The Effort Sharing Dinosaur

Avoiding extinction for the EU's climate ambition

The Effort Sharing Decision in a nutshell

The Effort Sharing Decision (ESD) covers more than half of the EU's emissions and is a key instrument for reaching the EU's 2050 goal of 80-95% emission reductions below 1990 levels. The ESD was introduced into the 2020 Climate and Energy package in 2009, as a governance tool to guide decarbonisation in the sectors that are not accounted for under the European Union Emission Trading System (EU ETS).

However, as with the ETS, the ESD is becoming out of step with reality. It is a dinosaur policy, stuck with old emissions projections and old unused carbon allowances, and needs radically refreshing if the EU is to get back on track with tackling climate change.

The targets that currently apply to emission reductions at the EU level operate on assumptions of what the ESD and EU ETS can deliver, individually. The current EU target of 30% reduction by 2030 in the ESD sectors was calculated with a view to reaching the less ambitious end of the 2050 range and is the very minimum requirement for ESD sectors. Additionally, the EU 2050 80% target assumes the EU ETS sectors will decarbonise by 90-95% by 2050.

In the light of the Paris Agreement, the EU needs to increase its ambition level for the ESD sectors, to be more in line with the upper end of the 2050 targets. The ESD needs to play a greater role in this process and should be amended to ensure that it delivers cost-effective emission reductions across the EU.

The European Commission is due to bring forward proposals for the next phase of the ESD in 2016. We recognise the importance in having a target driven governance framework around the non-traded sectors and think the first phase of the ESD was a first step towards this. While it is too early to acknowledge the achievements of the ESD, after only 2 years of its coming into force, we must nonetheless address the limitations that have already become apparent and which risk affecting the overall impact of this policy.

The current structure of the ESD will result in a huge cumulative surplus of Annual Emission Allocations (AEAs) up to 2020, and further surpluses would be accumulated up to 2030 unless changes are made to the proposed scheme design. The surpluses are bottlenecked at the Member State level due to several factors, such as the large spread between different MS allocations and the current lack of limitation on certain flexibilities within the ESD (banking). These drastically reduce the incentive to implement abatement measures in the non-ETS sectors.

More ambition in the ESD for 2030 is necessary and is achievable without much additional effort in order to align emissions in the non-traded sectors with the delivery of 2030 and 2050 EU targets. **This increased ambition is achievable without much additional effort, firstly by canceling the surplus of allowances and secondly by making sure that emissions are re-based against real emissions at the start of the next phase.**

A tightening of the scheme would pave the way to a more stable emissions reduction pathway to the 2050 target, ensuring that steep, less cost-effective, emission reductions are not required post 2030.

The 2016/7 legislative review of the ESD is key in achieving the aforementioned goals.

In this paper, we identify three main priorities for the on-going legislative review process:

1. **Removing the surplus of Annual Emission Allocations (AEAs) available in the ESD;**
2. **Re-basing the ESD post 2020 (ESD II) at actual emission levels;**
3. **Increasing overall ambition levels.**

Key findings

Our research demonstrates that even with no carry over of the current phase surplus, a post-2020 surplus will still build up if the new ESD target line simply picks up where the 2020 one finishes off, resulting in little additional abatement.

We forecast the accumulated surplus of AEAS in the first phase of the ESD will be 2,600 MtCO2e by 2020. This surplus is too great to allow for any carry over to the next phase of ESD. **All surplus ESD I allowances need to be cancelled in ESD II, if the necessary emission reductions are to occur post 2020.**

In addition, our forecasts show that emissions will already be 28% lower than 2005 levels in 2021, creating a surplus of 320MtCO2e in the first year of the next phase alone, if the end point of ESD I trajectory is used as the starting point for ESD II**. A new starting point for the ESD II trajectory therefore needs to be established. The baseline for the start of the new phase should be the average of 2018, 2019 and 2020 emission levels**.

However, even a new starting point will prove insufficient in generating the necessary emission reductions beyond business as usual (BAU) scenarios, if the current 30% reduction by 2030 target for the ESD is maintained. **In order to stimulate emissions reductions beyond BAU, the target would need to be increased to at least 40%.**

A 50% target would be more consistent with the Paris Agreement, as it would place the EU on track to reaching its 95% target for 2050, serving as a concrete effort in the direction of limiting the global temperature rise to "well below 2 degrees Celsius".

Finally, **five-year review clauses should be included** in the revised ESD to respond to future developments, notably under the review provisions of the Paris Agreement. **We recommend maintaining the existing yearly compliance cycle of the ESD.**

About this briefing

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1 Introduction: The Effort Sharing decision ahead of the 2016 review process

The European Union's (EU) Effort Sharing Decision (ESD) was first introduced into the EU's legal portfolio as an integral part of a wider legislative platform, the 2009 EU Energy and Climate package. It was designed as only one part of a wider architecture and as a policy framework of ***a complementary nature*****,** covering the emissions that, by definition, were not accounted for by the EU's main climate policy, the EU Emissions Trading System (EU ETS).

Together, the ESD and the EU ETS have been designed to deliver quantifiable emissions reductions required for EU economy-wide decarbonisation. The split between the EU ETS and the ESD resulted in a binary structure of the current EU-wide climate architecture. The two were designed to be of a non-interactive nature and as such, function as two separate carbon budgets. According to the European Commission (EC) Impact Assessment, this was an optimised split, with the EU ETS remaining the centerpiece of EU climate legislation and with the ESD and additional policies, such as sector specific policies, providing the extra incentives and tools to drive decarbonisation[1] at the Union level.

All the current targets (2020, 2030 and 2050) for the whole EU rely heavily on what each of these instruments can deliver. As such, if one instrument finds itself in a situation of under-delivery, the other one will have to make up for that and deliver beyond its target to ensure the EU stays on track to meeting its targets.

The two carbon budgets are very different in structure, the ETS being a policy spelling out common rules for a market-based system, while the ESD is rather a tool of governance, which only provides an overarching framework, comprising of a EU-wide target and 28 individual targets for the 28 Member States (MS). Yet, both instruments are plagued by the same endemic mismatch between assumed levels of emissions and actual emissions.

This has resulted in both instruments oversupplied with allowances, and both carbon budgets not tight enough for what they strive to deliver individually, let alone for what they were designed to deliver together.

