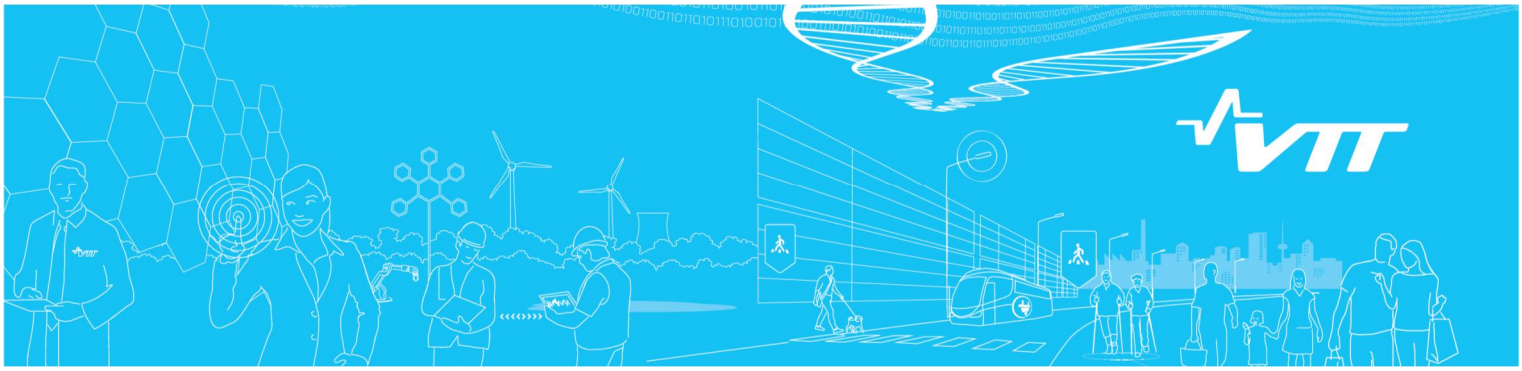

RESEARCH REPORT

VTT-R-02315-16

Flexibilities under the EU's Effort Sharing Decision towards 2030

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Confidentiality: Public

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Summary

EU has committed to reduce its domestic emissions from the sectors outside Emissions Trading System (non-ETS) by 30 % from 2005 by 2030. Distribution of the target between Member States has not been decided yet. If effort sharing will happen same way than in the current Effort Sharing Decision (ESD) in the 2020 climate and energy package, this effort will be distributed between the Member States according to GDP per capita, with possible adjustment based on the cost-efficient emission reduction potential of the Member States. In order to increase the cost-efficiency of emission reductions, the current flexibilities of the existing effort sharing could be enhanced and new flexibility mechanisms created for the second ESD period (2021-2030). The current flexibilities include banking and borrowing, transfers of AEAs between the Member States and use of international credits from project mechanisms under Kyoto Protocol. The possible new flexibilities, which have been explored for the second ESD period, include a project-based mechanism, centralized auctioning mechanism and one-off transfer of allowances from the ETS to the effort sharing sector. This report provides an overview of the existing and possible new flexibilities and quantitative and qualitative estimates of their effect on Finland and the EU.

The analysis showed that during the first ESD period (2013-2020), there will be surplus of AEAs in the EU. However, the situation will change considerably in 2021-2030. A net surplus of annual emission allocations (AEAs) at the beginning of the period is expected to turn into a substantial net deficit and additional reduction efforts will be required at the end of the period. Thus, banking of allowances will probably take place mainly in the beginning of the period. As there are substantial differences in supply and demand between the Member States, trading of AEAs is also likely to occur during the second ESD period. Trading could be further promoted through an auctioning mechanism, which could also include obligatory auctions. A project-based mechanism could be an option for creating new emission reduction projects and increasing the private sector participation. Another option for alleviating the AEA shortage is limited one-off transfer of emission allowances between the ESD and ETS sectors.

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Preface

This research analyses different possible flexibility mechanisms that could be used under the second ESD period 2021-2030 and their implications for Finland and the EU. The work has been done in the project “Taakanjakopäätöksen uudistaminen ja päästövähennysmahdollisuudet Suomessa”, funded by the Finnish Ministry of the Environment.

The steering group for the project comprised Environmental Counsellor Magnus Cederlöf, Ministerial Adviser Paula Perälä and Ministerial Adviser Tuija Talsi. The authors wish to thank the steering group for the discussions and comments during the project.

The views expressed in this report are those of the authors, and do not necessarily represent the view of Finnish Ministry of the Environment.

Espoo 31.5.2016

Riikka Siljander, Tommi Ekholm and Tomi J. Lindroos

Contents

List of abbreviations

AEA	– Annual Emission Allocation, allowance unit under ESD
EC	– The European Council
ESD	– Effort Sharing Decision
ETS	– Emission Trading System
EUA	– EU Allowance, allowance unit under ETS
LULUCF	– Land-use, land-used change and forestry
MS	– EU Member State
MSR	– Market Stability Reserve of the ETS
UNFCCC	– United Nations Framework Convention on Climate Change
WEM	– With Existing Measures, emission path with existing reductions measures
WAM	– With Additional Measures, emission path with additional reduction measures

1 Introduction

1.1 Background

The European Council (EC) adopted conclusions on the EU climate and energy policy framework for 2030 in October 2014. The conclusions include an overall domestic target of reducing the EU's greenhouse gas emissions by at least 40% from 1990 levels by 2030. This is further split to separate targets for the Emission Trading System (ETS) – 43% from 2005 level – and emission sources covered by the Effort Sharing Decision (ESD) – 30% from 2005 level. The ESD targets will be further split to national targets for all Member States. The proposal by the Commission for the effort sharing is expected in the summer 2016.

As part of the conclusions, it was stated that the use of flexibility instruments in the ESD sector "will be significantly enhanced in order to ensure cost-effectiveness of the collective EU effort and convergence of emissions per capita by 2030". The current ESD allows flexibility between Member States and limited flexibility for the timing of emission reductions (the banking and borrowing of emission allocations). In addition to these, a new flexibility between the ESD and ETS sectors will be introduced.

The purposes of the ESD flexibility mechanisms are twofold. First, the mechanisms aim to improve the cost-efficiency of emission reductions, so that reductions would be carried out where and when they are the least costly. The Member State targets are not initially determined in cost-efficient way, and therefore a cost-efficient implementation of the EU level ESD target would require transfers of emission allocations between Member States. The banking and borrowing possibility – on the other hand – allows adjusting the temporal profile of emission reductions, rewards countries for early action and overachievement of targets, and also evens out the impact of annual fluctuations in emission levels.

Second, the effort sharing within the ESD is based on solidarity between Member States. The emission reduction targets correspond to Member States' GDP per capita, with more wealthy countries having higher reduction targets, although some adjustment for cost-efficiency is planned for Member States with GDP/capita above the EU average. The trade of emission allowances within the ESD, while enhancing also cost-efficiency, would lead to monetary transfers to the less-wealthy Member States.

These mechanisms enhance the cost efficiency of the of emission reductions by introducing flexibility for the system. As a result, the emissions from a single Member State, for example, can be higher than in absence of the flexibility. The total EU-level emissions, however, remain the same. If implemented properly, the flexibility mechanisms are therefore consistent with the environmental integrity principle with regard to emissions. With temporal flexibilities, the scope has to be extended to cover a longer time interval: the flexibility mechanism does not affect the *cumulative* emissions, although emissions in a certain year can be higher.

In addition to the EC conclusions, two additional sources of flexibility can remain possible for the ESD sector. It is not yet known how the land-use sector (land-use, land-use change and forestry; LULUCF) will be included in the EU 2030 framework. It remains possible, that the emissions and sinks from the LULUCF sector could add to the flexibility of the ESD sector. Further, the Paris Agreement of the UNFCCC allows international emissions trading. While the overall EU target is a domestic reduction of at least 40% from 1990, interaction on a global emission market combined with a tightening of the overall target could possibly lead to a flow of international emission credits to either the ESD or the ETS sector. These mechanisms should be determined in such a way that they do not violate the environmental integrity principle, e.g. increase the overall net emissions of the EU.

