



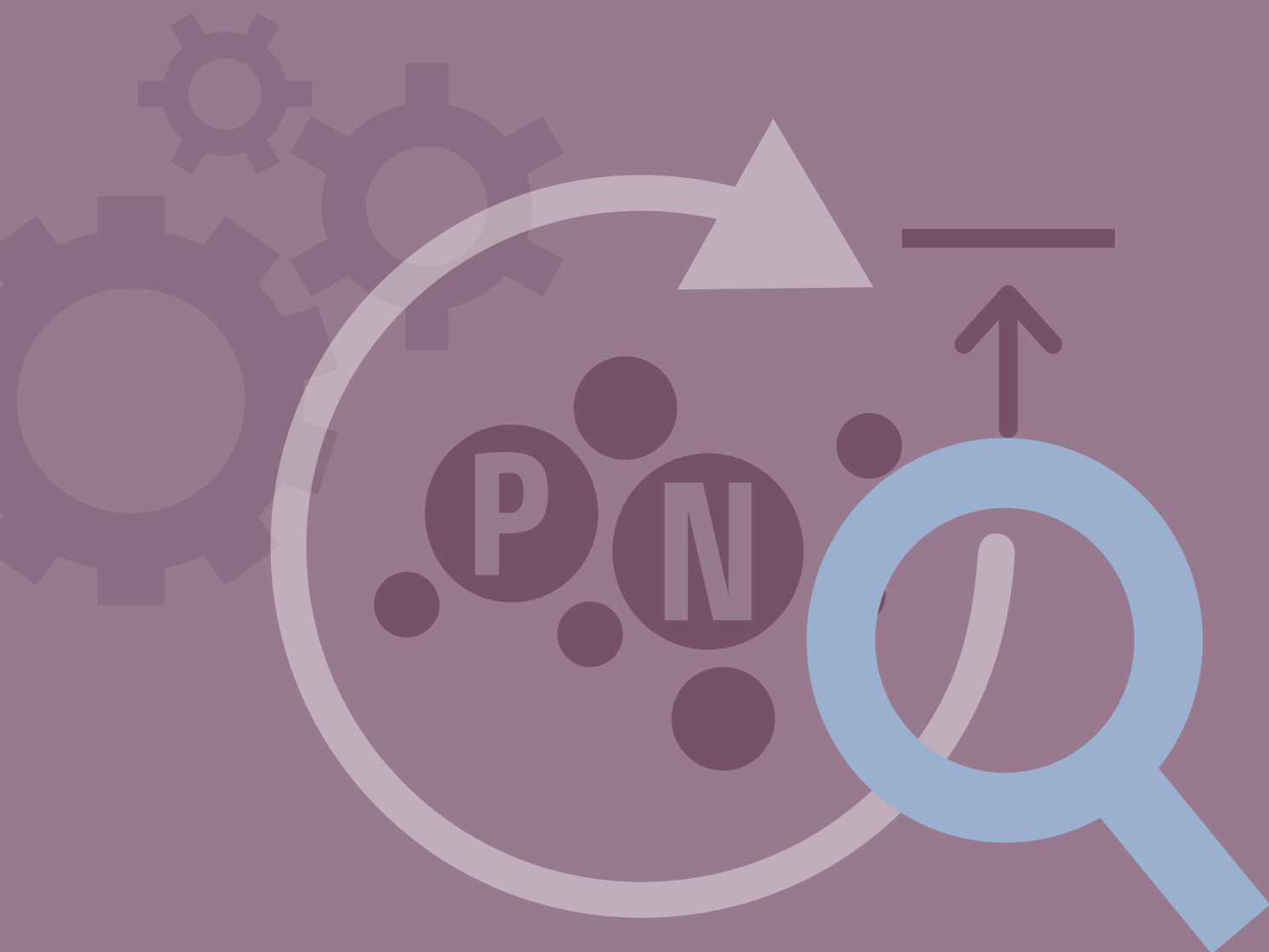
# Evaluation of the 2017 progress towards updated Nutrient Input Ceilings

  
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Authors: Lars M. Svendsen<sup>1</sup>, Søren Erik Larsen<sup>1</sup>, Bo Gustafsson<sup>2</sup>.

