



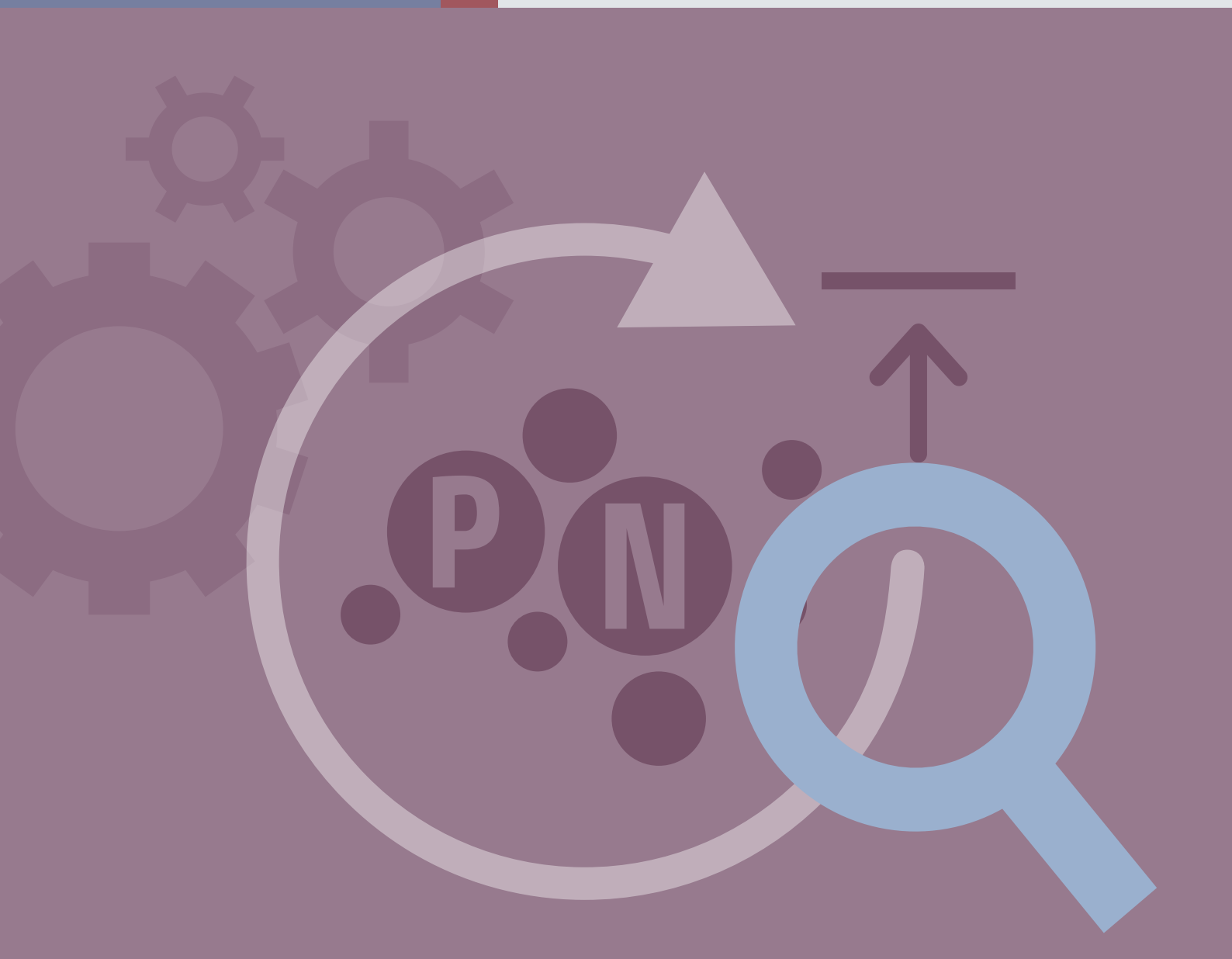
Evaluation of the 2017 progress towards updated Nutrient Input Ceilings

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Background

The Baltic Sea Action Plan 2021 update includes updated nutrient input ceilings (NIC) in the Eutrophication segment¹. The updated NIC are described in the report: “The revised nutrient input ceilings to the BSAP update. HELCOM (2021)”²

HELCOM PRESSURE 15-2021 invited RedCore DG to make a draft product available for HELCOM PRESSURE 16-2022, based on the latest NIC assessment (original NIC-2017 assessment is published in 2020 (Helcom, 2020)³, indicating possible changes due to the new NIC values.

This product should be seen as a *preliminary product* to indicate where updated NIC from BSAP2021 updated will change NIC-2017 assessment results. It is not a complete revised assessment as the PLC-8 project in late 2022 will make a new NIC-2020 assessment (using annual data from 1995-2020), and it will include an evaluation of the progress towards fulfilment of the new NIC's for big/transboundary rivers and take into account all re-reporting and updates of nutrient inputs timeseries, changes in shares of transboundary rivers between countries including Oder River and the most recent updated data on atmospheric deposition, and make new statistical analysis on all data.

The present document presents result of updating the NIC-2017 assessment by using the updated NIC from the BSAP 2021 update. It includes in the annex the results from the assessment of progress towards nutrient input ceilings based on 1995-2017 nutrient input data to the Baltic Sea as published in 2020 (see footnote 3). The original NIC-2017 assessment published in 2020 used the NICs derived from the 2013 Baltic Sea Action Plan.

Premises

As data in the PLC PLUS database are ongoing updated, and some older data are revised as for e.g. atmospheric deposition of nitrogen it is not possible to use exactly same dataset as was used in the original NIC-2017 assessment published in 2020. We have used the PLC-dataset available in 2020 used when elaborating the updated NIC to the 2021 Ministerial meeting, and when updating MAI Core nutrient input indicator 1995-2018 in autumn 2020. This data set includes data from 1995-2018 and includes particularly some of the changes implemented in the transboundary input time series for elaborating NICs for transboundary/major rivers.

We have compared the normalized total nitrogen (TN) and total phosphorus (TP) input time series (air + waterborne) 1995-2018 used for the present assessment with the corresponding data set used for the original NIC-2017 assessment. Where annual normalized TN or TP inputs differs more than 1%, we made new statistical analysis for break point, trend analysis, and fulfilment of NICs according to the PLC-guidelines⁴ (the methodology have not been changed since the original NIC-2017 assessment).

