodiesel can be met by increasing the recycled oil contribution from 13% (which leads to the 55% overall biodiesel GHG saving) to 25% by substituting a low sustainability production pathway such as rapeseed oil. In a similar manner, the 80% GHG saving would require a 60% contribution from recycled oils, while minimizing low sustainability production pathways.

In this scenario, it is also assumed that biofuels take over part of the renewable energy contribution of electricity. In principle, total electricity consumption in road transport is considered constant but the assumption is made that the contribution of renewables in electricity production confronts with difficulties compared to the REF scenario, hence a slower deployment of renewable electricity production is realised. The carbon free gross electricity generation from renewable energy in this scenario is shown in Table 4 and Figure 2. The gap in renewable energy that results from this change is then proportionally distributed to bioethanol, biodiesel and biojet fuel, so as to respect the same energy consumption as in the REF scenario. Alternatively, this scenario could reflect a slower overall penetration of electricity in transport.

Table 4: Share (%) of renewables in electricity generation in the DYNAM scenario.

| | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|-------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|
| Renewables | 14.40% | 14.40% | 21.00% | 24.05% | 28.55% | 30.85% | 32.75% | 34.25% | 35.15% | 35.60% | 36.30% |

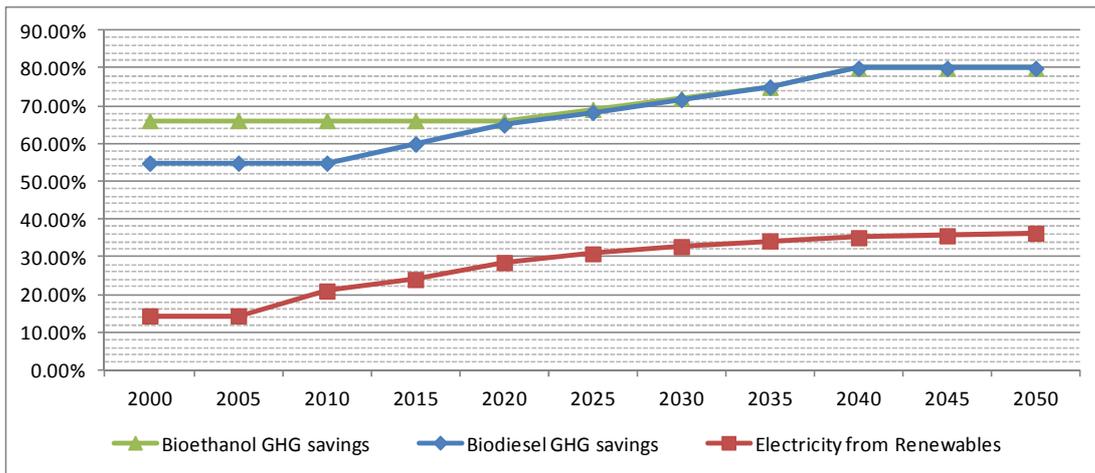


Figure 2: GHG savings of biofuels and share of renewables in electricity in the DYNAM scenario.

In addition, the penetration of biofuels in jet fuel (for the Aviation part) is somewhat faster compared to the Reference scenario as shown in Table 5 and Figure 3, to reflect faster GHG reductions expected from the aviation sector.

Table 5: Biofuel content in jet fuel in the different scenarios

| | 2000 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 |
|--------------|------|------|------|------|------|------|------|------|------|------|------|
| DYNAM | 0.0% | 0.0% | 0.0% | 0.0% | 1.0% | 2.0% | 3.0% | 3.5% | 4.0% | 4.5% | 5.0% |
| REF | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.3% | 0.6% | 1.9% | 3.7% |

The GHG savings % from biojet fuel was considered equal to the biodiesel value for the entire time series, as practically the same feedstock and process is used either for the production of biodiesel or bio-kerosene.

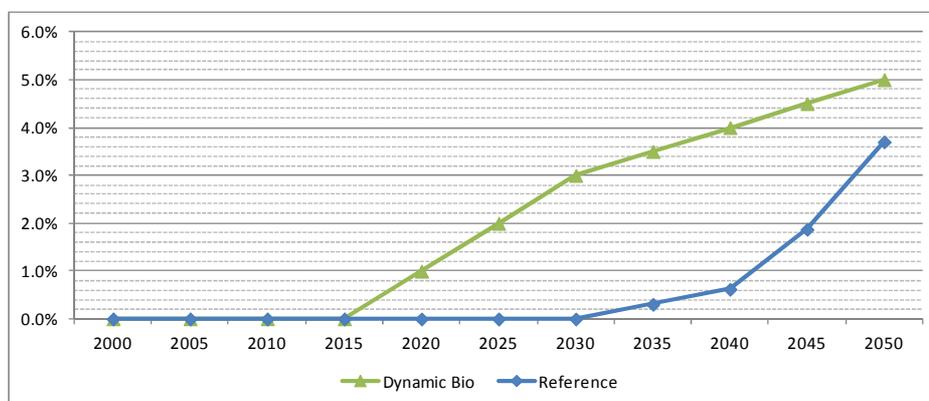


Figure 3: Share of biofuels in jet fuel in the REF and DYNAM scenarios.



2.4 Results

In the following sections, the results of the simulations are split down to Road Transport level, total Transport level, and Total energy-related CO₂. The total energy projection per fuel used in transport, following the assumptions in the previous section, is shown in Figure 4. The same energy mix has been used in all scenarios, however, the share of renewables for each fuel grade are differentiated in each scenario according to the assumptions outlined above.