An overall picture of the EU framework and the flexibility mechanisms applicable for the ESD sector are presented in Figure 1.

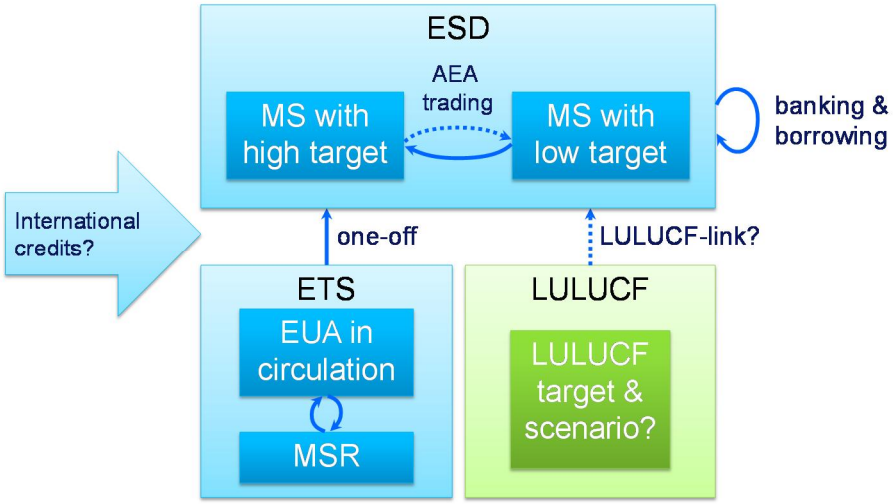

Figure 1. An overview of existing and planned flexibilities in the ESD sector.

1.2 The decision framework for long-term ESD action

In the presence of ESD flexibilities, a Member State has two means for filling its reduction obligation: carrying out emission reductions or acquiring emission allowances through flexibility mechanisms. The decision a country faces is therefore over how much each of these means is used to meet its target within the 2021-2030 period. This is illustrated in Figure 2.

Let us assume that the country's emissions would follow a certain baseline, which would be a result of current policies and measures. The target path is, however, lower than the baseline, implying that additional action is needed to comply with the target. Let us also assume that the country chooses to undertake some amount of additional emission reductions, but also of some amount of flexibility during 2021-2030. With these actions country complies with its ESD targets up to 2030.

For the post-2030 period, the implemented additional emission reductions would lead to a new baseline for the 2031-2040 period, denoted as "baseline 2" in Figure 2. For this period, the country faces a similar problem setting than for 2021-2030. The target path is now declining more steeply. The location of the new baseline, and its distance from the new target path, is dependent on how much emission reductions were carried out in the 2021-2030 period.

This creates a potential challenge for the use of flexibilities. The more a country uses flexibilities in the earlier period, the further its baseline is from the target path in the latter. This should not be a problem if flexibilities are also available during the latter period. However, country is likely to take advantage of flexibilities only if it is confident that flexibilities are also available post 2030. Otherwise the country would face steep reductions necessary to meet its 2040 emission target.

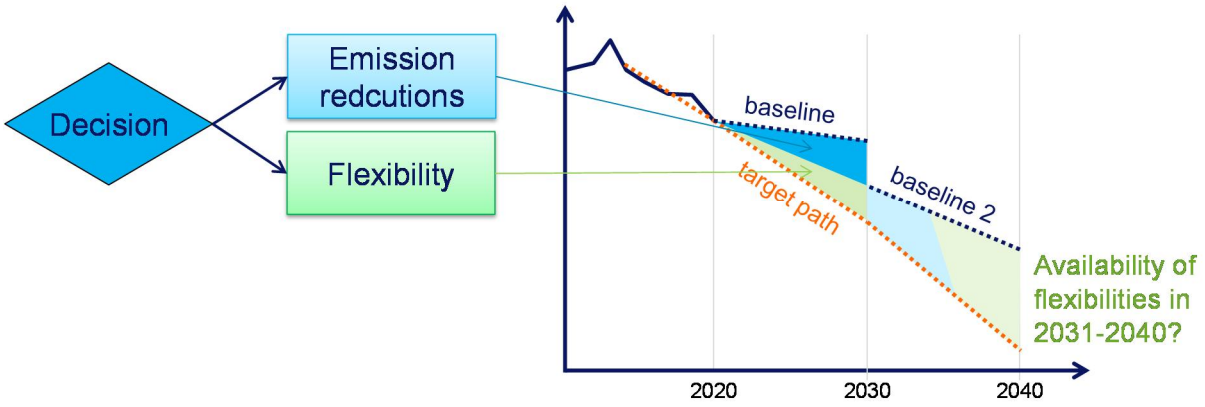

Figure 2. An illustration of the Member State decision framework for complying with its ESD targets in the 2021-2030 period and in longer term.

1.3 Scope and approach of this study

The study analyses the impacts of ESD flexibilities towards 2030. The focus will be on temporal flexibilities, flexibility between Member States and flexibilities between the ESD sector and the ETS. Numerical calculations are based on the Member States' own emission projections with existing measures (WEM) or with additional measures (WAM), as provided to the European Environment Agency[1]; the PRIMES model calculations[2], and the authors' estimate on the Member States' ESD targets for 2030. These projections are based on emission inventories reported in 2014 at their latest. However, a number of changes have taken place in emission inventory conventions starting from 2015, and these changes have a noticeable impact on past emission levels, projections and targets in tonne-terms[3].

The European Council's conclusions state that the Member States' targets should range between 0% and 40% from 2005, be distributed on the basis of GDP per capita, while for countries with GDP per capita over the EU average, the target will be "adjusted to reflect cost-effectiveness in a fair and balanced manner". As the latter statement to remains open to interpretation, we have used an assumption that targets equal the average of the PRIMES cost-efficient scenario 2014 and the GDP per capita based target. These two target levels, along with emissions in 2030 in the PRIMES reference scenario 2013, are presented in Figure 3.

The EC's conclusions do not describe the Member States' annual ESD targets prior to 2030. In this work, we assume a linear path between the 2020 and 2030 targets. As an alternative, it has been discussed whether e.g. the average of realized emissions from 2016-2018 could be used as a starting point for those countries who are already below their 2020 target in those years[4].

[1] European Environment Agency, *Trends and projections in Europe 2015*, EEA Report No 4/2015.
[2] European Commission, *EU energy, transport and GHG emission trends to 2050, Reference scenario 2013*.
[3] Lindroos T.J. and Ekholm T., Taakanjakosektorin päästökehitys ja päästövähennystoimet vuoteen 2030, VTT Technology 245, 2016 (In Finnish).
[4] Öko Institute e.V., EU effort sharing for the 2021-2030 periodSetting GHG emission targets for EU Member States, Berlin, 3. Feb. 2016