<sup>1</sup>) DCE – Danish Centre for Environment and Energy, Aarhus University, Denmark

<sup>2</sup>) BNI – Baltic Nest Institute, Stockholm University, Sweden

Layout: Laura Ramos Tirado

## Background

The Baltic Sea Action Plan 2021 update includes updated nutrient input ceilings (NIC) in the Eutrophication segment<sup>1</sup>. The updated NIC are described in the report: “The revised nutrient input ceilings to the BSAP update. HELCOM (2021)”<sup>2</sup>

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)<sup>3</sup>, 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-guidelines<sup>4</sup> (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)

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

<sup>2</sup> 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).

<sup>3</sup> 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/>

<sup>4</sup> 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 |
|--|-----|-----|--------|-----|--------|----|-----|
| <b>A: Original input ceiling (NIC)</b>                           |     |     | 7,322  |     | 6,352  |    |     |
| <b>B: Estimated input 2017</b>                                   |     |     | 16,559 |     | 12,327 |    |     |
| <b>C: Inputs 2017 including uncertainty (test value)</b>         |     |     | 18,182 |     | 13,526 |    |     |
| <b>Extra reduction by 2017 (A-C)</b>                             |     |     |        |     |        |    |     |
| <b>Remaining reduction to fulfill NIC by 2017 (C-A)</b>          |     |     | 10,861 |     | 7,175  |    |     |
| <i>Remaining in % of original NIC</i>                            |     |     | 148    |     | 113    |    |     |
| <b>Significant changes since reference period (%) to 2017</b>    |     |     | -      |     | -14    |    |     |
| <b>D: Updated input ceiling</b>                                  |     |     | 13,456 |     | 12,820 |    |     |
| <b>E: Revised estimated inputs 2017</b>                          |     |     | 15,357 |     | 9,808  |    |     |
| <b>F: Revised inputs 2017 including uncertainty (test value)</b> |     |     | 16,744 |     | 10,744 |    |     |
| <b>Extra reduction by 2017 with updated NIC (D-F)</b>            |     |     |        |     | 2,076  |    |     |
| <b>Remaining reduction to fulfil updated NIC by 2017 (F-D)</b>   |     |     | 3,288  |     |        |    |     |
| <i>Remaining in % of proposed updated NIC</i>                    |     |     | 24     |     |        |    |     |
| <b>Significant changes since reference period (%) to 2017</b>    |     |     | -      |     | -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 |     |     |    |     |
| Remaining in % of original NIC                            |     |     | 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 |    |     |
| Remaining in % of updated NIC                             |     |     | 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   |     |     |    |     |
| Remaining in % of original NIC                            |     |     | 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   |     |     |    |     |
| Remaining in % of updated NIC                             |     |     | 15    |     |     |    |     |
| Significant changes since reference period (%) to 2017    |     |     | -23   |     |     |    |     |

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| Czeck 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 |     |     |    |     |
| Remaining in % of original NIC                            |     |     | 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  |     |     |    |     |
| Remaining in % of updated NIC                             |     |     | 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    |
| Remaining in % of original NIC                          |     |       | 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  |       |       |        |        |
| Remaining in % of updated NIC                           |     |       | 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 |     |     |     |     |
| Remaining in % of original NIC                          |     |     | 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 |     |     |     |     |
| Remaining in % of updated NIC                           |     |     | 341 |     |     |     |     |
| Significant changes since reference period (%) to 2017  |     |     | -   |     |     | -11 |     |
| Accounting for extra reduction                          |     |     | -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   |     |     |        |        |
| Remaining in % of original NIC                          |     |       | 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           |     |       |       |     |     |        |        |
| Remaining in % of updated NIC                           |     |       |       |     |     |        |        |
| 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  |     |     |       |     |
| Remaining in % of original NIC                          |     |     | 109 |     |     |       |     |
| Significant changes since reference period (%) to 2017  |     |     | -25 |     |     | -14   | -12 |
| Accounting for extra reduction                          |     |     | -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  |     |     |       |     |
| Remaining in % of updated NIC                           |     |     | 109 |     |     |       |     |
| Significant changes since reference period (%) to 2017  |     |     | -25 |     |     | -14   | -10 |
| Accounting for extra reduction                          |     |     | -51 |     |     |       |     |
| Remaining taking into account extra reduction           |     |     | 0   |     |     |       |     |

