

Terminal Study

Final Result

BCP WG Terminals | Terminal Study – Final Result | December 2021

Brenner Corridor Platform WG Terminals – Terminal Study Final Result – November 2021

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The Working Group (WG) Terminals of the Brenner Corridor Platform, chaired by Giulia Costagli of RFI, was assigned with the task to analyse the terminals relevant for the Brenner transport with respect to current and future parameters including capacity, volume and services.

In order to do that systematically, KombiConsult GmbH was asked to support the WG Terminals in executing the task.

After a kick-off meeting in Innsbruck in March 2019, the draft final results were presented in the working group meeting in Verona on 12 June 2019.

The presentation was shared with the WG Terminals for comment and feedback until end of June 2019.

How to read this document (2/3)

Too, the terminal members of the WG and the terminal managers of the involved terminals were contacted individually to validate their data by end of July 2019. The comments received by that date were incorporated in this final version of the 2nd phase of the study, which shows the present situation on capacity and handling volume of the terminals and the most likely supply of capacity by 2030. Further comments clarifying a few points were incorporated in the version of 30.08.2019 which is the final version of the 1st and 2nd phase.

The 3rd phase (prognosis of handling volume by 2030) was done after the WG Infra study on the freight transport forecast is completed. The results were postponed from November 2019 and finally received on 12.11.2021. The data was included in the terminal study, presented to the WG Terminals on 23.11.2021, delivered and asked for comment. The comments were incorporated in this final document.

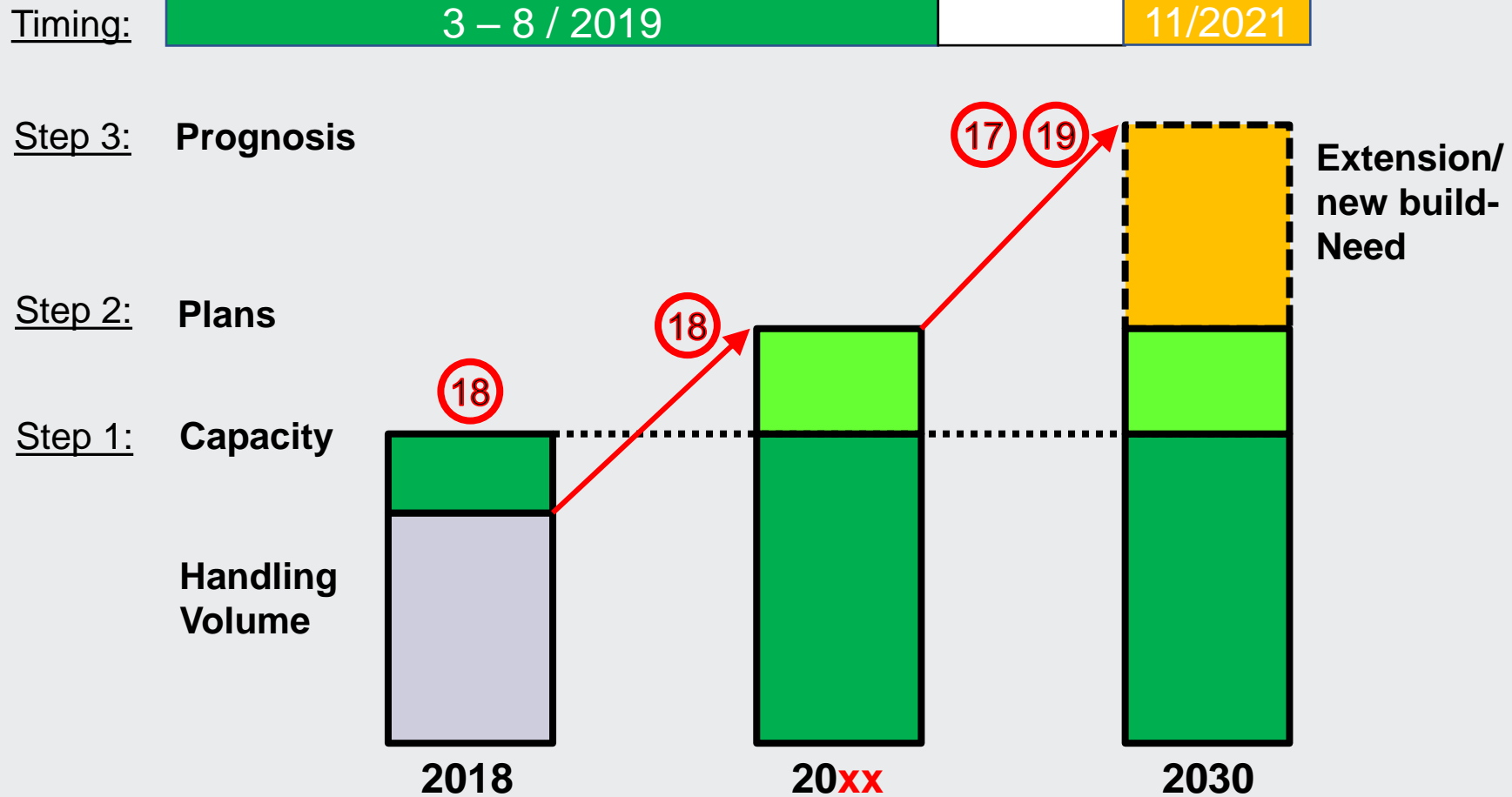
Frequently used abbreviations:

| | |
|----------|--|
| BAP: | Brenner Action Plan 2018 |
| CT: | Combined Transport |
| RoLa: | Rollende Landstraße, Rolling Motorway, Accompanied Combined Transport |
| UKV/UCT: | Unbegleiteter Kombiniertes Verkehr/ Unaccompanied Combined Transport |
| LU: | Loading Unit |
| WG: | Working Group |
| N: | North (of Brenner), the northern terminal |
| S: | South (of Brenner), the southern terminal |

Tasks of the WG Terminals from the BAP 2018

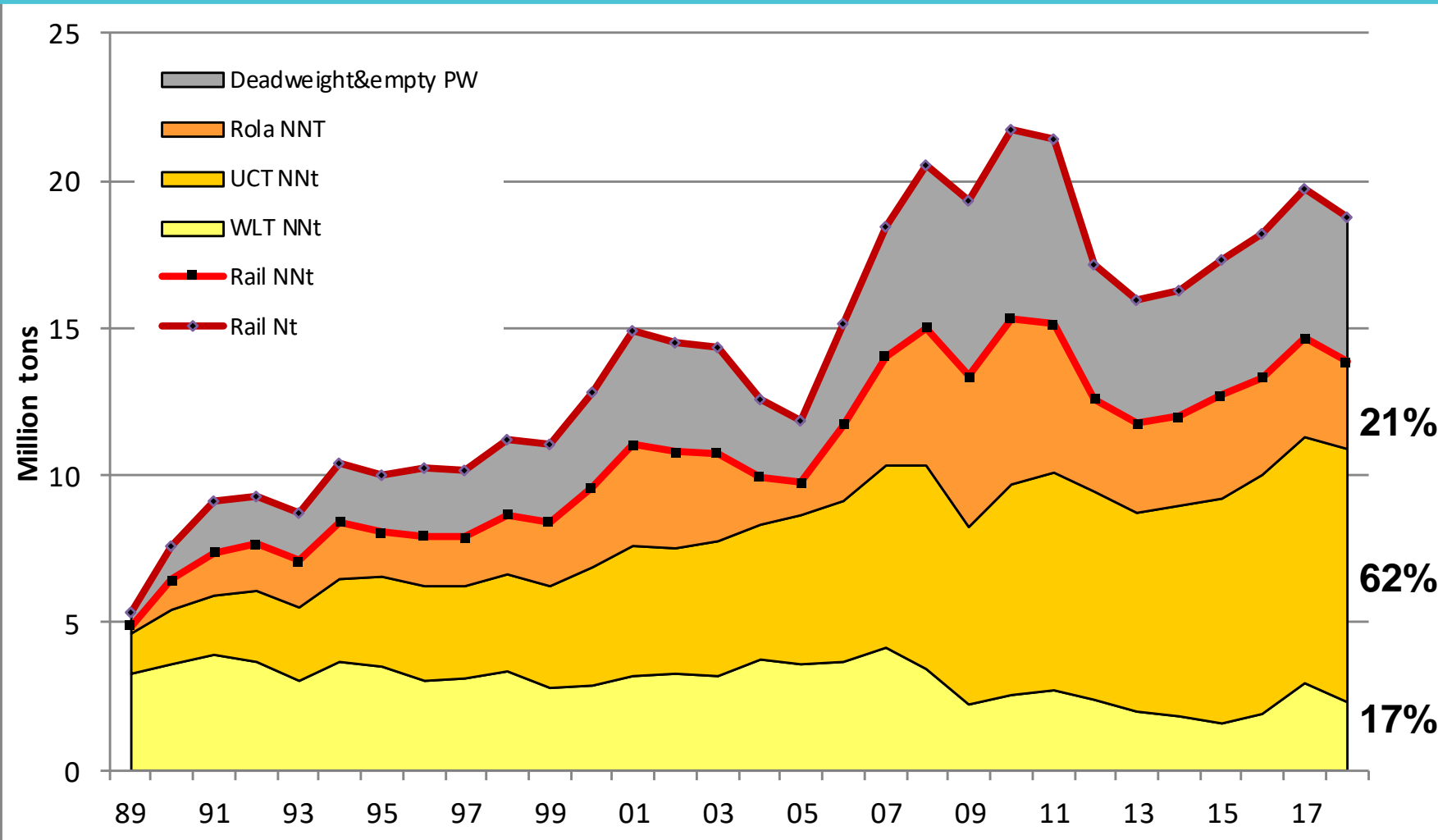
| Measure | Responsible Organisation for Realisation | until | Monitoring |
|--|--|-----------|------------------|
| 17. Gather existing studies, if available, to compare the different traffic forecasts in the area of freight transport with regard to the relevant departure and destination terminals. | WG Terminals | 2018 | WG Terminals BCP |
| 18. Analysis of the current offer (accessibility, infrastructure, equipment and processes, relations, etc.). Listing of the short and medium term expansion plans with regard to the planned capacities for 2027, especially with regard to 740m train length. | WG Terminals in Collaboration with Ministries and responsible terminal operators | 2018-2019 | WG Terminals BCP |
| 19. Realization of a study on the future demand for capacity in the terminals concerned in order to draw up a report on the need for additional handling capacity | Ministries DE, AT, IT in collaboration with WG Terminals and terminal operators | 2018-2019 | WG Terminals BCP |

