Capacity allocation & congestion management in the West coast corridor

NordREG WS DRAFT

Stockholm, 25th October 2018

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CONTENT

> Introduction West Coast Corridor (WCC)

> Capacity calculation and congestion management in WCC

> Future development

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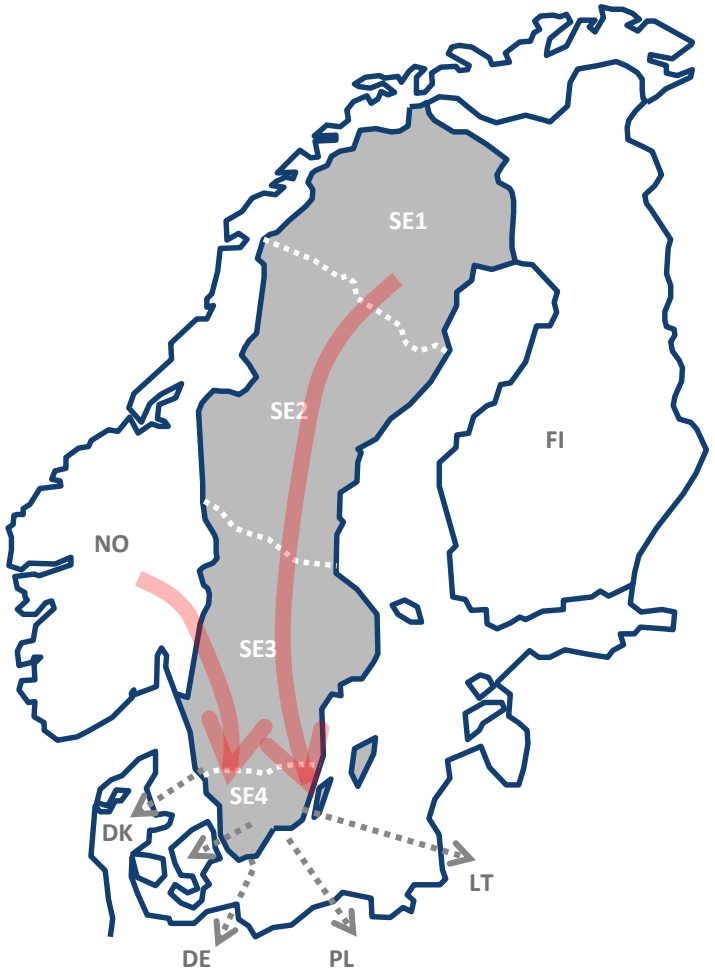
Introduction WCC: Grid operation

- Day-time operation:
  - + High load / high prices
  - + Transmit power to DK, DE, PL and LT
  - = Southbound flow



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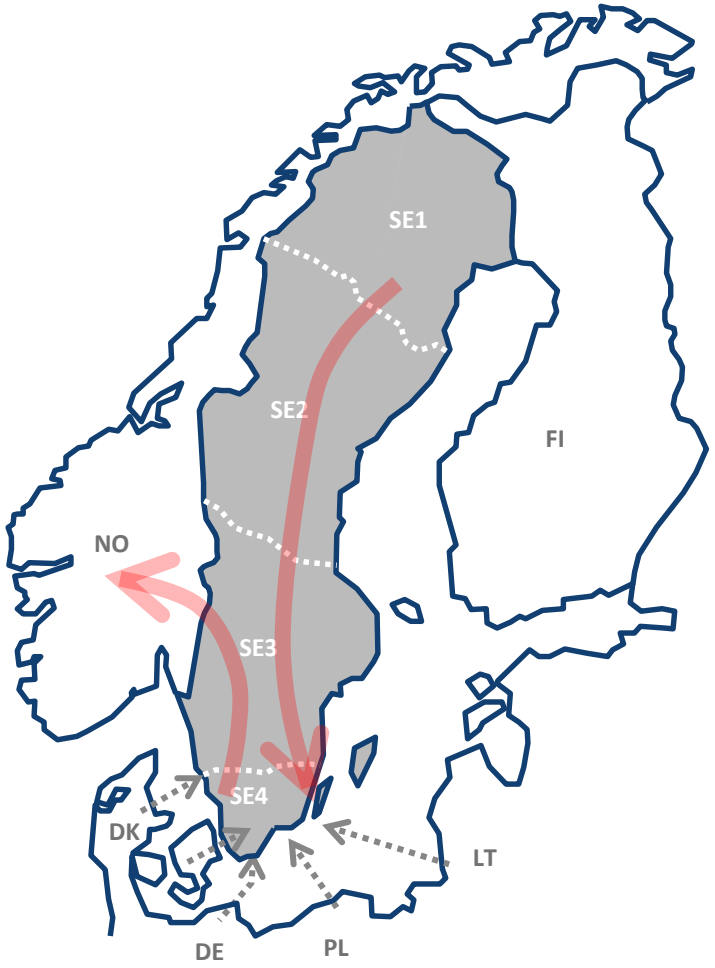
Introduction WCC: Grid operation

- Night time operation:
  - + Low load / low prices
  - + Save water in NO/SE1-2
  - = Northbound flow
  - = No effect limit SE4>SE3