DCE made new statistical analysis for the follow country-basins for both TN and TP:

- Belarus (BY) to Baltic Proper (BAP)

¹ Baltic Sea Action Plan 2021 Update: <https://helcom.fi/media/publications/BSAP-full-publication-v21-220405.pdf>

² HELCOM (2021): “The revised nutrient input ceilings to the BSAP update. HELCOM (2021)”. Authors: Bo Gustafsson (Baltic Nest Institute, Stockholm University), Lars M. Svendsen, (DCE, Aarhus University). Baltic Marine Environment Protection Commission – Helsinki Commission (2021).

³ Helcom (2020) Progress towards Nutrient Input Ceilings by 2017 by Lars M. Svendsen, Bo Gustafsson, Søren Erik Larsen and Dmitry Frank-Kamenetsky: <https://helcom.fi/baltic-sea-action-plan/nutrient-reduction-scheme/national-nutrient-input-ceilings/>

⁴ HELCOM (2019): HELCOM Guidelines for the annual and periodical compilation and reporting of waterborne pollution inputs to the Baltic Sea (PLC-Water): <https://helcom.fi/wp-content/uploads/2019/08/PLC-Water-Guidelines-2019.pdf>

- BY to Guld of Riga (GUR)
- Denmark (DK) to BAP
- DK to Danish Straits (DS)
- DK to Kattegat (KAT)
- Lithuania (LT) to BAP
- LT to GUR
- Latvia (LV) to BAP
- LV to GUR
- Poland (PL) to BAP
- Russia (RU) to BAP
- RU to GUR
- Ukraine /UA) to BAP

For TN, atmospheric inputs have been changed to all seven sub-basins. When elaborating the updated NICs it was decided to separate TN deposition from North Sea Shipping (NOS) from the TN deposition from “other countries/sources” (OC) as a separate source.

By adding data from one year to the input time series and normalizing inputs might slightly change the annual normalized TN and TP inputs, but this will only have a very minor effect when evaluating results of the assessment of progress towards fulfilling NICs based on the updated NIC with the corresponding results from the original NIC-2017 assessment.

To summarize, there is some factors that might provide differences between to original NIC-2017 assessment (footnote 3) and the updated NIC-2017 assessment presented besides that NIC have been updated (which is the main factor):

- Updated transboundary inputs between countries;
- Some of the TN and TP time series with annual data since 1995 have been updated;
- Normalization made on the updated and extended annual time series of TN and TP;
- New statistical analysis for the above-mentioned country-basins provides in some cases revised estimated of inputs in 2017 and revised uncertainty on inputs which lead to revised test values for the evaluation of fulfilling NIC.

It should further be noted that e.g., Denmark in 2021 have revised their entire TN and TP time series of inputs – this is not included in the assessment. Data Re-reported or corrected after 2020 by Denmark and by other countries will be included in the next NIC assessment (NIC-2020 assessment).

Oder River

Germany informed that for the original NIC-2017 assessment about 3.64% of total annual TN input to BAP from Oder and correspondingly 2.47 % of total annual TP inputs should be allocated as the German shares. These shares were also used calculating there original NICs.

Based on new models Germany provided revised shares for Oder River: 3.7 % for TN and 8.5 % for TP. For TN this minor change doesn't changes the estimated net TN inputs from Germany to BAP since net German TN input to BAP in average is 2,259 tons per year (average 2009-2017) of total 37,316 tons per year to BAP. The corresponding Oder River contribution from Germany makes a significant portion of German net TN input to BAP with 87 tons per year of 274 tons year (average 1999-2017 based on trend analysis).

Based on former trend analysis of Oder River annual TP input (that include a break point in 1999 in the time series) a new estimate for 2017 German annual TP input via Oder River is calculated assuming a break point at the year of changing the share, and then no trend after the break point. A new German input via Oder River have been calculated either assuming the new TP share are used for the last 3 and 5 years of the assessment dataset (1995-2017) and have been added to the other TP inputs to BAP to create a new input time series. With 3 years average the net TP input to BAP from Germany in the latest three years change from 274 tons per year to 465 tons per year, and for a corresponding 5-year average it changes to 469 tons per year. To find the test value to evaluated against the NIC we need to add and uncertainty on the input. As we used the original TP input time series for Oder River to calculate the new German shares, in this provisional assessment we assume that the variability around the new estimated time series comprising two break points is close to the original variability, so the estimated uncertainty is assumed the same in percentages of the estimated inputs. Therefore, the test value the for 3-year average is $465+22 = 487$ tons TP per year and for the 5-year average $469 +22 = 491$ tons TP per year. The 5-year average is shown in the annex. The estimated Polish TP inputs to the BAP are reduced accordingly in the annex.

In the NIC-2020 assessment (to be conducted late in 2022) a full statistical analysis will be performed, when it is agreed with Germany for which years the new German TN and TP Oder River shares should be used.

Assessment results

The detailed assessment results are included in the annex showing country per basin progress towards the original NICs (derived from BSAP 2013) and for the updated NICs (BSAP 2021 update). It also shows the results taking into account reallocation of extra reduction in neighboring basins. Remaining or extra reduction are included in the tables as is the remaining reduction in percentages of updated and original NICs, respectively. Further, any significant changes since the reference period (1997-2033) in nutrient inputs to 2017 are indicated (also given as percentages).

Table 1 summarizes the evaluation of progress by 2017 towards the updated TN NICs (the corresponding results from the original NIC-2017 assessment can be found in the link in footnote 3). Table 2 is the corresponding tables for TP NICs. Table 3 provide the same results as in table 1 but taking into account reallocation of extra reduction of TN, and in table 4 are the corresponding results for TP.

Table 5 summarizes the remaining reductions for TN country per basin by 2017 to fulfill the updated TN NICs, and table 6 is the includes the corresponding for TP.

After tables 1-6 we summarize the main changes in NIC-2017 assessment due to the updated NICs and the changes in annual TN and TP inputs and results of new statistical analyses for some country-basins.

Table 1a. Evaluation of progress by 2017 towards *updated* TN nutrient input ceilings (NICs) (NIC updated I BSAP2021 update – see link in footnote 1). Details on extra reduction or remaining reduction (in tons and in percentages of NIC), and on trends in input since the reference period (1997-2003) are included in the annex. BOB = Bothnian Bay; BOS = Bothnian Sea; BAP = Baltic Proper; GUF = Gulf of Finland; GUR = Gulf of Riga; DS = Danish Straits and KAT = Kattegat.