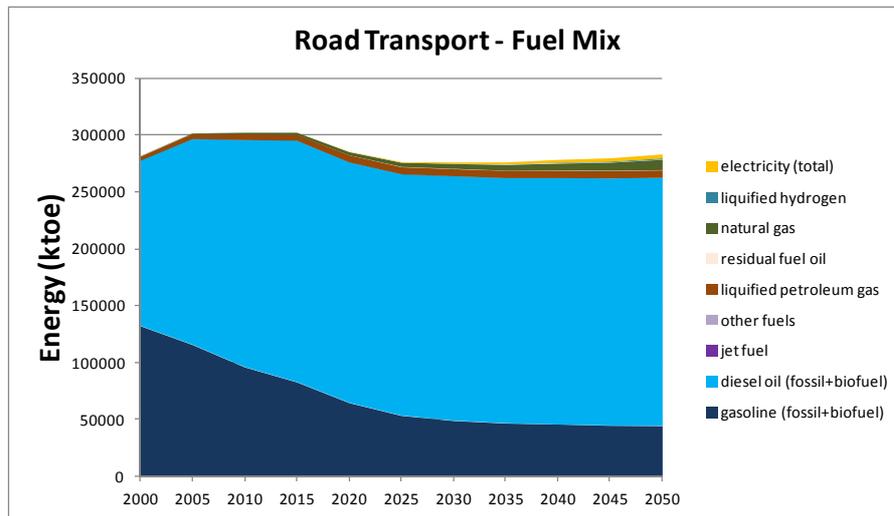


Figure 4: Basic road transport energy mix used in the scenarios of this study.

2.4.1 Road Transport

Figure 5 and Figure 6 show how the energy mix differs in the NOBIOF and DYNAM scenarios compared to the REF scenario, following the assumptions provided in the previous section.

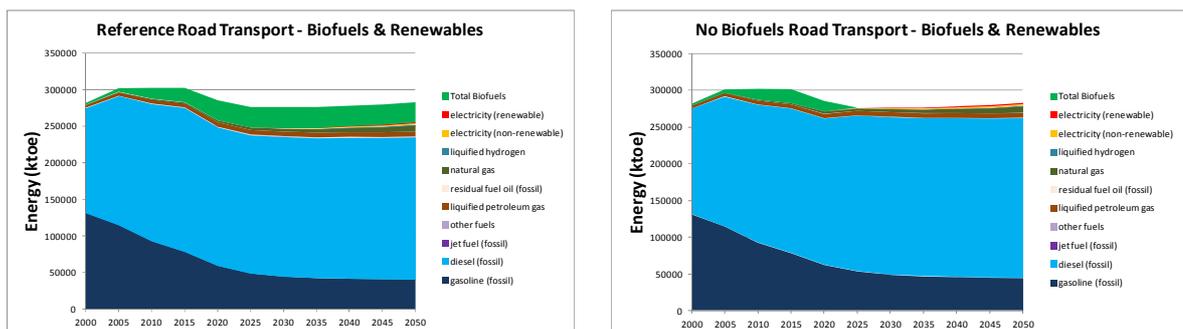


Figure 5: Energy mix in road transport: REF vs. NOBIOF scenarios.

These diagrams present the energy demand for each fossil fuel type in addition to the renewable electricity and total liquid biofuels (presented in red and green respectively). The differences are obvious in the comparison between the REF and the NOBIOF scenarios, where the Biofuels content is gradually reduced and disappears entirely by 2025.

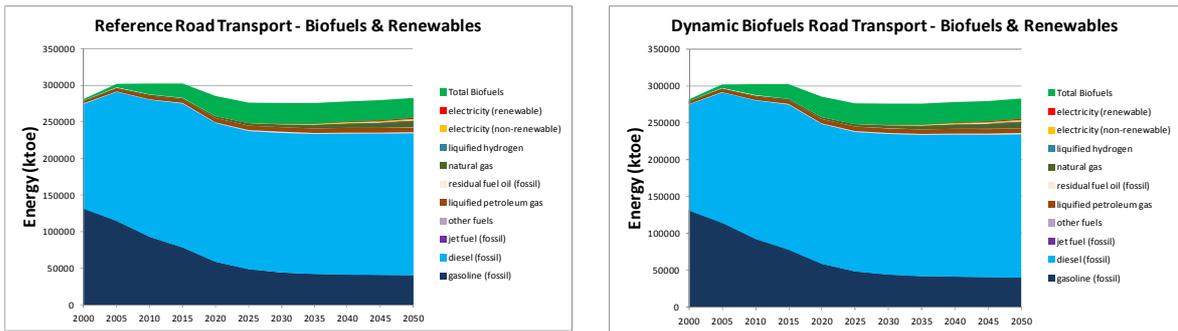


Figure 6: Energy mix in road transport: REF vs. DYNAM scenarios.

If the criteria of the Fuel Quality Directive 2009/30/EC are examined, it is clear that the targets set for the reduction of lifecycle GHG in 2020 by the scenario assumptions are met (Figure 7). The Reference scenario reaches the 6% target for 2020 and then this reduction remains almost the same. In the No Biofuels scenario, the 3% assumption is met for 2020 and a 0% is shown after this time. In the Dynamic Biofuels scenario, the increased biodiesel sustainability coupled with the highest energy share held by diesel (clearly shown in Figure 4) leads to a higher CO₂ reduction reaching almost 7.9% in 2040.