The 2016 review of the 2030 legislation is a crucial milestone in enabling this process to take place as smoothly and cost efficiently as possible, by opening up the space for policy makers to fix the current inconsistencies and shortcomings of both the ESD and the EU ETS. The 30% target for the ESD by 2030 is inadequate in setting the EU on track to meeting the upper range of its 2050 target and can place the EU at risk of non-delivery, which would send the wrong signal to the rest of the world, in the post-Paris context, where it was agreed that efforts need to be scaled up beyond current scenarios.

This report assesses the proposals for a second phase of the Effort Sharing Decision to 2030. The current analysis concentrates on calculating the surplus up to 2020 at MS level as well as for the EU28 as a whole. The surplus/deficit position is also forecasted up to 2030 based on EU-wide reduction

[1] *Impact Assessment on Energy and Climate policy up to 2030 [SWD (2014) 15]*

targets. Due to the current political environment in the EU and to the on-going debate around the allocation of the burden between MS, this analysis is only undertaken at the EU28 level.

By focusing strictly on individual MS targets and ignoring the larger picture of the overall ambition level in the ESD, EU policy makers risk losing sight of the actual net emissions necessary for the EU to reach its 2050 goals, which in the light of the Paris Agreement are to be understood as moving toward a 95% reduction by the half of the century. This could lead to serious consequences for the post-2030 period, with new decarbonisation curves growing increasingly steeper.

In the current set-up, certain MS might be faced with the prospect of transitional disruptions post 2030, since they would be faced with grim prospect of having to catch up and make up for the lesser effort in the previous phases, at what might be a higher cost.

The incremental and collective element of this scheme is weakened by the great disparity between individual targets and the cumulative surpluses of Annual Emission Allowances (AEAs), which are accumulating at MS level. In the long-term, the current structure runs the risk of placing the whole EU effort at risk of non-delivery, should the required reductions in the ETS sectors prove themselves to become increasingly expensive, as we move towards a full decarbonisation of this scheme.

2 A reality check on ESD emissions: Projections for 2020 and 2030, based on historical emissions

In this section, we describe how emissions in the ESD are currently below current targets and how targets for 2030 would in fact require only a minimal amount of reductions from business as usual (BaU). The current discrepancy between targets and current emissions levels means that we are faced with the prospect of having a decade's worth of 'hot air' in the ESD.

2.1 Sandbag methodology

In this report we have used the same methodology as used by the European Environment Agency (EEA) in their calculation of MS ESD emissions and progress towards their 2020 ESD targets[2]. There is a slight difference between Sandbag's results and the EEA's for the 2005 baseline year, with Sandbag's total ESD emissions estimates at 1.2% lower than the EEA for that year. This influences subsequent calculations beyond 2020 ESD emission targets are calculated with reference to 2005 emission levels, it is important to be precise about these base year emissions. We therefore use the EEA's published ESD emissions for

[2] *Data for the ESD sector of the economy are calculated by subtracting ETS emissions, as reported in the European Environment Agency (EEA) EU ETS Data Viewer, from total economy emissions as reported to the UNFCCC under the common reporting format (excluding LULUCF). ESD is everything except ETS, except LULUCF, and except international maritime. International aviation is included. UNFCCC reporting does not yet cover 2014, so for 2014 the whole economy emissions data is taken from the EEA's reporting of members states EU reporting obligations instead. This reporting does not include international aviation so Sandbag has estimated international aviation figures for 2014 by extrapolating the trend of the previous three-years. The ETS emissions data from the EEA EU ETS Data Viewer includes scope adjustments which provide for like for like comparisons over the whole time period under review for member states and activities joining the scheme after 2005.*

2005 in this analysis, but then use Sandbag's in-house calculations for ESD sectors emissions for the period from 2006 to 2014[3].

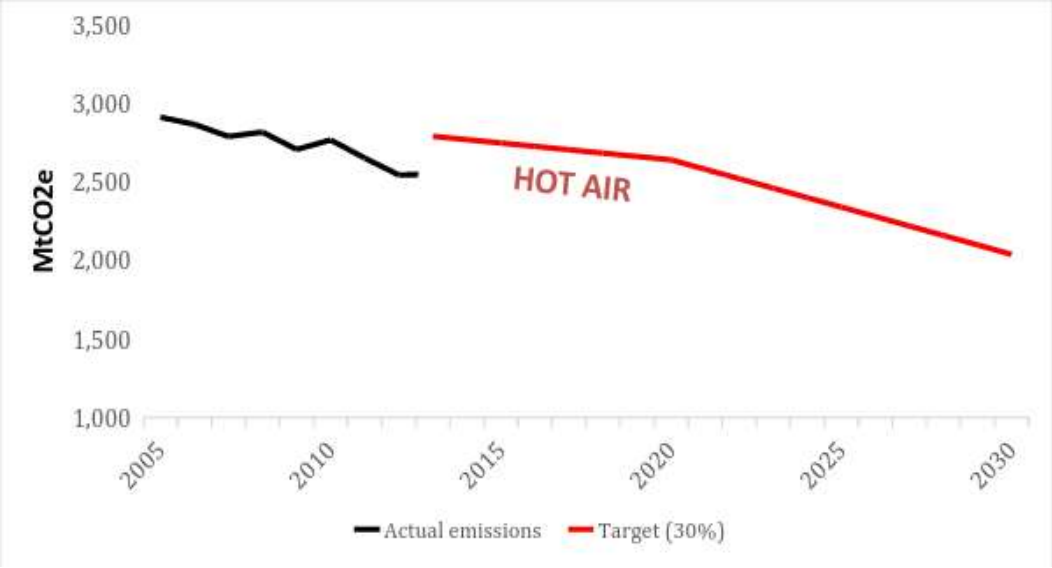
2.2 ESD Emission Targets and Baselines

Emissions targets for 2020 are published in Annex II to the Effort Sharing Decision[4] as percentage changes relative to 2005 emissions. However, these figures just present the end-point of the target trajectory. The Decision creates a target line from 2013 to 2020, defined as a linear trend between the 2020 end point and a baseline level of emissions. For countries with 2020 targets below 2005 levels, the baseline is the average of ESD emissions in 2008, 2009 and 2010 with the linear trajectory starting in 2013.