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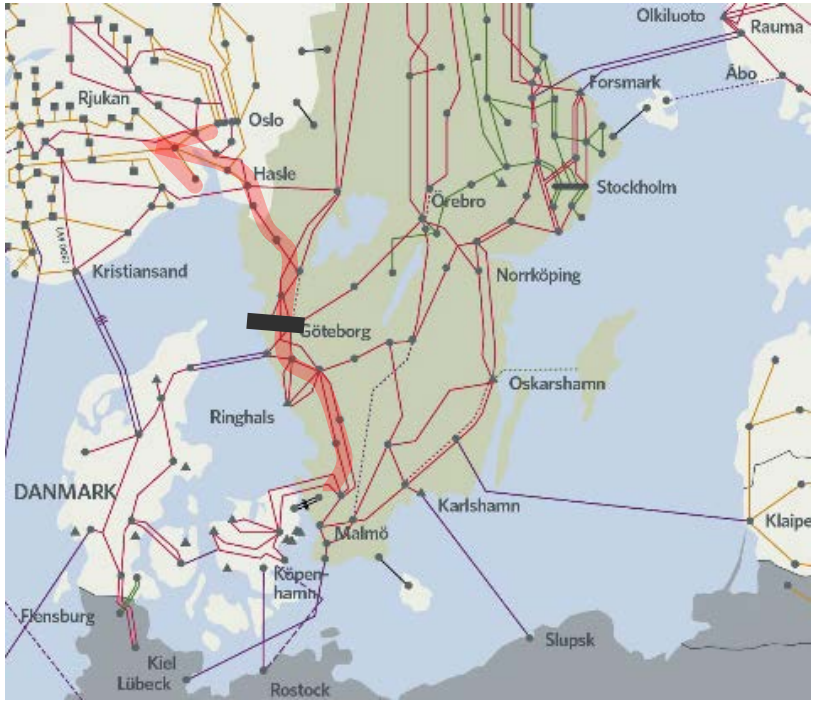
Introduction WCC: Grid limitation

- Congestion in the west coast corridor
  - Northbound flow
- Technical limitations
  - Overload after N-1 fault (SE3)
  - Transient instability after N-1 fault (SE3-NO1)



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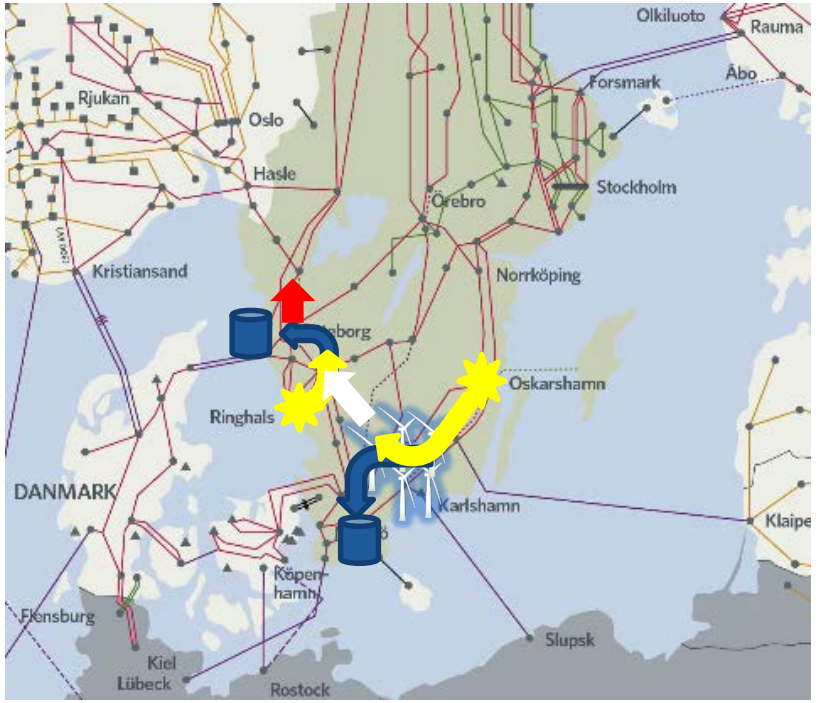
Capacity calculation and congestion management in WCC: Contribution factors

- Local energy-use and generation
  - Energy-use: Gothenburg and Malmoe
  - Nuclear: Oskarshamn and Ringhals
  - Wind power:



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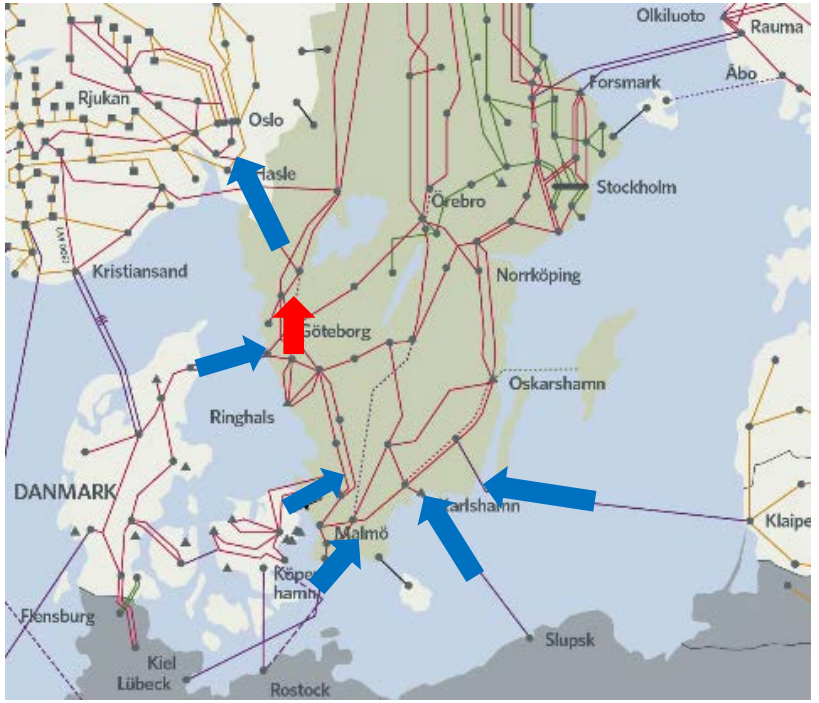
Capacity calculation and congestion management in WCC: Contribution factors