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

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

| <b>Finland TN</b>  | <b>BOB</b> | <b>BOS</b> | <b>BAP</b> | <b>GUF</b> | <b>GUR</b> | <b>DS</b> | <b>KAT</b> |
|--|------------|------------|------------|------------|------------|-----------|------------|
| <b>A: Original input ceiling (NIC)</b>                         | 35,081     | 29,619     | 1,569      | 20,653     | 255        | 64        | 77         |
| <b>B: Estimated input 2017</b>                                 | 34,393     | 24,446     | 1,406      | 21,396     | 180        | 43        | 56         |
| <b>C: Inputs 2017 including uncertainty (test value)</b>       | 35,550     | 26,485     | 1,442      | 22,198     | 185        | 45        | 57         |
| <b>Extra reduction by 2017 (A-C)</b>                           |            | 3,135      | 127        |            | 70         | 19        | 20         |
| <b>Remaining reduction to fulfill NIC by 2017 (C-A)</b>        | 419        |            |            | 1,544      |            |           |            |
| <i>Remaining in % of original NIC</i>                          | 1.2        |            |            | 7.5        |            |           |            |
| <b>Significant changes since reference period (%) to 2017</b>  | -7.4       | -16        | -41        | -15        | -39        | -43       | -42        |
| <b>Accounting for extra reduction</b>                          | -403       |            |            |            |            |           |            |
| <b>Remaining taking into account extra reduction</b>           | 16         |            |            |            |            |           |            |
| <b>D: Updated input ceiling</b>                                | 35,087     | 28,700     | 1,827      | 20,457     | 295        | 76        | 89         |
| <b>E: Estimated inputs 2017</b>                                | 34,393     | 24,446     | 1,406      | 21,396     | 180        | 43        | 56         |
| <b>F: Inputs 2017 including uncertainty (test value)</b>       | 35,500     | 26,485     | 1,442      | 22,198     | 185        | 45        | 57         |
| <b>Extra reduction by 2017 with updated NIC (D-F)</b>          |            | 2,215      | 385        |            | 110        | 31        | 32         |
| <b>Remaining reduction to fulfil updated NIC by 2017 (F-D)</b> | 413        |            |            | 1,741      |            |           |            |
| <i>Remaining in % of updated NIC</i>                           | 1,2        |            |            | 8.5        |            |           |            |
| <b>Significant changes since reference period (%) to 2017</b>  | -7.4       | -16        | -41        | -15        | -39        | -43       | -42        |
| <b>Accounting for extra reduction</b>                          | -284       |            |            |            |            |           |            |
| <b>Remaining taking into account extra reduction</b>           | 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 |     |    |     |
| Remaining in % of original NIC                          |       | 8.2   |     | 107 |     |    |     |
| Significant changes since reference period (%) to 2017  | -14   |       |     | -13 |     |    |     |
| Accounting for extra reduction                          |       | -7    |     |     |     |    |     |
| Remaining taking into account extra reduction           |       | 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 |     |    |     |
| Remaining in % of updated NIC                           |       | 8.9   |     | 112 |     |    |     |
| Significant changes since reference period (%) to 2017  | -14   | -     |     | -13 |     |    |     |
| Accounting for extra reduction                          |       | -9    |     |     |     |    |     |
| Remaining taking into account extra reduction           |       | 102   |     |     |     |    |     |