For countries with 2020 targets above 2005 emission levels, the baseline is the average of 2008, 2009 and 2010, but with the linear trajectory starting in 2009. 2030 targets are also calculated as relative to the base year emissions in 2005. The EC's 2030 climate and energy framework[5] proposes a 30% reduction on 2005 emissions by 2030 for the non-traded sectors, so that together with the reductions in the traded sectors, the EU can achieve its overall goal of a 40% reduction in emissions from 1990 levels.

In Figure 1, we portray the current discrepancy between the current emission levels and the targets for 2020 and 2030. If the current situation is simply continued in the next phase, we are faced with the prospect of having a decade's worth of 'hot air' in the ESD.

Figure 1. Current emission levels and historical trend versus 2020 and 2030 targets for ESD sectors, against a 2005 baseline



[3] *ESD 2005 baseline figures are taken from p.96 Table A3.3 of the EEA's 'Trends and projections in Europe 2015 - Tracking progress towards Europe's climate and energy targets' available here http://www.eea.europa.eu//publications/trends-and-projections-in-europe-2015.*

[4] *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.*

[5] *A policy framework for climate and energy in the period from 2020 to 2030 /* COM/2014/015 final*

2.3 ESD Emission Projections

This analysis forecasts emissions under Business as Usual (BaU) to calculate future compliance rates under different target scenarios. There are two main sources of emission projections for the ESD to 2030:

1. Member States' own estimates of projected emissions, collated by the EEA. These distinguish between projections With Existing Measures (WEM), and With Additional Policies (WAM) and relate to the ESD sectors;
2. The EC's own projections of emissions. [6]

The EC's Impact Assessment provides calculations of emissions in 2030 relative to 2005 under several scenarios. The work breaks down these projections into broad sector categories (Table 1, column 1). Some of these sectors map directly onto the ESD (residential and tertiary, transport, agriculture and other), while power generation, district heat and Combined Heat and Power (CHP) can be assumed to all be in the EU ETS. However only a portion of industrial emissions are covered by the EU ETS.

The aggregate emissions reductions projection for the ESD sectors by 2030 is only 18.1% below 2005 levels, in a business as usual scenario. Using these projections means that to achieve a 30% reduction on 2005 levels by 2030 would require an additional 12% reduction. However, we believe the Commission's projections under-estimate the likely BaU emissions reductions that will occur in the ESD sectors up to 2030, making the 30% target easily achievable (see section 1.2.4 below).

Table 1. Estimating ESD BAU emissions in 2030 relative to 2005

	GHG emissions in 2030 compared to 2005 * (1)	**% covered in ESD[7] *** ** (2)	**Share of each sector in ESD **** (3)	**Weighted emissions reduction potential (2005 – 2030)** (4)
Power generation, district heating & CHP	-46.70%	-	-	-
Industry (energy & process) (CO2)	-22.50%	33% [8]	5%	-1.1%
Residential & tertiary (mainly buildings) (CO2)	-31.40%	100%	30%	-9.3%
Transport (CO2)	-11.60%	100%	39%	-4.5%
Agriculture (non-CO2)	-4.50%	100%	20%	-0.9%

[6] EC, Jan 2014, Impact Assessment – A Policy Framework for Climate and Energy for the Period from 2020 up to 2030. COM(2014)15 Final

[7] We calculate the share of each of these sectors (industry, residential & tertiary, transport, agriculture and other non-CO2) in the ESD using the EC's 2015 Climate Action Progress Report (col 3).

[8] For the purpose of this analysis it has been assumed that two thirds of industrial emissions are in the ETS and one third in the ESD.

Other non-CO2 sectors	-36.40%	100%	6%	-2.2%
Total			**100%**	**-18.1%**

** source: EC, Jan 2014, Impact Assessment – A Policy Framework for Climate and Energy for the Period From 2020 up to 2030. COM(2014)15 Final.*

** Source: EC, 2015, Climate Action Progress Report, p 32 – Reference Scenario. (emissions relate to 2012)*

**** Sandbag estimate*

2.4 Additional emission abatement in the ESD

Research has been carried out to assess the abatement potential in the ESD sectors up to 2020 as part of an analysis of Member States' actions to implement the ESD. This includes an assessment of the abatement potential in ESD sectors at different marginal costs across the EU[9] (Table 2).

Table 2. Abatement potential in the ESD up to 2020 (MtCO2)[10]

Cost band (€/tCO2)	EU	Agriculture	Buildings	Transport	Industry	Waste
< 0	156	19	84	11	43	0
0 - 25	56	31	4	7	14	0
25 - 50	56	31	2	23	0	0
> 50	129	41	29	58	0	0
EU wide sector	**397**	**122**	**119**	**99**	**57**	**0**

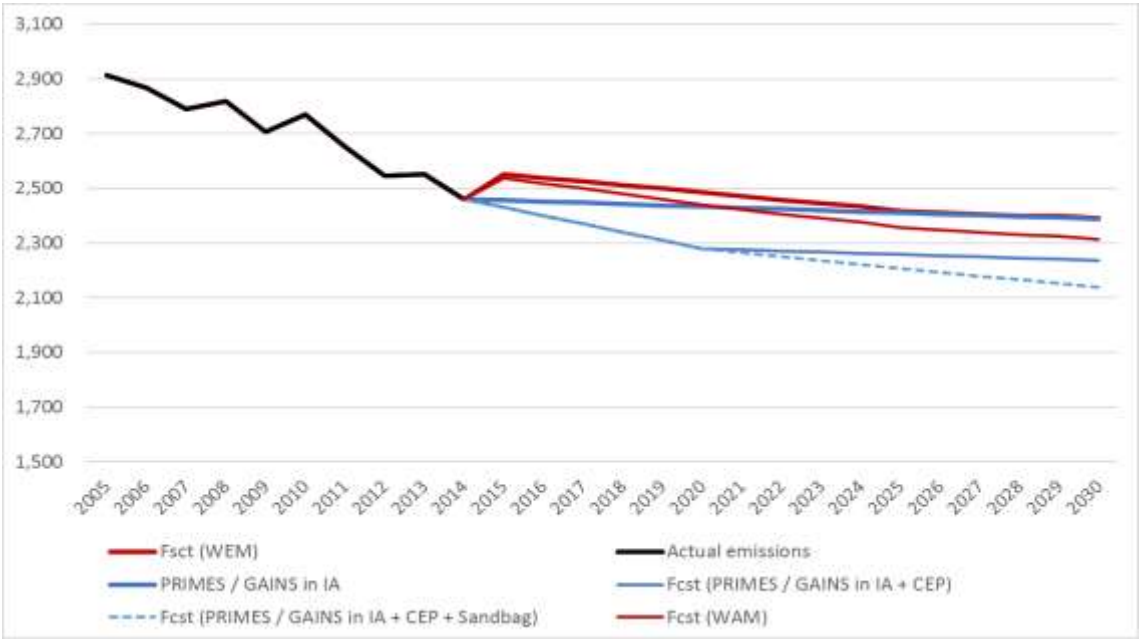
Our analysis assumes that the measures with negative costs would be taken up in addition to the reference scenario as defined by the EC without the need for additional measures[11]. Building on this differentiated potential, we compare five projections of emissions up to 2030 (see Figure 2.)