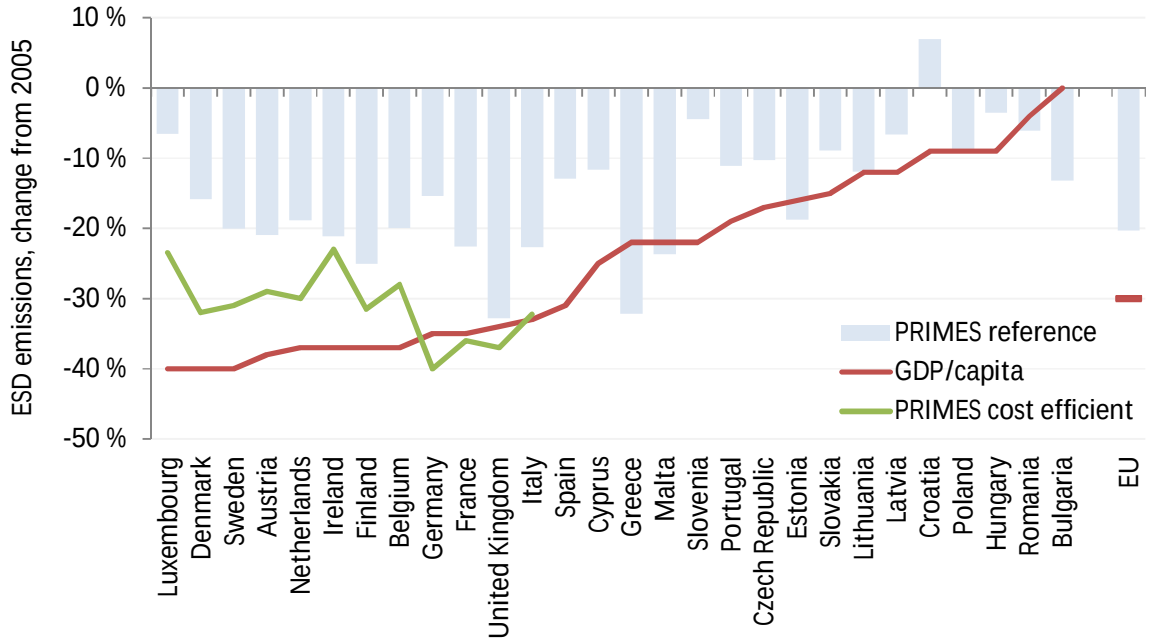

Figure 3. Member States' ESD emissions relative to 2005 levels in PRIMES reference scenario 2013, based on the GDP per capita effort sharing; and in the PRIMES cost-efficient scenario 2014 for Member States with GDP per capita higher than the EU average.

2 Temporal flexibilities

2.1 Banking and borrowing

The current Effort Sharing Decision[5] enables temporal flexibility in emission reductions by allowing banking and borrowing of AEAs between years. Member States can bank their unused AEAs and use them in the forthcoming years within the current ESD period. There is no quantitative limit for banking, but borrowing is limited to 5 % of the AEAs from the following year. In addition, Member States can request a higher borrowing rate in case of extreme meteorological conditions in 2013-2014.

In the next ESD period in 2021-2030, the possibility for borrowing and banking is likely to be maintained with similar rules. Transferring of surplus AEAs from the current to the next ESD period seems unlikely, and the accumulation of AEAs starts over in 2021. Adjustments could be made to the limit of borrowing. However, increased borrowing could impede the achievement of the overall target in the end of the ESD period because steep reductions are difficult to achieve within short period. One option is to allow higher borrowing rates in the beginning of the period but keep the 5 % limit in the end of the period. On the other hand, reducing of the borrowing rate could support the initiation of other flexibility mechanisms, e.g. transfers between Member States; and act as an incentive for earlier emission reductions.

Banking and borrowing can increase cost-effectiveness because they allow Member States to allocate their emission reduction efforts more freely between years, and e.g. overachieve the targets during the early part of 2021-2030. Temporal flexibilities also enable the Member States to prepare for annual fluctuations in emissions and for unexpected events and conditions. This is related to the compliance cycle of the ESD, which is currently annual. Although longer compliance cycles could be used in the post-2020 framework, the temporal

[5] Decision no 406/2009/EC of the European Parliament and of the Council of 23 April 2009 on the effort of Member States to reduce their greenhouse gas emissions to meet the Community's greenhouse gas emission reduction commitments up to 2020

flexibilities provide Member States some room to manoeuvre even with a short compliance cycle. The possibility to bank unused AEAs encourages for earlier emission reductions because it guarantees a larger safety buffer in the future. However, the banking possibility may also reduce the amount of traded AEA units since Member States may be reluctant to sell their unused AEAs but rather keep them for possible later use. Banking and borrowing is administratively fairly light and transparent flexibility mechanism, requiring decisions and registries of the amount of banked and borrowed AEAs. If the compliance cycle was extended to two or more years, the administrative burden would be reduced even further.

2.2 Quantity of banked units and the needed additional reduction efforts

The linear target pathway for the ESD sector in 2013-2030 and projected emissions in the WEM scenario in Finland and EU are presented in Figure 4. According to the WEM scenario, Finland is above its target pathway already in the beginning of the second ESD period in 2021. This implies that Finland reaches its 2020 target only through the banking of AEAs from the early part of the first ESD period[6]. The AEA deficit increases throughout the period 2021-2030, and Finland has no banked AEAs during the second ESD period. The same applies also in WAM and PRIMES reference scenario 2013 as can be seen in Table 1. The cumulated deficit varies between 27 and 31 Mt CO_2eq in different scenarios. However, a recent analysis with updated figures indicates that Finland will meet the 2020 target in the WEM scenario, and slightly overachieve the target in the WAM scenario[7].

In the EU-level, emissions under the ESD are below the linear target pathway in 2021-2022 in the WEM scenario (see Figure 4), creating a net surplus of AEAs that can be banked for the latter part of the second ESD period. However, from 2023 onwards, emissions in WEM scenario exceed the linear target pathway, and a deficit of AEAs begins to accrue. Cumulated deficit during the 2021-2030 is substantially higher than surplus (see Table 1). Also in WAM and PRIMES reference scenario 2013, deficit exceeds the surplus but high variation in the quantities occurs between different scenarios. Thus, banking and borrowing may provide some flexibility at the EU level, but there is also a significant need for additional emission reduction efforts towards 2030.

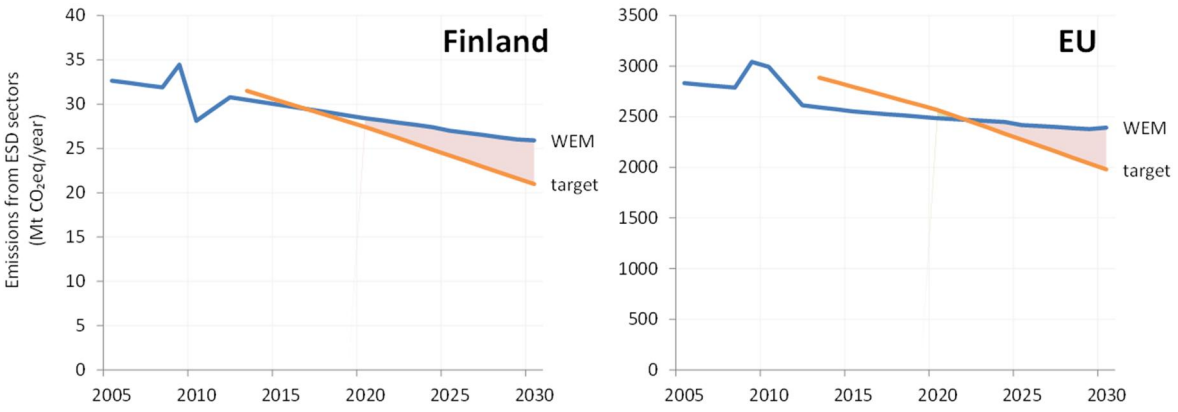

Figure 4. Emissions from the ESD sectors in Finland and EU according to WEM scenario and the linear target pathway.

[6] This conclusion is based on the WAM and WEM scenarios submitted for EEA in 2015.
[7] See Lindroos T.J. and Ekholm T., Taakanjakosektorin päästökehitys ja päästövähennystoimet vuoteen 2030, VTT Technology 245, 2016 (In Finnish).

Table 1. Cumulated surplus and deficit of AEAs in Finland and EU in 2021-2030. Surplus means the amount of AEAs that can be banked during the period.

	Finland		EU total	
	AEA surplus (Mt CO_2eq)	AEA deficit (Mt CO_2eq)	AEA surplus (Mt CO_2eq)	AEA deficit (Mt CO_2eq)
WEM	0	30.8	33	1818
WAM	0	27.1	118	1280
PRIMES reference scenario 2013	0	30.8	294	886

3 Flexibilities between Member States

3.1 Trading of AEAs

3.1.1 Bilateral trade between Member States

In the current period of ESD up to 2020, Member States may transfer the unused AEAs without any quantitative limitation, and up to 5 % of the AEAs of a given future year to another Member State. Transferred units can be used within the same year or in any subsequent year within the current ESD period. A Member State, which is not in compliance with its ESD targets at the time of transfer, cannot transfer any of its AEAs to another Member State. This for ensuring that transfer of AEAs will not hamper the achievement of seller Member State's own commitment.