Handling volume and capacity - Methodology



(Actual) capacity and handling volume (2018) of the respective terminal; (The terminal's) known short and medium term plans for capacity increase with respective target year; Study the need for development (prognosis), for 2030, derived from the traffic forecast of WG Infra.

Development of Rail Freight Traffic via Brenner 1989-2018



PW: Private (Rail) Wagon; NNT: Net-net-tons; UCT: Unaccompanied Combined Transport; WLT: Wagon load traffic.

KombiConsult analysis based on Verkehrsbericht Tirol, different years incl. 2018 published on 15.08.2019

Wagon Load traffic accounts for **17%** of net-net-tons (freight)

Accompanied CT (RoLa traffic) accounts for **21%**

- ▶ Wörgl – Brennersee (93%)

- ▶ Wörgl – Trento (17%)

→ Separate Task Force on evolution of RoLa

Unaccompanied combined transport (CT) accounts for **62%**

- ▶ With regular traffic according to RFI analysis at Brenner pass

- ▶ Correlates with KombiConsult knowledgebase

- ▶ Agreed during kick-off meeting in Innsbruck

→ **Focus of this Working Group Terminals**

Terminals selected* for the terminal study in relation to road traffic “spider”

Northern terminals:

- Falköping (SE)
- Kiel (3x)
- Lübeck
- Rostock
- Hamburg
- Bremen
- Hannover (2x)
- Kassel (2x)
- Herne
- Geleen (NL)
- Köln (2x)
- Wuppertal
- Ludwigshafen
- Leipzig
- Nürnberg
- Regensburg (4x)
- Augsburg (2x)
- München (2x)
- Wörgl (AT)
- Hall i.T. (AT)



*Selection has been made on their current Brenner-related rail volume, while the background of this map is used to display their relation to the present road traffic volume, which shows that they are basically well located to capture more freight from road.

Southern terminals:

- Brennersee
- Trento
- Verona (4x)
- Milano (2x)
- Lugo
- Bari

Source Map : “CAFTA 2015”

Overview of terminals and volume in 2018 in Loading Units p.a.

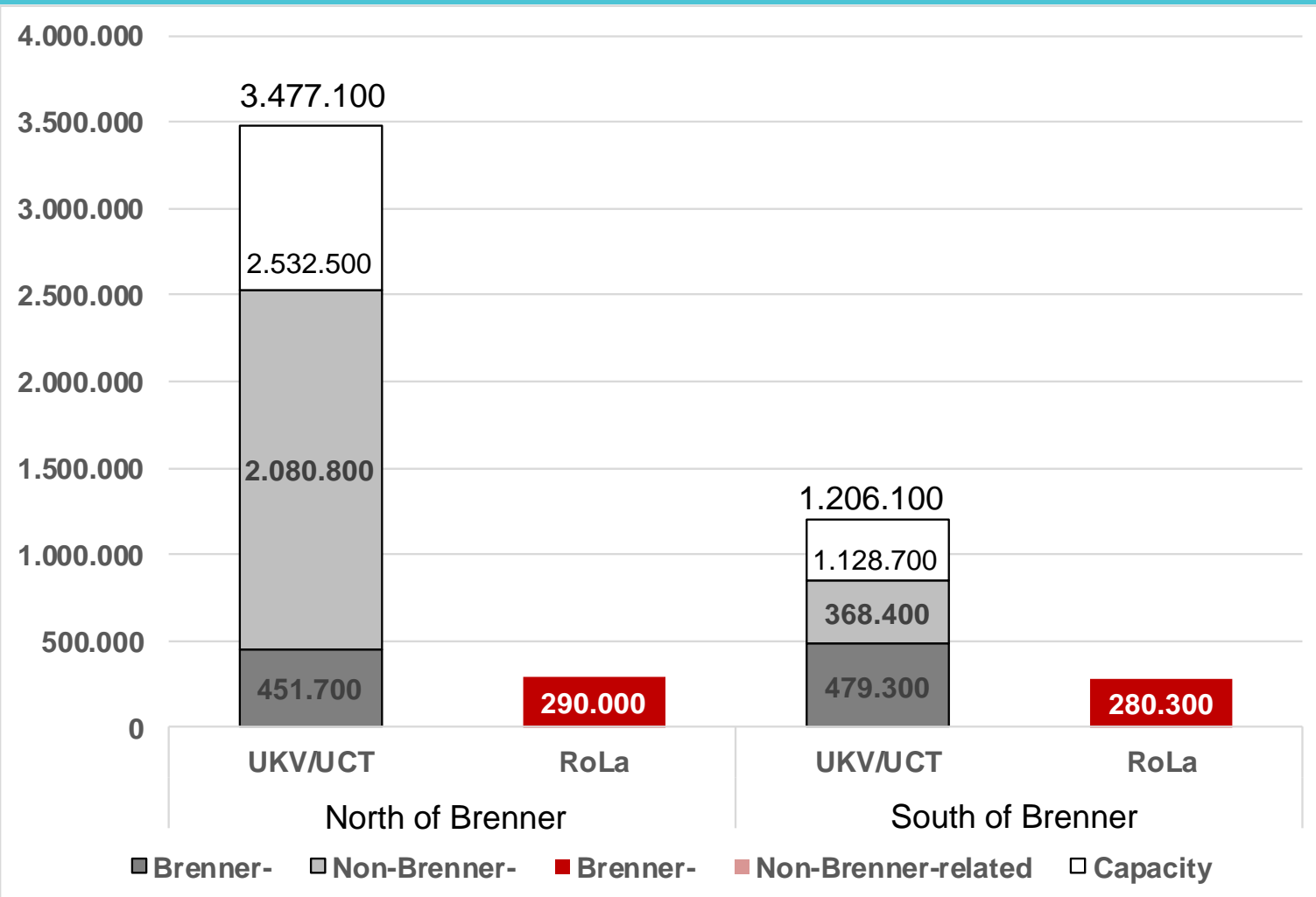
| Type | N° of sites* | thereof new by 2030 | Capacity 2018 | Volume 2018 | Utilisation | Brenner 2018 | Share |
|----------------|--------------|---------------------|------------------|------------------|-------------|------------------|------------|
| UKV/UCT | | | 3.477.100 | 2.532.500 | 73% | 451.700 | 18% |
| RoLa | | | 419.900 | 290.000 | 69% | 290.000 | 100% |
| Subtotal North | 30 | 4**) | 3.897.000 | 2.822.500 | 72% | 741.700 | 26% |
| UKV/UCT | | | 1.206.100 | 847.700 | 70% | 479.300 | 57% |
| RoLa | | | 270.000 | 280.300 | 104% | 280.300 | 100% |
| Subtotal South | 11 | 2***) | 1.476.100 | 1.128.000 | 76% | 759.600 | 67% |
| Total UKV/UCT | | | 4.683.200 | 3.380.200 | 72% | 931.000 | 28% |
| Total RoLa | | | 689.900 | 570.300 | 83% | 570.300 | 100% |
| Total | 41 | 6 | 5.373.100 | 3.950.500 | 74% | 1.501.300 | 38% |