[9] AEA, Ecofys, Fraunhofer, 2012, Next phase of the European Climate Change Programme: Analysis of Member States actions to implement the Effort Sharing Decision and options for further community wide measures. The AEA report references EU27 rather than EU28, but the difference is negligible in the context of the uncertainties in this analysis.

[10] The work distinguishes between measures that have negative costs, i.e. that would be economically viable without any additional regulatory support (often referred to as "no regret" options), and those that have positive costs in the bands €0 - 25/tCO2e abated, €25-50/tCO2e and > €50t/tcO2e.

[11] This is in line with the AEA report

Figure 2. Projections of ESD Emissions to 3030 (MtCO2e), factoring in Cost Effective Abatement Potential (CEP)



Source: Various, see text.

The Member States own projections under WEM and WAM are shown in red. The WEM projection is consistent with the PRIMES/GAINS reference scenario in the EC Impact Assessment in 2030 shown in blue. According to Member States own estimates as collated by the EEA, the addition of extra policies in the WAM projection reduces emissions in 2030 by only 3.2% compared to WEM.

We also show two further projections assuming that an additional 156Mt of cost effective potential (CEP) is implemented by 2020 (the total sum of cost-free abatement according to Table 2), in addition to that contained in the EC PRIMES/GAINS reference scenario (thin blue line). The solid blue line assumes the 156Mt is all implemented up to 2020, but that no further abatement occurs in addition to the EC PRIMES/GAINS reference scenario beyond 2020.

This however ignores the potential for cost effective abatement in the following decade post-2020, as more time allows for changes in technology, practices and capital stock (e.g. vehicles or farming practices). To allow for this we assume a moderate amount of further cost effective abatement takes place after 2020, at half the rate in the period up to 2020 (emissions fall at 0.6%/year compared to 1.27% a year from 2015 to 2020) (dashed blue line). **This is the emission projection used in the rest of this analysis.**

2.5 Setting the EU on track to Paris: Limiting global climate change to "well below 2 degrees Celsius" in the EU context

According to the European Commission's Communication "Limiting Global Climate Change to 2 degrees Celsius: The way ahead for 2020 and beyond", a 30% EU-wide reduction target for 2020, compared to 1990, was deemed to be the appropriate target for 2020, if a 2ºC goal was to be pursued[12]. As such, it is

[12] *Communication from the Commission to the Council, the European Parliament, the European Economic and Social Committee and the Committee of the Regions - Limiting global climate change to 2 degrees Celsius - The way ahead for 2020 and beyond* http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:52007DC0002

clear that a 20% target by 2020 is not consistent with this goal, let alone with the "well below 2º" goal agreed on in Paris.

The current -40% reduction by 2030 was calculated as the milestone between the 2020 current targets and the 2050 goals. However, it is clear that the starting point of this calculation is not in line with the ambition level that the EU committed itself to through the Paris Agreement.

Hence, following Paris, it is beyond necessary for the EU to step up its 2020 ambition to the one outlined in the aforementioned Communication, which would automatically trigger an upgrading of the 2030 target. We find an increase in the 2030 target to be quintessentially necessary, if the EU is to deliver its international obligations and to meet the upper range of its 2050 goals.

The 30% share of reductions in the ESD sectors by 2030 is derived from the overall 43% reduction in emissions, at Union level. As such, it is a target obtained from a calculation that takes into account a scenario that is out of line with a 2ºC goal. Therefore, the current target must be upgraded, in line with recent developments and in line with the "at least" part of the 40% target specified in the European Council Conclusions from October 2014.

3 Drowning in design: Cumulative surplus under the ESD

On the basis of the above projections, we calculate that **the total cumulative surplus of AEAs in the ESD will amount to around 2,600MtCO2e.** This estimate is considerably higher than the EEA's own analysis, which suggests a cumulative surplus of around 1,500MtCo2e by the end of 2020[13].

The starting point for considering Phase II ESD targets is the net position at the end of the 2020 period. If the surplus is material and is carried over it will reduce the effectiveness of emission reduction targets for the subsequent period.

