BZR CG: status update of BZR

5 December, online conference

entsoe

Reliable Sustainable Connected

Agenda

Topics:

1. **BZR study timeline**
2. **CE BZRR update**
3. **Nordic BZRR**
4. **PAN EU studies**
    1. Transition costs study,
    2. Liquidity study
5. **Public consultation:**
6. **AOB**
    1. Formal answer to ACER and NRAs
    2. Next BZR CG meeting
    3. Next steps

1. BZR study timeline (current status):

Dec 2023:

- Transition costs report approved
- Market liquidity report (CE BZRR part excluded) approved
- Public consultation questionnaire approved

mid-Dec 2023:

- Launch of Public Consultation

→ Transition costs report

→ Market liquidity report (CE BZRR part excluded)

Q1 2024:

- Launch of remaining part of the Public Consultation

→ Market liquidity report (with CE BZRR part included)

March 2024:

- Nordic BZRR study delivery
- Updated Transition costs report
- Updated liquidity study report

December 2024:

- CE BZRR study delivery
- Updated liquidity study report

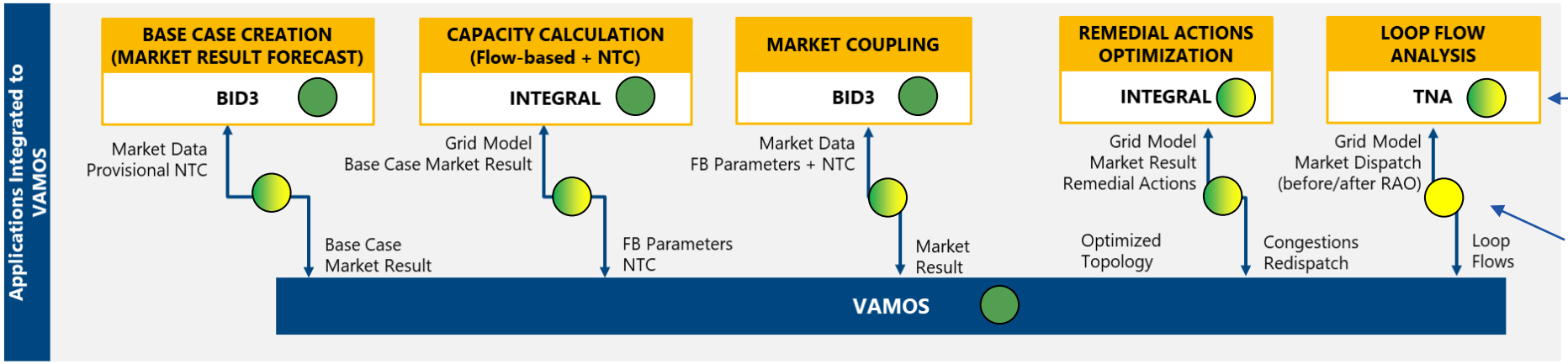
2. Update from CE Region

Timeline

- CE TSOs commit to delivering the final BZR report in one step, including the recommendation to amend (or not) the current bidding zone configuration, by the end of 2024. TSOs will strive to perform sensitivity analysis to include the ‘stability and robustness of BZs over time’ criterion as part of the final evaluation. However, this will require simplifications to the sensitivity analysis.
- TSOs are confident that applying those measures would allow for delivery of the BZR study and recommendation (including one sensitivity analysis) by the end of 2024. However, if TSOs encounter unforeseen modelling challenges with the sensitivity or must unexpectedly perform reruns, which put finalizing the study by the end of 2024 in jeopardy, TSOs will submit the final BZR report with a further reduced sensitivity analysis, in order to ensure delivery of the study by the 2024.

2. Update from CE Region

CE: Status of toolchain development and runtimes



Module	Status	Observed / estimated runtime (days)*
allEU NTC market coupling - BID3	Operational	4 ~ 5
CE FB capacity calculation - Integral	Operational	3 ~ 5
CE FB market coupling - BID3	Operational	4 ~ 5
Remedial action optimisation – Integral	Final testing stage	6 ~ 11
Loop flow analysis (2x) – TNA	Development / testing stage	7 ~ 12
Total expected runtime per scenario		**24 ~ 38**

*Considering that calculations occasionally fail or crash and require a restart

Expected runtime for 1 full base case: 10 configurations x 3 climate years / 7 CompCores x 24~38 days ≈ 103~163 days

2. Update from CE Region

Simulation status

Climate year	Calculation step					
	BID3	Integral	BID3	TNA	Integral	TNA
	allEU NTC	FB CC	FB MC	LF1	OSA + RAO	LF2
CY09	Quality checked	Quality checked	Being checked	CGMES inteface finalization	Initiated	CGMES interface finalization
CY89						
CY95						

- **The CC runs for three climate years (CYs) have been completed and passed the quality check.**
- **The MC runs for three climate years (CYs) have been completed and are undergoing a quality check.**
- **The RAO simulations have been initiated.**
- **The loopflow module requires the interface between the RAO and the loopflow module to be fixed before simulation runs can be performed.**

3. Nordic BZRR

Simulations

- The updated dispatch simulations for the base case and all configurations are finalized. The updated results and the output from the HHI calculation have been provided to Compass Lexecon as input for the liquidity study.
- Simulations for the dry year sensitivity have been started.
- The redispatch simulations are currently being conducted.
- As soon as all the dispatch and redispatch simulations are ready, a decision will be made to only focus on the configurations that shows a positive SEW.

Nordic BZRR

Timeplan

- The postponement of the public consultation to mid of December and some issues with the redispatch simulations will most likely result in the delivery of the recommendation and report earliest by end of March 2024.

4. Pan EU Studies: transition costs study

Disclaimer: work in progress

Pan-EU Studies

Transition costs: Questionnaire and Feedback

The methodology outlines mandatory and optional aspects for consideration in the bidding zone review process.

Transition cost definition

*Transition costs refer to the **one-off costs expected to be incurred** in case the BZ configuration is amended.*

*Shall relate to **adaptations** that are inherently and unambiguously **related to a specific BZ configuration change**.*

[…]

*Shall **not relate to adaptations** that are, in general, **necessary to ensure sufficient flexibility** of the systems to cope with a variable number of BZs due to a potential amendment of the BZ configuration in the future.*

Aim of the Study

*In order to identify and possibly estimate transition costs, a study shall be jointly performed for all BZRRs. The study shall aim to **provide an overview of necessary adaptations and possibly a range of related cost estimates**. The study shall also consider stakeholders' replies to the public consultation conducted pursuant to Article 17.4.*

*The resulting estimates shall be considered to **calculate the minimum 'lifetime'**, in years, of a BZ configuration, as described in Step 4 in Article 13.1(d)*

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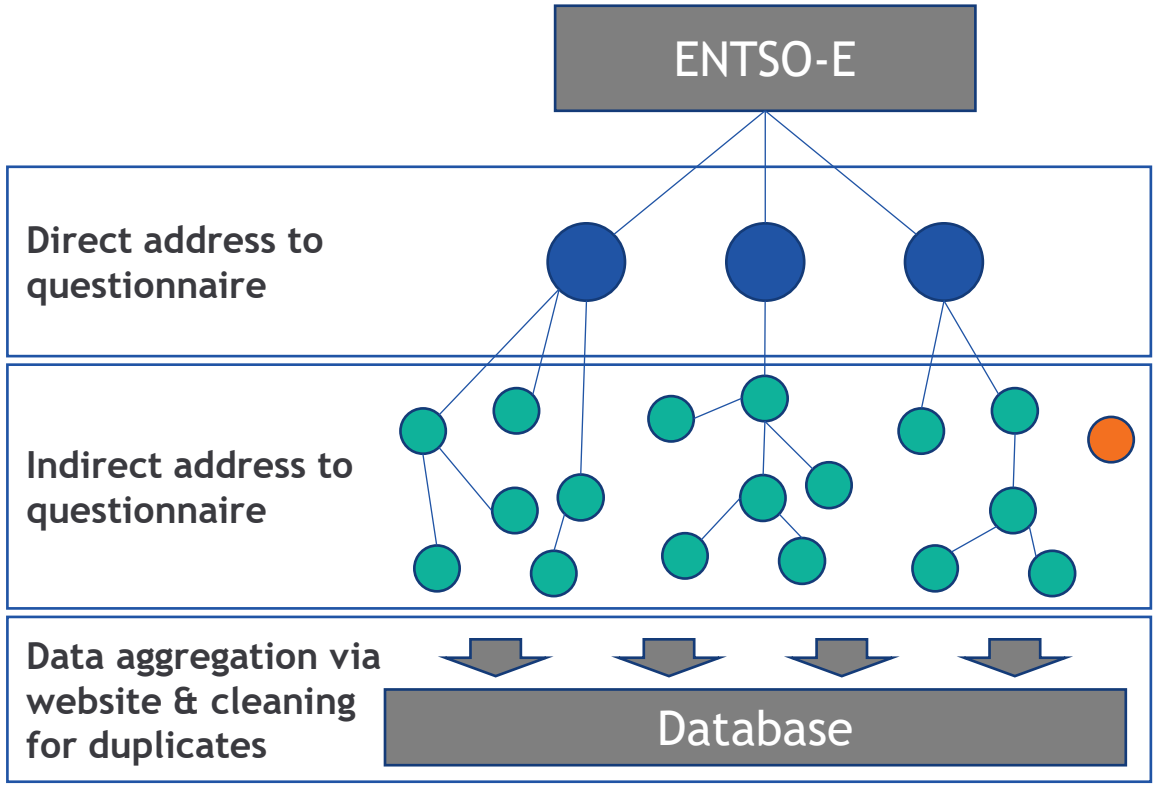
Methodology: Step 1 - Define group of market participants

The data for the transition cost study is aggregated through a publicly available questionnaire, distributed in the industry

Market participants frequently stated that they belong to more than one type. Therefore, for the final calculation, we have grouped types for their potential of being BRP. NEMOs, etc and clearing houses were combined as market infrastructure operators



Organisation types directly and indirectly addressed
Generator or storage operator
Large-scale industrial consumer
Energy trader
Retailer
Aggregator
NEMO or derivative exchange
Clearing house
Ministry or national regulatory authority
TSO
DSO
Other

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Methodology: Step 2 - Develop questionnaire

The cost categories were identified by ENTSO-E and the steering committee and discussed with the consultative group.