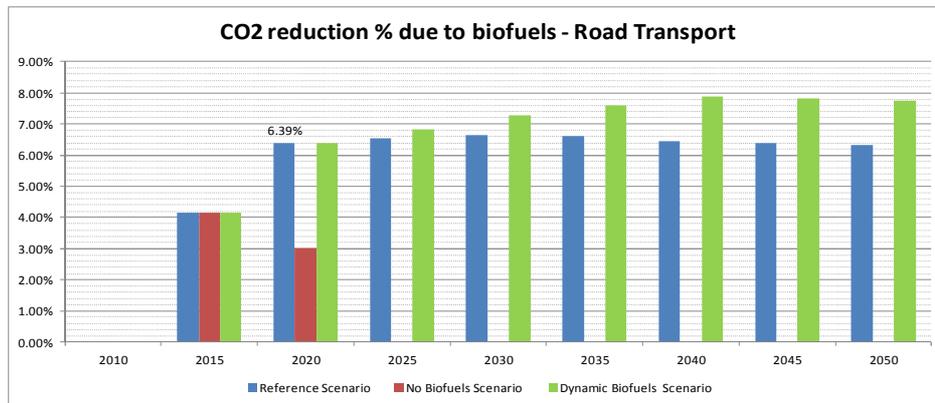


Figure 7: CO₂ reduction calculated according to Directive 2009/30/EC.

In Figure 8, the CO₂ emissions are shown for all three scenarios, expressed both in downstream and lifecycle terms, along with the percentage change between the Reference and the No Biofuels and Dynamic Biofuels scenarios, respectively. The increase in downstream CO₂ emissions in the No Biofuels Scenario exceeds 11% after 2020 compared to the Reference scenario, the majority of which originates from diesel fuel. In addition, the Dynamic Biofuels scenario can offer an extra improvement of 0.2% by 2050. The lifecycle emissions include upstream emissions only for gasoline and diesel.

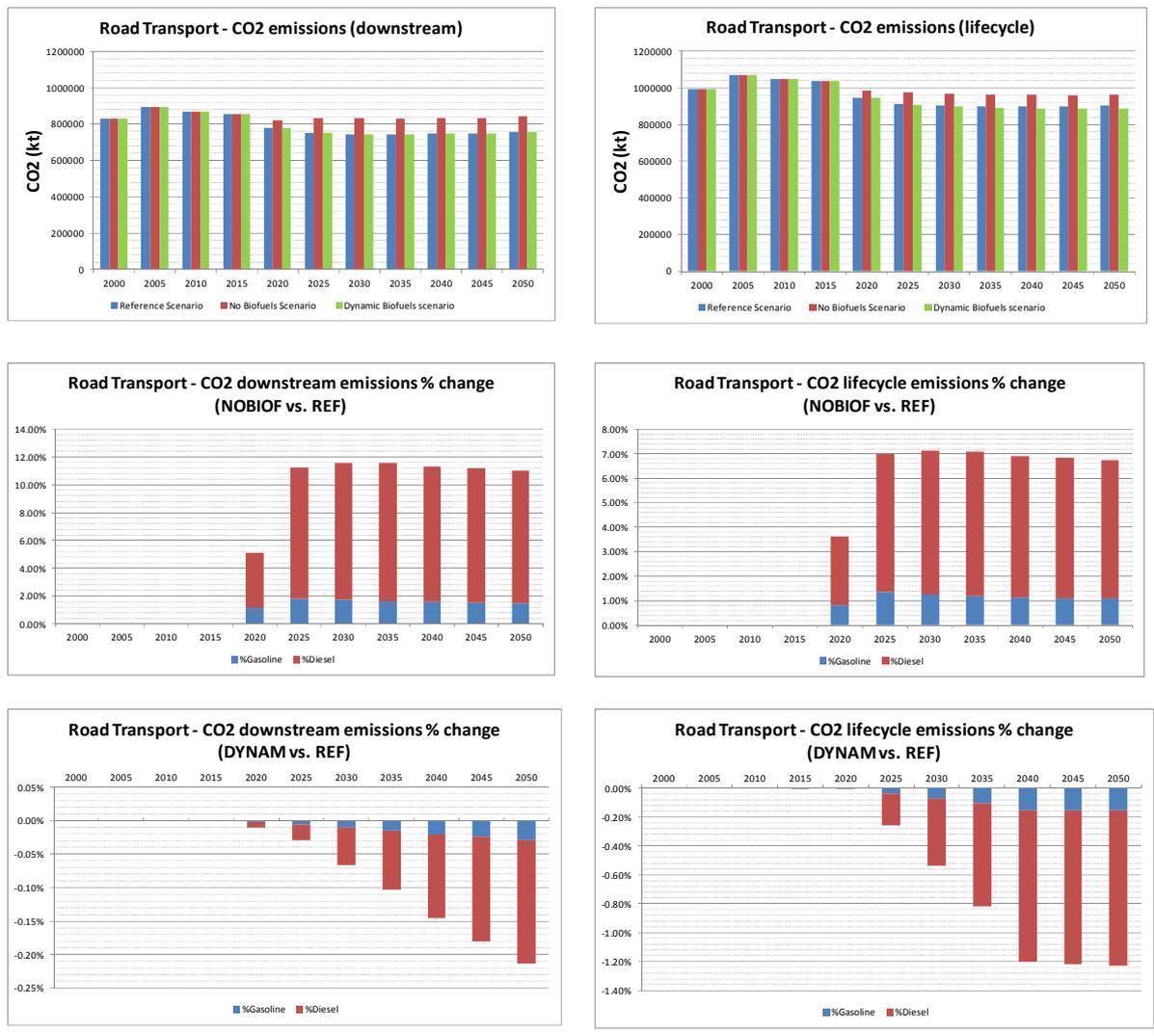


Figure 8: Total CO₂ emissions from transport and relative change: downstream (left side) and lifecycle (right side). Downstream CO₂ emissions from biofuels is considered to be zero.

If the lifecycle emissions are examined, the overall increase in CO₂ in the No Biofuels scenario can reach 7%, while the Dynamic Biofuels scenario can offer a higher advantage compared to the downstream emissions exceeding 1% by 2040, due the increased GHG savings in biofuels.

2.4.2 Total transport

Following a similar analysis as with road transport, the equivalent fuel mix for the entire transport sector is shown in Figure 9.