Possibility to trade AEAs between Member States is most likely to be maintained also in the second ESD period. Since there is likely to be a shortage of AEAs in the second ESD period, it is preferable that surplus AEAs are traded instead of being preserved by countries which are already below their target pathway. One option for promoting the trading of AEAs is creating a centralized auctioning mechanism.

The trade of AEAs provides additional flexibility for Member States to achieve their emission targets. Member States with strict target can partly compensate their domestic emission reduction efforts by buying additional allowances from Member States that have surplus of AEAs. On the other hand, the Member States with lower GDP/capita, and consequently lower emission targets, may receive additional income from selling their surplus AEAs. Thus, trading also promotes cost-efficient emission reductions and income transfers to poorer Member States. In addition, it enhances temporal flexibility because a Member State may, within the 5 % limit, sell its future AEAs if it expects to over-achieve its target. As long as trades are negotiated and agreed bilaterally between Member States, trading is administratively fairly light. However, the disadvantage of bilateral trades is the limited transparency of the supply and demand as well as the sold amounts and prices of AEAs. Under the MMR decision[8], Member States are required to report the transfers to the Commission, which will compile a report with aggregate data on transfers; but however, not on the volumes and prices of individual transfers

3.1.2 Estimated amount of traded AEAs in 2021-2030

The surplus and deficit of AEAs differ substantially between countries and different scenarios as can be seen from Figure 5. For example, Germany has substantial deficit of AEAs in the

[8] Commission Implementing Regulation (EU) No 749/2014.

WEM and WAM scenarios but remarkable surplus in the PRIMES cost-efficient scenario 2014, which implies that Germany has lot of cost-effective emission reduction potential. As noted earlier, Finland has deficit of AEAs in all scenarios. According to the scenarios, France, Spain, and possibly Germany will have the most considerable deficit, whereas Greece, Hungary, and Romania will have the most substantial surplus of AEAs. The sum of surpluses and deficits in the EU-level were provided in Table 1.

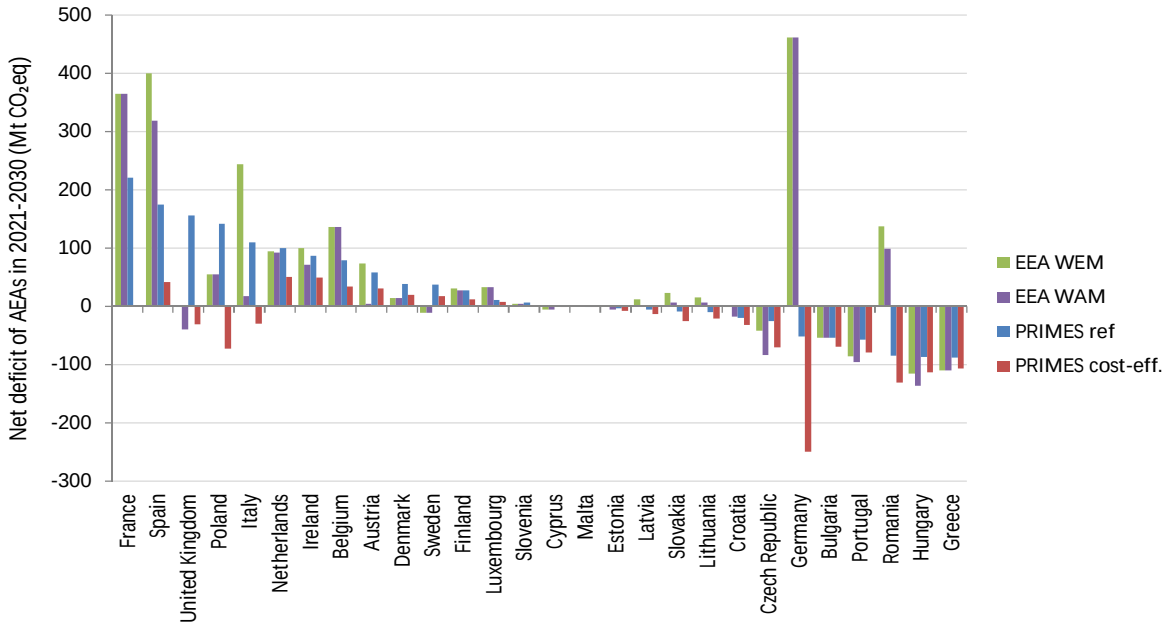

Figure 5. Net deficit of AEAs in different countries in 2021-2030 according to WEM, WAM and PRIMES reference scenario 2013 and cost-effective scenario 2014. Negative quantities refer to a surplus of AEAs.

The temporal development of the net AEA supply within the EU is presented in Figure 6. In the beginning of the period, there is a net surplus of AEAs in all scenarios, but from 2024 onwards, there is net deficit in all but PRIMES cost-efficient scenario 2014. In WEM, WAM, and PRIMES reference scenario 2013, the deficit in the end of the period is substantially higher than the surplus in the beginning of the period. This implies that even though some Member States have surplus, it is not enough to cover the deficit of other Member States, resulting with a considerable demand for additional emission reductions by the end of the period. The surplus of AEAs in the PRIMES cost-efficient scenario 2014 occurs because cost-effective emission reductions are carried out without considering that EU's emissions are already below the linear target pathway in 2021. Thus, the surplus cumulates especially in the beginning of the period and there is a net surplus of AEAs in 2021-2030. Therefore, the scenario does not reflect a true cost-effectiveness.

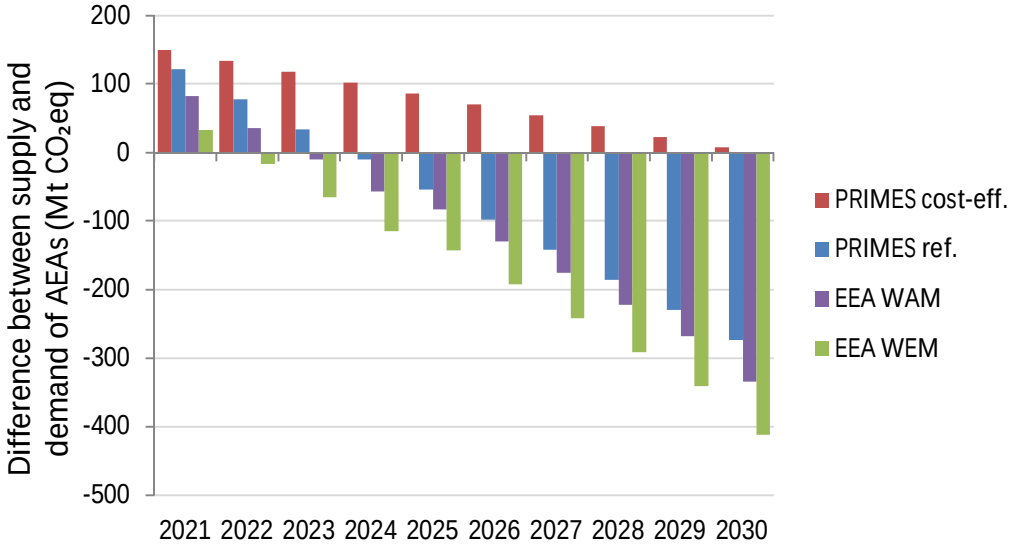

Figure 6. Difference between supply and demand in the whole EU in WEM, WAM and PRIMES reference scenario 2013 and cost-effective scenario 2014.

The economic impact of AEA trading is twofold. First, the emission reduction costs would be reduced both on the EU level and in individual Member States. The volume of this cost saving has, however, not been quantified, because scenarios on ESD reductions without the Member State flexibility have not been carried out.

Second, the trading results in a monetary flow from the buying to the selling Member States. The monetary volume of the AEA depends on the price of traded AEA units. An indication for this price can be gained from the PRIMES scenarios. The main scenario with a -40% reduction target for 2030 implied a marginal cost of 40 €/t in 2030 for the ESD sector. However, additional efforts to introduce renewables or boost energy efficiency resulted in marginal costs between 11 and 22 €/t. Based on these estimates, the monetary volume of AEA trade would range from 250 mln. to 5 bn. €/year.