3.1 Carry-over of the 2020 surplus: impact on ambition levels

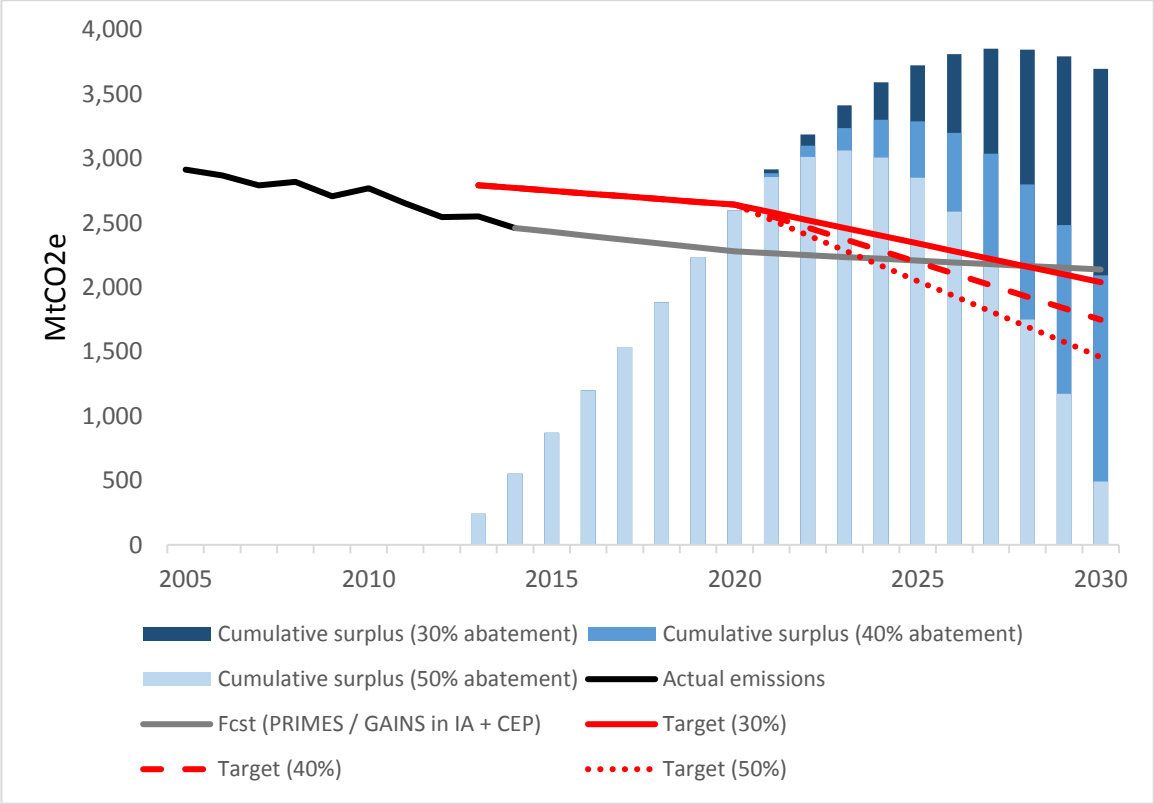
If the 2030 target trajectory is continued from the target end point in 2020, at current ambition levels, then the surplus will continue to increase up to the point at which emissions fall below the target line. However due to cumulative surplus, by the end of 2030, no net emission reductions will be required beyond BaU.

In fact, even extending the 2030 target to -40% for the ESD sector still does not use up the cumulative surplus across the EU, since under a 40% reduction on 2005 levels by 2030, the surplus across the EU will have reduced to only around 1,700MtCO2e, again requiring no net reduction beyond BAU (Fig 3).

[13] The reason for the difference is that Member States have assumed that emissions between 2014 and 2015 from the ESD sectors will actually increase by a small amount under the WEM assumptions. Our analysis suggests this is highly pessimistic and that emissions will continue to decrease resulting in even greater surpluses to 2020.

Assuming full carryover of the surplus to post 2020, a 50% target would still mean that no net effort beyond BAU would be required across the EU by 2030[14] (Fig. 3).

Figure 3. Emissions, targets and surplus under a 30%, a 40% and a 50% ESD target in 2030 with full carry-over pre to post 2020 (MtCO2e)



This demonstrates that under the current ambition level, there can be no carryover of the surplus into the next phase, as that would significantly diminish the effort necessary, while it would exacerbate the differences in different efforts to be carried out by individual MS.

3.2 Bottlenecked surpluses

Current ESD I rules on flexibilities allow for full banking of surpluses between the years within a country. The Decision limits the transfer of allowances to 5% of a country's allocation of AEAs in any given year before compliance and allows further transfers to occur after compliance. The flexibility, however, in its current form does not provide a structural response to the build-in surpluses. Most Member States will be in surplus till 2020, which will limit the incentive and rationale to use this flexibility.

[14] *These figures are aggregates across the EU and assume seamless exchange of allowances between Member States to manage surpluses and deficits on an annual basis. If this does not occur countries with deficits may be encouraged to abate more than their projected BAU emissions.*

Up to 2030 the effect of these flexibilities – if retained in the new ESD legislation – on the cumulative EU surplus depends on the distribution of targets between Member States[15]. If the post 2020 allocations are not evenly distributed the vast amount of surplus risks continuing concentrating in a relatively small group of countries as the current mechanism is far from being a carbon market that would serve to equalize the surplus.

Annex 1 shows the expected cumulative surplus positions across the EU28 up to 2020 under the Member State WEM forecasts. Our analysis applies the extra 6.3% of cost effective reductions by 2020, at the EU28 level, not to Member States and is therefore not shown in this table.

This suggests that only two MS (Austria and Luxembourg) would have net deficits by 2020, amounting up to less than 1% of the total surplus. These would be dwarfed by the surpluses in other countries, showcasing the problem that is inherent to current structure of the ESD, which leads to the accumulation of several surpluses, all bottlenecked at the MS level.

The surplus at the end of the 2020 period is problematic, if the ESD is to encourage sustained efforts to reduce emissions post 2020. Many countries with large surpluses will simply have no reason to invest in abatement measures beyond BAU if they are allowed to use accumulated emission reductions. This will also mean that they will be facing steeper curves of abatement in the post-2030 period, which might make them more vulnerable to transitional shocks, towards 2050.

3.3 Breaking open the bottlenecks: addressing the structural build-up of surplus

Sandbag recommends there be no carry over of accumulated AEAs from ESD pre-2020 to the new ESD.

Additionally, we propose that current flexibilities available within the ESD are enhanced, in order to compensate for the current limitations on trading. Additional flexibilities should also be introduced, in order to ensure that trading between MS leads to additional reductions. More specifically, we would like to see two main changes:

Limit the yearly rate of banking allowances, at MS level, to 5%, symmetrically to the limit on borrowing and transfer for the 2020-2030 ESD II.

This would have the positive effect of reducing the cumulative surplus over the period, while at the same time minimising the risk that some MS will end up with an extremely high surplus due to their very low targets and high cost effective potential, versus some who would have a shortage of surpluses and would have to undergo costly transactions or undergo costly projects – such an outcome would in fact be the opposite of a “balanced and fair” distribution of responsibilities, as is required in the EUCO;

Introduce a EU-level project based mechanism within the ESD.