- Transmission flows
  - Export to:
    - NO3
  - Import from:
    - DK1, DK2
    - DE
    - PL
    - LT



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Capacity calculation and congestion management in WCC: Reason for current capacity reductions

- Caused by unfavourable transmission flows
  - Northbound flows
  - Night-time and/or weekends
- Capacity reductions needed
  - Risk of transient instability and/or blackout after N-1 fault
  - Lack of suitable and efficient regulation resources
  - Commitment to reinforce the West Coast Corridor

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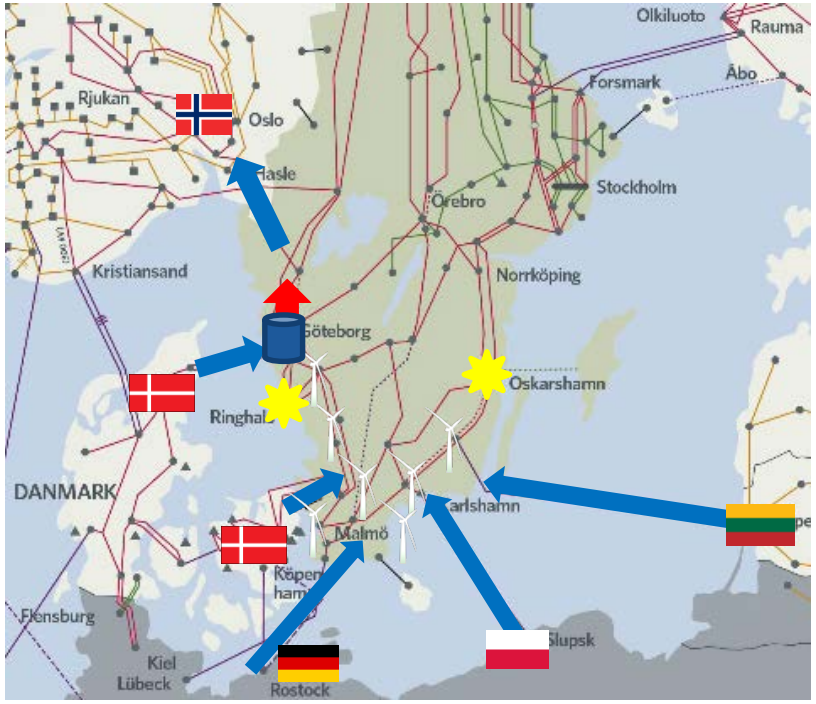
Capacity calculation and congestion management in WCC: Capacity split between interconnectors

- Expected flow on the West Coast Corridor
  - Apply latest available prognosis data
    - Wind- and nuclear power
    - Load in Gothenburg and Malmoe
  - Expect possible flow
    - Import from DK1, DK2, DE, PL and LT
    - Export to NO1



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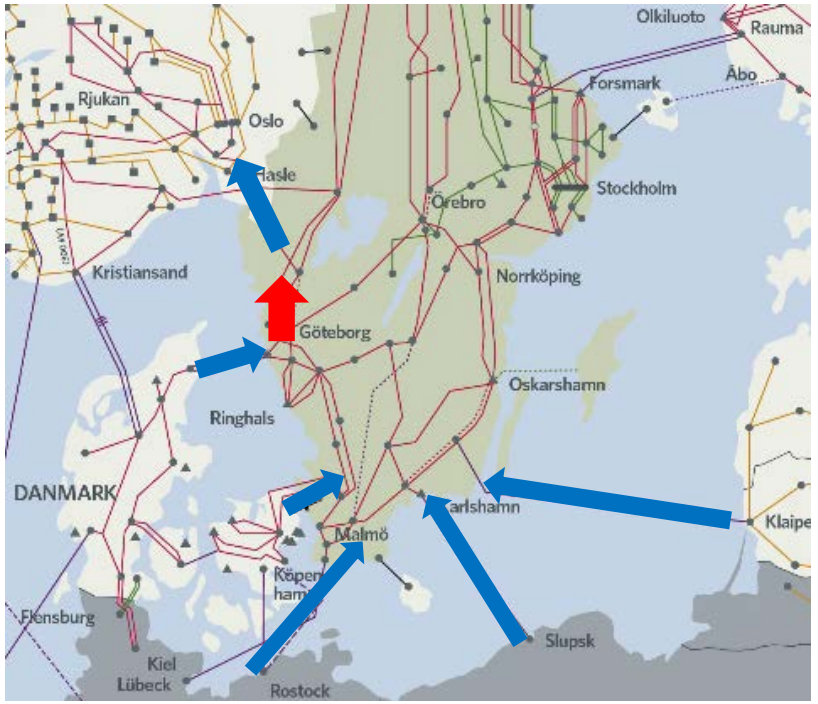
Capacity calculation and congestion management in WCC: Capacity split between interconnectors