Country/basin	BOB	BOS	BAP	GUF	GUR	DS	KAT
Denmark	↓	↓	↓	↓	↓	↓	↓
Estonia	↓	↓	↓	↓	↓	↓	↓
Finland	↓	↓	↓	↓	↓	↓	↓
Germany	↓	↓	↓	↓	↓	↓	↓
Latvia	↓	↓	↑	↓	↓	↓	↓
Lithuania	↓	↓	↑	↓	↓	↓	↓
Poland	↓	↓	↓	↓	↓	↓	↓
Russia	↓	↓	↓	↓	↓	↓	↓
Sweden	↓	↓	↓	↓	↓	↓	↓
Belarus			↓		↓		
Czech Republic			↓				
Ukraine			↑				
Baltic Sea shipping	↓	↓	↓	↓	↓	↓	↓
North Sea Shipping	↓	↓	↓	↓	↓	↓	↓
Other countries	↓	↓	↓	↓	↓	↓	↓

↑	Significant increase (95 % confidence) from reference period (1997-2003) to 2017
↓	Significant decrease (95 % confidence) from reference period (1997-2003) to 2017
↓	Only airborne inputs to the sub-basin
↓	Only transboundary waterborne inputs to the sub-basin
↓	NIC are not fulfilled
↓	Within statistical certainty NIC cannot be justified
↓	NIC is with 95 % certainty fulfilled; input ceiling are not exceed

Table 2. Evaluation of progress towards *updated* TP NICs by 2017. See caption to table 1.

Country/basin	BOB	BOS	BAP	GUF	GUR	DS	KAT
Denmark			↓			↓	↓
Estonia			↓	↓	↓		
Finland	↓			↓			
Germany			↓			↓	
Latvia			↓		↓		
Lithuania			↓		↓		
Poland			↓				
Russia			↑	↓	↓		
Sweden	↓	↓	↓			↓	↓
Belarus			↓		↑		
Czech Republic			↓				
Ukraine			↑				
Baltic Sea shipping							
North Sea shipping							
Other countries							

Table 3. Evaluation of progress towards *updated* TN NICs by 2017 including reallocation of extra reduction as compared with table 1. See caption to table 1.

Country/basin	BOB	BOS	BAP	GUF	GUR	DS	KAT
Denmark	↓	↓	↓	↓	↓	↓	↓
Estonia	↓	↓	↓	↓	↓	↓	↓
Finland	↓	↓	↓	↓	↓	↓	↓
Germany	↓	↓	↓	↓	↓	↓	↓
Latvia	↓	↓	↑	↓	↓	↓	↓
Lithuania	↓	↓	↑	↓	↓	↓	↓
Poland	↓	↓	↓	↓	↓	↓	↓
Russia	↓	↓	↓	↓	↓	↓	↓
Sweden	↓	↓	↓	↓	↓	↓	↓
Belarus			↓		↓		
Czech Republic			↓				
Ukraine			↑				
Baltic Sea shipping	↓	↓	↓	↓	↓	↓	↓
North Sea Shipping	↓	↓	↓	↓	↓	↓	↓
Other countries	↓	↓	↓	↓	↓	↓	↓

 Application of extra reduction achieved in neighboring sub-basin

Table 4. Evaluation of progress towards *updated* TP NICs by 2017 including reallocation of extra reduction as compared with table 1. See caption to table 1 and 3.

Country/basin	BOB	BOS	BAP	GUF	GUR	DS	KAT
Denmark			↓			↓	↓
Estonia			↓	↓	↓		
Finland	↓	↓		↓			
Germany			↓			↓	
Latvia			↓		↓		
Lithuania			↓		↓		
Poland			↓				
Russia			↑	↓	↓		
Sweden	↓	↓	↓			↓	↓
Belarus			↓		↑		
Czech Republic			↓				
Ukraine			↑				
Baltic Sea shipping							
North Sea shipping							
Other countries							

Table 5. Remaining reduction country by basin (in percentages) to fulfill updated TN NIC by 2017. “-“ means NICs are fulfilled, “blank” not relevant. Accounting for extra reduction in a neighboring basin are not taken into account.

Country/basin	BOB	BOS	BAP	GUF	GUR	DS	KAT
Denmark	-	-	-	-	-	-	-
Estonia	-	-	24	25	3.1	-	-
Finland	1.2	-	-	8.5	-	-	-
Germany	-	-	12	-	-	-	-
Latvia	3.4	0.9	73	24	7.2	-	5.3
Lithuania	8.3	4.3	109	27	58	1.8	11
Poland	-	-	23	10	-	-	-
Russia	6.0	1.5	38	6.2	1.4	-	8.0
Sweden	-	-	25	-	-	-	-
Belarus			24		-		
Czech Republic			15				
Ukraine			106				
Baltic Sea shipping	58	53	49	43	67	46	29
North Sea Shipping	118	100	98	105	102	73	56
Other countries	43	44	41	39	35	40	46

Table 6: Remaining reduction country by basin (in percentages) to fulfill updated TP NIC by 2017. “-“ means NICs are fulfilled, “blank” not relevant. Accounting for extra reduction in a neighboring basin are not taken into account.

Country/basin	BOB	BOS	BAP	GUF	GUR	DS	KAT
Denmark			109			-	-
Estonia			162	41	29		
Finland	-	8.9		112			
Germany			350			-	
Latvia			73		23		
Lithuania			57		-		
Poland			119				
Russia			233	9.1	36		
Sweden	7.3	-	125			-	2.5
Belarus			150		67		
Czech Republic			82				
Ukraine			221				
Baltic Sea shipping							
North Sea shipping							
Other countries							

Summary of main changes assessing updated NICs as compared with original (derived from BSAP 201) TN and TP NICs