This which would enable countries to reallocate their efforts to the most cost-effective options across the whole EU28, therefore meeting their “targets collectively”, as required in the EUCO. This would serve to

[15] *The analysis in this paper does not make projections on these allocations as this is still being debated, but assumes that there is as equal distribution as possible between MSs so that the aggregate EU position is reflected at MS level, i.e. that say a 10% surplus at the EU level is mirrored by a 10% surplus at MS level.*

also remove the bottlenecks, while allowing for the AEAs to be used up most effectively. This option will be further analysed in a subsequent briefing on enhanced flexibilities.

4 Fixing the ESD

4.1 Starting fresh: Ambition scenarios without the carry-over of the surplus

In the following analysis, we compare the effects of no carryover of remaining AEAs from ESD I to ESD II, under a 30%, a 40% and a 50% target. **The 50% target is the only scenario under which net emission reductions would be compatible with the 2050 Roadmap and the EU's long-term goals and commitment under the Paris Agreement.**

With a 30% target in 2030, the newly cumulative surplus rises until around 2027 as the collective EU target is still above the projected BAU emissions. After this date, the target is lower than projected emissions and the surplus starts to decline. Even under these circumstances, the surplus would still be around 1,000CO2et by the end of period in 2030.

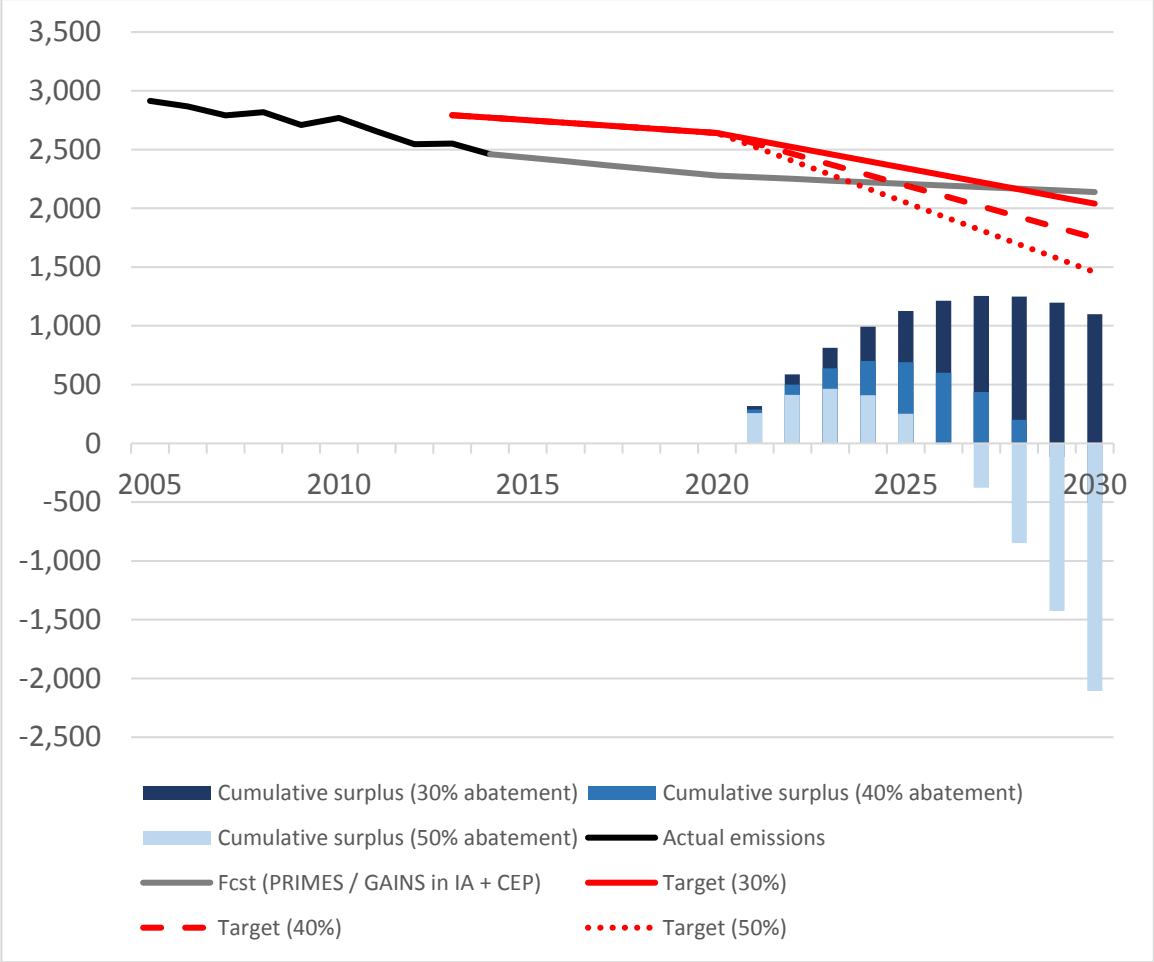
This would only change under a 40% target. Only by increasing the ambition of the target to -40% in 2030 does the cumulative surplus turn into a deficit at the EU level (Fig 3). This amounts to a collective net reduction of 500Mt beyond BAU at the EU level, which is an approximate annual reduction of 2% per year relative to 2014 levels over the decade 2020 to 2030.

Increasing the ambition even further to 50% reduction by 2030, with no carry-over of surplus allowances from ESD I, would require further reductions at the EU level of nearly 2000Mt over the period, or around an 8% reduction on average relative to 2014 levels (Fig 4).

Sandbag stands firm on its conclusion that in order to bring the EU back on the cost-effective path towards 2050, its economy-wide emissions target for 2030 should be 50% below 1990 levels[16]. A correction for the existing surplus ought to be the highest priority for the current review process and would be more consistent with the goals of the Paris Agreement.