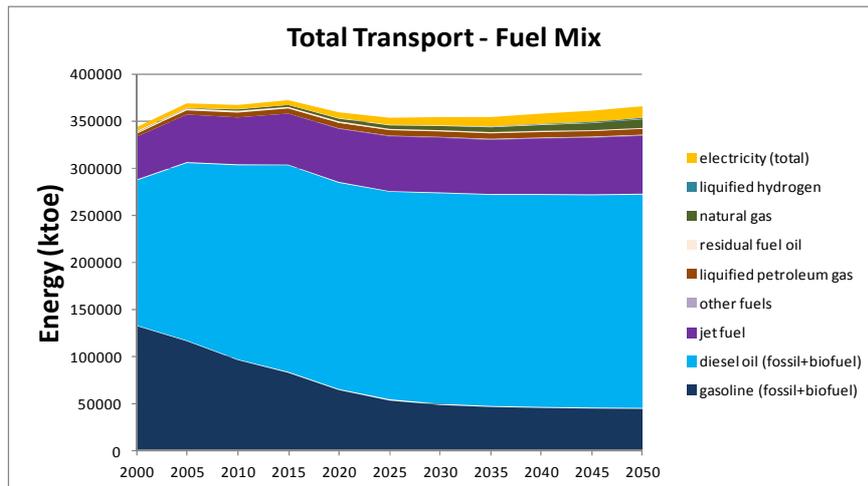


Figure 9: Basic transport energy mix used in the scenarios of this study.

Compared to the Road Transport energy mix, it is evident that apart from the high share of diesel fuel, the jet fuel energy demand is quite significant and in fact surpasses the gasoline share after 2020, due to the expected high growth of the aviation sector. Only domestic aviation is taken into account in the graph.

Again, the phasing out of biofuels is evident by comparing the energy demand in the Transport sector between the Reference and the No Biofuels scenario in Figure 10.

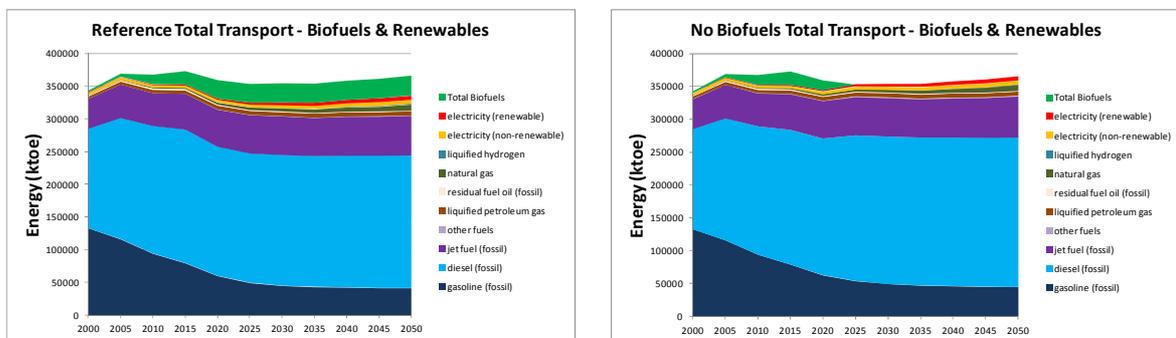


Figure 10: Energy mix in transport: REF vs. NOBIOF scenarios.

In Figure 11, the differences in energy demand allocation between the DYNAM and REF scenarios is now more obvious, due to higher electricity share in total transport compared to road transport and the inclusion of jet fuel. The former one clearly illustrates the difference due to the renewable level change and the latter one includes an increase in biofuel content.

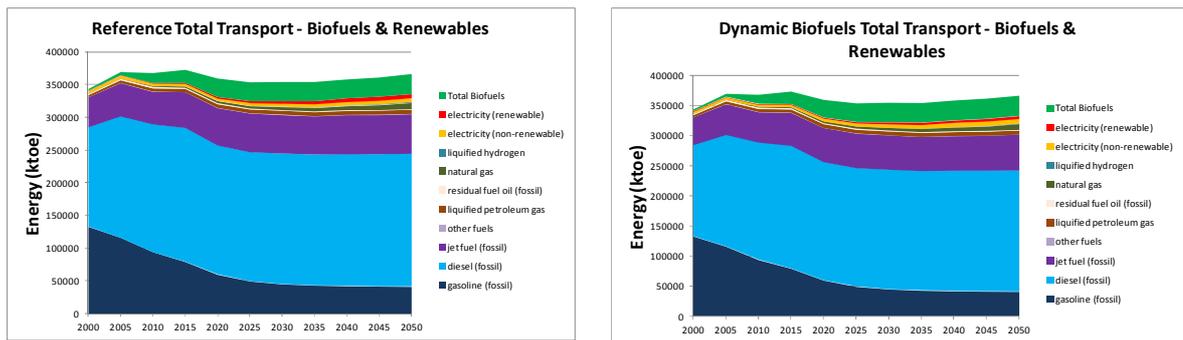


Figure 11: Energy mix in transport: REF vs. DYNAM scenarios.

In Figure 12, the renewable energy content for all three scenarios is calculated according to Directive 2009/28/EC; the 10% renewable content in energy demand for 2020 is met for the REF scenario, while in the NOBIOF scenario this drops to almost 6%. The Dynamic Biofuels scenario generally includes a somehow higher renewable content compared to the Reference scenario, which is primarily attributed to the higher penetration of biofuels in aviation. In road transport, the renewables content remains unaltered. Also, the DYNAM scenario shows the impact of substituting part of renewable electricity with biofuels.