- Adjust capacities on day-ahead (before day-ahead turn-out)
  - Adjust capacities according to forecast and grid limitation
  - Capacity calculation derived through pro-rata iterations against installed NTC
  - Variations may occur due to forecast differences, dry/wet year and other limiting outages



Illustrative example on possible capacity reduction between concerned interconnectors

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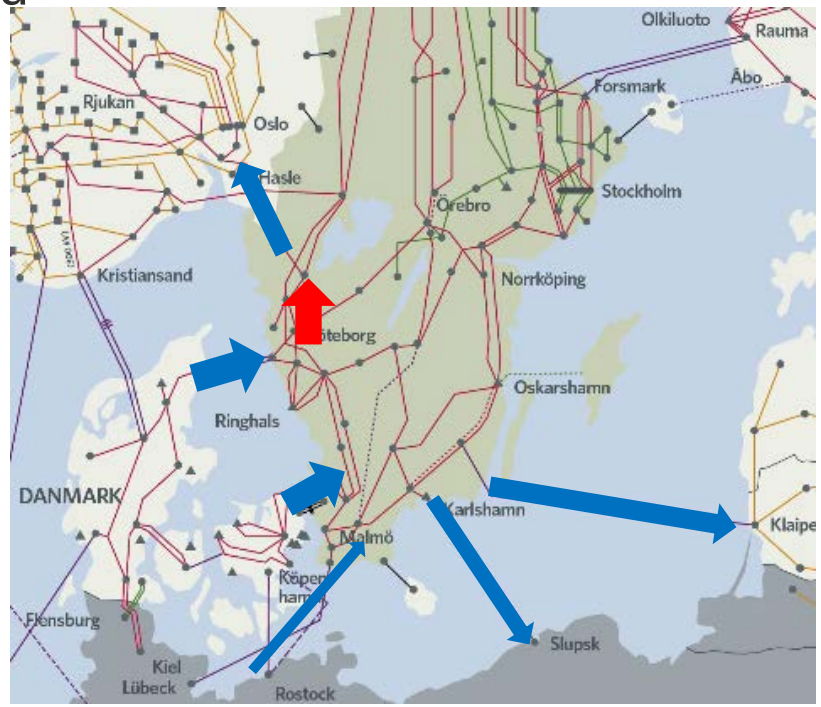
Capacity calculation and congestion management in WCC: Capacity split between interconnectors

- Adjust capacities on intraday (after day-head turnout)
  - Optimize given ATC from latest available forecast on West Coast Corridor and wind power production
  - Take account unutilized ATC on interconnectors not taken part in the intraday-training
  - Adjust capacities on the basis on risk assessment



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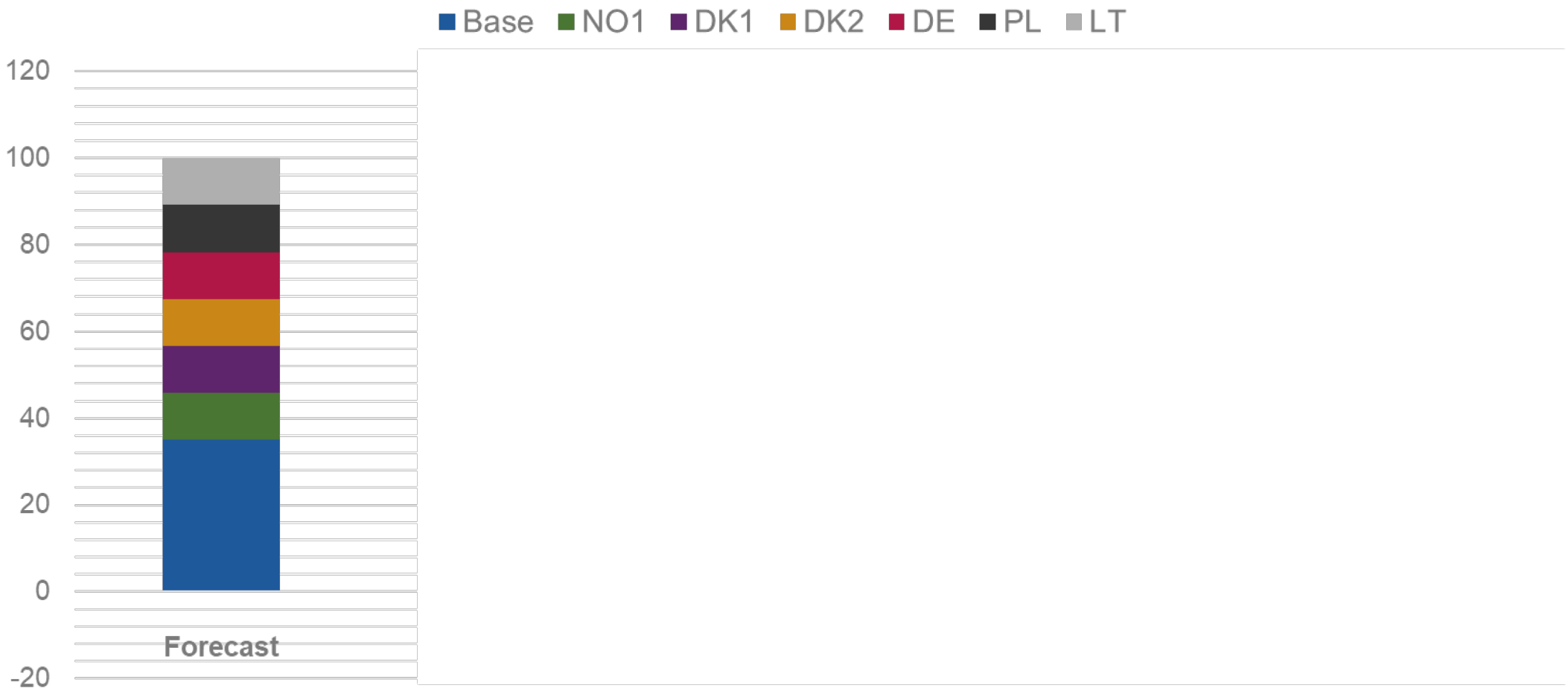
West Coast Capacity Distribution