*) Total number of sites studied of which 35 operational in 2018 and 38 expected to be operational in 2030

***) Hannover Megahub Lehrte, München (new), Regensburg-Ost (new), Augsburg GVZ (new)

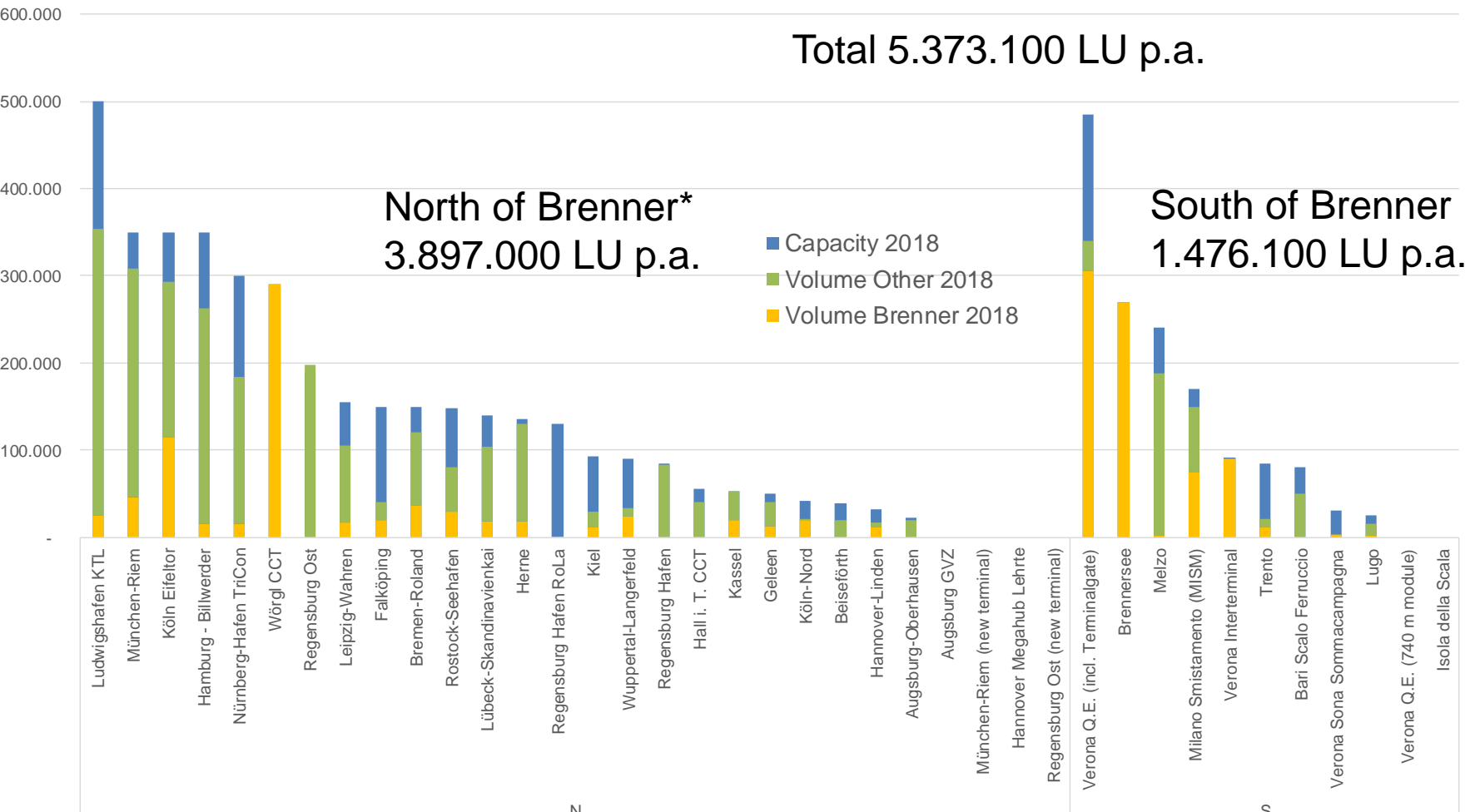
***) Verona Q.E. 740m module; Isola della Scala

Handling Capacity and Volume 2018 in Loading Units p.a.



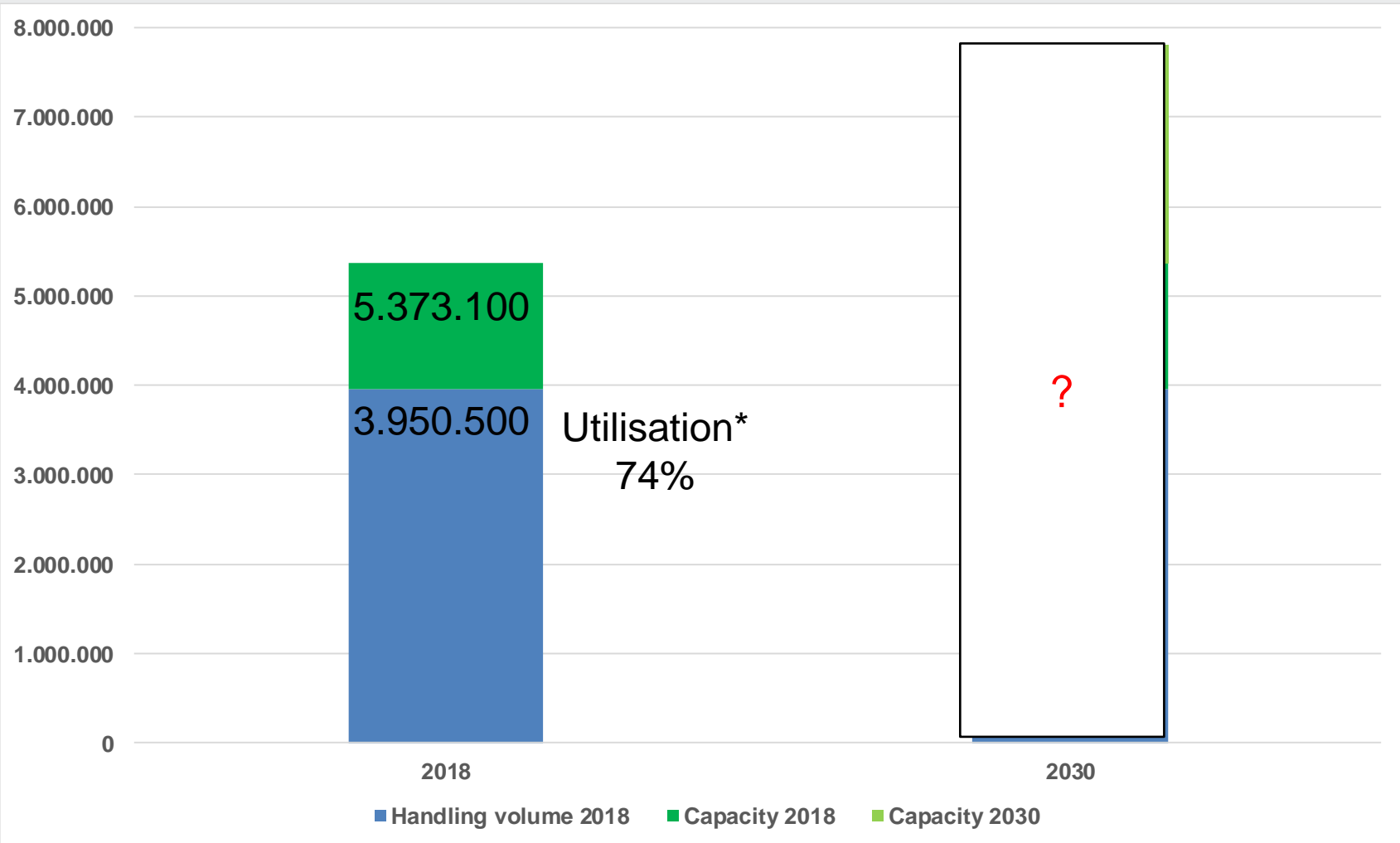
* For RoLa only volume 2018 but no capacity indication, since out of scope of this study.