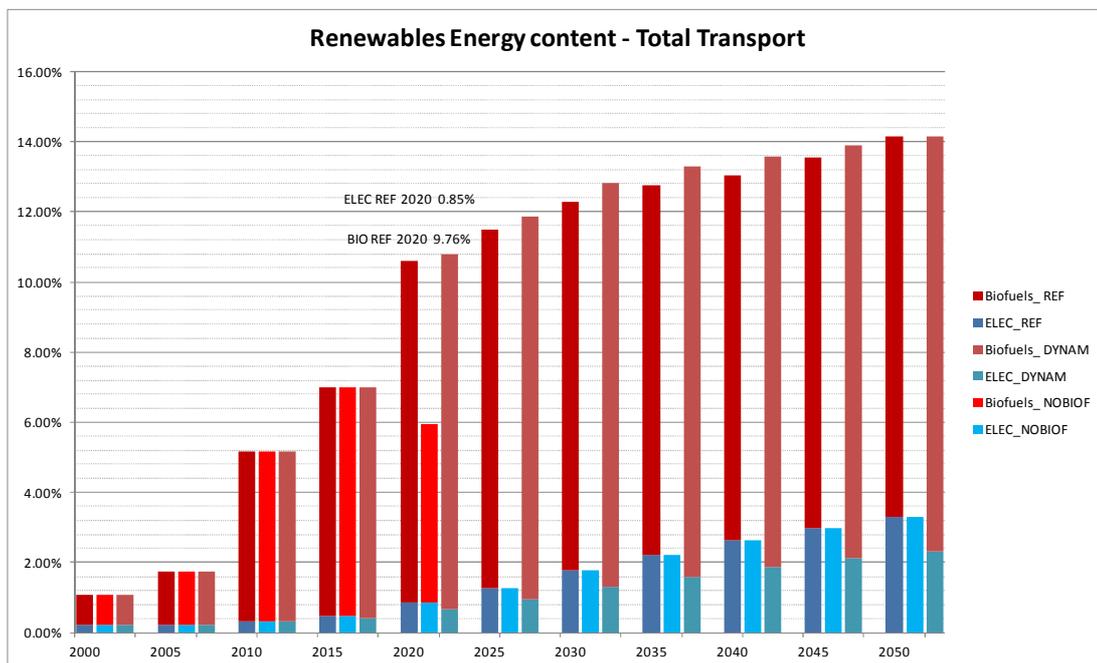


Figure 12: Renewable energy content calculated according to Directive 2009/28/EC.

The three scenarios are compared in terms of the total CO₂ emissions produced by the Transport sector in Figure 13. This also shows the different of the two alternative scenarios compared to the REF scenario. The downstream and lifecycle CO₂ emissions are separately presented, in order to distinguish the impacts between the upstream and downstream

emissions. The lifecycle emissions include upstream emissions from gasoline, diesel and jet fuel.

The increase in downstream CO₂ emissions in the NOBIOF scenario reaches more than 9% in the Transport sector in the post 2020 era. If lifecycle emissions are taken into account then this reaches almost 7%. By comparing the Dynamic Biofuels vs. the Reference scenario, it can be observed that downstream CO₂ emissions can be further decreased by more than 1% by 2035, mainly due to the increase of biojet fuel content in Aviation. This is evident from the last figure on the left side (downstream DYNAM vs. REF). This gain can reach 2% in terms of lifecycle CO₂ emissions, in which case the increased biodiesel, bioethanol and biojet fuel GHG savings further reduce transport sector emitted CO₂.