[16] *As stated in our submission to the European Commission Consultation on the review of the Effort Sharing Decision published in June 2015 https://sandbag.org.uk/site_media/pdfs/reports/ESD_Consultation_response_June_2015_1.pdf*

Figure 4. Emissions, targets and surplus under a 30%, a 40% and a 50% ESD target in 2030 with NO carry-over pre to post 2020 (MtCO2e)



4.2 A new baseline for the ESD II

Whilst much of the focus is on the reduction target in 2030, a key issue with the ESD is the starting point for the reduction trajectory. If the starting point is too high, it creates surplus, which is carried forward and reduces the abatement effort in subsequent years. This is certainly the case if the ESD II target line starts where the ESD I finishes, i.e. a 10% reduction on 2005 emission levels. **Our projections forecast that emissions would already be 28% lower than 2005 levels in 2021, creating a surplus of 320MtCO2e in the first year of the scheme alone.**

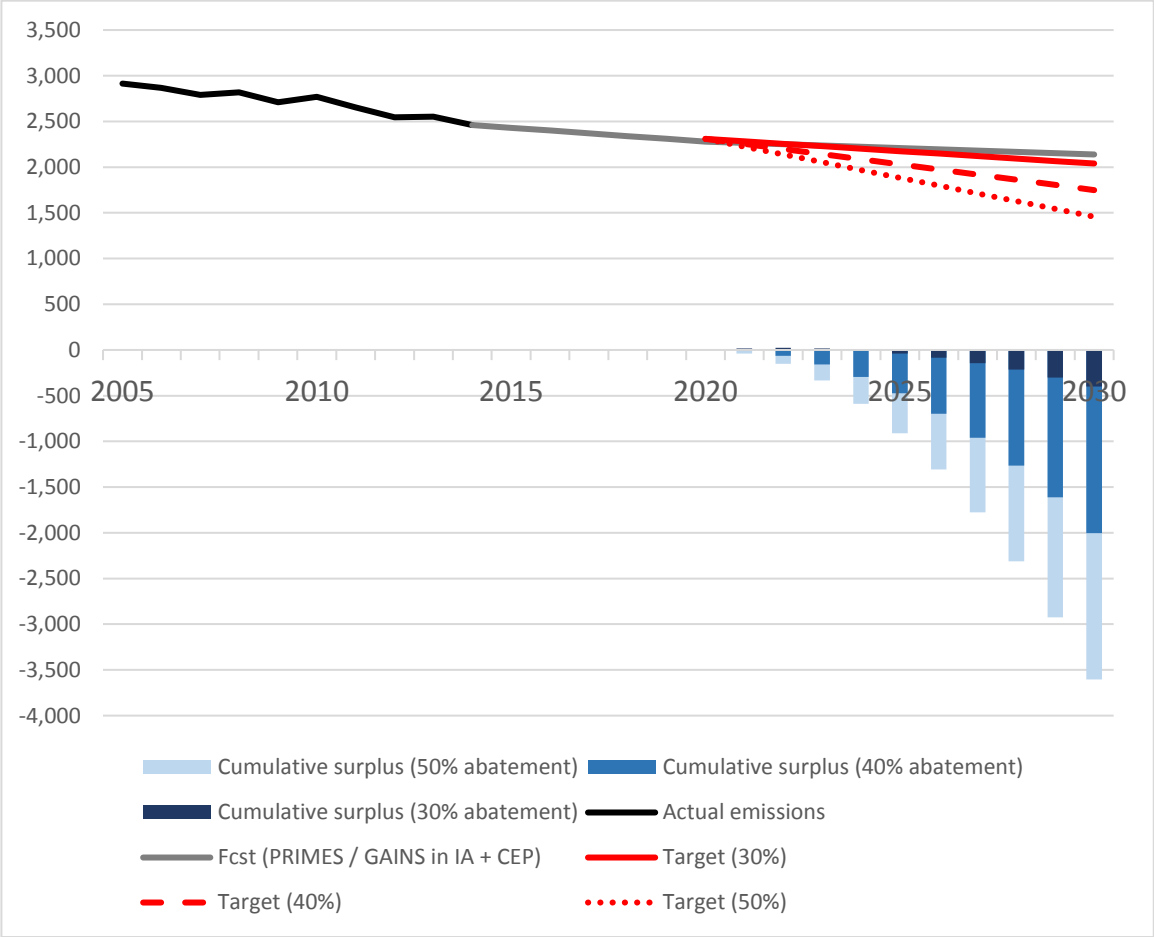
The realistic solution is therefore to start the post 2020 period with a new base year. To be consistent with the structure of the pre 2020 ESD it would seem sensible to take an average of three years. Figure 5 shows the effects of starting the base year on the average of 2018, 2019 and 2020, against the three different target scenarios operationalised in this paper.

A 30% target would result in an annual average abatement of around 1.5% relative to current emission levels. When increasing the target to 40% target for the whole ESD, we would achieve an 8% annual

average reduction at EU level. This reduction would of course be non-linear and dispersed geographically, however this average is used to indicate the overall abatement potential in the ESD sectors.

The 40% target would still not get the EU on track for meeting its 2050 goals. The curve following the 2030 target would be very steep and abatement will become increasingly expensive, introducing potential disruptions to the economy. A 50% reduction target would achieve a 15% annual average reduction relative to 2014 levels.

Fig 5. Baseline year 2018, 2019, 2020 average, under a 30%, a 40% and a 50% reduction target, with no carry over. (MtCO2e)



As such, it is Sandbag's view that a Paris Agreement compatible target for the ESD, which would make the transition to the ultimate goal of decarbonising our economy to up to 95% by 2050, would need a 50% target in 2030 for the ESD sectors. Such a target would achieve a 15% annual average reduction relative to the latest emission levels public at the time of this publication.

Summary: Identified solutions to the cumulative surplus

These three sections have highlighted the **importance of the interaction between the 2030 target, the baseline start year in 2021 and how the ESD I surplus is managed.**

On this basis, and assuming ESD I surpluses are allowed to be carried over to ESD II, **only a 50% reduction target in 2030 would produce a net cumulative deficit across the EU.** But even this would require a baseline in 2021 of the average of 2018, 2019 and 2020.

It is only by wiping clean the surplus from ESD I that emissions over the 2021 - 2030 are reduced in a material way. If the ESD II baseline is continued from the end point of ESD I, then only a 50% target in 2030 (relative to 2005 emissions) will create a meaningful need to reduce emissions (8% reduction across the period compared to 2014 emission levels). Alternatively if the ESD II baseline is recalculated as the average of 2018, 2019 and 2020 a 40% emission reduction target will deliver the same requirement of 8% over the period.

The combination of restricting all carry-over, using a baseline of the average of 2018, 2019 and 2020 and a 50% reduction target in 2020, produces an aggregate emission reduction requirement of 15% over the period relative to 2014 emission levels.