For total nitrogen

- Based on the updated TN NICs the following country-basins change evaluation on progress towards NIC-2017 as compared with the original TN NIC-2017 assessment (tables 1 and 3 compared with results in the reference in footnote 3):
 - Germany: DE-GUF and DE-KAT from red to green
 - Denmark: DK-BAP from yellow to green
 - Estonia: EE-BOB, EE-BOS and EE-KAT from red to green and EE-DS from yellow to green
 - Latvia: LV-BOB from red to yellow and, LV-GUR from green to red and LV-DS from red to green
 - Poland: PL-BOS from yellow to green; PL-GUR, PL-DS and PL-KAT from red to green
 - RU-BOS from red to yellow; RU-GUR and RU-DS from red to green
 - Sweden: SE-GUF from red to green
 - Belarus: BY-GUR from red to green
 - Czech Republic: CZ-BAP from red to yellow
- Splitting NIC for OC (other countries/sources) in North Sea Shipping and remaining other countries/sources are not changing the fulfilment status. NIC are not fulfil to any basin for either NOS or OC with updated NIC as is the case for the original NIC for OC.
- Evaluation of fulfilment have changed for 20 country basins using the updated NICs, with 19 obtaining a change to a better status of progress towards NIC fulfilment. 15 of the changes is for country-basins with only airborne inputs from the country to the basin.
- 59 country-basins have either decreased remaining reduction or increased extra reduction using the updated NICs. For 22 country-basins remaining reduction are increased or extra reduction decreased. Particularly Baltic Sea Shipping (BSS) have markedly reduced remaining reduction from about 500% in the original NIC-2017 assessment to about 50% in the updated NIC-2017 assessment as the updated NIC have been increased with a factor 3 to 4 for BSS. The changes in shares between countries in inputs from transboundary rivers have a marked impact for some of the country-basin status as for e.g., LV to GUR. It is not possible to compare updated NIC's for North Sea Shipping (NOS) and other countries/sources (OC) with the original NIC's as in the original NIC-2017 assessment NOS was included in OC.
- Taking into account reallocation of extra reduction in neighboring basins (tables 3) do not change any of the conclusions of the status for fulfilling updated NIC's but reduced remaining reductions for the 7 country-basins the reallocation is applied upon.

For total phosphorus:

- Using updated TP NICs the following country-basins change evaluation on progress towards NIC are found as compared with the original TP NIC-2017 assessment (tables 2 and 4 compared with results in the reference in footnote 3):
 - Estonia: EE-GUR from yellow to red
 - Belarus: BY-GUR for green to red
- Evaluations have changed for only 2 country basins using updated NICs, and both obtaining a poorer status of progress towards fulfilling NIC, due to updated NICs are lower than original NICs.
- Taking into account reallocation of extra reduction in a neighboring basin DK-BAP changes from red to green and SE-KAT changes from yellow to green assessing with the updated NIC, where status remains yellow for SE-KAT using original NICs.
- 16 country-basins have either decreased remaining reduction or increased extra reduction using the updated NICs. For 11 country-basins the remaining reductions are either increased or extra reductions are reduced. One country-basin has not changed on remaining/extra reduction. Changes in shares of transboundary inputs and marked changes in updated NICs compared with original NICs explains why BY to GUR changes status from red to green.
- Germany has a higher extra reduction in Danish Straits (51 tons TP) with updated NIC as compared with the original NIC (0.2 tons TP) which can be used to reduce remaining reduction for GE-BAP with 16 tons TP. On the other hand, for DK to Danish Straits extra reduction is reduced from 222 tons to 161 tons TP using updated NIC, reducing possible reallocation from 70 to 51 tons TP to DK-BAP, but this is still sufficient to fulfil updated Danish Baltic Proper NIC.
- Using the revised GE share of Oder River TP (8,5% as compared to 2,47% in the original NIC-2017 assessment) increases the remaining reduction from 178 to 382 tons TP or to 350 % of updated NIC. Concurrently, remaining Polish TP reduction to BAP is reduced with 209 tons P or to 119 % of updated NIC.

Annex

The annex includes tables per country per basin for TN and TP, respectively, with the results of the assessment progress towards original NIC-2017 (derived from BSAP 2013) as the upper part of the tables (see footnote 3), and for the updated NICs in the lower part of the tables, by 2017. It also includes results of accounting for reallocating of extra reduction of TN and TP, respectively in a neighboring basin (all in tons), where applicable. The original NICs did not include TN NIC for NOS (North Sea Shipping) as this source was included in OC (other countries/sources), but for updated NICs the inputs from OC in North Sea shipping and remaining sources outside HELCOM countries are divided and NICs defined accordingly. The tables include information on remaining or extra reduction (in tons) and remaining reduction in percentages of NIC. Further statistically significant changes (in %) from the reference period (1997-2003) to 2017 are indicated. Tables of atmospheric phosphorus deposition (which are allocated under OC) are not included as its temporal variation is unknown and therefore assumed to be constant during 1995-2017. Regarding use of colors see legends under table 1.

Belarus TN	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)			7,322		6,352		
B: Estimated input 2017			16,559		12,327		
C: Inputs 2017 including uncertainty (test value)			18,182		13,526		
Extra reduction by 2017 (A-C)							
Remaining reduction to fulfill NIC by 2017 (C-A)			10,861		7,175		
<i>Remaining in % of original NIC</i>			148		113		
Significant changes since reference period (%) to 2017			-		-14		
D: Updated input ceiling			13,456		12,820		
E: Revised estimated inputs 2017			15,357		9,808		
F: Revised inputs 2017 including uncertainty (test value)			16,744		10,744		
Extra reduction by 2017 with updated NIC (D-F)							
Remaining reduction to fulfil updated NIC by 2017 (F-D)			3,288		2,076		
<i>Remaining in % of proposed updated NIC</i>			24				
Significant changes since reference period (%) to 2017			-		-23		

Belarus TP	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)			244		797		
B: Estimated input 2017			880		711		
C: Inputs 2017 including uncertainty (test value)					765		
Extra reduction by 2017 (A-C)					31		
Remaining reduction to fulfill NIC by 2017 (C-A)			720				
<i>Remaining in % of original NIC</i>			295				
Significant changes since reference period (%) to 2017			-14		7		
D: Updated input ceiling			349		407		
E: Revised estimated inputs 2017			790		633		
F: Revised inputs 2017 including uncertainty (test value)			873		680		
Extra reduction by 2017 with updated NIC (D-F)							
Remaining reduction to fulfil updated NIC by 2017 (F-D)			656		273		
<i>Remaining in % of updated NIC</i>			188		67		
Significant changes since reference period (%) to 2017			-		5.9		

Czech Republic TN	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)			2,693				
B: Estimated input 2017			2,740				
C: Inputs 2017 including uncertainty (test value)			3,200				
Extra reduction by 2017 (A-C)							
Remaining reduction to fulfill NIC by 2017 (C-A)			507				
<i>Remaining in % of original NIC</i>			19				
Significant changes since reference period (%) to 2017							
D: Updated input ceiling			3,551				
E: Revised estimated inputs 2017			3,198				
F: Revised inputs 2017 including uncertainty (test value)			3,734				
Extra reduction by 2017 with updated NIC (D-F)							
Remaining reduction to fulfil updated NIC by 2017 (F-D)			183				
<i>Remaining in % of updated NIC</i>			15				
Significant changes since reference period (%) to 2017							
			-23				