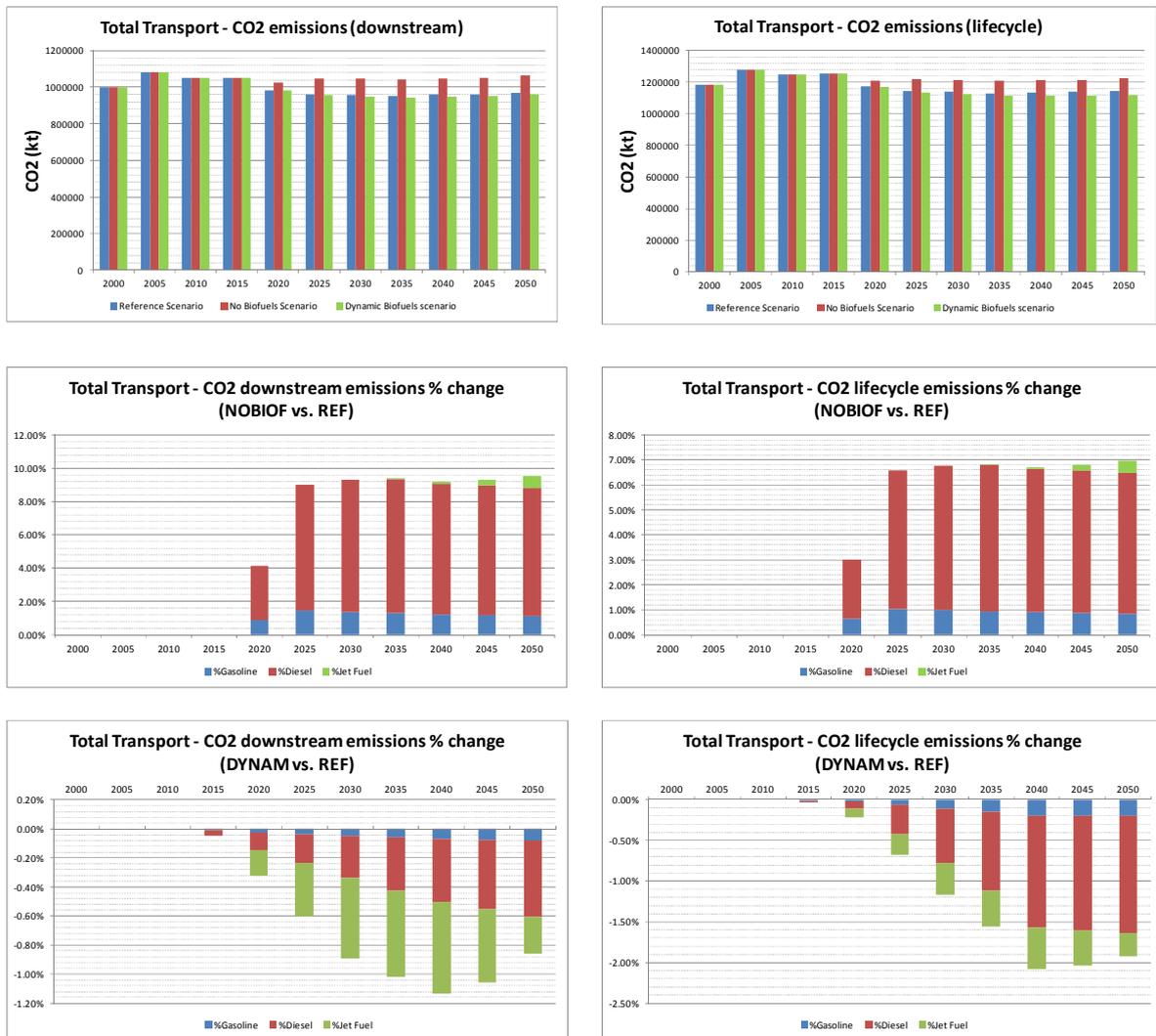


Figure 13: Total CO₂ emissions from transport and relative changes in the different scenarios: downstream (left side) and lifecycle (right side).

Thus, if the comparison is performed between the No Biofuels and the Dynamic Biofuels Scenario to reveal the maximum potential of biofuels, then the total increase reaches 8.5% in



2040 for lifecycle CO₂ emissions and 10% for downstream emissions with respect to the DYNAM scenario.

Diesel fuel appears to be the main point of interest, especially in lifecycle CO₂ emissions from the Transport sector. Yet, it can be deduced that biojet fuel and bioethanol can also play important roles in decarbonisation campaigns, particularly due to the increased projected share of jet fuel in the next decades.

2.4.3 Total CO₂

In this section, the comparison of the examined scenarios is carried out for Total CO₂ emissions originating from energy-related sources. All other sources are considered to follow the baseline development, as this is provided in the Trends to 2050 study. On top of this, the three different scenarios of transport developed in the previous sections are added. This comparison is demonstrated in Figure 14.

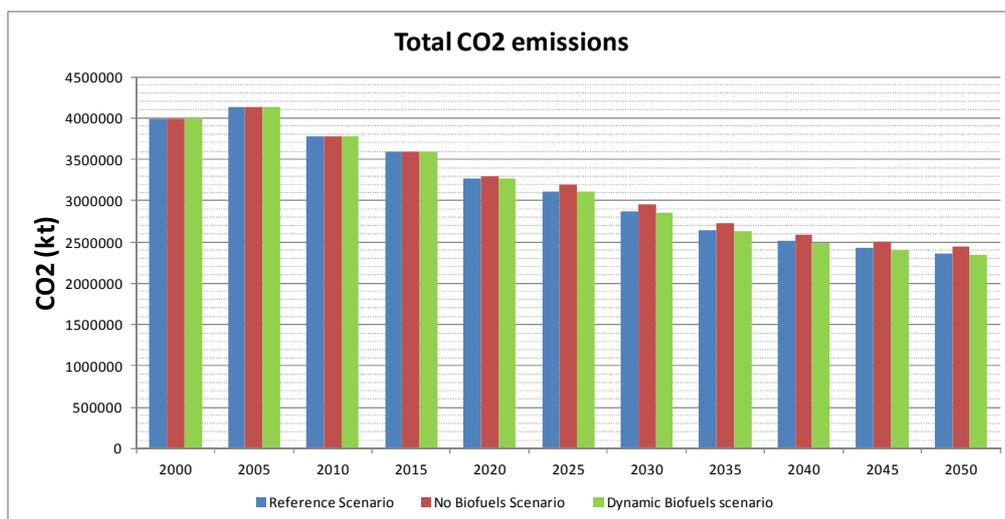


Figure 14: Total manmade CO₂ emissions evolution assuming baseline development for the non-transport sectors and the three scenarios developed for transport in this study.

The increase in total CO₂ emissions due to the No Biofuels scenario assumptions can range from 35 Mt in 2020 to almost 80 Mt in 2050 compared to the Reference scenario. This increase can be further extended if the Dynamic Biofuels scenario is taken into account for comparison; the previous numbers reach 38 Mt and 101Mt of CO₂ respectively. In terms of relative change, the results are illustrated in Figure 15. A percentage increase of 4.3% (NOBIOF vs. DYNAM) is projected for 2050.

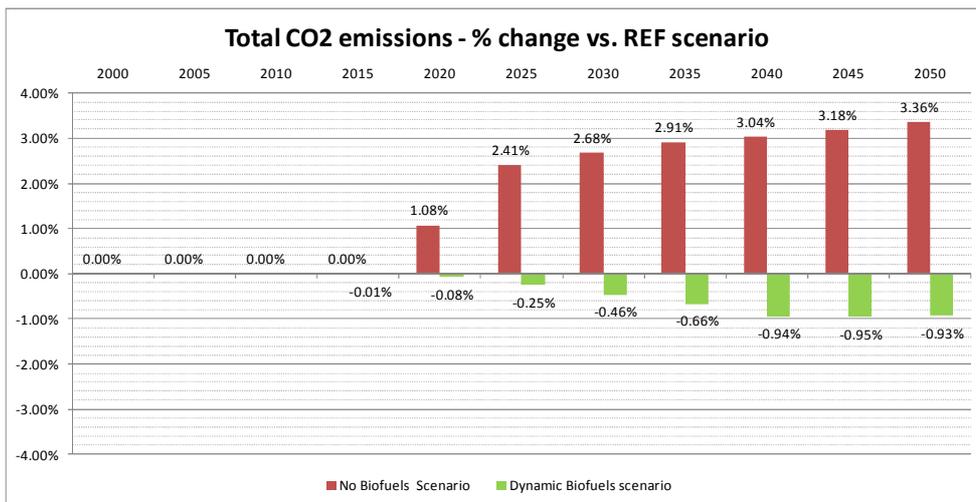


Figure 15: Relative change in Total CO₂ emissions due to the No Biofuels and Dynamic Biofuels scenarios (compared to the Reference scenario).