Cost category	Definition	Transition cost examples

Changes to internal business processes and IT systems	Costs incurred by changes to organization and coordination specifically attributable to BZ re-configuration	• Adapting existing IT systems to specific BZ configurations
		• Costs associated to the efforts (FTE) linked to changing of processes like for example:
		  • splitting or merging teams that are responsible for a specific BZ
		  • changing trading or algorithmic trading processes
		  • going through the process of revaluating assets
		  • adopting portfolio optimisation processes
		  • adopting processes around the payment of renewable subsidies like feed-in-tariffs
		  • testing changed processes
		  • informing employees about the changed processes
		• changes to other ongoing exchanges between market participants and TSOs and public bodies, for example balancing and electricity balancing accounts

Adjustment to or termination of contracts and regulation	Costs incurred by amending existing contracts to BZ re-configuration including. legal costs	• Re-negotiation, or termination of contracts, depending on their complexity. Particularly, if the reference location of price changes or is not accepted by contract parties anymore (incl. GOs, PPAs, legal arrangements) • Re-drawing of legislation, for instance contracts/legislation that refer to a single bidding zone, that does not exist anymore after a BZ reconfiguration • Possible costs, because electricity sold forward is affected (will apply mainly in case of shorter lead times)
Adjustments of processes with NEMOs, TSOs and public bodies	Costs incurred by adapting interaction with NEMOs, TSOs or public bodies	• Reporting obligations that must be adjusted to be specific for each new BZ
Additional costs	Any costs directly related to the BZ configuration not covered by any of the categories above	• Any examples not covered above

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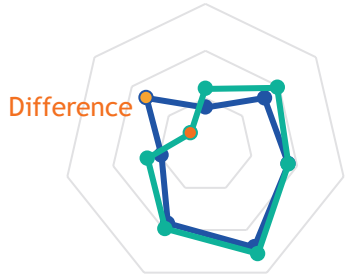
Methodology: Step 3 - Method for cost estimation and data quality check

The cost estimates are aggregated and checked for quality and robustness. Below, a high-level excerpt is provided.

Quality checks

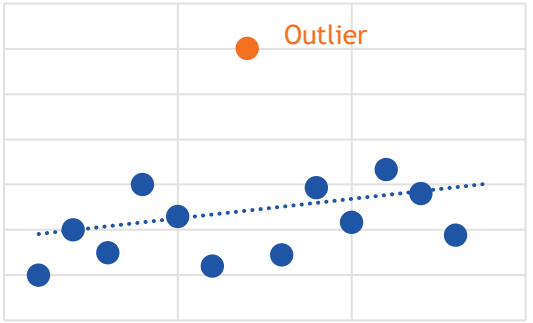
- Depending on the sample size, different quality checks will be applied to:
  - **Identify the best method** for finding total transition costs
  - Estimate the **expected error** and transition cost range
  - Clean the data for data entry errors
- **Typical checks** that will be applied are:
  - Model specificities test
  - Matching tests (see top right)
  - Outlier tests (see bottom right)
  - Estimates against benchmarks
  - Calculation of the regression power
- The results of the quality check give indication to where a close **examination of the explanation of the cost estimates** is most important

Example matching Analysis



- Two entries of similar companies are compared.
- Differences between them are analysed for plausibility.
- This approach is used for small data sets

Example outlier Analysis



- A trend between entries of all or many companies is identified through statistical methods.
- Outliers are analysed for plausibility.
- This approach is used for large data sets.

The number and completeness of responses was limited such that outlier testing was essentially reduced to the analysis of the explanation of the transition cost estimates. Remaining outliers were discussed, but not excluded, where relevant.

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Data set and cost extrapolation

Total cost extrapolation follows a scaling approach and results in a bandwidth of costs per BZ reconfiguration.

Many participants submitted only cost estimates without stating
a) the share independent of company size and
b) their market share
To account for a), CL has additionally constructed "checks" where different assumptions on the share of costs independent of company size were made.
To account for b), market shares have been researched by CL where possible.

Data coordinates				Cost data				Market metrics			
Company ID	BZ reconfi-guration	Company type	Cost category	FTE	FTE Cost	Other cost	Share inde-pendent of comp. size	Market share (physical)	Market share (revenue)	Number of companies	Prior experience
1	1 (DE2)	A	IT Systems	2	100 000	500 000	50%	5% of A in 1		100	Yes
2	1 (DE2)	A	IT Systems	4	110 000	400 000	50%	5% of A in 1		100	No
3	1 (DE2)	A								100	
4	1 (DE2)	B								600	
1	2 (DE2)	A	IT Systems	1	100 000	500 000	50%			100	Yes
2	2 (DE2)	A	IT Systems	4	150 000	400 000	50%			100	No
…	…	…	…	…	…	…	…	…	…	…	…

Example Data

Grouping conditional on quality check outcome

Total cost = FTE*FTE Cost +Other cost>

BZ reconfiguration transition cost independent of company size = Number of companies * Total cost * Share of costs independent of comp. size

BZ reconfiguration transition cost dependent on company size = Avg(Market shares) * Total cost * (1-Share of costs independent of comp. size)

Average total cost estimate = Avg(BZ recon. transition cost independent of company size + BZ recon. transition cost dependent on company size)

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Limitations

Many participants insisted that the pending BZ-reconfiguration implies costs that are not covered by the transition cost definition set out in this study.

The answers received after two surveys and a round of interviews result in significant limitations for the transition cost estimation.

Data quality

- The data used for the calculation of transition costs has been collected from stakeholders, who participated in the survey and **provided cost estimates voluntarily**. Also, we were not mandated to subject the data to an audit beyond normal plausibility tests.
- Therefore, the collected data may show a **degree of heterogeneity** because of **differing interpretations** of the cost definitions. There may also be heterogeneity due to **local or other idiosyncratic factors**. The quality of submitted cost estimates may **differ in accuracy**, for example due to different or **limited availability of resources, the understanding of the questions asked, or biases**. The heterogeneity of estimates highlights the significant uncertainty prevalent in transition cost estimates for BZ configurations.
- To mitigate this limitation ENTSO-E, TSOs and Compass Lexecon have **conducted a public webinar** for the first questionnaire. For the second questionnaire, we directly approached selected market participants, to **explain the questionnaire** and discuss the participant's transition costs. Additionally, we **reached out to participants** in case of unclear cost estimate explanations. Notwithstanding, we were limited in auditing the data such that the dataset may not be representative.

Number of responses and aggregation of organisation type

- From the two initiated surveys, we received answers from 42 stakeholders, some of them incomplete. Given the number of countries involved, and the various organisation types, this is a limited number.
- Participants regularly stated in their responses to be part of **multiple organisation types at the same time**.
- Because of that, and in order to increase the number of data points within each organisation type, the TSOs and Compass Lexecon decided to **aggregate cost estimates of selected organisation types** by the criterium that the company bears or may bear **balancing responsibility**. Hence, we combined generators, retailers, aggregators, traders, etc. into one group. This has the disadvantage, that the **heterogeneity of the group increases**.

Overall number of responses

- We received **42 answers overall**, some of them incomplete
- To increase the number of data points, we conducted a **second questionnaire** and distributed the call for participation widely across the industry by contacting **industry associations** and organisations.
- To further increase the number of data points, and thereby the explanatory power of the computed cost estimates, we **checked the plausibility** of these results by computing total transition costs with all data provided – **also with those estimates that were incomplete** (we then applied additional assumptions where input was missing)
- Nonetheless, the scaled transition cost calculation should, if at all, only be considered as a **ballpark range** of transition cost as per the definition. As such, the provided ranges are **not completely conclusive**, and must be considered a ballpark area. Because of the relatively limited number of data points and the way in which the ranges were calculated (scaling), they should not be interpreted as an error margin, but rather as differing estimates.

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Answers to questionnaires – completeness

The responses we received do not cover all types of organisations and not all countries.

Number of responses per organisation type and country with complete data (with partially usable data / data used as check)

	France	Germany	Italy	Netherlands	Sweden
Wholesale / retail	1 (8)	3 (10)	0 (6)	2 (9)	0 (4)
TSO	1 (0)	5 (0)	0 (0)	1 (0)	1 (0)
DSO	0 (1)	3 (2)	0 (0)	0 (0)	0 (0)
Market infrastructure providers*	1 (0)	1 (0)	0 (0)	1 (0)	2 (0)
Public Administration	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)

Note: * One company, excluded here, verbally provided preliminary cost estimates that are considered when discussing total transition cost range estimates for market infrastructure providers. They are else excluded.

Source: Compass Lexecon analysis of stakeholder input provided in questionnaires

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Answers to questionnaires – ability to scale

Most data points received concern costs associated with changes to busines processes and IT systems.

Number of data points for cost independent of company size and (size-adjusted) cost dependent on company size (size-independent | size-dependent)

	Wholesale / retail	TSO	DSO	market infrastructure provider	Public Admin.
Business processes	46 | 15	Not relevant for scaling	12 | 12	Not relevant for scaling	No data received
IT systems	51 | 15		12 | 12		
Reporting obligations	45 | 14		12 | 12		
Re-negotiation / termination of contracts	44 | 9		12 | 12		
Re-drawing of legislation	24 | 6		12 | 12		
Other: adjustment to or termination of contracts and regulation	38 | 6		12 | 12		
Other: processes with TSOs and public bodies	31 | 10		12 | 12		
Any examples not covered above	31 | 10		12 | 12		
No cost type differentiation	0 | 0		0 | 0		