Czech Republic TP	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)			108				
B: Estimated input 2017			258				
C: Inputs 2017 including uncertainty (test value)			312				
Extra reduction by 2017 (A-C)							
Remaining reduction to fulfill NIC by 2017 (C-A)			204				
<i>Remaining in % of original NIC</i>			189				
Significant changes since reference period (%) to 2017							
D: Updated input ceiling			57				
E: Revised estimated inputs 2017			70				
F: Revised inputs 2017 including uncertainty (test value)			104				
Extra reduction by 2017 with updated NIC (D-F)							
Remaining reduction to fulfil updated NIC by 2017 (F-D)			47				
<i>Remaining in % of updated NIC</i>			82				
Significant changes since reference period (%) to 2017							
			-				

Germany TN	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)	817	3,170	27,473	1,312	1,465	21,957	3,285
B: Estimated input 2017	746	2,995	37,316	1,537	1,331	18,414	4,117
C: Inputs 2017 including uncertainty (test value)	755	3,028	38,204	1,554	1,345	19,419	4,159
Extra reduction by 2017 (A-C)	62	142			120	2,539	
Remaining reduction to fulfill NIC by 2017 (C-A)			10,731	242			874
<i>Remaining in % of original NIC</i>			39	18			27
Significant changes since reference period (%) to 2017	-26	-25	-16	-24	-23	-22	-18
Accounting for extra reduction			-644				-1,495
Remaining taking into account extra reduction			10,087				0
D: Updated input ceiling	947	3,920	34,077	1,645	1,747	23,647	4,661
E: Estimated inputs 2017	746	2,995	37,316	1,537	1,331	18,414	4,117
F: Inputs 2017 including uncertainty (test value)	755	3,028	38,204	1,554	1,345	19,419	4,159
Extra reduction by 2017 with updated NIC (D-F)	192	892		91	402	4,228	502
Remaining reduction to fulfil updated NIC by 2017 (F-D)			4,127				
<i>Remaining in % of updated NIC</i>			12				
Significant changes since reference period (%) to 2017	-26	-25	-16	-24	-23	-22	-18
Accounting for extra reduction			-1,253				
Remaining taking into account extra reduction			2,874				

Germany TP	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)			101			351	
B: Estimated input 2017			274			324	
C: Inputs 2017 including uncertainty (test value)			287			350	
Extra reduction by 2017 (A-C)						0.2	
Remaining reduction to fulfill NIC by 2017 (C-A)			186				
<i>Remaining in % of original NIC</i>			184				
Significant changes since reference period (%) to 2017						-11	
D: Updated input ceiling			109			401	
E: Estimated inputs 2017			469			324	
F: Inputs 2017 including uncertainty (test value)			481			350	
Extra reduction by 2017 with updated NIC (D-F)						51	
Remaining reduction to fulfil updated NIC by 2017 (F-D)			372				
<i>Remaining in % of updated NIC</i>			341				
Significant changes since reference period (%) to 2017			-			-11	
<i>Accounting for extra reduction</i>			-16				
Remaining taking into account extra reduction			356				

Denmark TN	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)	231	904	7,910	334	381	30,313	29,319
B: Estimated input 2017	151	612	7,835	272	246	21,079	23,615
C: Inputs 2017 including uncertainty (test value)	157	632	8,119	282	253	22,747	24,707
Extra reduction by 2017 (A-C)	74	272		52	128	7,566	4,613
Remaining reduction to fulfill NIC by 2017 (C-A)			209				
<i>Remaining in % of original NIC</i>			2,6				
Significant changes since reference period (%) to 2017	-49	-47	-33	-48	-47	-25	-23
Accounting for extra reduction			-1755				
Remaining taking into account extra reduction			0				
D: Updated input ceiling	280	1,148	9,025	421	462	28,067	28,538
E: Estimated inputs 2017	151	612	7,835	272	246	21,079	23,629
F: Inputs 2017 including uncertainty (test value)	157	632	8,119	282	253	22,747	24,726
Remaining reduction to fulfil updated NIC by 2017 (F-D)	123	516	906	139	209	5,320	3,812
Remaining reduction to fulfil new NIC by 2017							
<i>Remaining in % of updated NIC</i>							
Significant changes since reference period (%) to 2017	-49	-47	-33	-48	-47	-25	-23
Accounting for extra reduction							
Remaining taking into account extra reduction							

Denmark TP	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)			21			1,040	829
B: Estimated input 2017			41			769	706
C: Inputs 2017 including uncertainty (test value)			45			818	726
Extra reduction by 2017 (A-C)						222	103
Remaining reduction to fulfill NIC by 2017 (C-A)			23				
<i>Remaining in % of original NIC</i>			109				
Significant changes since reference period (%) to 2017			-25			-14	-12
<i>Accounting for extra reduction</i>			-70				
Remaining taking into account extra reduction			0				
D: Updated input ceiling			21			979	815
E: Estimated inputs 2017			41			769	729
F: Inputs 2017 including uncertainty (test value)			45			818	748
Extra reduction by 2017 with updated NIC (D-F)						161	67
Remaining reduction to fulfil updated NIC by 2017 (F-D)			23				
<i>Remaining in % of updated NIC</i>			109				
Significant changes since reference period (%) to 2017			-25			-14	-10
<i>Accounting for extra reduction</i>			-51				
Remaining taking into account extra reduction			0				

Estonia TN	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)	95	317	1,413	11,265	13,029	18	20
B: Estimated input 2017	96	338	1,766	13,604	12,726	18	21
C: Inputs 2017 including uncertainty (test value)	98	346	1,840	14,183	13,501	18	21
Extra reduction by 2017 (A-C)							
Remaining reduction to fulfill NIC by 2017 (C-A)	3	29	427	2,918	472	0	1
<i>Remaining in % of original NIC</i>	3.2	9.3	30	26	3.6		6.8
Significant changes since reference period (%) to 2017	-20	-	-	-	-	-21	-20
D: Updated input ceiling	113	404	1,478	11,334	13,099	22	24
E: Estimated inputs 2017	96	338	1,766	13,604	12,726	18	21
F: Inputs 2017 including uncertainty (test value)	98	346	1,840	14,183	13,501	18	21
Extra reduction by 2017 with updated NIC (D-F)	15	58				4	3
Remaining reduction to fulfil updated NIC by 2017 (F-D)			362	2849	402		
<i>Remaining in % of updated NIC</i>			24	25	3.1		
Significant changes since reference period (%) to 2017	-20	-17	-8.2	-	-	-21	-20