3.1.3 Auctioning of AEAs

One option for increasing transparency and the amount of traded AEAs is establishment of a centralized auctioning mechanism. There are several possibilities for the implementation. It can, for example, take a form of a central information platform or a centralized auctioning mechanism, through which all the AEA sales have to be performed. In addition, one option is establishment of obligatory auctions, through which Member States are obligated to auction a predetermined part of their AEAs. A centralized auctioning mechanism could help to establish a common price for AEAs and increase transparency, because information about buyers, sellers, and transaction prices would be easily available. This, in turn, could increase the amount of traded AEAs and thus cost-effectiveness. In addition, transaction costs could be lower compared to bilateral trade because common rules and procedures could be established, and applied to all transactions instead of negotiating the terms of each trade separately.

There are also possible problems related to the establishment of the auctioning mechanism. The main concern is the functionality of the mechanism because the number of market participants is limited and the projected surplus of AEAs is low during the second ESD period. Only Member States are entitled to hold AEAs, which limits the number of market participants to 28 Member States. In addition, not all of them would be willing to buy or sell AEAs, which would further limit the number of market participants and supply of AEAs. Unwillingness to sell surplus AEAs may arise because governments are often risk averse. Thus, Member States with AEA surplus may want to assure that they will overachieve the

overall target before selling their surplus. Consequently, the surplus AEAs may come to the market with delay, and there may be very few AEAs in the market in the beginning of the period. In addition, the Member States are very different size, and the larger Member States with higher purchasing power could have an advantage in the market. Another shortcoming is the lack of private sector participation, which is one of the objectives of the reform of flexibility mechanism. Participation of the private sector would increase the number of market participants and the effectiveness of the market because private actors are less prone to risk aversion tending rather for profit maximization.

Obligatory auctions could help to ensure that there are AEAs in the market, and also increase predictability of the amounts for sale. The obligatory auctioning mechanism could be implemented, for example, by obligating the Member States to auction all or a specific share of the surplus AEAs or part of each Member States' annual AEAs through a central institution. In the last case, Member States would receive less AEAs but they could buy AEAs from the market. At the same time, the revenue from sold AEAs could be returned back to the Member State, negating the cost from re-purchased AEAs.

Obligatory auctions could substantially increase the volume of AEAs in the market, as can be seen in Figure 7. In WEM, WAM, and PRIMES reference scenario 2013, auctioning of 5 % of the annual AEAs would more than double the supply, and exceed the supply in PRIMES cost-efficient scenario 2014. For Finland, obligatory auctioning of 1-10 % of the annual AEAs corresponds to 0.2-2.0 Mt CO_2eq in 2030 and 2.4-24 Mt CO_2eq cumulatively in 2021-2030. Increased trade of AEAs would promote the cost-efficiency of emission reductions efforts. However, it would not reduce the gap between supply and demand (see Table 1), and the need for additional efforts. In addition, obligatory auctioning impedes the ability of Member States to prepare for exceptional years, and in the case of obligatory auctioning of surplus unit, the incentive for early emission reductions is reduced.

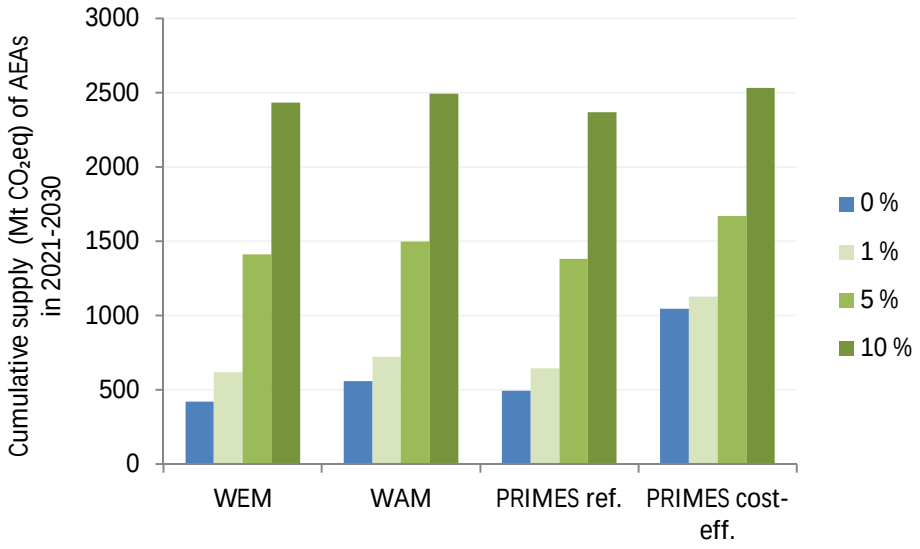

Figure 7. Cumulative supply of AEAs in 2021-2030 in the EU if 0, 1, 5 or 10 % of the annual AEAs are auctioned. The AEA surplus from the countries that are projected to overachieve their target is also taken into account in the estimations.

3.1.4 Administrative burden and transaction costs

Under current Effort Sharing Decision, there are no rules for transaction modalities, and transfers are based on bilateral agreements. The transfers should be reported to the European Commission and registered both in the buyer and seller Member States registries in order to avoid double counting. The greatest administrative burden comes from negotiating of and agreeing upon the terms of the transfer, which have to be performed separately for

each transaction. Administrative burden could be reduced by applying common rules for all transactions, leaving only volume, price and transaction date to be negotiated bilaterally. However, this would require that common rules are established and agreed on.

If a centralized auctioning mechanism is established, the administrative burden depends on the implementation of the mechanism. If it serves only as a central information platform, the administrative burden would not considerably differ from the current system. The only difference is that the amount of traded AEAs would have to be published in a central site. If all the sales are arranged through a centralized auctioning mechanism, it requires an establishment of a central institution, and rules for the procedure. The basic design elements could follow the auctioning of EUAs under ETS. A centralized auctioning mechanism could reduce the administrative burden and transaction costs because common rules and procedures could be applied to all transactions. However, if the amount of traded AEAs is low, the transaction costs per traded AEA may be relatively high. A reasonable amount of traded AEAs could be ensured through obligatory auctions. Administrative burden and transaction costs would also decrease if compliance cycle was extended from the current annual cycle since auctions would be organized less frequently.

3.2 Project-based mechanism

3.2.1 Introduction and design of the mechanism

The current ESD has no specific project-based mechanism. However, international credits from project mechanisms under Kyoto Protocol; Clean Development Mechanism (CDM) and Joint Implementation (JI), can be used for meeting the emission targets within EU.

For the second ESD period, EU has announced a target of reducing domestic greenhouse gas emission in ESD sectors by 30 % compared to 2005. Thus, EU commits to reduce emission by 30 % within Europe, and international credits cannot be utilised for achieving the target, but only for additional reductions. In addition, Member States can use credits from projects under Article 24a without any quantitative limit during the first ESD period. However, Article 24a is not operational, and thus it has never been used and does not appear as a potential source of flexibility for the second ESD period.

Creating of a project-based mechanism to the ESD sector is one option for enhancing flexibility for the period 2021-2030. The idea of the mechanism is that a buyer Member States could receive AEAs by financing emission reduction projects in other Member States who are willing to host projects. In addition, the procedure would involve a project developer who implements the emission reduction project in the host Member State. The project developer can be a public or private actor, and it could act as a mediating institution between the buyer and host Member States. A possible option would also be a system where the host Member State can be the buyer at the same time, calling for projects to be implemented within the country by private project developers. In addition, one proposal that has been presented is an establishment of centralized institution – a clearinghouse – which would act as a broker of the demand and supply, and selecting the projects to be implemented[9]. An outline of the project-based mechanism is presented in Figure 8.

[9] Sartor, O., Bart, I., Cochran, I., Tuerk, A. Enhanced flexibility in the EU's 2030 Effort Sharing Agreement: issues and options. Final report. Climate Strategies. Apr. 2015.