Source: Compass Lexecon analysis of stakeholder input provided in questionnaires

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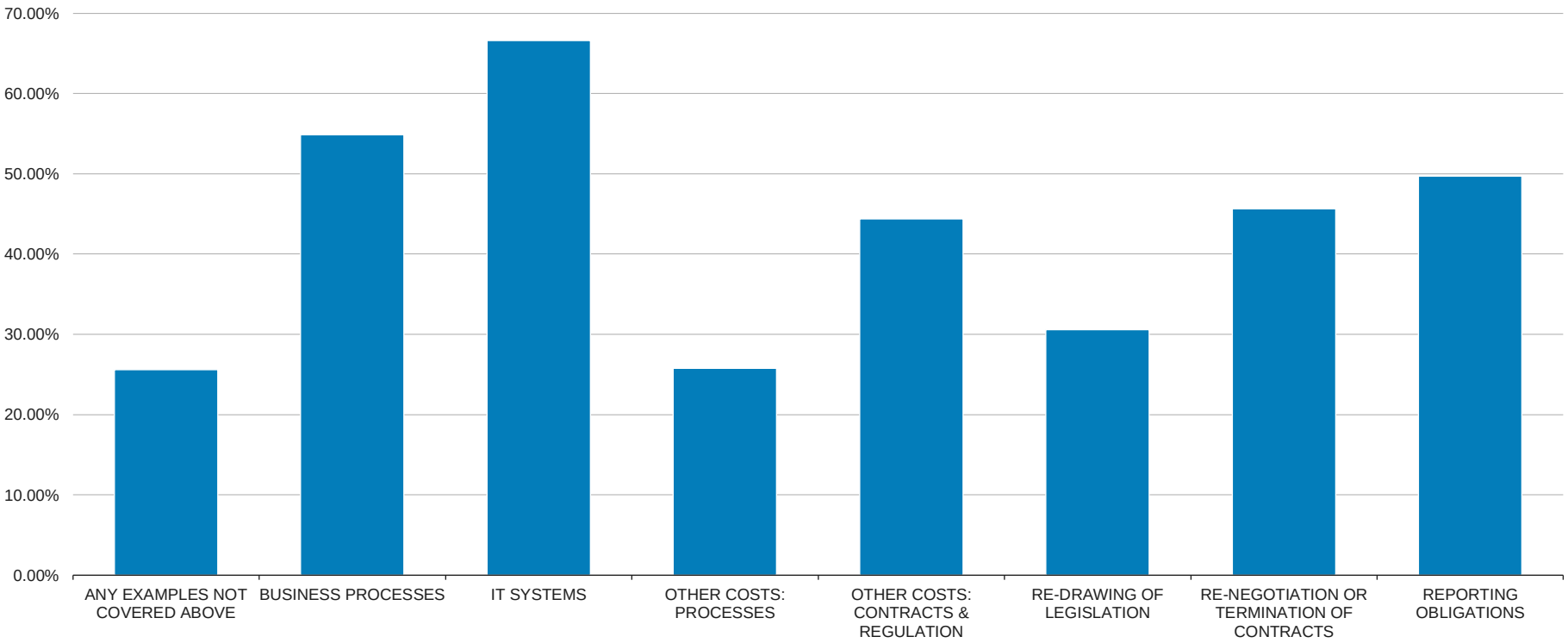
Answers to questionnaires – size independence of data points

Overall, most types of costs are predominately dependent on company size, except for business processes and IT costs.

Size-independence of costs by cost type



Source: Compass Lexecon analysis of stakeholder input provided in questionnaires

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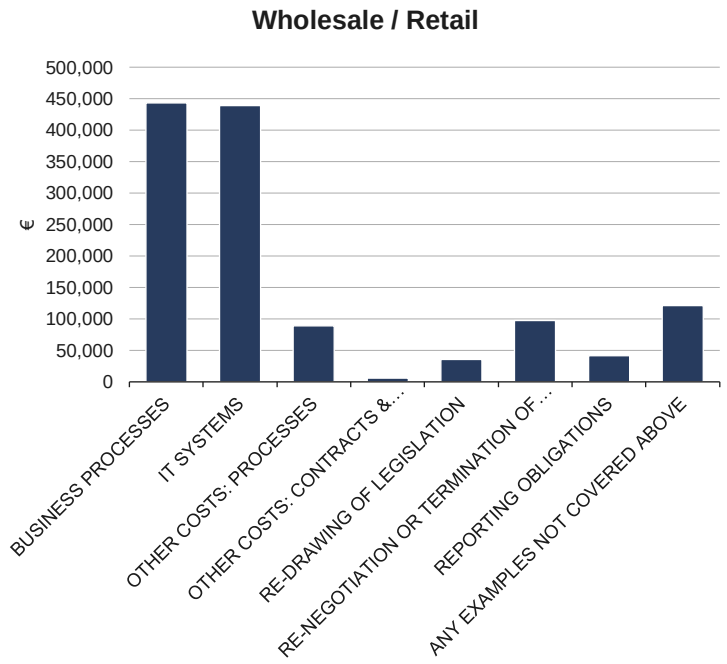
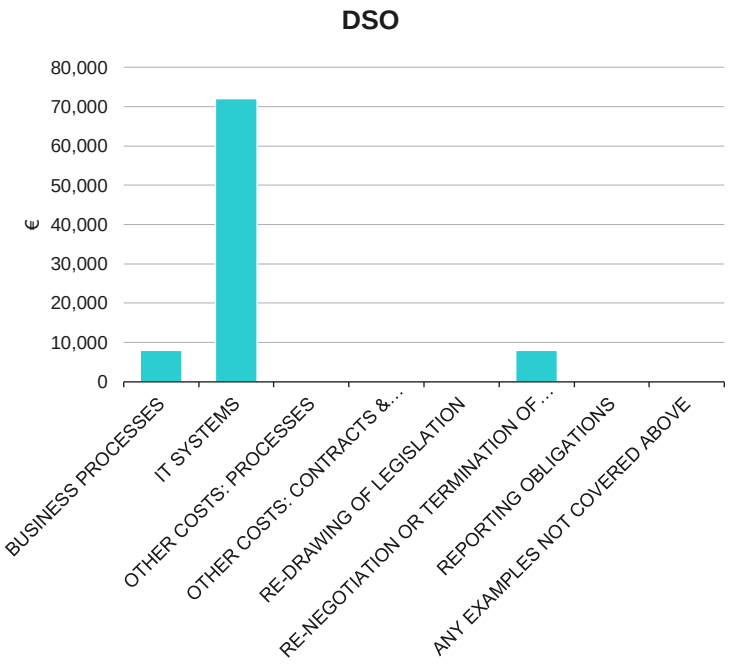
Analysis of received cost estimates – Size-independent cost

The received estimates show that size-independent cost are mostly for business process and IT system changes

Average size-independent costs by cost type and organisation type





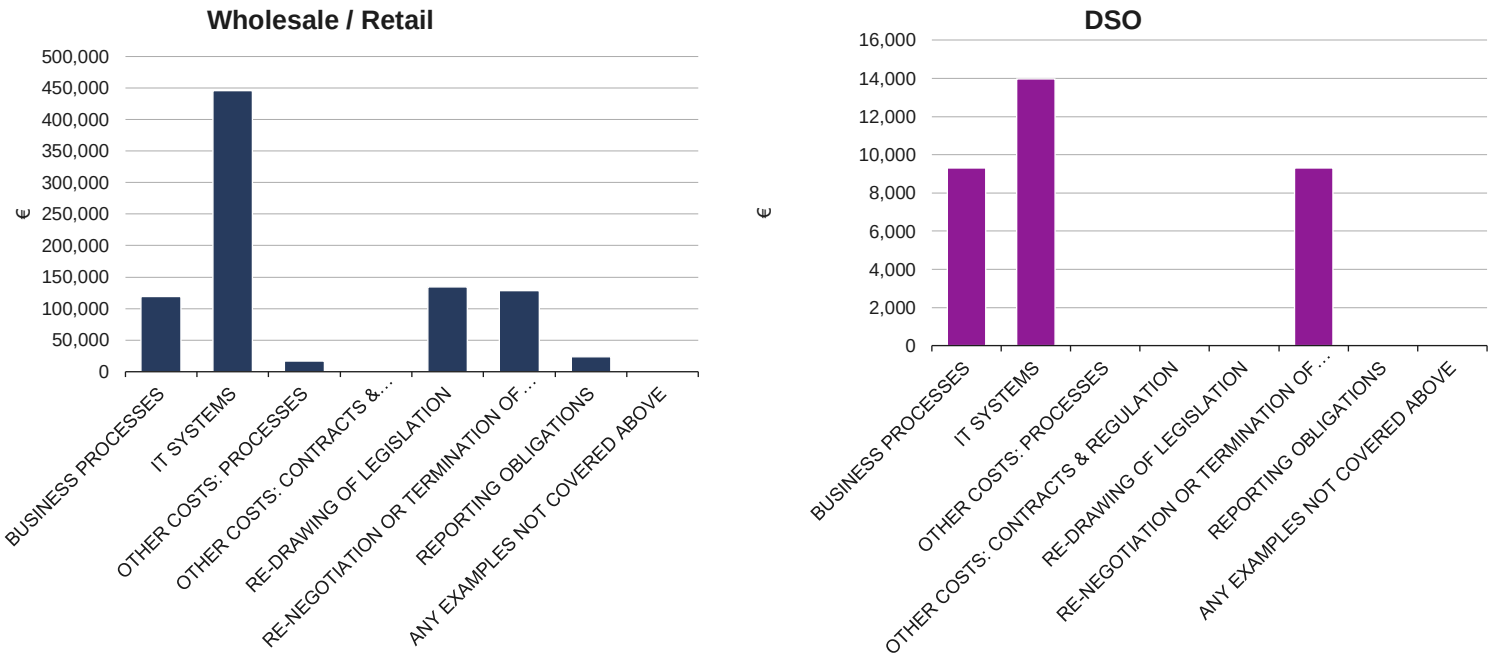
Source: Compass Lexecon analysis of stakeholder input provided in questionnaires

Disclaimer: work in progress

Analysis of received cost estimates – Size-dependent cost

The received estimates show that cost depedent on company size are highest for IT system changes

Average size-dependent cost by cost category (per 1% scaling factor)



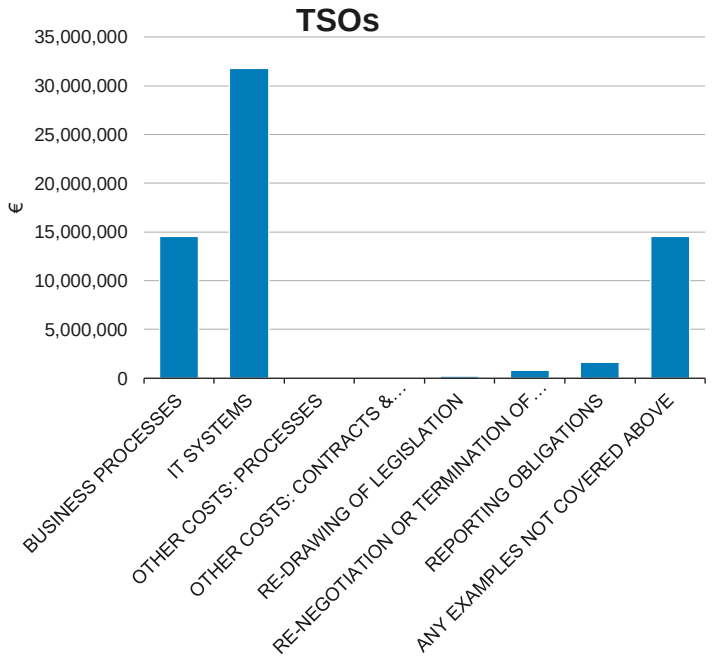
Source: Compass Lexecon analysis of stakeholder input provided in questionnaires