Forecast: First capacity distribution (pro-rata) (day-ahead)

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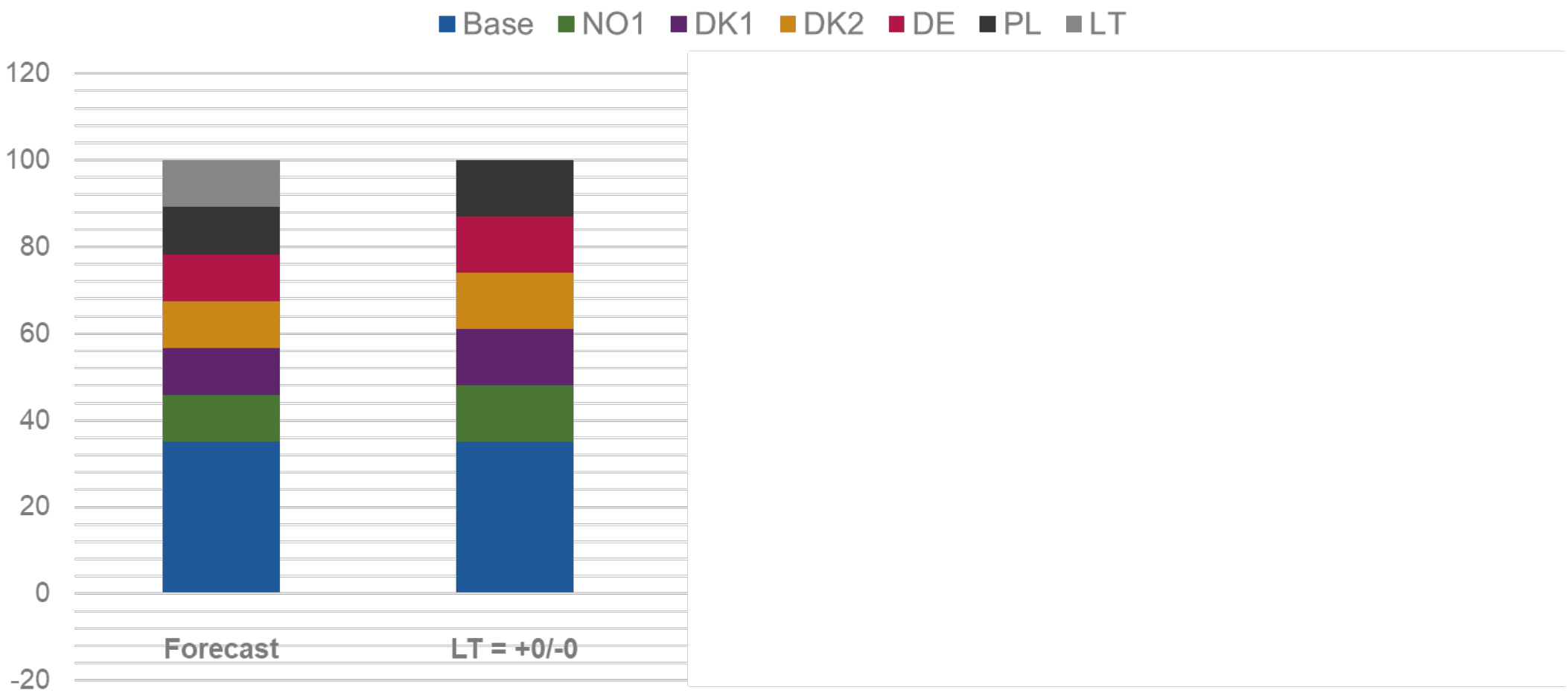
West Coast Capacity Distribution



LT = +0/-0: Take outages into account (in this example NordBalt) (day-ahead)