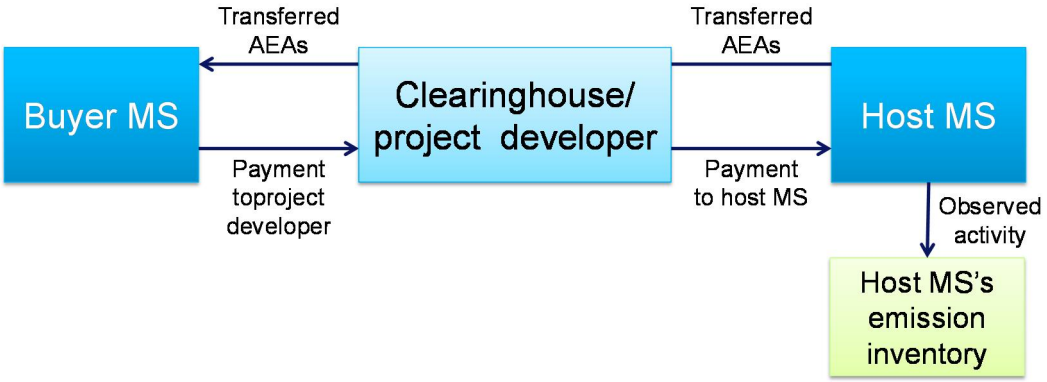

Figure 8. An outline on the functioning of a project-based flexibility mechanism with a mediating institution (clearinghouse or project developer). A buyer Member State contracts the clearinghouse or project developer to carry out a project in a host Member State. As a result the buyer receives AEAs from the host, directly or via the mediator, based on the project's estimated impact on reducing emissions in the host country. This impact is then indirectly observed in the host country's emission inventory.

There are several design options for the project-based mechanism. It can be based, for example, on public tendering and either monetary payment or transfer of AEAs to the project developer[10], or on the centralized clearinghouse. At least the following details should be considered in the implementation of the project-based mechanism:

- Who will initiate and arrange the sell: buyer MS, host MS, project developer or clearinghouse?
- When the emission reductions of a given project are estimated and AEAs transferred?
- Should private project developers be entitled to hold AEAs or do they receive only monetary payment?
- How are the reductions of the project matched with the inventory of the host MS?
- Who will bear the risks?

If the project-based mechanism is based on the public tendering, the process can be initiated either by buying Member State, host Member State or a private project developer. There is no substantial difference between the cases where the initiator is the buying or hosting Member State and the project developer receives a monetary payment. Either a Member State willing to sell AEAs or a Member State interested in buying AEAs calls for projects through public tendering, and the project developer would approach the possible buyer and host Member States and act as broker of the sale. The project developer has to have agreements on the transaction of AEAs with both buyer and host Member States. If project developer receives the payment as AEAs, an agreement would be needed only with the host Member State, and the received AEAs could be sold later in the market. This could possibly decrease the transaction costs but requires a reform of the current system, in which only Member States are entitled to hold AEAs. The reform of the system would make project developers prone to the price risk associated to trade of AEAs. In addition, allowing also private actors to hold AEAs may complicate the system.

[10] Meyer-ohlendorf, N. EU Effort Sharing Decision after 2020: Project-based Mechanism and Other Flexibility Instruments. Ecologic Institute. 9. July 2015.

A centralized clearinghouse would provide a more transparent system for identifying projects, and for matching supply and demand. It could also reduce the transaction costs and administrative burden of Member States by utilizing the economies of scale. As proposed by Climate Strategies[11], the process would proceed as follows: First, the clearinghouse would call for Member State interested in buying AEAs to submit their demand schedules for the period 2021-2030. Then, it would call for emission reduction projects, and select projects to be implemented so that the demand of AEAs matches to the projects. The selection can be based on a price criteria or a broader set of criteria. The results of the tendering process would be published, which creates transparency of the supply, demand and price development of AEAs.

In the project-based mechanism, risks are involved in the transactions. Emissions reduced through a particular project are estimated as a difference between actual emissions and a counterfactual baseline. If the baseline is set incorrectly, the actual emission reductions of the project are under- or overestimated. This will not jeopardize the environmental integrity principle in terms of net emissions, because the amount of AEAs in the system does not increase and compliance will be checked from national emission inventories, not the project-based reduction estimates. However, errors in estimating the actual emission reductions of a project will pose a risk of additional costs either for the buyer or hosting Member State, or the project developer depending on the transaction modalities.

If the buying Member State receives all or part of the AEAs when the project is agreed on, the hosting Member State poses a risk of giving up more AEAs than is the actually reduced emissions of the project. This causes additional costs because the lost AEAs have to be replaced with additional emission reductions. If the AEAs are transferred only when the project is finished and the actual emission reductions are verified, the buying Member State may have to pay higher cost per AEA than expected if the verified reductions are lower than were initially estimated. If the project developer receives the payment as AEAs, it will bear this risk. On the other hand, if more emissions are reduced through the project than was initially expected, the cost per AEA is lower than assumed. When AEAs are transferred after verification, the hosting Member State will give away only as many AEAs than is the actual emissions reduced by the project, although it would be less or more than initially estimated.

3.2.2 The advantages and possible drawbacks

The purpose of the project-based mechanism is to increase cost-efficiency of emission reductions. The objective is to increase private sector involvement because private investors are often more profit-seeking than state governments, and thus, better in identifying cost-effective means for reducing emissions. In addition, involvement of private sector would mobilise additional funds to the emission reductions. Project-based mechanism would also allow implementing emission reductions where it can be done at lowest cost. For example, a Member State, which has strict target and high marginal cost of emission reductions, could finance a project in a Member State where the marginal cost is lower. On the other hand, this would provide investments to poorer Member States and could initiate emission reductions which would not otherwise be realized because the poorer Member State does not have enough funding, or such a loose target that there is no compelling need for additional reductions for achieving the target. In EU level, there is expected to be substantial deficit of AEAs in the second ESD period, and a substantial need for additional emission reduction measures. Project-based mechanism would establish a market for creating new projects for reducing emissions.

The project-based mechanism has also potential drawbacks. It will be uncertain whether the Member States are willing to finance projects in other countries instead of making domestic investments, and let the spill-over benefits, like increased employment and reduction of the

[11] Sartor, O., Bart, I., Cochran, I., Tuerk, A. Enhanced flexibility in the EU's 2030 Effort Sharing Agreement: issues and options. Final report. Climate Strategies. Apr. 2015.

local air pollution, flow abroad. Member States may also be unwilling to finance emission reduction projects abroad if the environmental integrity of the projects is questionable. This may be the case, for example, if the project has only short term benefits but no long-term climatic effects or the actual benefits are otherwise spurious. This is one subject of criticism related to CDM and JI. In addition, the buying Member States may be reluctant to use the mechanism if there is no guarantee of the persistence of the mechanism after 2030 because steep reduction in domestic emissions would possibly be needed in 2030-2040 if the mechanism is not maintained (see section 1.2). Significant time delays in project-based AEA transfers may reduce the willingness to use the mechanism. For example, the project implementation and the verification of reduced emissions may take several years.

There are also uncertainties related to the willingness of Member States to host projects. Member States that are in compliance with their target might not see enough benefits from hosting projects, particularly given the prospect of an increased risk. In order to increase the MS benefits from hosting projects, a system comparable to JI could be adopted: only 90 % of the project's emission reductions would be transferred to the buyer Member State and 10 % would stay in the hosting country. In addition, if there is no sufficiently transparent information on prices, potential buyer and hosting Member States and available AEAs; project developers as well as buying and hosting Member States may find it too complicated to initiate and implement the transaction.

The administrative burden and transaction costs would be higher compared to the AEA trading. However, the advantage compared to the AEA trading is that project-based mechanism could help to catalyse new emission reduction projects that are needed to fill the substantial shortage of AEAs in the second ESD period.