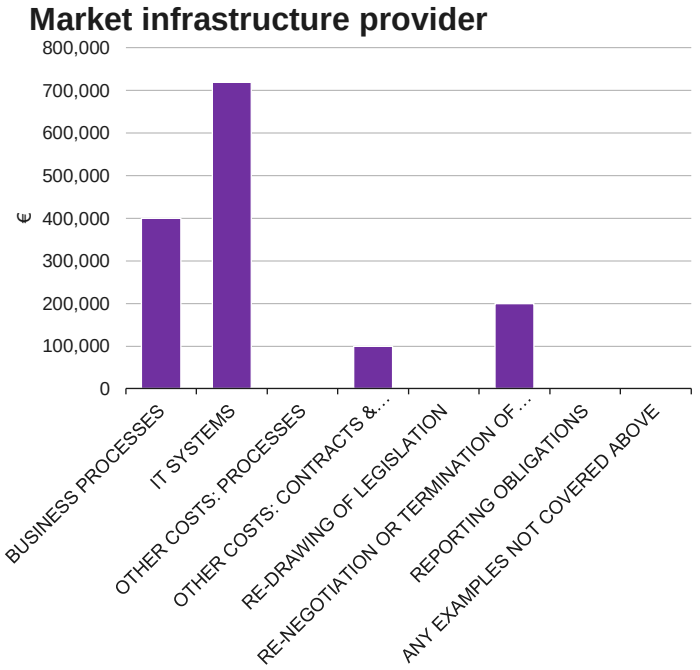
Disclaimer: work in progress

Average transition cost – TSO and market infrastructure provider

The provided cost estimates show for TSOs and market infrastructure providers that they face primarily IT system change costs

Average transition cost – TSOs and market infrastructure providers





Source: Compass Lexecon analysis of stakeholder input provided in questionnaires

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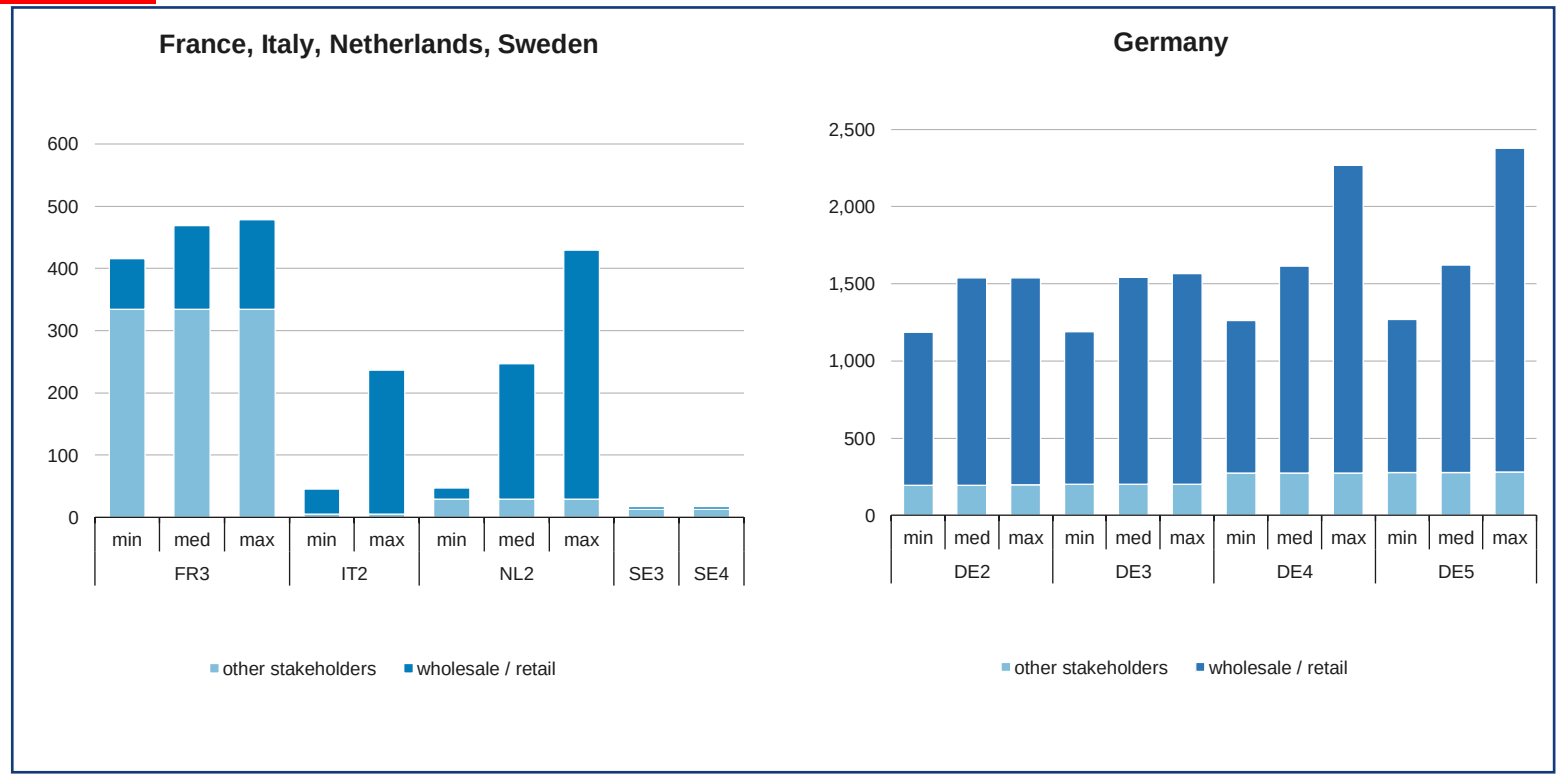
Total transition cost estimates

The calculated total transition cost are largely dependent on the submitted data. They are hence subject to the individual company, the type of organisation, and the estimation of the relevance of company size.

Total Transition Cost Ranges per number of zones in a country (in mn EUR)

Updated



Source: Compass Lexecon analysis of stakeholder input provided in questionnaires

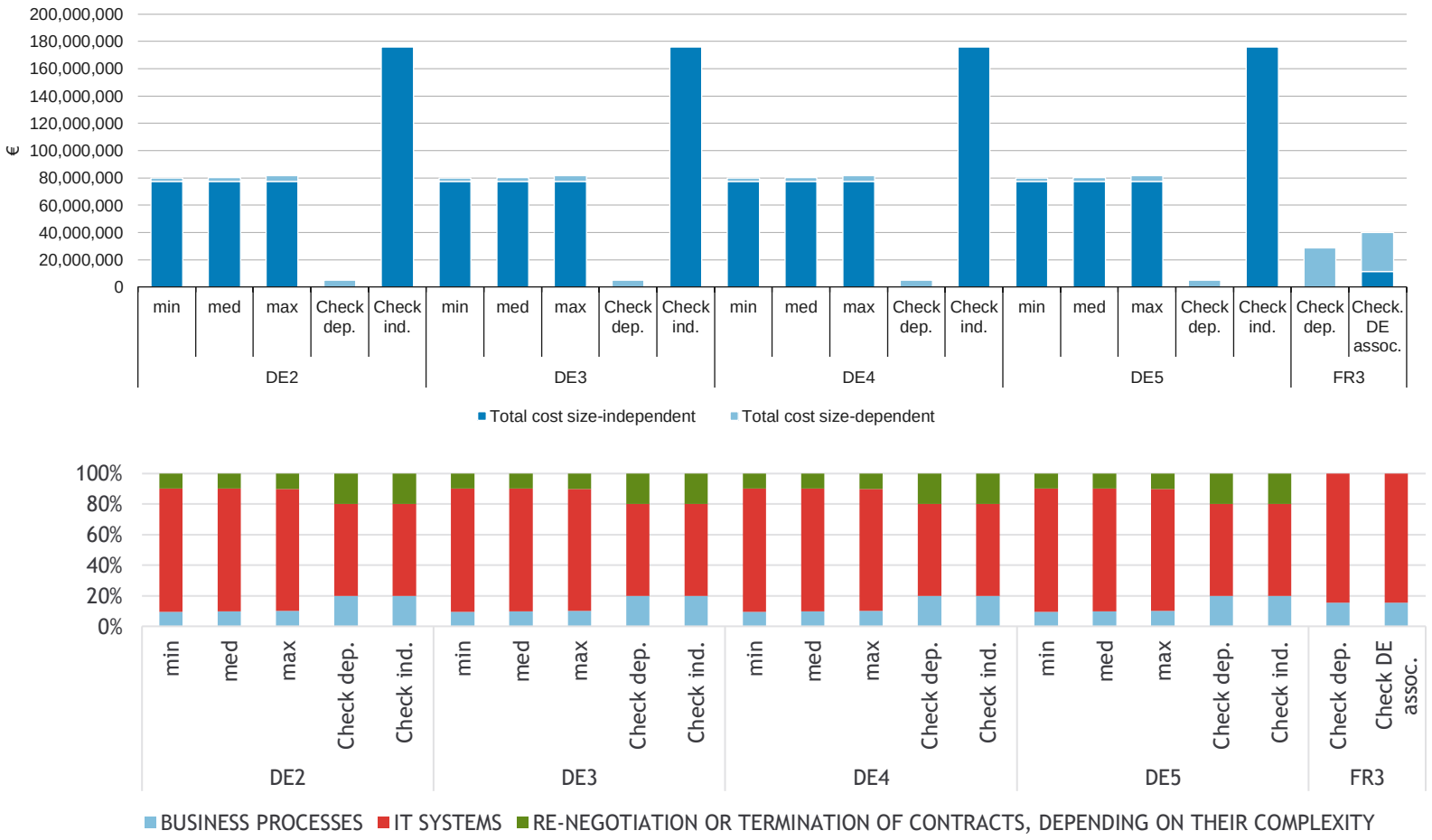
Note: One submitted estimation was excluded as outlier as it would have resulted in scaled transition costs of over EUR 10 bn.