Clearly, the overall effect of implementing a No Biofuels scenario in the Transport sector can have significant consequences on total CO₂ emissions especially in the longer term. This effect can be further investigated via the share development of the Transport sector as shown below.

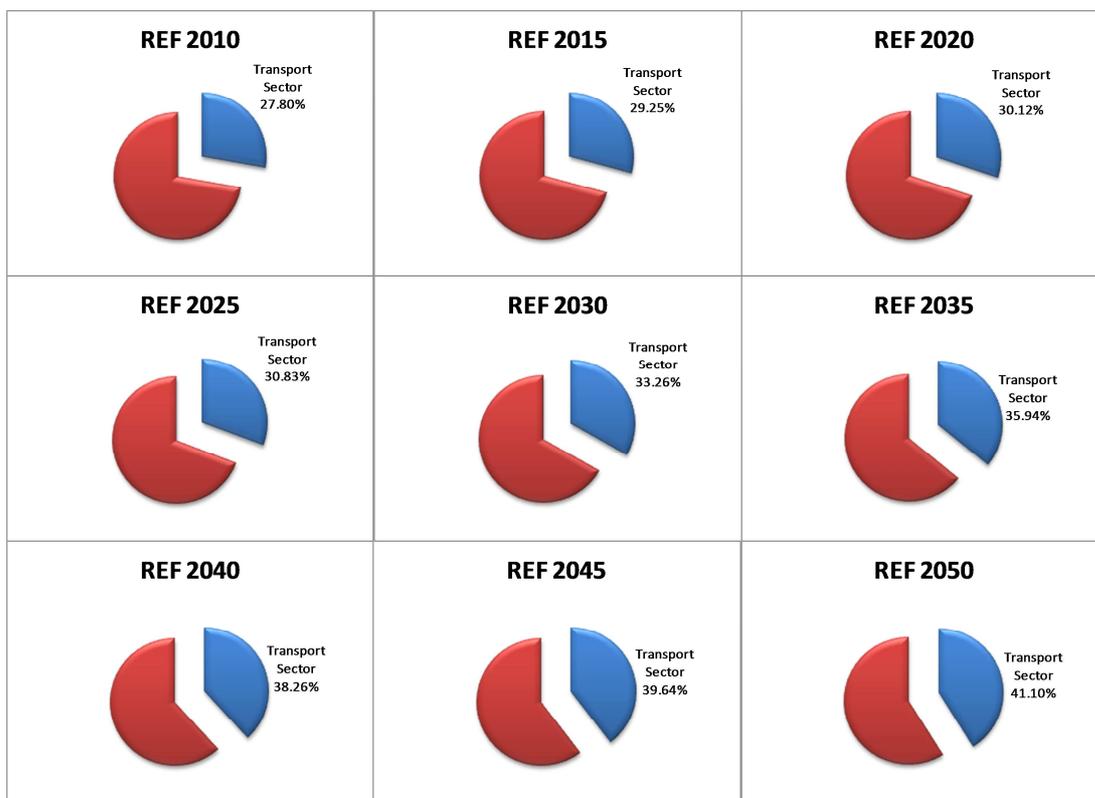


Figure 16: Transport sector CO₂ emissions share vs. other sectors – Reference scenario.



Figure 17: Transport sector CO₂ emissions share vs. other sectors – No Biofuels scenario.