Handling Capacity, Volume and Brenner Share 2018 in Loading Units p.a.



* Brenner crossing transport with „northern“ terminals and „southern“ terminals including „Brennersee“

Handling Capacity and Volume 2018 in Loading Units p.a.



* Total over unaccompanied and RoLa handling; few smaller terminals with capacity but no handling volume included.

The **total handling capacity** supplied by the studied terminals was 5.4 million loading units in 2018 of which 4.0 million were used (74%).

The **utilisation** of the RoLa terminals (83%) is basically higher than the one of the UCT terminals (72%), and the northern UCT terminals are slightly more occupied (73%) than the southern ones (70%).

The **share of Brenner related traffic** accounts for 18% of the northern UCT terminal's handling volume while the share in the southern UCT terminals is 57%.

This confirms the general observation that the Brenner related traffic is focused on a few sites in the south, with those located in Verona area playing the most important role, while the northern “catchment area” of the Brenner is wider.

Individual terminals have utilisation rates below or above this average figure, and in particular the following show capacity bottlenecks (>80% utilisation) already now (2018):

- ▶ Bremen Roland (80%) Kassel (100%)
- ▶ Herne (97%) Geleen (81%)
- ▶ Köln-Eifeltor (84%) Wörgl CCT (RoLa, 100%)
- ▶ München Riem (88%) Brennersee (RoLa, 100%)
- ▶ Regensburg-Ost (104%) Verona Interterminal (98%)
- ▶ Regensburg Hafen (98%) Milano Smistamento (88%)
- ▶ Augsburg-Oberhausen (89%)

Additional capacity constraints may be experienced also in the other terminals on specific periods of the year, times of the day or for certain services such as buffer storage.

Furthermore the (international) train slot and other market requirements may not allow to use the available capacity fully.

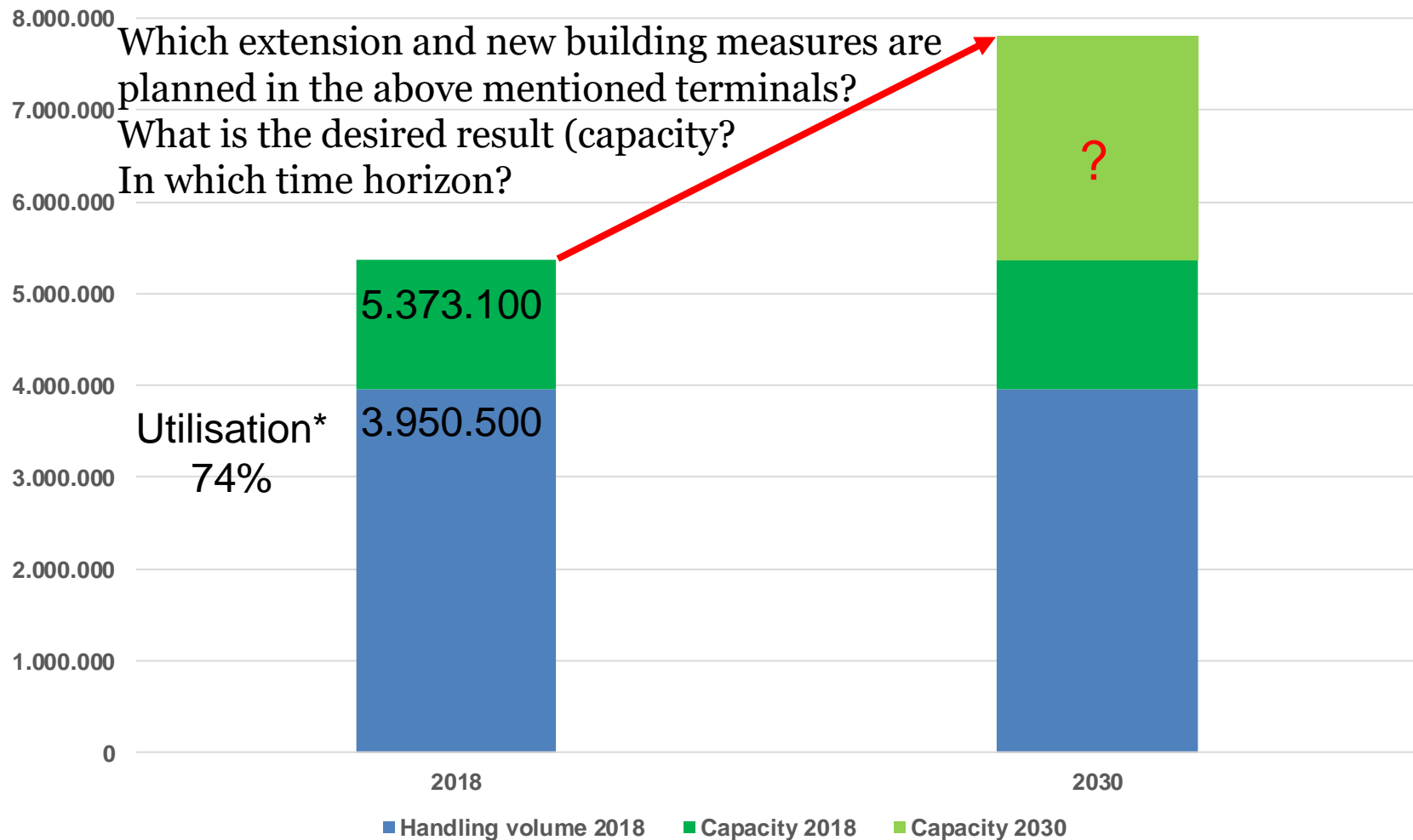
Validation of Brenner related Handling Volume 2018

- The Tyrol Traffic Report 2018 provides the volume of freight traffic via the Brenner for the different market segments, which were converted into loading units.
- The traffic volume is largely covered by the handling volume of the terminals included in the Terminal Study, which is a proof of the quality of the terminal studies' relevance.

| Market | Tyrol Traffic Report* | Segment | BCP Terminal Study |
|--------|-----------------------|-----------|--------------------|
| UCT | 477.222 LU | UCT North | 451.700 LU ✓ |
| | | | 95 % Coverage |
| | | UCT South | 479.300 LU ✓ |
| | | | 100 % Coverage |
| RoLa | 286.314 LU | RoLa | 290.000 LU ✓ |
| | | | 100 % Coverage |

* Verkehrsbericht 2018 on tirol.gv.at, published on 15.08.2019, converted according to KombiConsult knowledgebase

Handling Capacity and Volume 2018 in Loading Units p.a.



* Total over unaccompanied and RoLa handling; few smaller terminals with capacity but no handling volume included.