Estonia TP	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)			8	236	239		
B: Estimated input 2017			22	274	210		
C: Inputs 2017 including uncertainty (test value)			24	317	239		
Extra reduction by 2017 (A-C)							
Remaining reduction to fulfill NIC by 2017 (C-A)			16	81	0,4		
<i>Remaining in % of original NIC</i>			194	34	0,2		
Significant changes since reference period (%) to 2017			-	-48	-23		
D: Updated input ceiling			9	225	185		
E: Estimated inputs 2017			22	274	210		
F: Inputs 2017 including uncertainty (test value)			24	317	239		
Extra reduction by 2017 with updated NIC (D-F)							
Remaining reduction to fulfil updated NIC by 2017 (F-D)			15	92	54		
<i>Remaining in % of updated NIC</i>			162	41	29		
Significant changes since reference period (%) to 2017			-	-48	-23		

Finland TN	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)	35,081	29,619	1,569	20,653	255	64	77
B: Estimated input 2017	34,393	24,446	1,406	21,396	180	43	56
C: Inputs 2017 including uncertainty (test value)	35,550	26,485	1,442	22,198	185	45	57
Extra reduction by 2017 (A-C)		3,135	127		70	19	20
Remaining reduction to fulfill NIC by 2017 (C-A)	419			1,544			
<i>Remaining in % of original NIC</i>	1.2			7.5			
Significant changes since reference period (%) to 2017	-7.4	-16	-41	-15	-39	-43	-42
Accounting for extra reduction	-403						
Remaining taking into account extra reduction	16						
D: Updated input ceiling	35,087	28,700	1,827	20,457	295	76	89
E: Estimated inputs 2017	34,393	24,446	1,406	21,396	180	43	56
F: Inputs 2017 including uncertainty (test value)	35,500	26,485	1,442	22,198	185	45	57
Extra reduction by 2017 with updated NIC (D-F)		2,215	385		110	31	32
Remaining reduction to fulfil updated NIC by 2017 (F-D)	413			1,741			
<i>Remaining in % of updated NIC</i>	1,2			8.5			
Significant changes since reference period (%) to 2017	-7.4	-16	-41	-15	-39	-43	-42
Accounting for extra reduction	-284						
Remaining taking into account extra reduction	129						

Finland TP	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)	1,668	1,255		322			
B: Estimated input 2017	1,545	1,292		634			
C: Inputs 2017 including uncertainty (test value)	1,608	1,357		668			
Extra reduction by 2017 (A-C)	60						
Remaining reduction to fulfill NIC by 2017 (C-A)		103		346			
<i>Remaining in % of original NIC</i>		8.2		107			
Significant changes since reference period (%) to 2017	-14			-13			
<i>Accounting for extra reduction</i>		-7					
<i>Remaining taking into account extra reduction</i>		96					
D: Updated input ceiling	1,683	1,246		315			
E: Estimated inputs 2017	1,545	1,292		634			
F: Inputs 2017 including uncertainty (test value)	1,608	1,357		668			
Extra reduction by 2017 with updated NIC (D-F)	75						
Remaining reduction to fulfil updated NIC by 2017 (F-D)		111		353			
<i>Remaining in % of updated NIC</i>		8.9		112			
Significant changes since reference period (%) to 2017	-14	-		-13			
<i>Accounting for extra reduction</i>		-9					
<i>Remaining taking into account extra reduction</i>		102					

Lithuania TN	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)	110	491	33,093	261	5,795	54	60
B: Estimated input 2017	115	508	49,060	382	9,558	66	87
C: Inputs 2017 including uncertainty (test value)	117	517	43,565	389	10,303	67	89
Extra reduction by 2017 (A-C)							
Remaining reduction to fulfill NIC by 2017 (C-A)	7	25	20,471	128	4,509	13	29
<i>Remaining in % of original NIC</i>	6.2	5.1	62	49	78	24	48
Significant changes since reference period (%) to 2017	-	-	48	-	47	-	-
D: Updated input ceiling	108	495	25,878	305	8,820	66	80
E: Revised estimated inputs 2017	115	508	49,545	382	12,927	66	87
F: Revised inputs 2017 including uncertainty (test value)	117	517	54,067	389	13,943	67	89
Extra reduction by 2017 with updated NIC (D-F)							
Remaining reduction to fulfil updated NIC by 2017 (F-D)	9	22	28,189	84	5,123	1	9
<i>Remaining in % of updated NIC</i>	8.3	4.3	109	27	58	1.8	11
Significant changes since reference period (%) to 2017	-	-	47	-	47	-	-

Lithuania TP	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)			831		166		
B: Estimated input 2017			984		27		
C: Inputs 2017 including uncertainty (test value)			1,102		97		
Extra reduction by 2017 (A-C)					69		
Remaining reduction to fulfill NIC by 2017 (C-A)			271				
<i>Remaining in % of original NIC</i>			33				
Significant changes since reference period (%) to 2017			-47		-92		
<i>Accounting for extra reduction</i>			-45				
Remaining taking into account extra reduction			226				
D: Updated input ceiling			703		175		
E: Revised estimated inputs 2017			985		21		
F: Revised inputs 2017 including uncertainty (test value)			1,102		76		
Extra reduction by 2017 with updated NIC (D-F)					99		
Remaining reduction to fulfil updated NIC by 2017 (F-D)			399				
<i>Remaining in % of updated NIC</i>			57				
Significant changes since reference period (%) to 2017			-47		-92		
<i>Accounting for extra reduction</i>			-65				
Remaining taking into account extra reduction			334				

Latvia TN	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)	63	273	6,091	183	53,898	24	25
B: Estimated input 2017	74	328	10,965	300	43,255	30	35
C: Inputs 2017 including uncertainty (test value)	76	333	11,143	304	46,387	30	36
Extra reduction by 2017 (A-C)					7,511		
Remaining reduction to fulfill NIC by 2017 (C-A)	3	60	5,540	121		6	11
<i>Remaining in % of original NIC</i>	3.4	22	91	66		24	43
Significant changes since reference period (%) to 2017	-4.5	-	-	-	2.1	-4.9	-4.5
Accounting for extra reduction							-1
Remaining taking into account extra reduction							10
D: Proposed updated input ceiling for TN	73	330	6,457	246	43,074	31	34
E: Revised estimated inputs 2017	74	328	10,486	300	43,090	30	35
F: Revised inputs 2017 including uncertainty (test value)	76	333	11,143	304	46,172	30	36
Extra reduction by 2017 with updated NIC (D-F)						1	
Remaining reduction to fulfil updated NIC by 2017 (F-D)	3	3	4,686	58	3,098		2
<i>Remaining in % of updated NIC</i>	3.4	0.9	73	24	7.2		5.3
Significant changes since reference period (%) to 2017	-4.5	-	25	-	-	-4.9	-4.5