3.3 Administrative burden and transaction costs

The administrative burden is increased when projects are attached to the AEA transfers compared to the direct trade in AEAs because additional procedures would be required. A measurement reporting and verification of reductions would be needed for each project, which would increase the administrative burden of Member States. In addition, the tendering process would require effort both from national administration and the project developer, which would be reflected as a higher project costs, and be eventually payed by the buyer Member State. Thus the transaction costs of the buyer Member State are higher compared to the AEA trading. If private project developers are entitled to hold AEAs, an account system is also needed to keep track of AEA holdings. The setting would be comparable to the ETS sector, where private companies and individuals can hold an account of ETS allowances.

A centralized clearinghouse could potentially reduce the administrative burden and transaction costs compared to decentralized project-based mechanism by establishing common rules and procedures, and by utilizing the economies of scale. The main tasks would be calling for tenders, selecting projects, and publishing the related information. In order to limit the administrative burden, the clearinghouse could be set as a task of private sector actor, comparable to the auctioning platform under ETS. Though the advantage of the clearinghouse is the reduced administrative burden and transaction costs compared to decentralized mechanism, the administrative burden per reduced Mt CO_2eq may become higher than in bilateral agreements if the amount of projects implemented through the mechanism is low.

4 Flexibilities between ESD and ETS

4.1 One-off reduction

The European Council decided in 2014 on a new flexibility mechanism for the ESD sectors, implemented through "a limited, one-off, reduction of the ETS allowances"[12]. The mechanism will be available only for Member States that have a national target that is significantly more stringent than both the EU average and the country's cost-effective reduction potential. The Council concluded that decisions regarding the mechanism should be made before 2020, "while preserving predictability and environmental integrity".

Support for added flexibility between the two sectors can be presented from multiple perspectives. The ETS sector has accumulated a vast surplus of EUA allowances during the past years, which will be available also during the 2021-2030 period. This leads to that only very limited emission reductions need to be carried out in the ETS sector during that decade, rendering marginal emission reduction costs in the sector very low. Meanwhile, the ESD sector's marginal reduction costs are expected to be relatively high in some Member States. In addition, while the overall EU-level targets of ETS and ESD sectors were set initially in a cost-efficient manner, changes over time e.g. in energy markets will shift the balance of cost-efficient emission reductions between the sectors. Such a change has taken place already in crude oil price, the decline of which increases emission reduction costs in the ESD sector, but has a far lesser impact on the ETS sector. Moreover, as the planned new flexibility can be taken into use by selected Member States at their own discretion, the countries will take advantage of that flexibility only if it can provide added cost efficiency to the emission reduction policies.

The European Council's conclusion merely provides an outline, however, and a number of open features remain in the design of this new flexibility. These include:

- Which countries are eligible for the use of the mechanism
- What is the maximum amount of transferable ETS allowances by each country
- When the eligible countries have to decide on the possible use of the mechanism
- From where the transferred ETS allowances are drawn (e.g. from the MS's auction volume or the secondary market)
- Do units from the ETS transfer one-for-one to the ESD units

While in principle the mechanism merely transfers allowances from one sector to another, the mechanism is likely to have a dynamic impact on the timing of emission reductions in both sectors. The ESD sector is likely to have a shortfall of AEAs up to 2030, and additional units through the one-off transfer are likely to reduce the necessary emission reductions. Although the ETS sector holds currently a large surplus of EUA allowances, the market stability reserve (MSR) is likely to withdraw the surplus by 2030. The MSR has predetermined rules of withdrawing EUA units in situations where there is a significant surplus of EUA units on the market, but also releasing units back to the market if the surplus is below 400 Mt. Therefore, the dynamic impacts of the one-off transfer, with respect to both ESD and ETS sectors and the environmental integrity principle, need to be considered.

[12] European Council, EUCO 169/14, CO EUR 13 CONCL 5, Brussels, 24 October 2014

4.2 Impact of the one-off reduction on the ETS sector

Here, we provide an estimate on one-off transfers' impact on the ETS sector and the surplus of EUA allowances. In the ESD sector, the transfers would increase the allocation of AEA units – probably during the early years of the 2021-2030 period, which could then be banked forward.

As an interpretation of countries eligible for the one-off transfer, we take countries whose average target percentage from 2005, as presented in Figure 3, is larger than both the EU average (-30%) and the cost effective reduction potential implied by the PRIMES scenarios. These countries comprise the Nordics, Benelux countries, Austria, Italy and Spain.

The maximum amount of transferable emission units is assumed to be either 2% or 5% of the cumulative emissions from these countries' ESD sectors within the 2021-2030 period. This is a purely speculative assumption, and puts the maximum amount to 141 or 353 Mt CO_2.

The emission allocation in the ETS sector, WEM and WAM scenarios, and the resulting EUA surplus and the volume of the MSR is presented in Figure 9 both with and without the one-off transfer. In the first case, without the one-off transfer, the MSR withdraws the surplus of allowances completely from the market by 2030 in the WEM scenario, and nearly in the WAM scenario.

Assuming one-off transfers of either 141 or 353 Mt to take place in 2020 in the WEM case, the surplus is reduced radically in 2020. However, as smaller surplus also leads to a lesser rate of absorption of surplus units by the MSR. Consequently, the amount of surplus allowances on the market is only slightly lower during the latter part of the decade, and the one-off transfer has mainly an impact on the volume of the MSR, as can be seen in the lower part of Figure 9.

The one-off transfer would therefore increase the total EU-wide emissions in 2030, assuming that the transferred EUA units will substitute AEA units one-to-one. However, the volume of MSR would be lower in 2030 due to the one-off transfer. This volume would be gradually released to the ETS market in the post-2030 period, and hence the one-off transfer would also lead to lower ETS emissions after 2030. The one-off transfer will therefore have two main impacts: it would shift the balance of emission reductions from the ESD to the ETS, but also postpone emission reductions into the post-2030 period, due to the buffering effect of the MSR. As the volume of the one-off transfer would be limited, these shifts would also have a very limited magnitude.

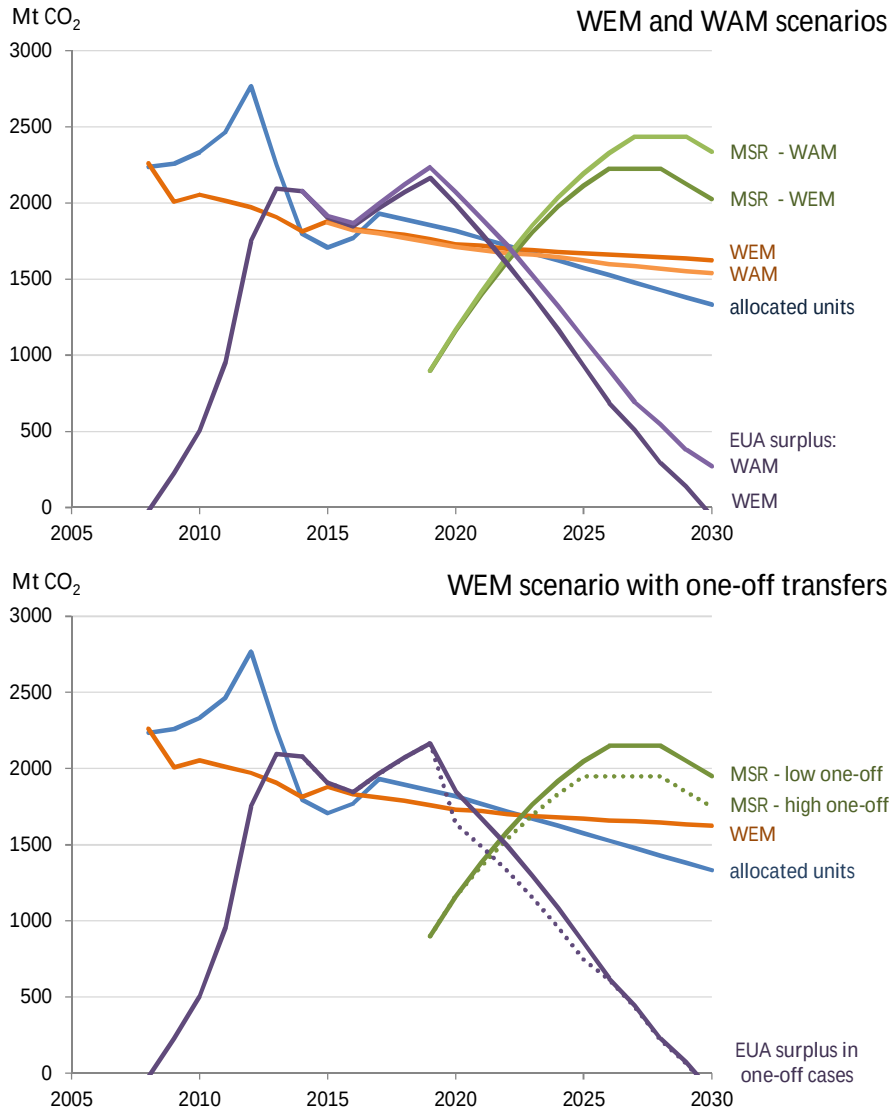

Figure 9. Allocation and surplus of ETS EUA units in WEM and WAM scenarios without the one-off transfer (top) and with either 141 Mt or 353 Mt one-off transfer in 2020 (bottom).