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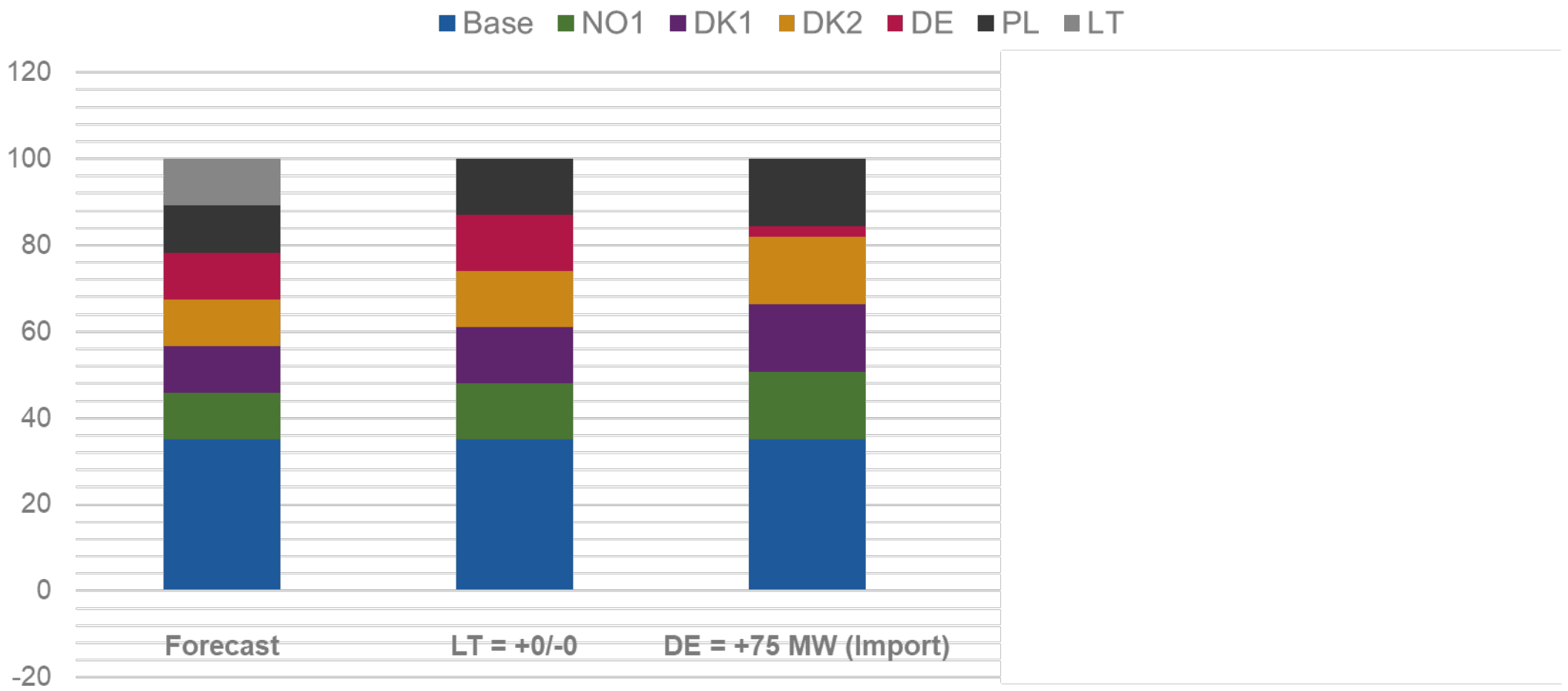
West Coast Capacity Distribution



DE = +75 MW: Take other UMM into account (in this example max import from Baltic Cable) (day-ahead)

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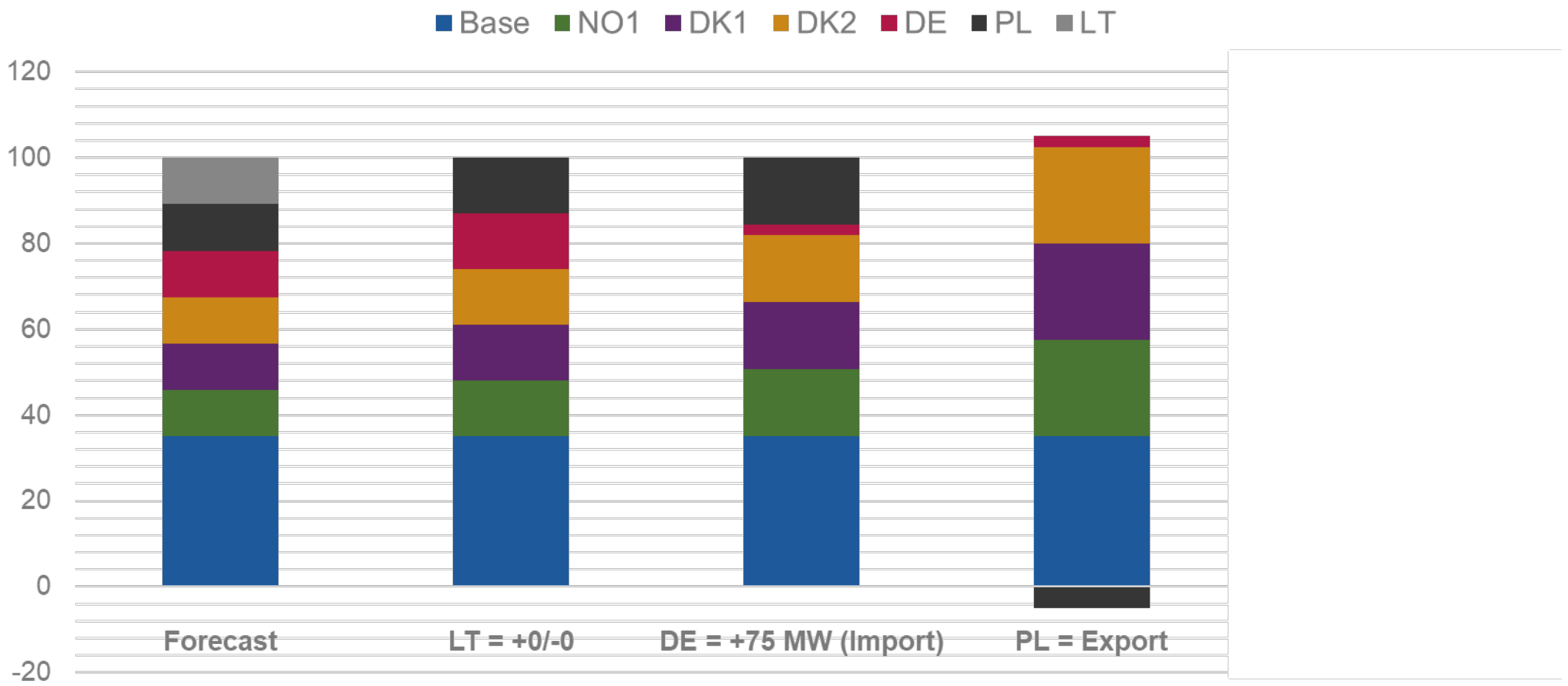
West Coast Capacity Distribution