Latvia TP	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)			74		541		
B: Estimated input 2017			238		1,199		
C: Inputs 2017 including uncertainty (test value)			290		1337		
Extra reduction by 2017 (A-C)							
Remaining reduction to fulfill NIC by 2017 (C-A)			217		796		
<i>Remaining in % of original NIC</i>			295		147		
Significant changes since reference period (%) to 2017			-46		-		
D: Updated input ceiling			167		1,061		
E: Revised estimated inputs 2017			238		1,121		
F: Revised inputs 2017 including uncertainty (test value)			290		1,305		
Extra reduction by 2017 with updated NIC (D-F)							
Remaining reduction to fulfil updated NIC by 2017 (F-D)			123		244		
<i>Remaining in % of updated NIC</i>			73		23		
Significant changes since reference period (%) to 2017			-46		-		

North Sea Shipping TN	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)							
B: Estimated input 2017							
C: Inputs 2017 including uncertainty (test value)							
Extra reduction by 2017 (A-C)							
Remaining reduction to fulfill NIC by 2017 (C-A)							
<i>Remaining in % of original NIC</i>							
Significant changes since reference period (%) to 2017							
D: Updated input ceiling	131	475	2,427	196	150	729	884
E: Revised estimated inputs 2017	282	936	4,749	397	299	1242	1,365
F: Revised inputs 2017 including uncertainty (test value)	286	948	4,814	403	304	1259	1,383
Extra reduction by 2017 with updated NIC (D-F)							
Remaining reduction to fulfil updated NIC by 2017 (F-D)	155	473	2,387	207	154	530	499
<i>Remaining in % of updated NIC</i>	118	100	98	105	102	73	56
Significant changes since reference period (%) to 2017	-28	-28	-28	-28	-28	-28	-28

Other Countries TN	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)	1,876	6,603	33,002	3,455	2,804	5,880	5,579
B: Estimated input 2017	2,174	7,859	41,181	4,340	3,129	7,790	7,615
C: Inputs 2017 including uncertainty (test value)	2,197	7,945	41,643	4,396	3,166	7,891	7,711
Extra reduction by 2017 (A-C)							
Remaining reduction to fulfill NIC by 2017 (C-A)	321	1,342	8,641	941	362	2,011	2,132
<i>Remaining in % of original NIC</i>	<i>17</i>	<i>20</i>	<i>26</i>	<i>27</i>	<i>13</i>	<i>34</i>	<i>38</i>
Significant changes since reference period (%) to 2017	-33	-32	-34	-31	-32	-38	-38
D: Updated input ceiling	1,375	5008	26947	2,986	2,188	4,933	4,502
E: Revised estimated inputs 2017	1,932	7,082	37,391	4,036	2,896	6,810	6,471
F: Revised inputs 2017 including uncertainty (test value)	1,971	7,226	38,066	4,137	2,960	6,918	6,570
Extra reduction by 2017 with updated NIC (D-F)							
Remaining reduction to fulfil updated NIC by 2017 (F-D)	596	2,218	11,119	1,151	772	1,985	2,068
<i>Remaining in % of updated NIC</i>	<i>43</i>	<i>44</i>	<i>41</i>	<i>39</i>	<i>35</i>	<i>40</i>	<i>46</i>
Significant changes since reference period (%) to 2017	-33	-32	-34	-30	-31	-38	-37

Poland TN	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)	644	2,802	160,857	1,166	1,361	1,125	1,106
B: Estimated input 2017	619	2,767	191,775	1,519	1,385	1,290	1,361
C: Inputs 2017 including uncertainty (test value)	324	2,832	187,679	1,554	1,417	1,321	1,394
Extra reduction by 2017 (A-C)	44						
Remaining reduction to fulfill NIC by 2017 (C-A)		30	34,314	388	56	196	288
<i>Remaining in % of original NIC</i>		1.1	21	33	4.1	17	26
Significant changes since reference period (%) to 2017	-12	-13	-	-13	-13	-12	-13
Accounting for extra reduction		-19					
Remaining taking into account extra reduction		11					
D: Updated input ceiling	668	3,125	151,997	1,407	1,596	1,480	1,443
E: Revised estimated inputs 2017	619	2,767	177,055	1,519	1,385	1,290	1,361
F: Revised inputs 2017 including uncertainty (test value)	624	2,832	187,679	1,554	1,417	1,321	1,394
Extra reduction by 2017 with updated NIC (D-F)	44	293			179	159	49
Remaining reduction to fulfil updated NIC by 2017 (F-D)			35,682	147			
<i>Remaining in % of updated NIC</i>			23	10			
Significant changes since reference period (%) to 2017	-12	-13	-	-13	-13	-12	-13
Accounting for extra reduction			-174				
Remaining taking into account extra reduction			49,135				

Poland TP	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)			4,309				
B: Estimated input 2017			8,742				
C: Inputs 2017 including uncertainty (test value)			9,359				
Extra reduction by 2017 (A-C)							
Remaining reduction to fulfill NIC by 2017 (C-A)			5,050				
<i>Remaining in % of original NIC</i>			117				
Significant changes since reference period (%) to 2017			-21				
D: Updated input ceiling			4,291				
E: Revised estimated inputs 2017			8,760				
F: Revised inputs 2017 including uncertainty (test value)			9,383				
Extra reduction by 2017 with updated NIC (D-F)							
Remaining reduction to fulfil updated NIC by 2017 (F-D)			5,092				
<i>Remaining in % of updated NIC</i>			119				
Significant changes since reference period (%) to 2017			-21				

Russia TN	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)	710	1,551	9,253	62,522	2,516	174	174
B: Estimated input 2017	876	1,992	13,841	63,185	3,761	233	261
C: Inputs 2017 including uncertainty (test value)	889	2,022	14,398	65,320	4,059	237	265
Extra reduction by 2017 (A-C)							
Remaining reduction to fulfill NIC by 2017 (C-A)	179	471	5,145	2,798	1,543	63	91
<i>Remaining in % of original NIC</i>	25	30	56	4.5	61	36	52
Significant changes since reference period (%) to 2017	-	-	-	-17	-15	-	-
D: Updated input ceiling	839	1,993	10,317	61,503	3,296	238	245
E: Revised estimated inputs 2017	876	1,992	13,633	63,185	2,820	233	261
F: Revised inputs 2017 including uncertainty (test value)	889	2,022	14,198	65,320	3,029	237	265
Extra reduction by 2017 with updated NIC (D-F)					267	1	
Remaining reduction to fulfil updated NIC by 2017 (F-D)	50	29	3,881	3,817			20
<i>Remaining in % of updated NIC</i>	6	1.5	38	6.2			8.0
Significant changes since reference period (%) to 2017	-	-	-	-17	-14	-	-
Accounting for extra reduction			-208				-1
Remaining taking into account extra reduction			3,673				19