| Lithuania TN   | BOB | BOS | BAP    | GUF | GUR    | DS  | KAT |
|--|-----|-----|--------|-----|--------|-----|-----|
| <b>A: Original input ceiling (NIC)</b>                           | 110 | 491 | 33,093 | 261 | 5,795  | 54  | 60  |
| <b>B: Estimated input 2017</b>                                   | 115 | 508 | 49,060 | 382 | 9,558  | 66  | 87  |
| <b>C: Inputs 2017 including uncertainty (test value)</b>         | 117 | 517 | 43,565 | 389 | 10,303 | 67  | 89  |
| <b>Extra reduction by 2017 (A-C)</b>                             |     |     |        |     |        |     |     |
| <b>Remaining reduction to fulfill NIC by 2017 (C-A)</b>          | 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  |
| <b>Significant changes since reference period (%) to 2017</b>    | -   | -   | 48     | -   | 47     | -   | -   |
| <b>D: Updated input ceiling</b>                                  | 108 | 495 | 25,878 | 305 | 8,820  | 66  | 80  |
| <b>E: Revised estimated inputs 2017</b>                          | 115 | 508 | 49,545 | 382 | 12,927 | 66  | 87  |
| <b>F: Revised inputs 2017 including uncertainty (test value)</b> | 117 | 517 | 54,067 | 389 | 13,943 | 67  | 89  |
| <b>Extra reduction by 2017 with updated NIC (D-F)</b>            |     |     |        |     |        |     |     |
| <b>Remaining reduction to fulfil updated NIC by 2017 (F-D)</b>   | 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  |
| <b>Significant changes since reference period (%) to 2017</b>    | -   | -   | 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   |     |     |    |     |
| Remaining in % of original NIC                            |     |     | 33    |     |     |    |     |
| Significant changes since reference period (%) to 2017    |     |     | -47   |     | -92 |    |     |
| Accounting for extra reduction                            |     |     | -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   |     |     |    |     |
| Remaining in % of updated NIC                             |     |     | 57    |     |     |    |     |
| Significant changes since reference period (%) to 2017    |     |     | -47   |     | -92 |    |     |
| Accounting for extra reduction                            |     |     | -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   |
| Remaining in % of original NIC                            | 3.4  | 22  | 91     | 66  |        | 24   | 43   |
| Significant changes since reference period (%) to 2017    | -4.5 | -   | -      | -   | 2.1    | -4.9 | -4.5 |
| <b>Accounting for extra reduction</b>                     |      |     |        |     |        |      | -1   |
| <b>Remaining taking into account extra reduction</b>      |      |     |        |     |        |      | 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    |
| Remaining in % of updated NIC                             | 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 |
|--|-----|-----|-----|-----|-------|----|-----|
| <b>A: Original input ceiling (NIC)</b>                           |     |     | 74  |     | 541   |    |     |
| <b>B: Estimated input 2017</b>                                   |     |     | 238 |     | 1,199 |    |     |
| <b>C: Inputs 2017 including uncertainty (test value)</b>         |     |     | 290 |     | 1337  |    |     |
| <b>Extra reduction by 2017 (A-C)</b>                             |     |     |     |     |       |    |     |
| <b>Remaining reduction to fulfill NIC by 2017 (C-A)</b>          |     |     | 217 |     | 796   |    |     |
| <i>Remaining in % of original NIC</i>                            |     |     | 295 |     | 147   |    |     |
| <b>Significant changes since reference period (%) to 2017</b>    |     |     | -46 |     | -     |    |     |
| <b>D: Updated input ceiling</b>                                  |     |     | 167 |     | 1,061 |    |     |
| <b>E: Revised estimated inputs 2017</b>                          |     |     | 238 |     | 1,121 |    |     |
| <b>F: Revised inputs 2017 including uncertainty (test value)</b> |     |     | 290 |     | 1,305 |    |     |
| <b>Extra reduction by 2017 with updated NIC (D-F)</b>            |     |     |     |     |       |    |     |
| <b>Remaining reduction to fulfil updated NIC by 2017 (F-D)</b>   |     |     | 123 |     | 244   |    |     |
| <i>Remaining in % of updated NIC</i>                             |     |     | 73  |     | 23    |    |     |
| <b>Significant changes since reference period (%) to 2017</b>    |     |     | -46 |     | -     |    |     |

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

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

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| 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 |     |     |    |     |
| Remaining in % of original NIC                            |     |     | 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 |     |     |    |     |
| Remaining in % of updated NIC                             |     |     | 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  |
| Remaining in % of original NIC                            | 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  |
| Remaining in % of updated NIC                             | 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  |    |     |
| Remaining in % of original NIC                            |     |     | 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  |    |     |
| Remaining in % of updated NIC                             |     |     | 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  |     |       |        |
| Remaining in % of original NIC                          |        |        | 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  |     |     |       |        |
| Remaining in % of updated NIC                           |        |        | 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 |
| Remaining in % of original NIC                          | 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 |
| Remaining in % of updated NIC                           | 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    |     |     |    |     |

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| 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 |     |     |    |     |
| Remaining in % of original NIC                            |     |     | 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 |     |     |    |     |
| Remaining in % of updated NIC                             |     |     | 221 |     |     |    |     |
| Significant changes since reference period (%) to 2017    |     |     | 12  |     |     |    |     |