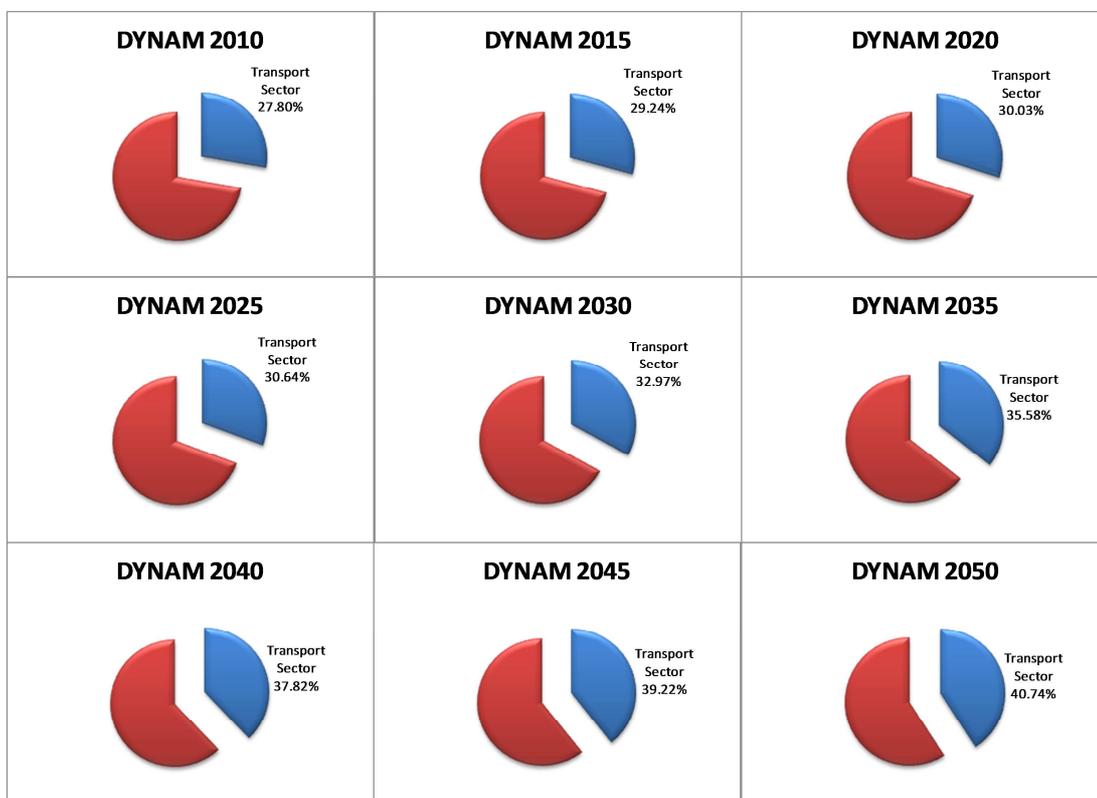


Figure 18: Transport sector CO₂ emissions share vs. other sectors – Dynamic Biofuels scenario.

It is obvious that the Transport sector CO₂ (downstream) emissions increase in share with respect to the Reference total CO₂ emissions, especially after 2025, starting from 27.8% in 2010 and reaching 41.1% in 2050 for the Reference scenario. This observation is even more pronounced in the No Biofuels scenario, which practically abolishes biofuels after 2020 without considering any counterbalancing measures; this projection leads to a Transport sector percentage of 45% of total manmade emissions in 2050. The Dynamic Biofuels scenario also offers a small reduction compared to the Reference scenario due to the fact that, although the Transport sector downstream emissions decrease, the upstream emissions (attributed to the other sectors in these pie charts) also decrease by a similar relative figure.

2.5 Discussion

Biofuels have had a significant role in improving the sustainability of transport over the years. In 2010, biofuels contributed to a replacement of 4.4% of total diesel and gasoline used in transport, with proportional benefits to the reduction of GHG emissions. This trend was expected to further continue in the future. For example, the increase in biofuel use leads to road transport producing almost 4% less CO₂ per unit of energy supplied in 2015, compared to the 2010 levels. In the reference scenario used in this study, which is consistent to the Trends to 2050 study by the European Commission, biofuels constitute 93% of total renewable energy use in transport, thus assisting member states reaching their renewable targets. All these positive results were achieved on the basis of relevant policies that supported and promoted the biofuels use and the acceptance of biofuels by the key market players.

If such targeted policies do not continue in the future, then it should be expected that the role of biofuels will diminish, with significant negative consequences to the contribution of transport to total greenhouse gas emissions and increasing risk of failing the renewable energy targets. Assuming the same electricity penetration as in the reference scenario, without biofuels, transport is projected to contribute to 45% of total manmade CO₂ emissions by 2050. This can be curtailed to below 41% with the use of biofuels. In the medium term, the abolishment of biofuels is projected to lead to an additional 77-90 Mt of CO₂ emissions by 2030. This equals to 2.7-3.1% of total manmade CO₂ emissions in 2030 that will otherwise have to be reduced in the other sectors or with other technical means.

This study did not take into account international maritime and aviation transport to avoid methodological issues and interpretations about how international transport should be covered. If a gross estimate is made that 50% of EU international aviation and maritime transport should be allocated to EU emissions, then the transport share would be expected to go well beyond 50%. Therefore, policies and solutions that specifically address transport seem necessary to control the overall increasing contribution of this sector to total manmade emissions. The current efforts of including international maritime and aviation emissions to total emissions seem well justified and should continue to tackle a global problem, such as climate change.

One may consider that the renewable energy targets might potentially be reached by an increased penetration of electric vehicles in the lack of biofuels in the total energy mix. The electric demand assumed in the reference scenario takes into account that about 2.7 million



vehicles can potentially circulate in European roads by 2020, assuming an average consumption of 150 Wh/km and an average annual mileage of 10000 km for each of these vehicles. These numbers increase to 5.6 million vehicles in 2030 and 24.3 million vehicles in 2050. These numbers are consistent with industry and member state targets on the rate of placement of electric vehicles on the roads, although they already seem quite optimistic given the (only) 50 thousand electric vehicles market in 2013. The contribution of biofuels to total energy demand is from 10 to twenty times higher compared to electricity over the years. Therefore, if the biofuels-related activity was to be substituted by electric vehicles, this would require more than 10 times higher number of electric vehicles to achieve the same renewable energy contribution (taking into account the higher efficiency of electric vehicles and the sustainability index of electricity). This means that reaching the renewable targets without biofuels requires unrealistic numbers of total electric vehicles circulation, especially in the short to medium term.

Overall, the softening or abolishment of biofuel specific targets in transport will bring significant additional burden to other transport modes. This becomes increasingly challenging given that the target for total CO₂ reductions has been set to 40% in 2030. Without biofuels in place, the reduction of CO₂ falls into engine efficiency improvements, alternative fuels, infrastructural changes, and others. Except of the technical difficulties that this raises, it also results to additional costs and to potential obstacles due to the behavioural changes that such modifications require.

Road transport, where most of the biofuel potential resides is a sector not taken into account in the ETS. Therefore, if the biofuel use in road transport diminishes, then the corresponding reductions will have to be reached in other non-ETS sectors such as the building and agricultural sectors. The interim targets for GHG reductions in the non-ETS sectors are 30% lower emissions in 2030 than in 2005. The difficulty in reaching these targets increases without biofuels.

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