Russia TP	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)			277	2,892	185		
B: Estimated input 2017			692	1,841	209		
C: Inputs 2017 including uncertainty (test value)			754	3,174	225		
Extra reduction by 2017 (A-C)							
Remaining reduction to fulfill NIC by 2017 (C-A)			477	282	41		
<i>Remaining in % of original NIC</i>			172	9.8	22		
Significant changes since reference period (%) to 2017			21	-73	-		
D: Updated input ceiling			242	2,909	99		
E: Revised estimated inputs 2017			746	1,841	119		
F: Revised inputs 2017 including uncertainty (test value)			806	3,174	134		
Extra reduction by 2017 with updated NIC (D-F)							
Remaining reduction to fulfil updated NIC by 2017 (F-D)			564	265	35		
<i>Remaining in % of updated NIC</i>			233	9.1	36		
Significant changes since reference period (%) to 2017			17	-73	-		

Sweden TN	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)	17,924	33,350	30,942	502	449	6224	34,206
B: Estimated input 2017	15,646	25,619	37,096	507	354	5142	28,210
C: Inputs 2017 including uncertainty (test value)	16,273	26,605	38,513	513	358	5474	29,321
Extra reduction by 2017 (A-C)	1,652	6,745			91	750	4,886
Remaining reduction to fulfill NIC by 2017 (C-A)			7,571	11			
<i>Remaining in % of original NIC</i>			24	2.2			
Significant changes since reference period (%) to 2017	-17	-22	-7	-34	-32	-15	-20
Accounting for extra reduction			-234				
Remaining taking into account extra reduction			7337				
D: Updated input ceiling	17,718	32,633	30,690	626	525	6,056	32,799
E: Estimated inputs 2017	15,646	25,619	37,096	507	354	5,142	28,210
F: Inputs 2017 including uncertainty (test value)	16,273	26,605	38,513	513	358	5,474	29,321
Extra reduction by 2017 with updated NIC (D-F)	1,445	6,028		113	167	582	3,478
Remaining reduction to fulfil updated NIC by 2017 (F-D)			7,823				
<i>Remaining in % of updated NIC</i>			25				
Significant changes since reference period (%) to 2017	-17	-22	-7.1	-34	-32	-15	-20
Accounting for extra reduction			-284				
Remaining taking into account extra reduction			7539				

Sweden TP	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)	826	1,125	308			105	740
B: Estimated input 2017	789	760	691			80	735
C: Inputs 2017 including uncertainty (test value)	870	822	715			85	772
Extra reduction by 2017 (A-C)		303				20	
Remaining reduction to fulfill NIC by 2017 (C-A)	44		407				32
Remaining in % of original NIC	5.3		132				4.3
Significant changes since reference period (%) to 2017	-	-35	-17			-24	-
Accounting for extra reduction	-94		-208				-24
Remaining taking into account extra reduction	0		199				8
D: Updated input ceiling	811	1133	318			116	753
E: Estimated inputs 2017	789	760	691			80	735
F: Inputs 2017 including uncertainty (test value)	870	822	715			85	772
Extra reduction by 2017 with updated NIC (D-F)		311				31	
Remaining reduction to fulfil updated NIC by 2017 (F-D)	59		397				19
Remaining in % of updated NIC	7,3		125				2.5
Significant changes since reference period (%) to 2017	-	-	-17			-24	-
Accounting for extra reduction	-97		-217				-37
Remaining taking into account extra reduction	0		180				0

Baltic Sea shipping TN	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)	72	292	1,434	147	112	165	149
B: Estimated input 2017	440	1,719	7,583	953	565	934	892
C: Inputs 2017 including uncertainty (test value)	447	1,748	7,710	968	574	950	907
Extra reduction by 2017 (A-C)							
Remaining reduction to fulfill NIC by 2017 (C-A)	375	1,455	6,276	821	462	785	758
<i>Remaining in % of original NIC</i>	520	498	438	559	412	475	509
Significant changes since reference period (%) to 2017	-27	-27	-27	-27	-27	-27	-27
D: Updated input ceiling	284	1,141	5,180	675	345	651	701
E: Estimated inputs 2017	440	1,719	7,583	953	565	934	892
F: Inputs 2017 including uncertainty (test value)	447	1,748	7,710	968	574	950	907
Extra reduction by 2017 with updated NIC (D-F)							
Remaining reduction to fulfil updated NIC by 2017 (F-D)	163	607	2,530	293	229	299	206
<i>Remaining in % of updated NIC</i>	58	53	49	43	67	46	29
Significant changes since reference period (%) to 2017	-27	-27	-27	-27	-27	-27	-27

Ukraine TN	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)			1,948				
B: Estimated input 2017			2,784				
C: Inputs 2017 including uncertainty (test value)			3,075				
Extra reduction by 2017 (A-C)							
Remaining reduction to fulfill NIC by 2017 (C-A)			1,127				
<i>Remaining in % of original NIC</i>			58				
Significant changes since reference period (%) to 2017							
D: Updated input ceiling			1,693				
E: Revised estimated inputs 2017			3,155				
F: Revised inputs 2017 including uncertainty (test value)			3,485				
Extra reduction by 2017 with updated NIC (D-F)							
Remaining reduction to fulfil updated NIC by 2017 (F-D)			1792				
<i>Remaining in % of updated NIC</i>			106				
Significant changes since reference period (%) to 2017			43				

Ukraine TP	BOB	BOS	BAP	GUF	GUR	DS	KAT
A: Original input ceiling (NIC)			33				
B: Estimated input 2017			223				
C: Inputs 2017 including uncertainty (test value)			241				
Extra reduction by 2017 (A-C)							
Remaining reduction to fulfill NIC by 2017 (C-A)			208				
<i>Remaining in % of original NIC</i>			622				
Significant changes since reference period (%) to 2017			12				
D: Updated input ceiling			47				
E: Revised estimated inputs 2017			139				
F: Revised inputs 2017 including uncertainty (test value)			151				
Extra reduction by 2017 with updated NIC (D-F)							
Remaining reduction to fulfil updated NIC by 2017 (F-D)			104				
<i>Remaining in % of updated NIC</i>			221				
Significant changes since reference period (%) to 2017			12				