PL = Export: Take decided Elspot flow into account (in this example export omn SwePol Link) (intraday)

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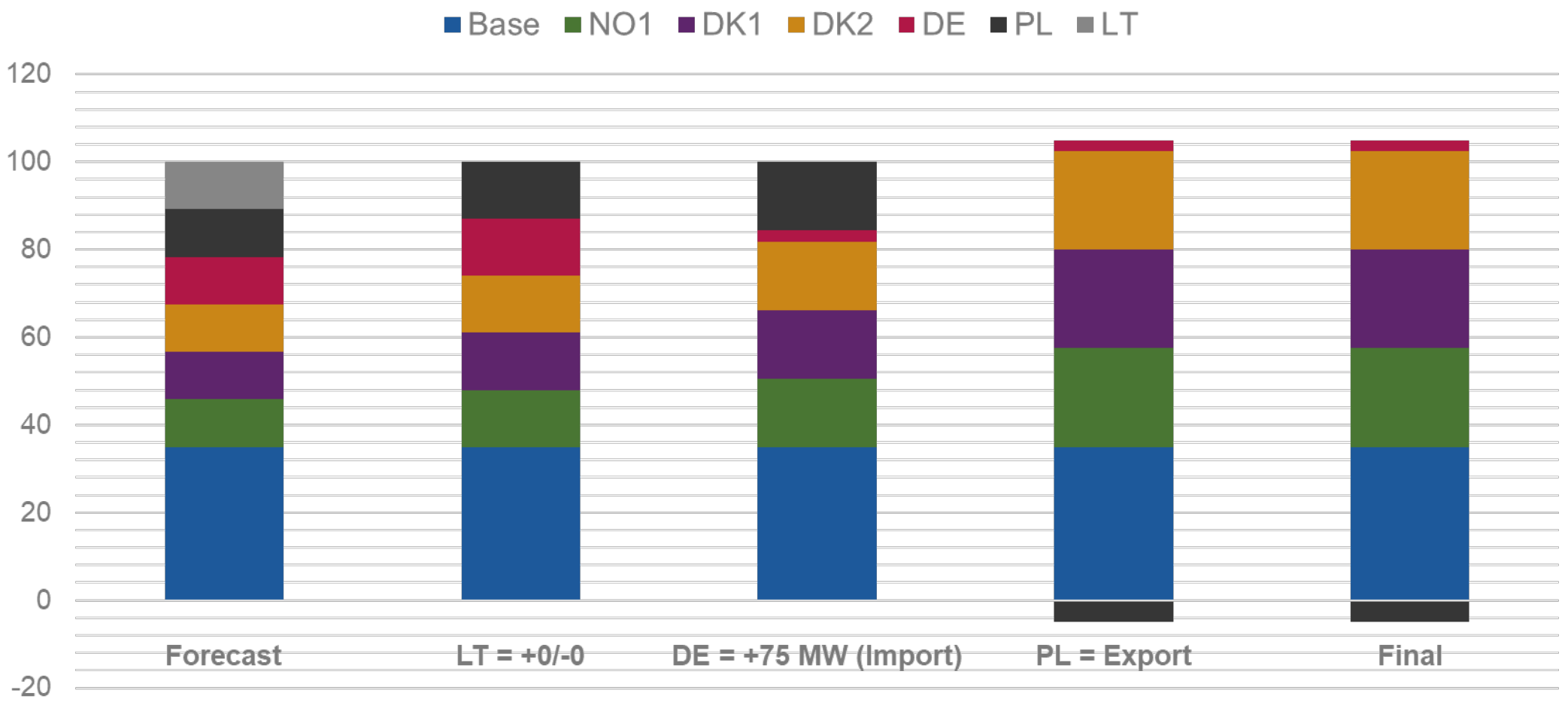
West Coast Capacity Distribution