Disclaimer: work in progress

Total transition cost estimates – DSOs

The scaled complete DSO costs suggest costs of EUR 80 mio. for Germany and EUR 30-40 mio for France.

Total Transition Cost Estimates for DSOs (top), Share of total transition cost per type for DSOs (bottom)

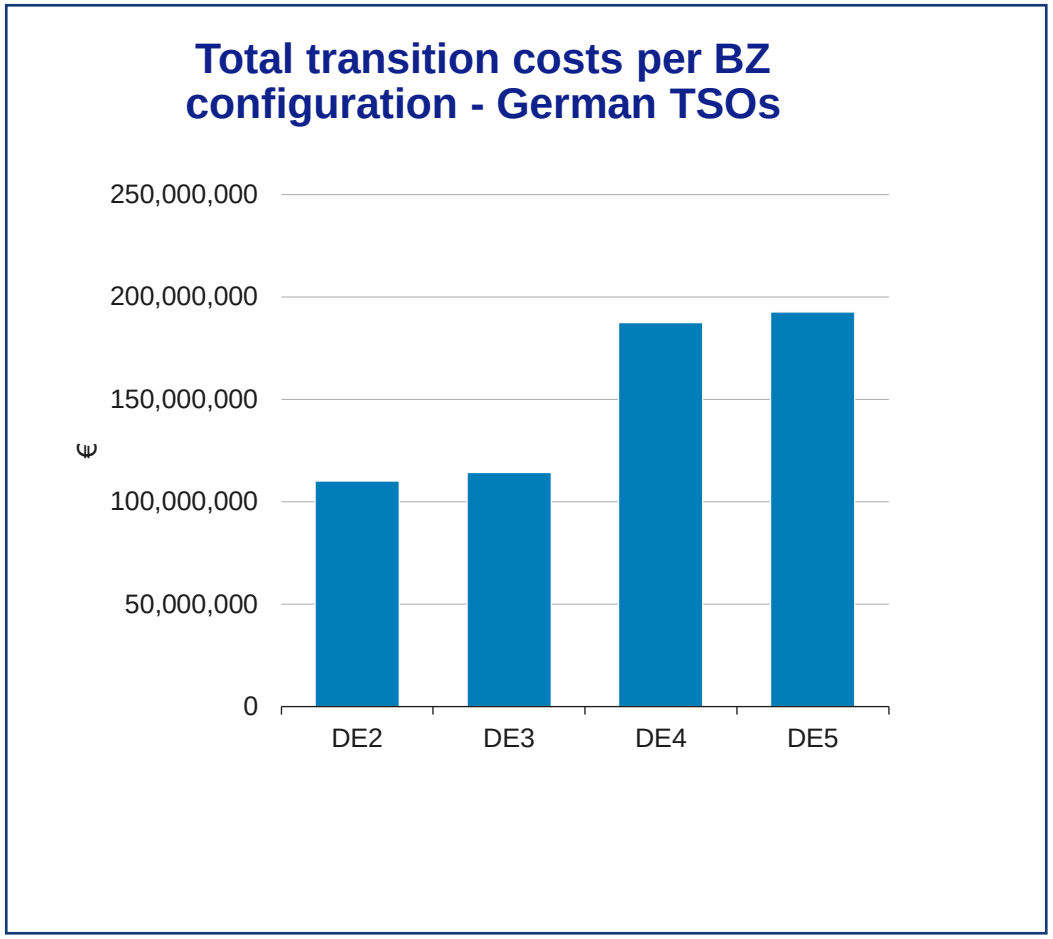


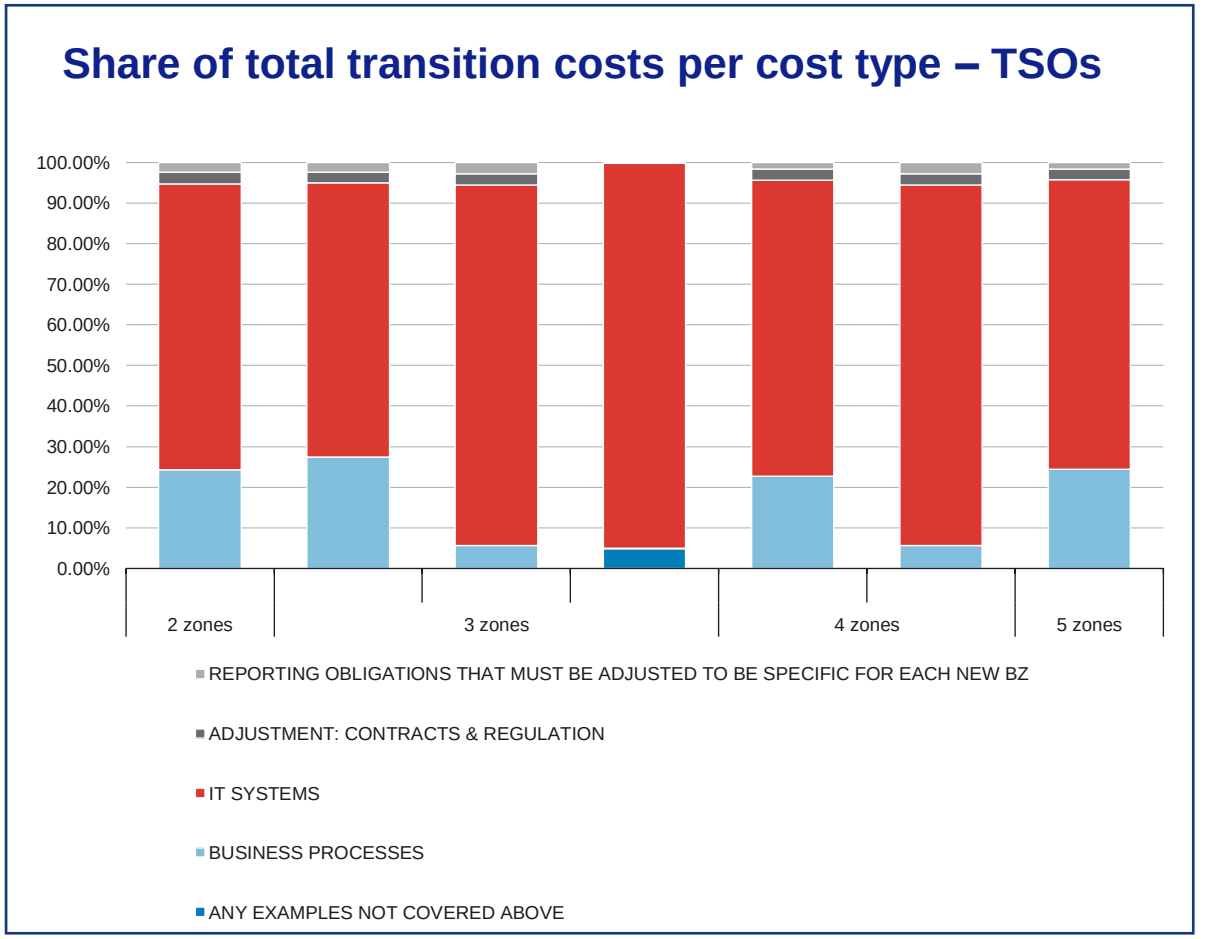
Source: Compass Lexecon analysis of stakeholder input provided in questionnaires

Disclaimer: work in progress

Total transition cost estimates – TSOs

TSO costs increase with increasing number of BZs in Germany. Costs are predominately from IT system changes.





Source: Compass Lexecon analysis of stakeholder input provided in questionnaires

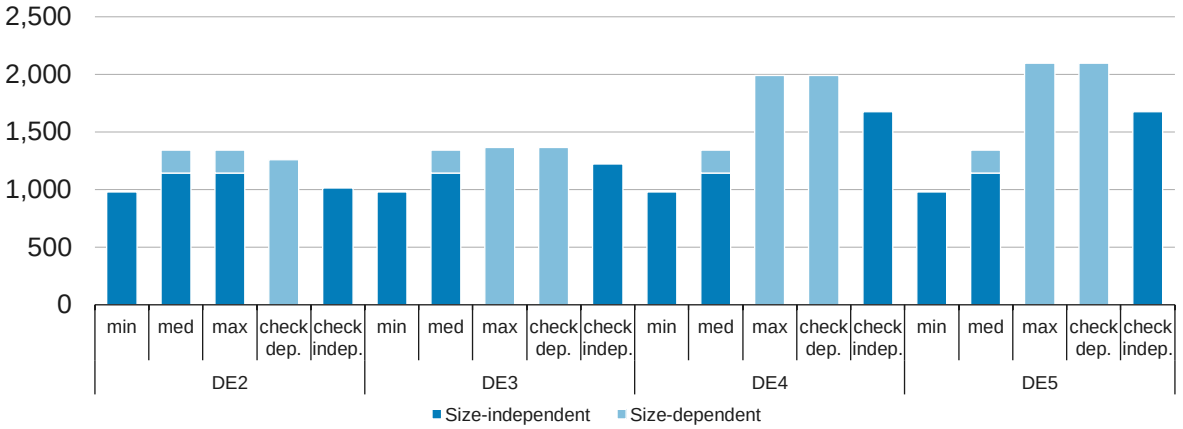
Disclaimer: work in progress

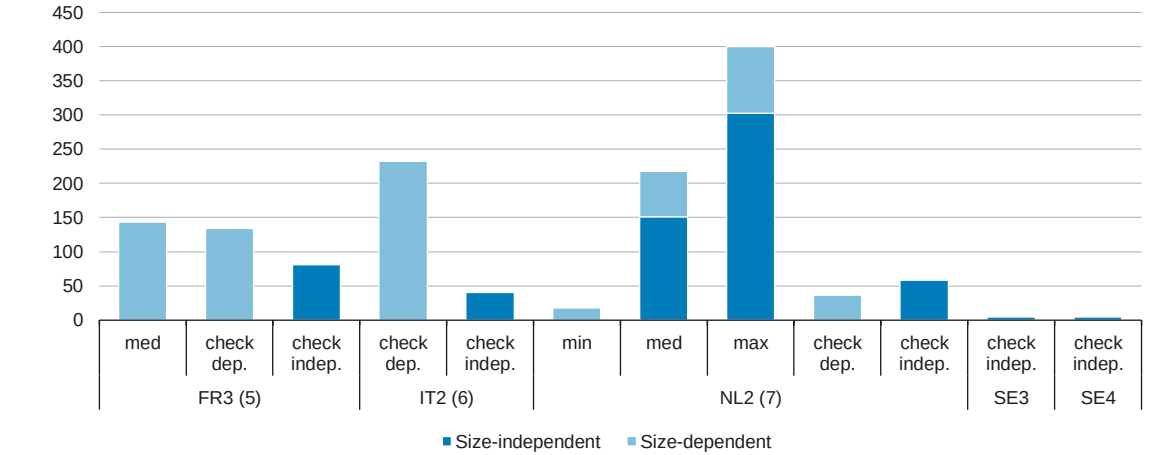
Total transition cost estimates – Market participants