Table 3 compares the dynamic interaction of the three variables utilized in this analysis and their impact on the average annual reductions that would be required as a result, at EU level, up to 2030, against current emission levels.

Table 3. Summary of average emission reductions in 2013 – 2020 relative to 2014 emissions under different ESD II structures (assuming no restriction on trading between Member states)

	Full carry-over of ESD I surplus to ESD II			**No carry-over of ESD I surplus to ESD II**		
2030 reduction target	**30%**	**40%**	**50%**	**30%**	**40%**	**50%**
Baseline in 2021						
Continuation from ESD I	-	-	-	-	2%	8%
Avg 2018, 2019, 2020	-	-	8.6%	1.5%	8%	15%

5 Conclusions and policy recommendations

If the EU's 2050 goals are to be reached, the ESD will have to play a greater role in incentivising decarbonisation. The target and the structure of this instrument, relying on individual MS targets across a wide spread, have led to the creation of several bottle-necked surpluses, amounting to a considerable EU wide surplus of allowances in these sectors.

Sandbag estimates that the size of the surplus in the ESD sectors by 2020 will be approximately 2,600MtCO2e. Carrying such a surplus over into the second phase of the ESD would be counterproductive to reaching the EU's goals for 2050. Our analysis has shown that only a 40% or a 50% target against a 2020 real emissions target will actually result in significant net emissions reductions in the ESD sectors for the period of up to 2030, being the only Paris Agreement compatible options for the EU ESD.

Sandbag's policy recommendations are the following:

1) **Ensure no surplus AEAs are carried over to the next phase.**

   That means two things: on one hand a no carry-over of surplus AEAs from ESD I and on another hand, it would require capping the current banking flexibility to 5% on a yearly basis. This would safe proof the MS with the lowest reduction requirements against a very steep decrease post-2030.

2) **Fix the current flexibilities embedded in the ESD,** with a view to minimising the surplus which accumulates over the period.

   This would require a capping the yearly banking rate at 5% of AEAs as well as introducing an enhanced flexibility, internal to the ESD, which would allow for surpluses to be addressed and for reductions to be achieved collectively as a default option, removing the bottlenecks embedded in the current structure. This possibility will be further explored in an upcoming publication.

3) **Increase the target to a minimum of 40% or ideally to 50%,** to actually enable the ESD to work as effectively as possible, delivering the greatest results and placing the EU on a Paris compatible track to meeting its 2050 goals**.**

4) **Modify the starting point to reflect real emission levels in 2020,** by setting the new point to be the average of 2018, 2019 and 2020 emissions.

   Setting the baseline to start from actual emissions levels, rather than historic projections: this would have the benefit of both increasing ambition, while at the same allowing for more accurate assumptions to be modeled in, with a view to increasing the relevance of the targets.

5) **Make the ESD Paris attuned by Including a 5-year review clauses, while maintaing the yearly compliance cycle.**

This would allow for increased ambition to be easily incorporated in the ESD in response to future developments, as well as it would make the ESD Paris compatible, which is an absolute must given the EU's role in securing the Paris Agreement and the speed at which we need to continue to deliver implementation, globally. This should not be done at the expense of the yearly compliance cycle of the current ESD.

Any attempt to change the yearly compliance structure would render current flexibilities volatile and would reduce the rigor of this scheme, which is counterproductive to achieving Paris and giving a positive and ambitious signal to the rest of the world.

Sandbag is, at the time of writing, undergoing research on enhanced flexibilities in the ESD and will provide an evidence-based proposal in the upcoming future.

Annex I

Cumulative Surpluses under ESD to 2020 assuming WEM forecasts (MtCO2e) (Surplus = +ve number)

	2013	2014	2015	2016	2017	2018	2019	2020
Austria	2.9	7.1	6.4	5.3	3.9	2.2	0.1	-2.1
Belgium	4.8	10.6	12	12.1	11.1	8.9	5.6	1.1
Bulgaria	3.9	6.9	10.8	15.2	19.9	25.2	30.8	36.9
Croatia	2.4	5.5	8	10.3	12.5	14.5	16.4	18.1
Cyprus	0.6	1.7	3.9	6.2	8.8	11.6	14.5	17.6
Czech Republic	1.3	3.1	6	10.5	16.4	23.9	32.9	43.4
Denmark	5.2	10.3	14.4	17.7	20.1	21.8	22.2	22.4
Estonia	0.2	0.8	1.3	1.9	2.5	3.1	3.8	4.5
Finland	2.3	4.2	6	7.2	8.2	8.7	9	9
France	15.5	48.5	69.1	88.3	106.1	122.5	137.5	151
Germany	-0.6	14.7	20.5	25.8	30.9	35.5	39.8	43.7
Greece	12.9	26.5	38.8	52.2	66.5	82	98.5	116
Hungary	11.6	25.2	36.3	49.4	64.5	81.5	100.5	121.6
Ireland	10.9	21.6	23.6	23.9	23.4	21.2	17.6	12.7
Italy	38.8	83.5	116.6	146.6	173.7	197.8	219	237.2
Latvia	1.1	1.9	2.7	3.5	4.3	5.2	6	6.9
Lithuania	1	2.1	3.2	4.5	6.2	8	10.2	12.6
Luxembourg	0.5	1.2	0.8	0.2	-0.9	-2.3	-4	-6.2
Malta	0.2	0.5	0.7	0.9	1.1	1.4	1.6	1.8
Netherlands	16.4	41.6	52.1	61.6	70.3	77.9	84.6	90.4
Poland	7	13.1	22.5	32.6	43.5	55.3	67.8	81.2
Portugal	8.6	18.3	26.6	35.9	46.2	57.4	69.5	82.6
Romania	7.7	17.1	25.3	34.1	43.6	53.7	64.4	75.8
Slovakia	2.6	5.8	8.4	11.3	14.5	17.9	21.6	25.6
Slovenia	1.4	3	4	5.1	6.4	7.7	9.2	10.7
Spain	32	61	86.1	107.1	124.3	137.7	147	152.8
Sweden	7.3	15.4	20.6	25.8	30.9	36.1	41.2	46.3
United Kingdom	42.9	100.7	121.8	142.8	160.7	175.7	187.4	198.9
EU28	**241**	**552**	**748**	**938**	**1,120**	**1,292**	**1,455**	**1,613**