Extension and new construction of terminals 1-8

Augsburg GVZ: new terminal with 4 tracks and crane (2021) substituting the present one (Augsburg-Oberhausen)

Bari: enlargement of track numbers and replacement of reachstackers by a gantry crane (2025)

Kassel / Beiseförth: enlargement of tracks to 600 m and 1 more gantry crane (no date)

Bremen-Roland: more performant gantry cranes (2024)

Falköping: Additional 2 handling tracks and 2 arrival and departure tracks (2020)

Hamburg-Billwerder: new module with 720 m tracks and 3 cranes; extension of tracks in module 1 to 750 m (no date)

Hannover **Megahub** Lehrte (after opening 2027): 3 cranes, extension of interim storage, 3 reception/departure tracks

Isola della Scala: new terminal with tracks and cranes (no date)

Köln-Nord: extension of tracks by 5x700 m and 3 cranes; extension to 9 tracks and 6 cranes possible (2025)

Ludwigshafen KTL: Building a so-called Trailer-Warehouse (Trailer-Hub) for storing Trailers in a „shelf“ on 6 levels

Lübeck-Skandi: enlarge terminal tracks up to 740m (2022)

München-Riem: extension of tracks in 1 module up to 750m,

München-Riem (new terminal): new location with two modules each 4x720 m and total 6 cranes (no date)

Nürnberg Hafen (TriCon): renting an additional area for interim storage (2020)

Extension and new construction of terminals 16-18

Regensburg Hafen: extension of tracks and 1 crane (no date)

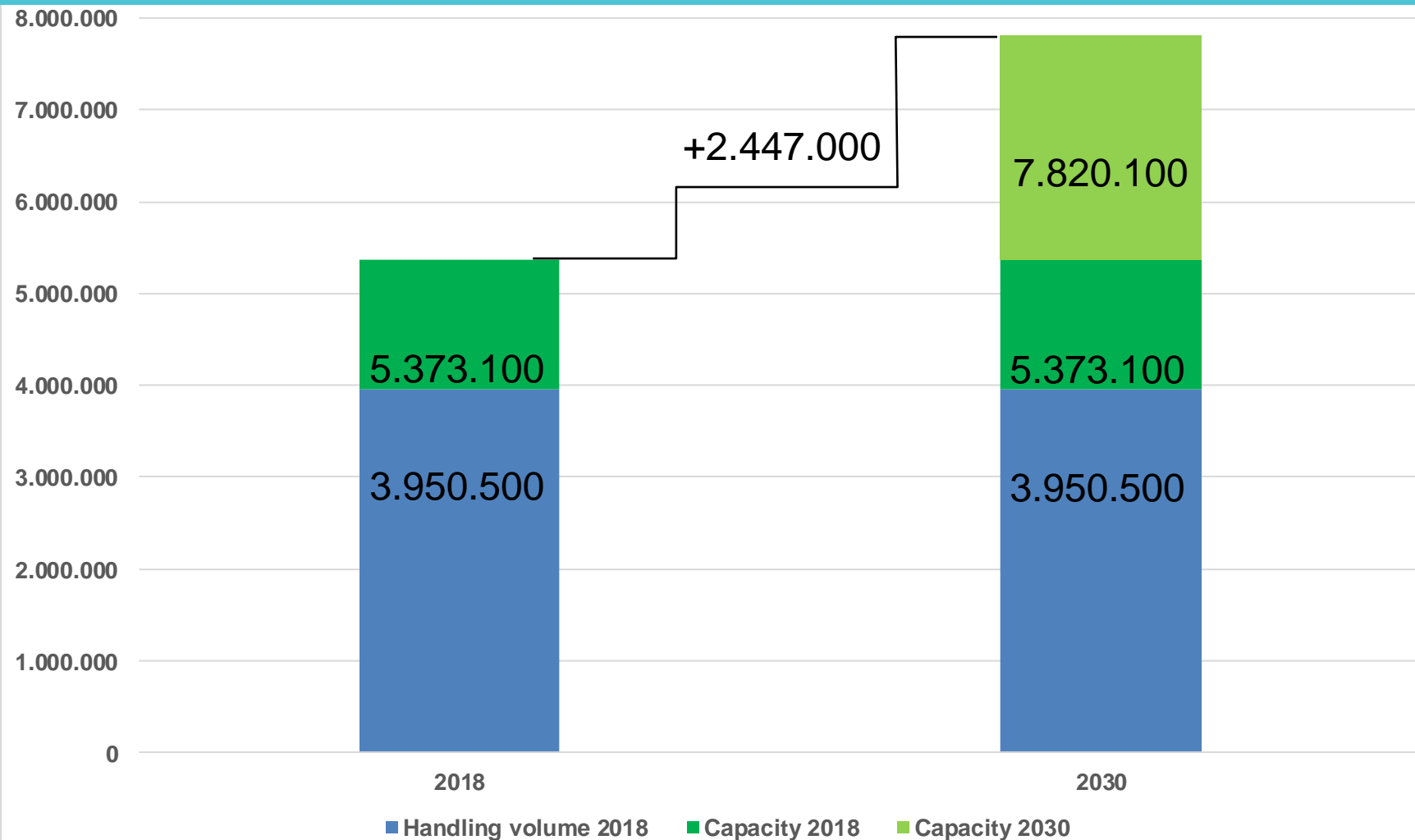
Regensburg Ost: new terminal with 4 tracks á 720 m and 4 cranes (replacing existing terminal)

Trento: Extension of the terminal by 4 ha and tracks of 750 including electrified (2021)

Verona Q.E. (740 module): new Terminal with 8 tracks of 750 m length (2026)

Wörgl: Extension of the loading tracks (before commissioning Brenner Basis tunnel)

Handling Capacity 2018 and planned for 2030 in Loading Units p.a.



* Total over unaccompanied and RoLa handling; few smaller terminals with capacity but no handling volume included.

The **total handling capacity** will be 7.8 million loading units in 2030, under consideration that the reported improvement projects will supply their capacity of about 2.5 million loading units stepwise and in-time.

The enlargement includes 1.6 million loading units for the „northern“ and 0.9 million loading units for the „southern“ terminals by 2030.

The difference in the capacity between “northern” and southern” terminals, both for the present and extended capacity, is no problem as such, because the supplied handling capacity (in particular in the north) is used also for other, non-Brenner related transports.

However, the question if the planned supply is “sufficient” for 2030 can only be answered after the WG Infra Study is agreed upon and the data analysed.

The terminals analysed in the scope of the study show a variety of total sizes, track length, types of equipment and layout in general which can mostly be explained by their historic growth.

Most of the terminals offer either unaccompanied or Rola-services despite Trento-Roncafort, which offers both.

The „**good practices**“ shared in the ScanMed Ideas Laboratory in Verona in April 2016 are still relevant for the terminals and include e.g.

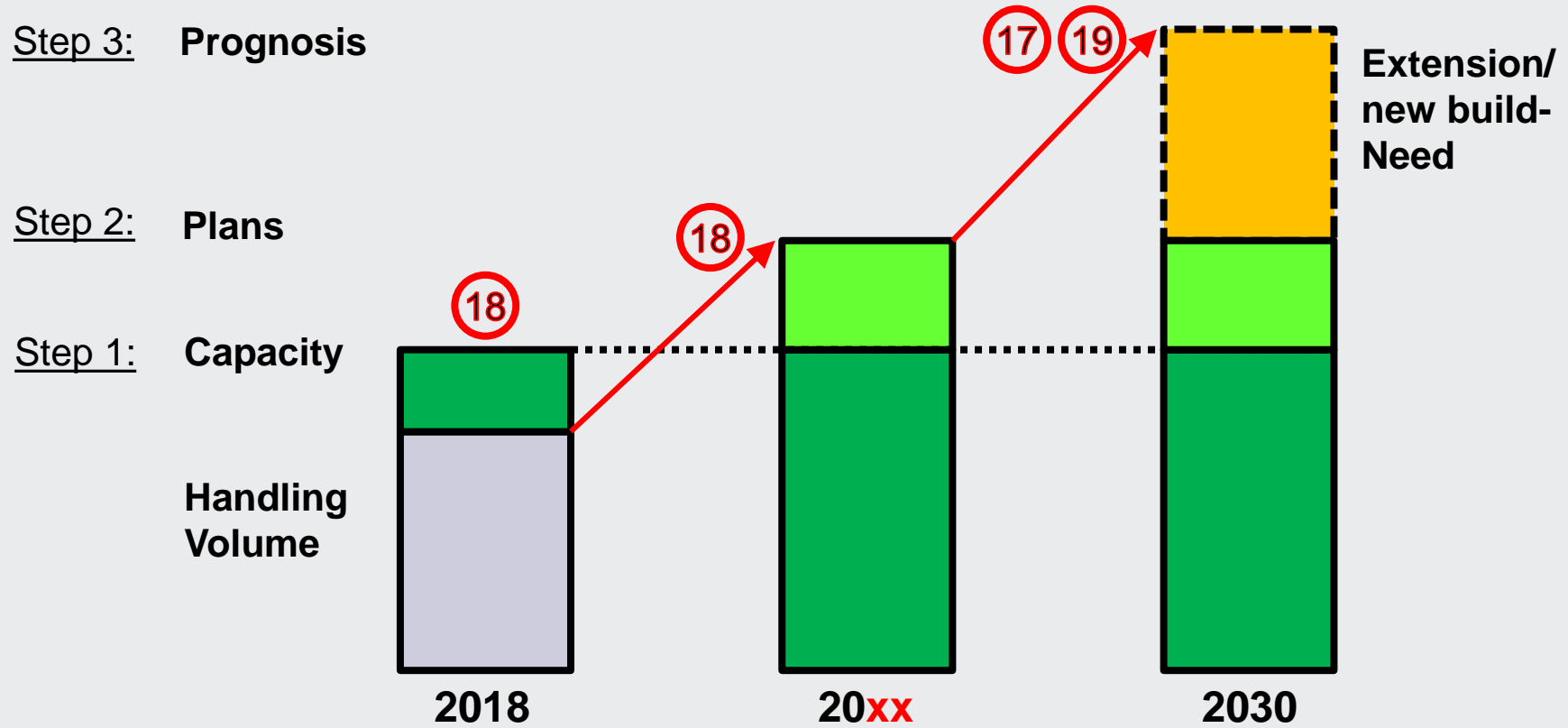
- ▶ Reach compliance with respect to TEN-T requirements
- ▶ Extend the opening times, if local market allows for
- ▶ Increase the flow-factor on tracks
- ▶ Examine the portfolio of additional services
- ▶ Implement IT-systems including OCR-Gates
- ▶ Identify the limiting factor and improve it

However, terminals which show a **utilisation rate of 80% or more** already today (in 2018) should consider planning and realizing enlargement projects to supply the capacity in-time.