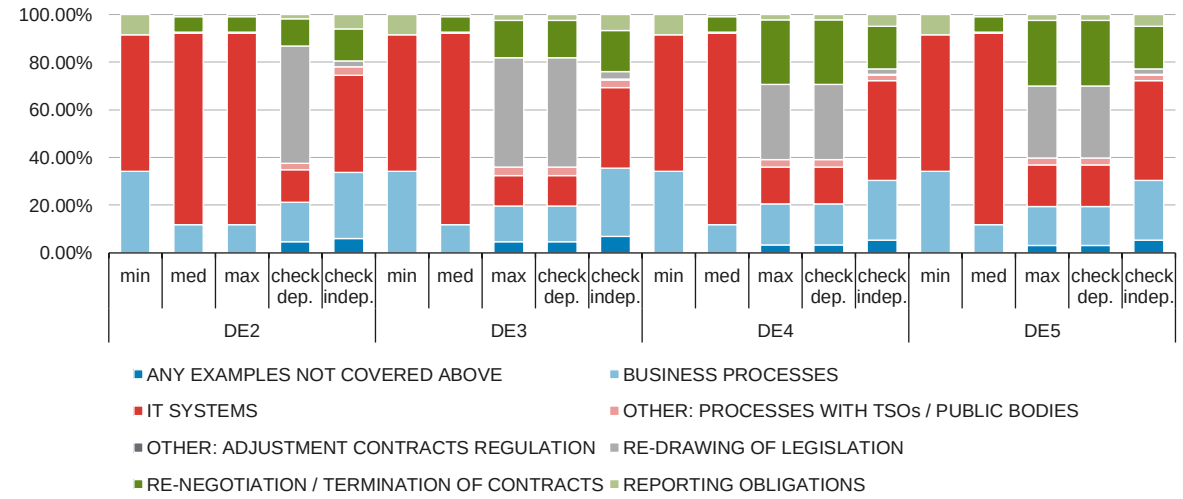
Uncertainty in costs for market participants is significant. The cost origin seems to vary from one country to another.

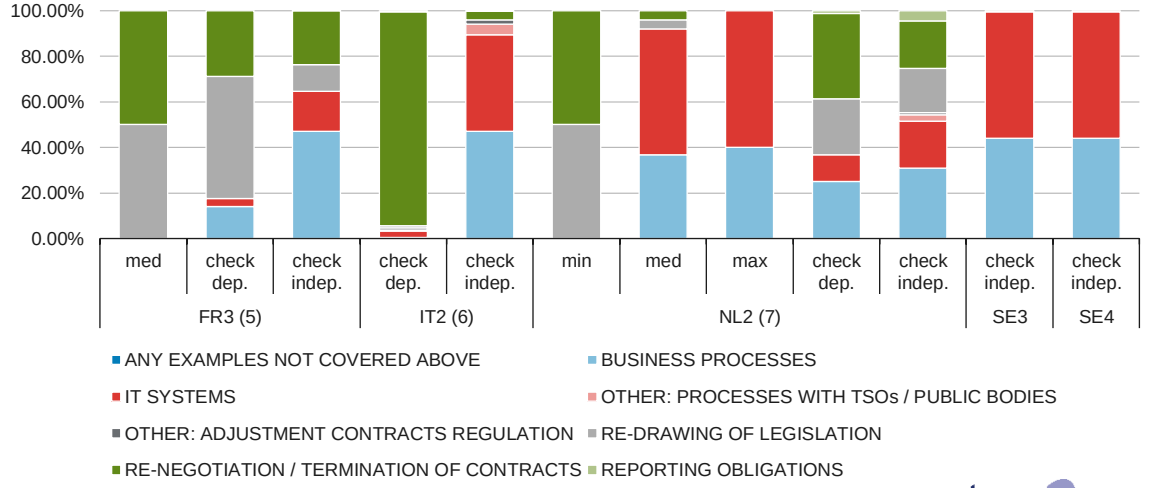
Transition cost estimates (top) and its composition (bottom) for the wholesale / retail markets (in mn EUR)

Updated









Source: Compass Lexecon analysis of stakeholder input provided in questionnaires

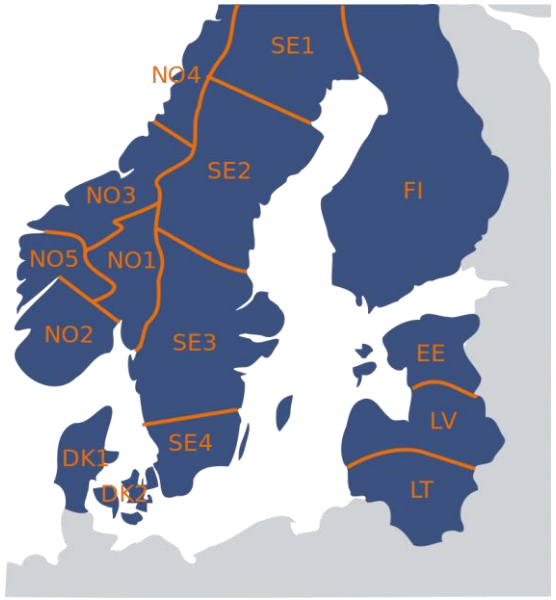
Pan EU Studies: market liquidity and transaction costs study

Disclaimer: work in progress

Disclaimer: work in progress

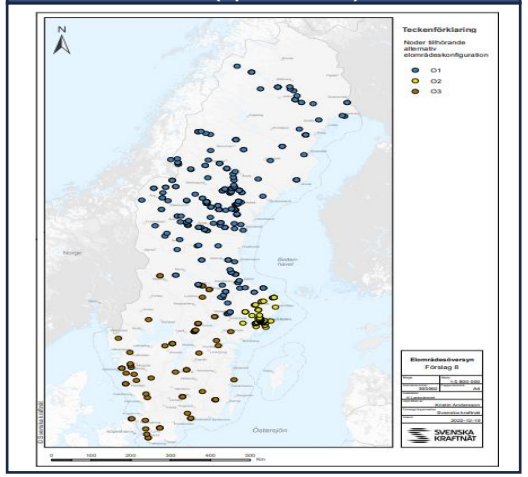
Simulation of reconfigurations: Nordics

Cases and scenarios in the simulation

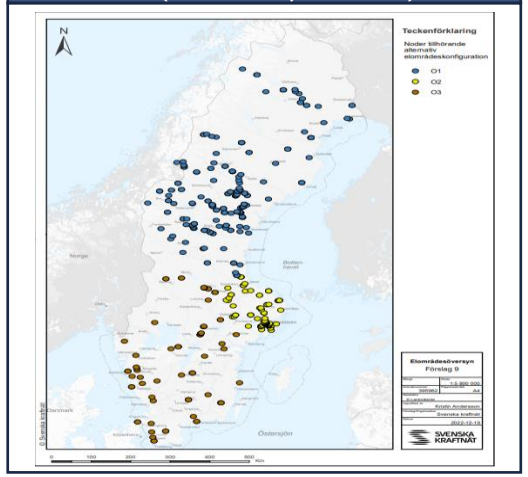


- Prices are simulated for **five cases**:
  base case, config. 8, config. 9, config. 10 and config. 11
- For each case, prices are simulated for **three scenarios**:
  1989, 1995 and 2009

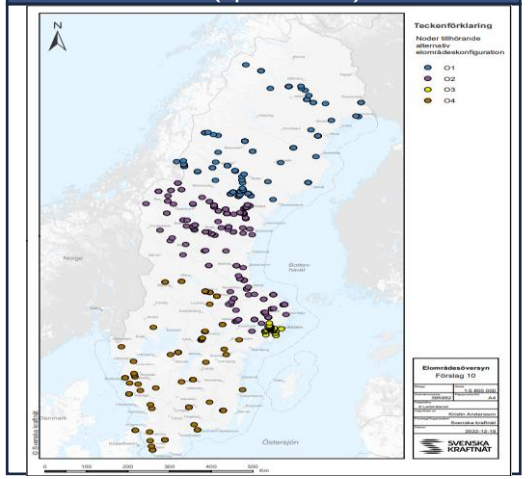
Configuration 8
SE3 (spectral P1)*



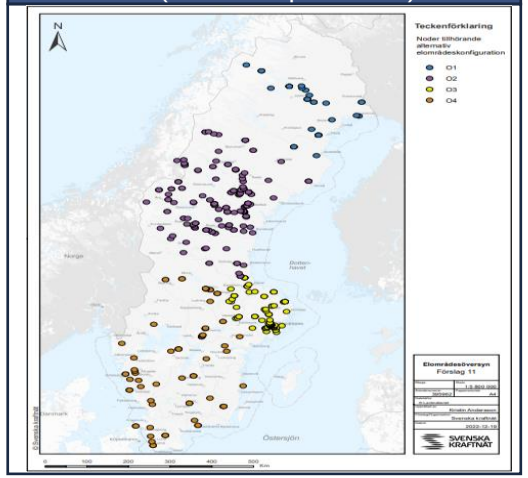
Configuration 9
SE3 (modified spectral P1)*



Configuration 10
SE4 (spectral P1)*



Configuration 11
SE4 (modified spectral P1)*



Note: *The notation here refers to the configurations as stated by ACER. Optional BZ are called “O1” to “O4”, specified by configuration. The existing zones (base case) are called “SE1” to “SE4” – these base case BZ are not to be confused with the configuration naming by ACER.
Source: Compass Lexecon analysis based on Acer 2022 and Svk

Disclaimer: work in progress

Analysis of simulated data for Sweden – Summary

Liquidity in terms of **HHI** and **price correlations** enhances in all configurations compared to the base case. In terms of **generation** and **demand**, the development is mixed.