4.3 Administrative burden and transaction costs

The administrative burden of the one-off reduction would be light. The participating Member States would purchase the EUA units from the auctions or the secondary market. These units would be annulled or the Member State could be held responsible for holding the units at an EUA account indefinitely. By being able to present the amount of withhold EUA units, the amount would be taken into account when checking the compliance of the Member State's ESD target.

5 LULUCF

Emissions and carbon sinks within the land-use, land-use change and forestry sector (LULUCF) are not part of the EU climate and energy policy targets for 2020, and their role in the 2030 framework remains open. As a preparation for the expansion of future emission targets to cover more extensively the LULUCF sector, the EU Commission has proposed possible policy alternatives that would ensure that the LULUCF sector contributes to the EU's climate change commitments.

Possible policy frameworks include 1) development of the sector's commitments as a separate framework, 2) inclusion of the sector in the Effort Sharing Decision (ESD) with the current non-ETS sector, or 3) merging the agriculture and land-use sectors to form the AFOLU sector (agriculture, forestry and land-use) and assigning separate targets for AFOLU and the remaining part of the non-ETS sector. How the commitments for these possible sector divisions would be defined has not yet been communicated by the Commission.

Generally, including more sectors under a common target – or allowing the emission reductions or enhanced sinks on one sector to compensate for emissions in another sector – would, in principle, improve both the cost-efficiency and flexibility meeting the climatic commitments. Therefore, including the LULUCF and ESD sectors under a common emission target – or allowing a linkage between the sectors in the case the LULUCF sector receives its own sectoral target – would add to the flexibility and improve cost-efficiency.

The weight of the LULUCF sector in the emission inventory varies considerably between Member States. For forested member states, such as Austria, Finland and Sweden; the sector provides a considerable net carbon sink. For most Member States, however, the net emissions or net sink from the sector is relatively small.

A recent impact assessment[13] on the different possibilities of including the LULUCF sector in the emission reduction commitments for Finland concluded that flexibility between ESD and LULUCF would indeed improve cost-efficiency. A large mitigation potential with costs lower than the most of measures in the ESD sector was identified in the forestry sector. However, this would come with a cost of increased uncertainty. The future development of forest carbon sinks in particular was assessed to be far more uncertain than the development of ESD sector's emissions. An improperly determined target for the forestry sector could result in a large amount of "hot air" – i.e, excess emission credits flooding to the ESD sector – or an unnecessarily strict emission target.

While it would be beneficial to extend cross-sectoral flexibility also to the land-use sector in the future, it seems that a considerable reduction of uncertainties both in the accounting and prediction of land-use emissions and sinks is a prerequisite for robust climate policy on the sector.

6 Summary and conclusions

Flexibility mechanisms are likely to have a far more important role in the ESD sector's emission reduction towards the 2030 targets than for the 2020 targets. The European Council's conclusions from 2014 identified flexibility mechanisms as primary means to achieve cost-efficiency. This is particularly important for finding and implementing cost-efficient emission reductions between Member States, because the initial burden sharing between Member States is only partially based on cost-efficiency considerations.

Further, cost-efficiency can be also improved between sectors. Although the 2030 emission targets of ETS and ESD sectors were initially set in a cost-efficiency manner, the costs and potentials of different emission reduction measures in the sectors will change over time – e.g. due to fluctuations in energy prices – leading to the need to adjust the balance of emission reductions between sectors over time.

In this report, we have made quantitative estimates on the volume and impacts of three of flexibility mechanisms planned for the ESD sector in the post-2020 period. Banking of credits

[13] Ekholm, Honkatukia, Koljonen, Laturi, Lintunen, Pohjola, Uusivuori: EU 2030 climate and energy framework – assessment of the opportunities and conflicts relating to the inclusion of the LULUCF sector. Valtioneuvoston selvitys- ja tutkimustoiminnan julkaisusarja 6/2015 (In Finnish, with an extended abstract in English).

is likely during the early part of the second ESD period. There exist a substantial potential for the trade in AEAs between Member States, and realizing this potential is critical for achieving cost-efficiency on the EU-level. Given the lack of experience in AEA trading and the possibility that Member States might be risk-averse and withhold any unused AEA units, an obligatory and centralized auctioning of unused AEAs – or of a predetermined share from the initial allocation – would ensure that the volume of the AEA market remains reasonable.

As for what impact the agreed and planned flexibility instruments have for a specific Member State depends on a number of details. The accumulation of bankable credits depends on the realized annual emissions and annual targets. The AEA-trade between Member States depends both on the realization of emission pathways relative to the target path, but also on the willingness of countries to sell the excess and buy the shortfall in AEA units. As some concern exist over how well such a market could function, alternatives implementations – such as obligatory trading of excess allowances or a fixed share of the initial allocation – exist. Last, the specifics on the one-off transfer between ETS and ESD sectors remain open. Further decisions need to be made on which countries are eligible for the transfer, what is the maximum transferable amount, and when countries have to carry out the transfers.

As an example, Finland would not accrue bankable credits in the analysed scenarios. The PRIMES cost-efficient scenario 2014 implies roughly 2 Mt of purchased AEA units in 2030 for Finland, and 12 Mt in 2021-2030. The exact volume of the one-off transfer has not been decided, although it has been stated as being “limited”. As rough assumptions, we assumed the volume to be either 2% or 5% of the eligible Member States’ cumulative ESD emissions in 2021-2030. With these assumptions, Finland could transfer 5 Mt or 11 Mt for the whole period 2021-2030, i.e. 0.5 Mt or 1.1 Mt annually if divided evenly across years. Hence, the one-off transfer would be of slightly lesser magnitude as the trade in AEA units between Member States.

Two additional observations made during the analysis have broader implications. First, the banking of ESD emission units – and also to some extent the additional ESD units through the one-off transfer - lead to that the ESD emissions in 2030 are likely to be higher than the 2030 target-level of the sector. Similarly, the banking of excess allowances in the ETS sector lead to that the ETS emissions in 2030 are higher than the sector’s 2030 target. As a result, the total emissions in the EU are likely to be higher than what the planned -40% reduction from 1990 – which is stated e.g. in the EU’s intended nationally determined contribution to the Paris Agreement – would imply. This stems from the difference between the formulation of the sectoral and EU-level targets: the former are cumulative over a longer time frame, while the latter states that target for a single year. While this discrepancy is primarily a matter of interpretation on emission targets, its potential implications should be acknowledged early on.

Second, even though the currently stated targets and flexibility mechanisms extend to 2030, the decision-making over national climate policies has even a longer time horizon. If a Member State takes advantage of the flexibility mechanisms in order to comply with its emission targets towards 2030, its emission trajectory will be higher than without the flexibility mechanisms. In light of the 2050 targets, even steeper emission reductions are expected towards 2040. A country relying heavily on flexibilities towards meeting the 2030 target would face serious difficulties in meeting its 2040 target if flexibilities would not be present in the 2040 package. In other words, countries will use flexibility mechanisms in large volumes only if they can rely on their existence also after 2030. The possible success of well-functioning flexibility mechanisms, therefore, depends also on the long-term predictability of climate policy.