Those sites (e.g. Augsburg, Regensburg, Milano) have already identified projects (see previous slides) where realisation needs to be started and monitored.

For those and other sites regional market studies, detailed planning, drawing of implementation plans, plan approval, finance agreement and realisation is due to be done.

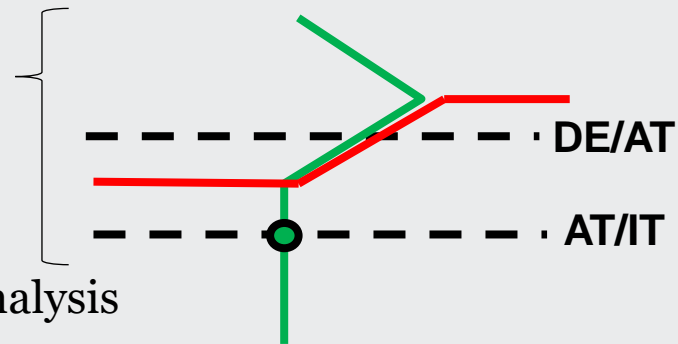
Handling volume and capacity - Methodology



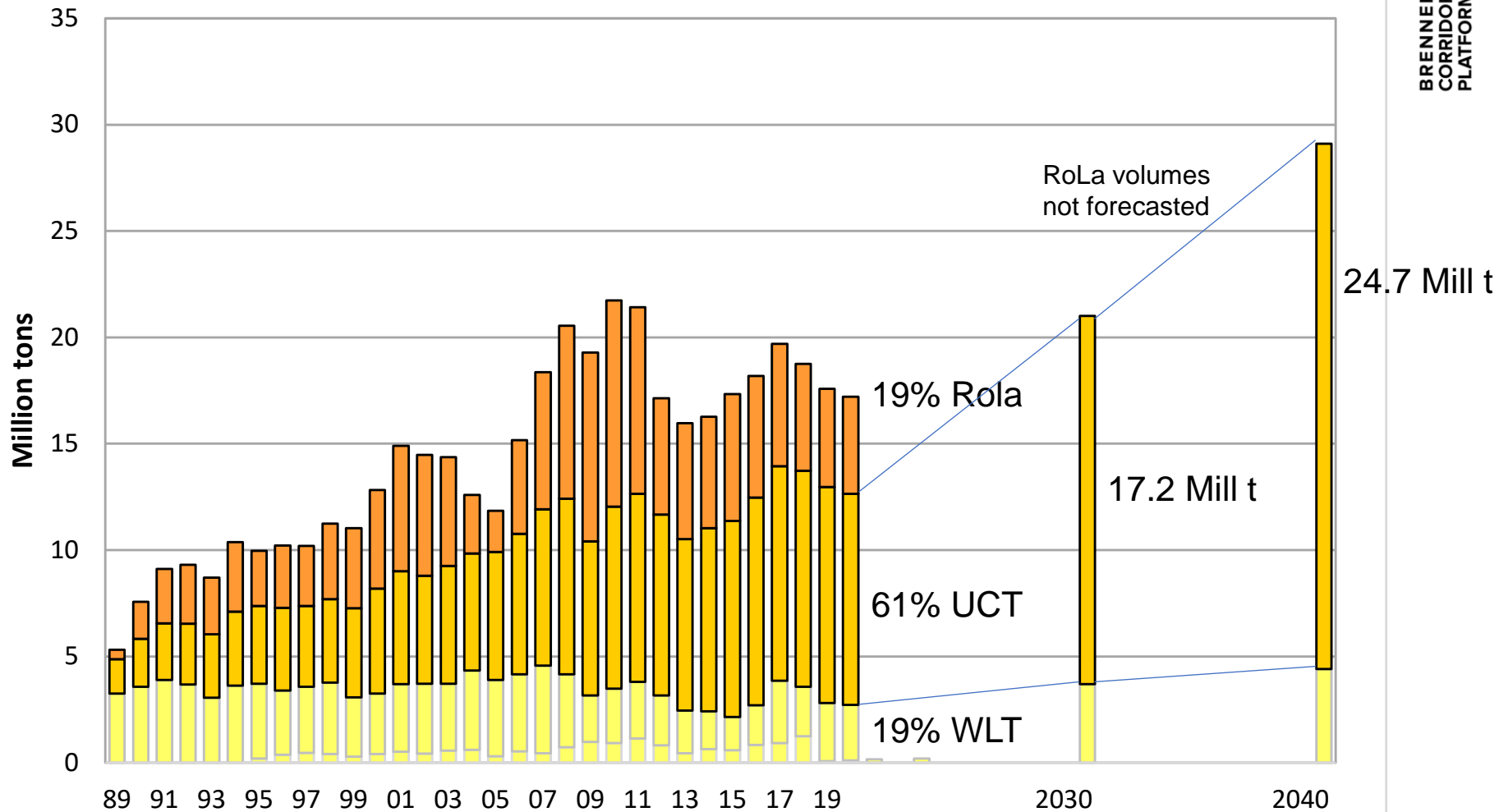
(Actual) capacity and handling volume (2018) of the respective terminal; (The terminal's) known short and medium term plans for capacity increase with respective target year; Study the need for development (prognosis), for 2030, derived from the traffic forecast of WG Infra.

Volume forecast according to „**BCP Central Case**” **2030 and 2040 scenarios** from the trilateral working group Freight Transport Traffic Study after approval of their Report by the BCP WG Infrastructure received on 12.11.2021:

- ▶ Net-tons per **terminal area** which means exact named terminals or regional names with more than one terminal
- ▶ **Net-tons** recalculated to Loading Units with 23 tons/LU for UCT and 21 tons/RoLa consignment (VB-Tirol 2018)
- ▶ General increase of „**non-Brenner**“ volumes in terminals by 2% p.a. based on 2018 figures (if available)
- ▶ Total volume Brenner corridor and **sub-volume Brenner crossing** to be in line with 2018 analysis



Development of Rail Freight Traffic via Brenner 1989 - 2020, Forecast 2030, 2040



RoLa: Rolling Motorway; UCT: Unaccompanied Combined Transport; WLT: Wagon Load Traffic
 KombiConsult analysis based on Verkehrsbericht Tirol, different years incl. year 2020 and
 BCP Rail Freight Traffic Study November 2021 „BCP Central Case scenarios“ for years 2030 and 2040

Table of terminal data includes
questionable past (2016) RoLa volumes

- ▶ „Wörgl – Trento“ „3.4 Mio t“
while official statistics (VB Tirol 2016) quantifies
Total 3.32 Mio. t of which
- ▶ Wörgl - Brennersee 89% = 2.9 Mio t
- ▶ Wörgl - Trento 9% = 0.3 Mio t
- ▶ Regensburg - Trento 2% = 0.1 Mio t

No forecast for RoLa traffic by terminal („included in
Road“ despite figures presented in the table)