- Average **HHI** remains stable and extreme values decrease. The maximum and average value in conf. 11 remain unchanged.
- Average **price correlation** and extreme values increase in all configurations compared to the base case.
- Average **generation** increases in conf. 8 and 9 and remains approximately the same in conf. 10 and 11. In contrast to the other configurations the minimum decreases in conf. 10.
- Average **demand** increases in conf. 8 and 9 and remains the same in conf. 10 and 11. Minima and Maxima become less extreme in conf. 8 and 9.

Case	Descriptive statistic	HHI	Price corr.	Generation	Demand
Base case	Max	**SE1:** 0.12	**SE3:** 0.69	**SE3:** 11,547	**SE3:** 12,621
	Average	0.07	0.48	4,920	4,250
	Min	**SE4:** 0.04	**SE1:** 0.18	**SE4:** 724	**SE1:** 1,618
Conf. 8	Max	↓ **O2:** 0.09	↑ **O3:** 0.71	↑ **O1:** 13,170	↓ **O3:** 11,622
	Average	0.07	↑ 0.54	↑ 6,566	↑ 5,667
	Min	↓ **O3:** 0.03	↑ **O1:** 0.31	↑ **O2:** 1,426	↑ **O2:** 1,721
Conf. 9	Max	↓ **O2:** 0.11	↑ **O3:** 0.72	↓ **O1:** 11,312	↓ **O3:** 11,622
	Average	0.07	↑ 0.54	↑ 6,534	↑ 5,667
	Min	↓ **O3:** 0.03	↑ **O1:** 0.29	↑ **O2:** 2,195	↑ **O2:** 2,641
Conf. 10	Max	↓ **O1:** 0.11	↑ **O4:** 0.74	↓ **O2:** 8,226	↓ **O4:** 11,622
	Average	0.07	↑ 0.55	↓ 4,891	4,250
	Min	↓ **O4:** 0.03	↑ **O1:** 0.21	↓ **O3:** 98	↓ **O3:** 1,238
Conf. 11	Max	**O1:** 0.12	↑ **O4:** 0.71	↓ **O4:** 8,636	↓ **O4:** 11,623
	Average	0.07	↑ 0.5	↓ 4,893	4,250
	Min	↓ **O4:** 0.03	↑ **O1:** 0.25	↑ **O3:** 2,189	**O1:** 1,618

Note:
- The analysis is based on averages across all climate years.
- The analysis is conducted for each variable separately.
- The displayed **averages** are annual **averages across all BZs** in the considered configuration.
- The displayed **max** and **min** show the **highest and lowest observed monthly value of the stated BZ**.

↑ Increase compared to base case

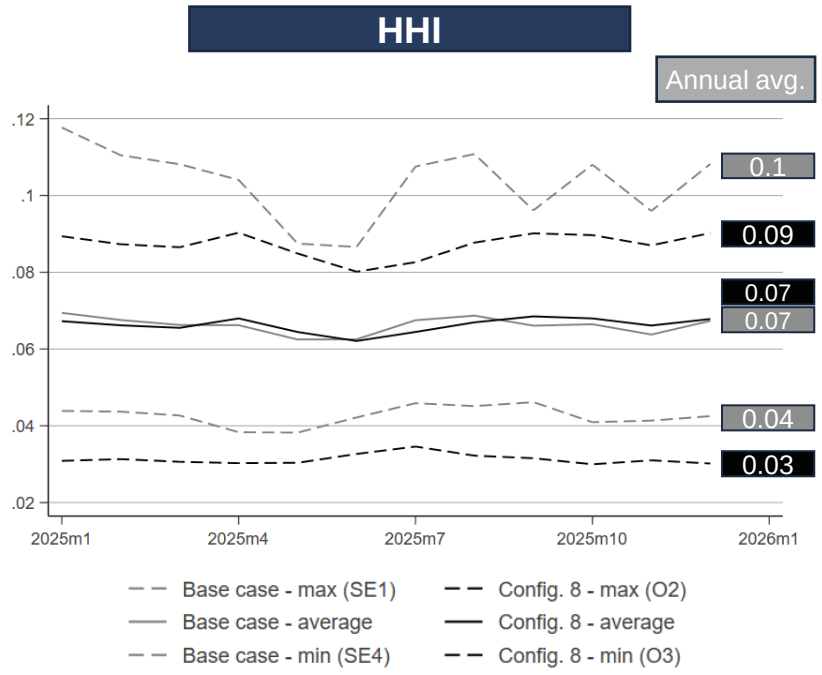
↓ Decrease compared to base case

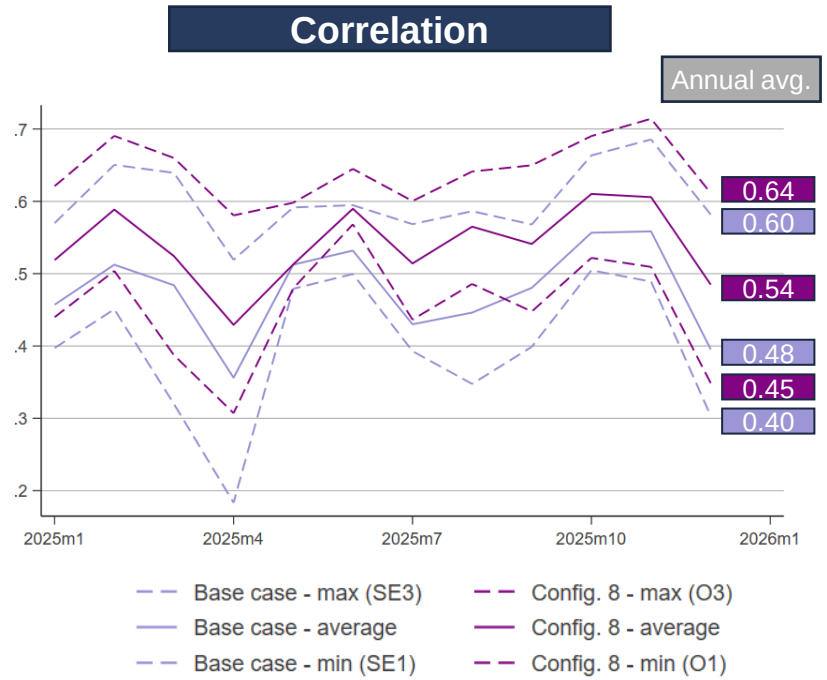
Source: Compass Lexecon analysis based on Svk simulated data
Note: Svk results are preliminary and quality checks are ongoing

Disclaimer: work in progress

Analysis of simulated data for Sweden – Config. 8 (1/2)

The averages and extreme values slightly increase for **correlation** and slightly decrease or remain stable in the case of the **HHI**.





Note:

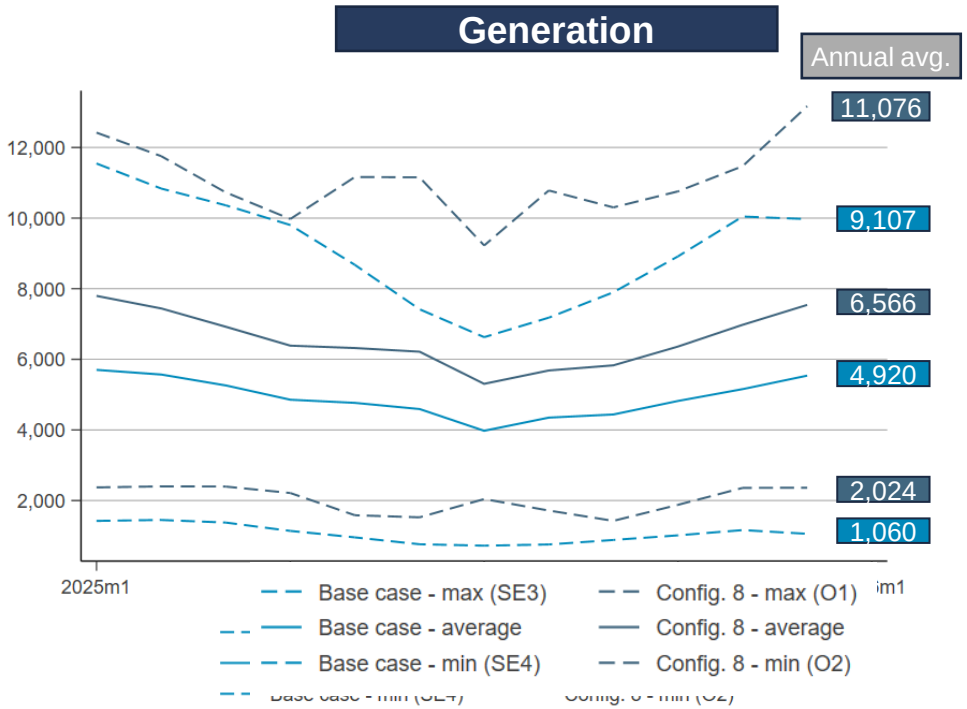
- The analysis is based on averages across all climate years. All variables are analysed separately. The figures display monthly averages.
- The lines indicated as **averages** in the legend represent the monthly **averages across all zones**. The lines for **min** and **max** display **the monthly averages of the indicated BZ**. The min-BZ and max-BZ was identified based on the lowest and highest annual average among BZs.
- The boxes give the annual average of the plotted line.