Final: Possible distribution of west coast capacity

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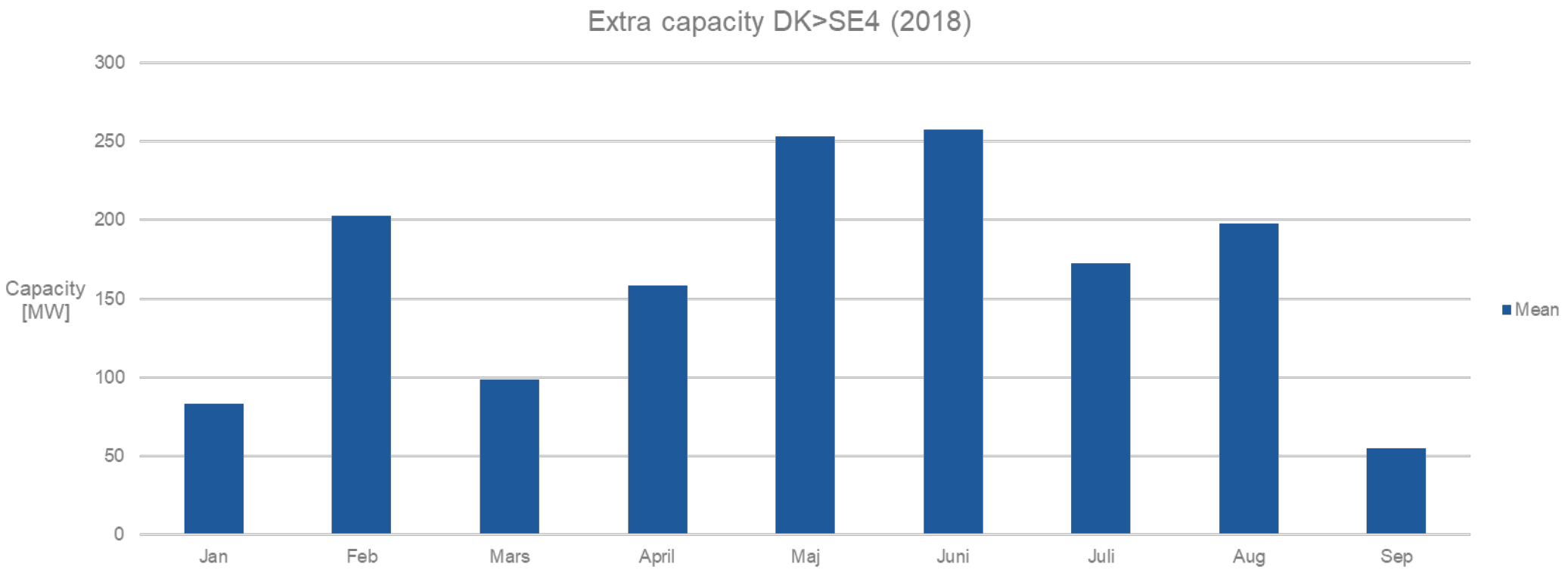
Additional capacity, intraday (DK2>SE4)



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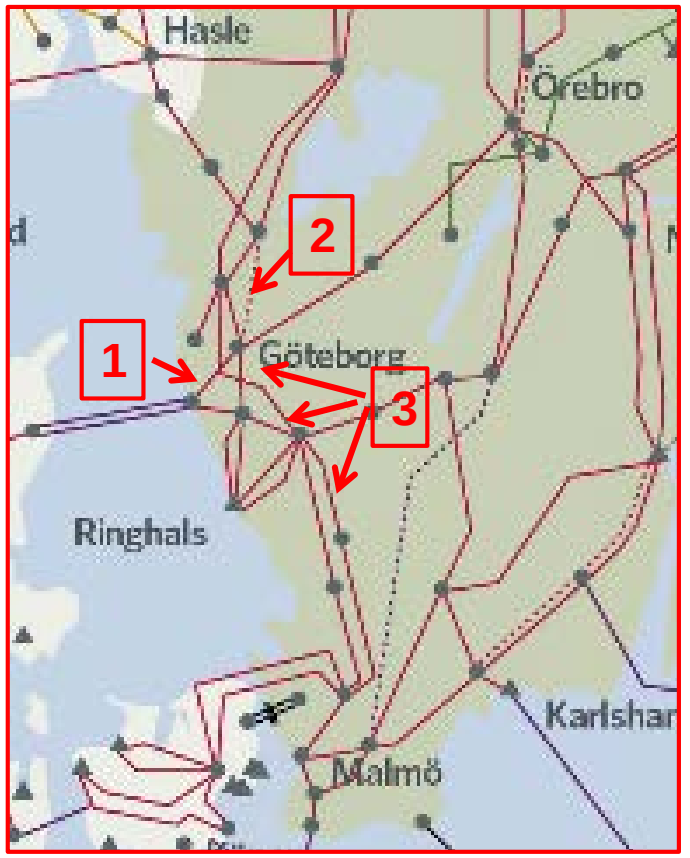
Future development

- Nordic Capacity Calcultion Methodolgy
- Bidding zone review
- Grid investments

1. The 400 kV-line Stenkullen – Lindome has been built (10 July 2012)
2. The 400 kV-line Skogssäter – Stenkullen is being built (doted line)
3. Grid maintenance will continue on existing west coast lines during next decade



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Thank you for your attention!

Questions?

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