RoLa not in scope of WG Terminals

→ not treated in the WG Terminal forecast

“BCP Central Case” 2030 and 2040 scenarios – Unaccompanied Combined Transport (UCT)

| | Total Brenner Corridor | | | Brenner crossing | | | Difference | | |
|-------------------------|------------------------|------------------|------------|------------------|------------------|------------|------------|------------------|-----------|
| | Base year | BCP Central Case | | Base year | BCP Central Case | | Base year | BCP Central Case | |
| | 2016 | 2030 | 2040 | 2016 | 2030 | 2040 | 2016 | 2030 | 2040 |
| Net-tons | | | | | | | | | |
| North | 9.526.481 | 21.057.938 | 29.860.305 | 7.692.893 | 17.228.573 | 24.674.291 | 1.833.588 | 3.829.365 | 5.186.015 |
| South | 7.692.893 | 17.228.573 | 24.674.291 | 7.692.893 | 17.228.573 | 24.674.291 | 0 | 0 | 0 |
| Loading Units | | | | | | | | | |
| North | 414.195 | 915.563 | 1.298.274 | 334.474 | 749.068 | 1.072.795 | 79.721 | 166.494 | 225.479 |
| South | 334.474 | 749.068 | 1.072.795 | 334.474 | 749.068 | 1.072.795 | 0 | 0 | 0 |
| Growth Rate p.a. | | | | | | | | | |
| | | | | 2030/2016 | 2040/2030 | 2040/2016 | | | |
| North | | | | 6% | 4% | 5% | | | |
| South | | | | 6% | 4% | 5% | | | |

| Terminals | „Sud“ |
|-----------|-------|
| North | 28 |
| South | 14 |
| Total | 42 |

The volume forecast of the BCP Central Case 2030 and 2040 scenarios include a **Brenner crossing** transport volume of 749.068 LU in 2030 and 1.072.795 LU in 2040 respectively.

A volume of 166.494 LU in 2030 and 225.479 LU in 2040 is not considered, since it does not cross the Brenner and has no impact on the southern terminals.

This volume is transported between Northern terminals, but not all of the terminals were subject to the detailed analysis in 2019 which focused on the ones relevant for Brenner crossing.

For the forecast 42 terminals or terminal areas were taken into account of which 28 are located in the north and 14 in the south.

List of terminals and selection made for forecast 2030/2040

„Final Terminal (Area) Selection“ is based on

- List of terminals analysed for 2018 in 2019
- List of Terminals and terminal areas for which a forecast volume is provided for 2030 and 2040 in the BCP forecast scenario 2030/2040

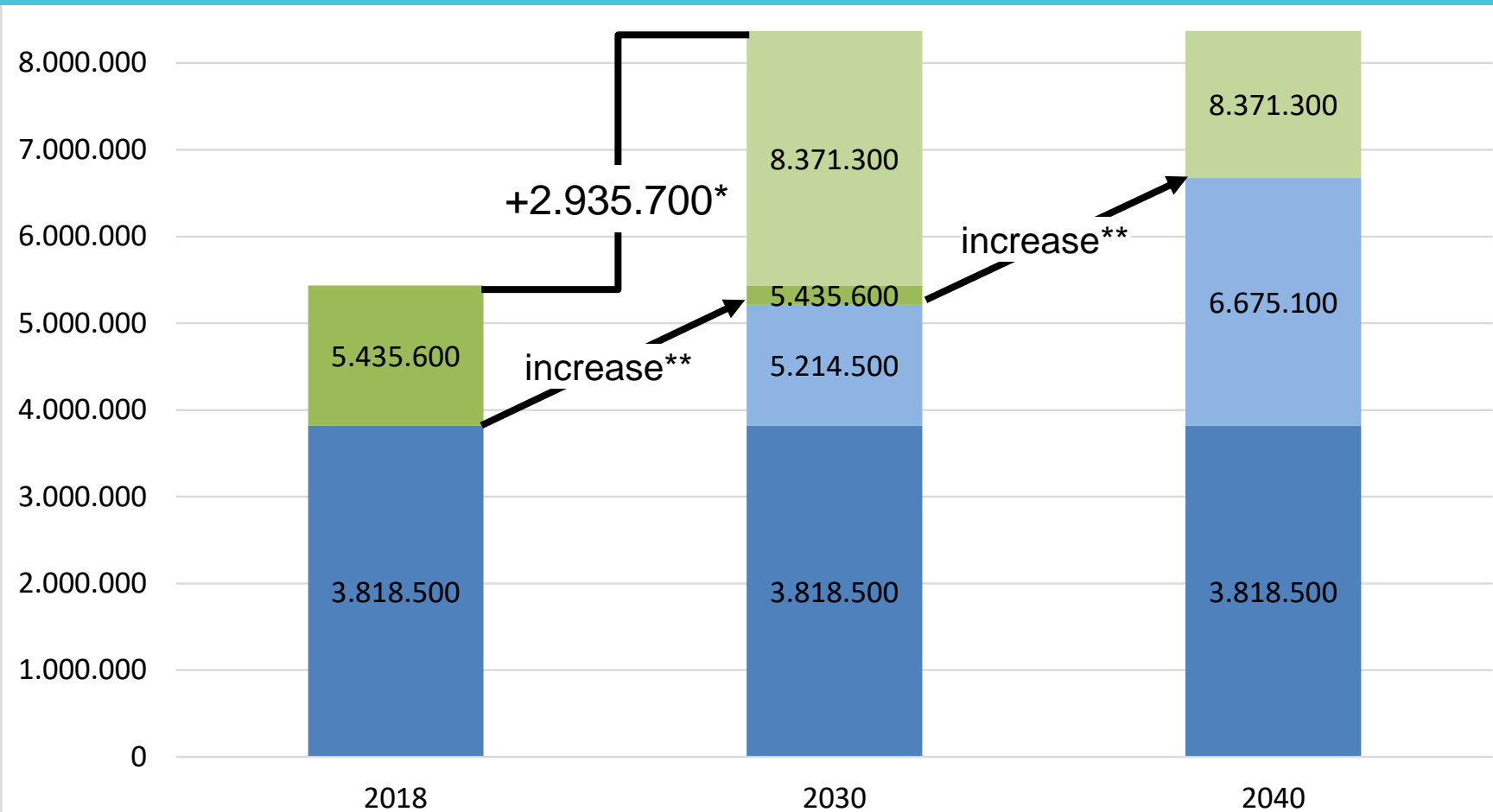
Most terminals or terminal areas are included in **both lists** and they are included in the forecast with their forecasted Brenner volume, forecasted non-Brenner volume and calculated capacity (2018 and known measures);

A few terminals were not included in the 2018 analysis but in the **BCP forecast**; they are included with their forecasted Brenner volume = capacity (since their „non-Brenner“ volumes and capacity are not known);

For a few terminals **no forecast** is provided, so that are left out of the 2030/2040 analysis;

Terminals not included in neither list are not taken into account although they may have an impact in future, too. This relates also for terminals connected via Gateway terminals.

Handling Capacity and Volume 2018, 2030 and 2040 in Loading Units p.a.



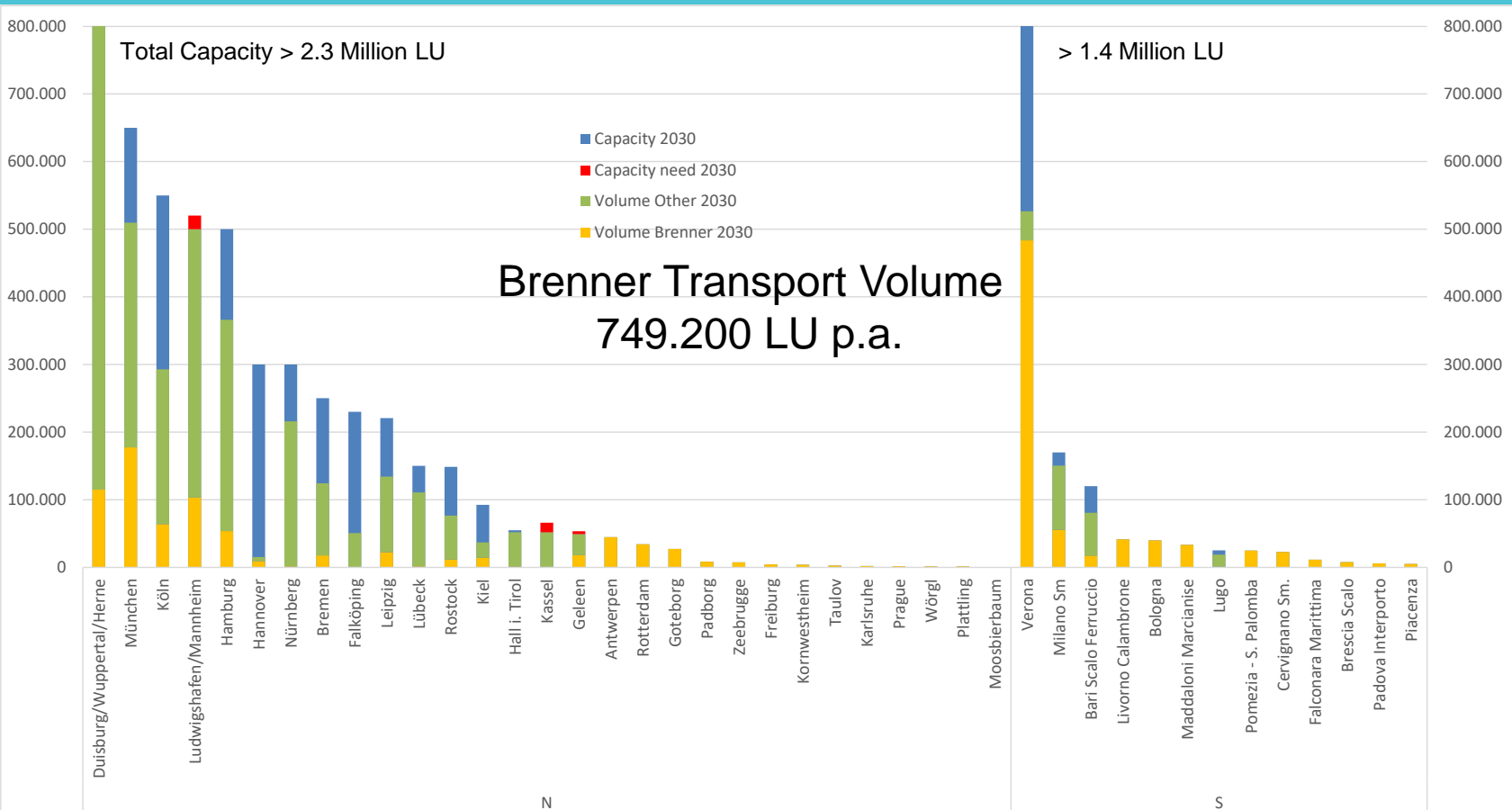
■ Handling volume 2018 ■ Additional Handling volume ■ Handling capacity 2018 ■ Additional Handling capacity

*Known/planned capacity enlargement projects in selected terminals/terminal areas

**Brenner related traffic from forecast by terminal (6%/4% p.a. respectively); other traffic based on 2018 volume +2% p.a.

KombiConsult analysis November 2021

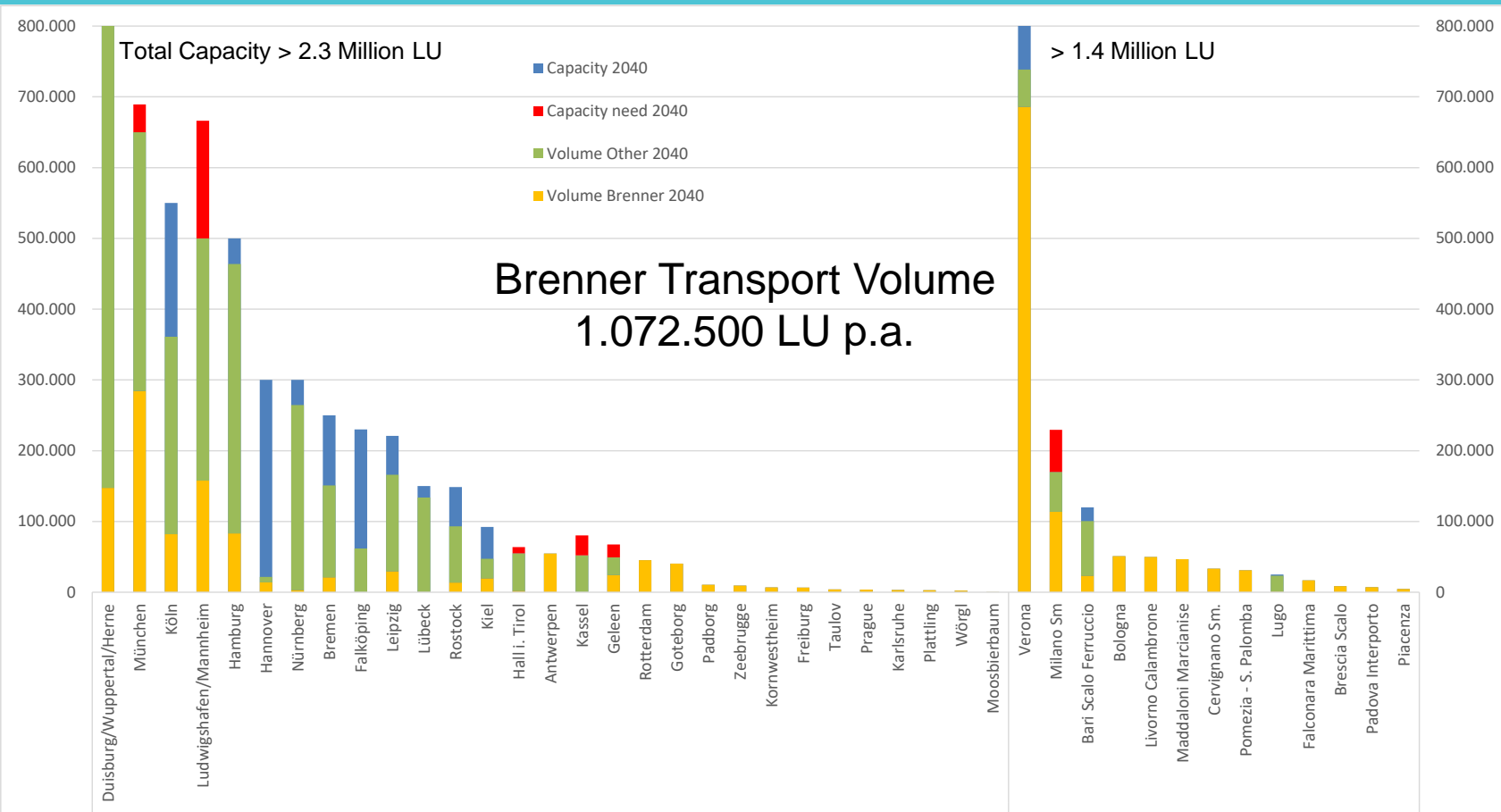
Handling Capacity, Volume and Capacity Need 2030 in Loading Units p.a.



Additional Capacity Need 2018/2030:

Ludwigshafen/Mannheim +20.000; Kassel +14.000; Geleen +4.000

Handling Capacity, Volume and Capacity Need 2040 in Loading Units p.a.



Additional Capacity Need 2018/2040:

Ludwigshafen/Mannheim +166.000; Kassel +28.000; Geleen +18.000
München +39.000; Hall i.T. +8.000; Milano SM +59.000

Handling Capacity, Volume and Capacity Need 2030/2040

Based on the capacity available in 2018 and by adding the capacity from known enlargement projects, the planned capacity by 2030 was derived and maintained for 2040, since no further projects were known. The **total future planned capacity** is **8.371.300 LU p.a.**

The **total handling volume** in 2030 is **5.435.600 LU** and below the planned capacity. However, at the level of **terminal areas** an additional Capacity Need in 2030 is seen for (in LU p.a.): Ludwigshafen/Mannheim +20.000; Kassel +14.000; Geleen +4.000

In 2040 even more capacity would be needed in these terminals areas (in LU p.a.):

Ludwigshafen/Mannheim +166.000; Kassel +28.000; Geleen +18.000

München +39.000; Hall i.T. +8.000; Milano SM +59.000.

- Capacity shortages are already visible in some of the Brenner axis terminal areas today. Especially terminals with high handling volume are displaying capacity utilisation rates of over 80 percent.
- However, extension or construction measures for those terminal areas have already been mapped out. A timely implementation of these measures is now key.
- Provided that the measures planned are implemented accordingly, the need for further capacity increases will be limited to only a few terminal areas in the future (2030/2040).
- These predictions now need to be verified by means of more detailed analyses carried out by the responsible parties in the identified terminal areas. The results should then be taken into account when it comes to the planning of expansions or the construction of new terminals and the financing of such undertakings.

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