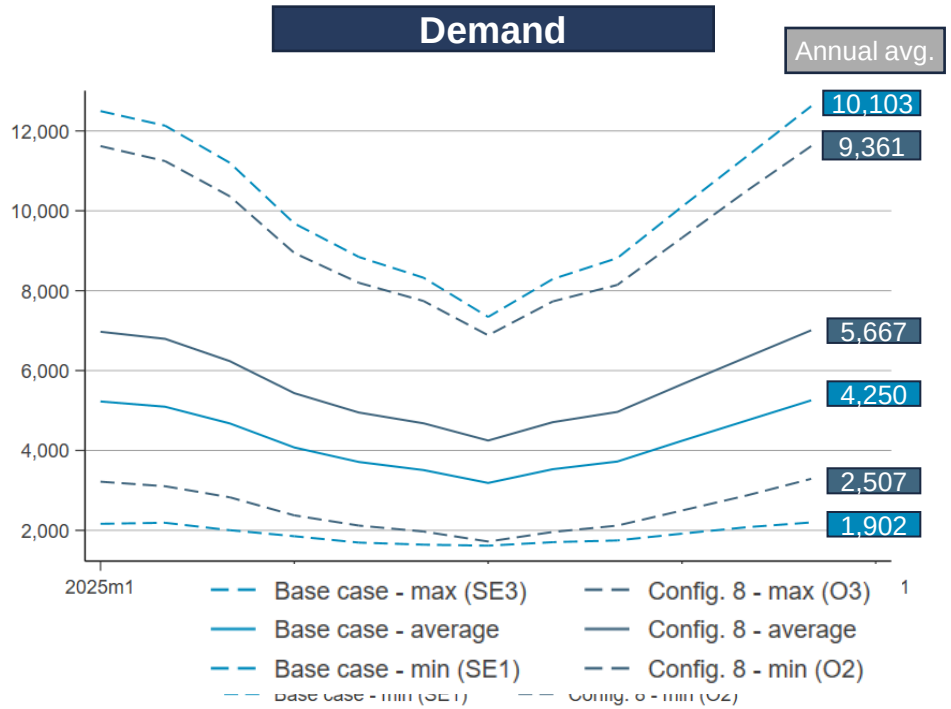
Source: Compass Lexecon analysis based on Svk simulated data
Note: Svk results are preliminary and quality checks are ongoing

Disclaimer: work in progress

Analysis of simulated data for Sweden – Config. 8 (2/2)

The generation in the min-BZ (i.e. with lowest generation) **increases** in Config 8 compared to the equivalent in the Base case. The generation in the max-BZ (i.e. with highest generation) also increases. With only three BZs, **the average BZ generation increases**. The changes in demand are similar to those in generation, except for the BZ with greatest demand, where the demand **decreases** slightly.





Note:

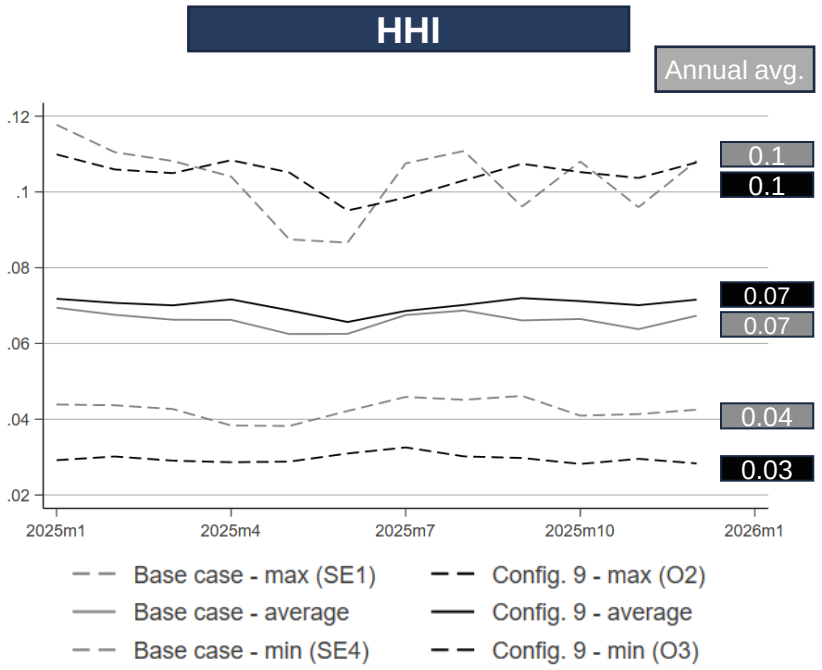
- The analysis is based on averages across all climate years. All variables are analysed separately. The figures display monthly averages.
- The lines indicated as **averages** in the legend represent the monthly **averages across all zones**. The lines for **min** and **max** display **the monthly averages of the indicated BZ**. The min-BZ and max-BZ was identified based on the lowest and highest annual average among BZs.
- The boxes give the annual average of the plotted line.

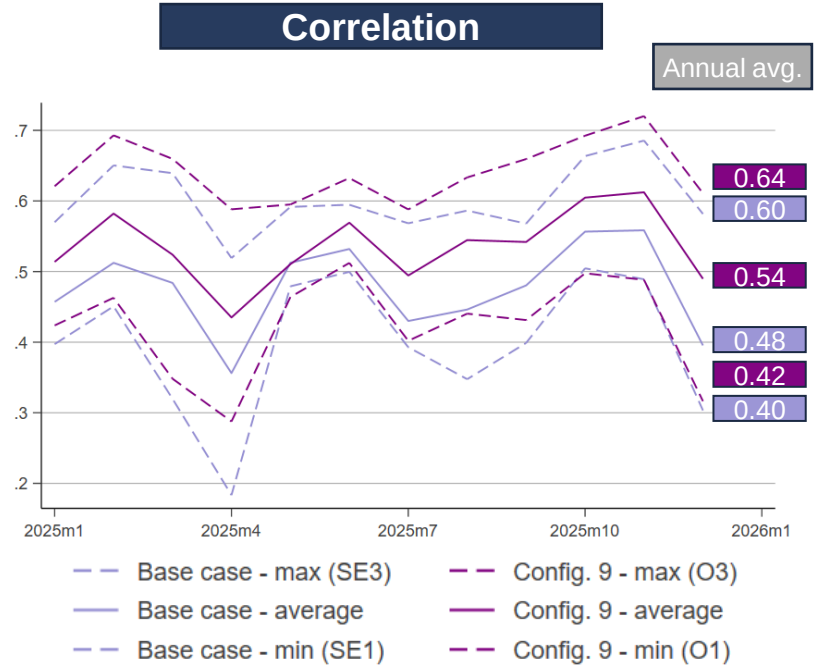
Source: Compass Lexecon analysis based on Svk simulated data
Note: Svk results are preliminary and quality checks are ongoing

Disclaimer: work in progress

Analysis of simulated data for Sweden – Config. 9 (1/2)

The averages and observed extremes slightly increase for **correlation** and slightly decrease or remain stable for the **HHI**.





Note:

- The analysis is based on averages across all climate years. All variables are analysed separately. The figures display monthly averages.
- The lines indicated as **averages** in the legend represent the monthly **averages across all zones**. The lines for **min** and **max** display **the monthly averages of the indicated BZ**. The min-BZ and max-BZ was identified based on the lowest and highest annual average among BZs.
- The boxes give the annual average of the plotted line.

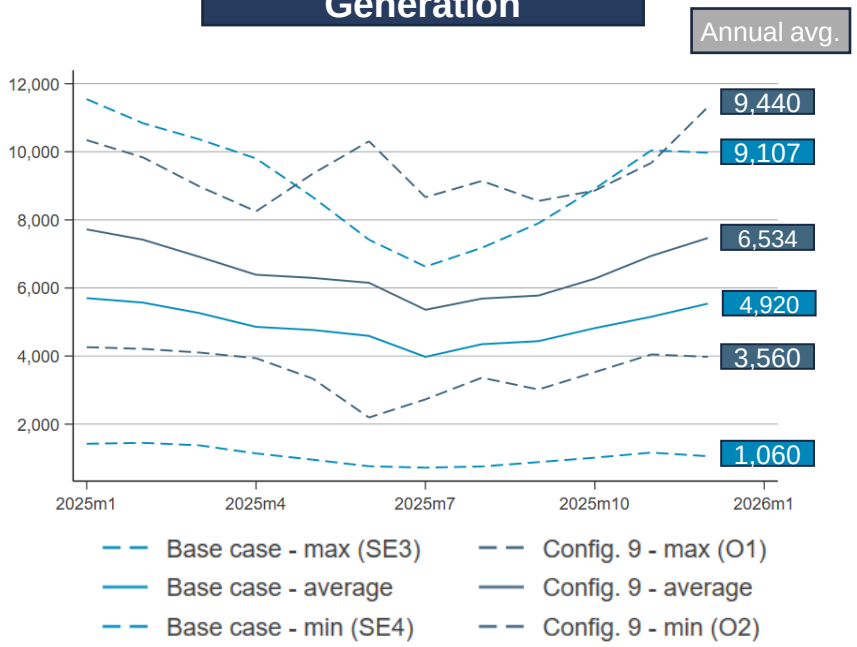
Source: Compass Lexecon analysis based on Svk simulated data
Note: Svk results are preliminary and quality checks are ongoing

Disclaimer: work in progress

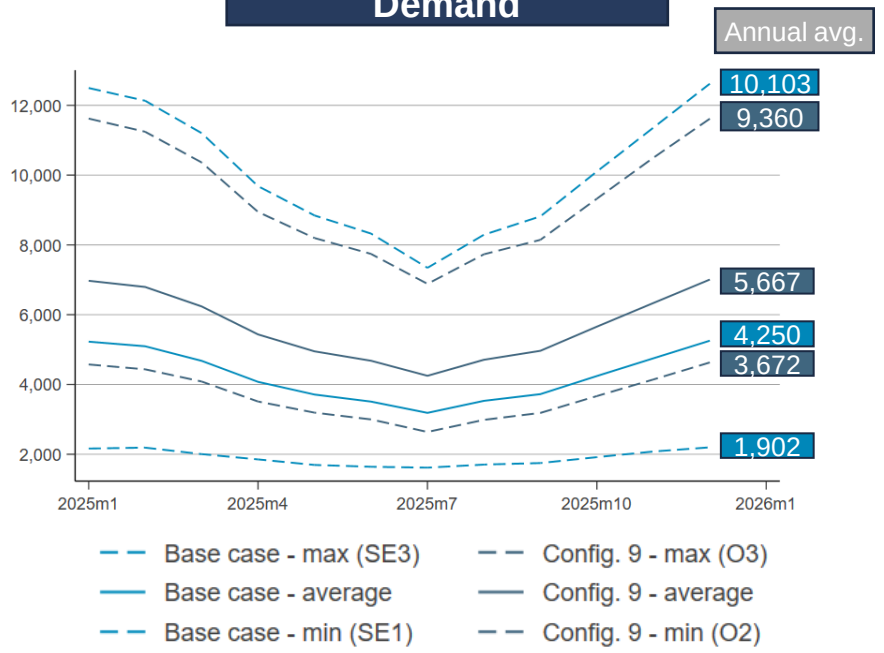
Analysis of simulated data for Sweden – Config. 9 (2/2)

The generation in the min-BZ (i.e. with lowest generation) **increases significantly** in Config 9 compared to the equivalent in the Base case. The generation in the max-BZ (i.e. with highest generation) is approximately the same but with a different profile. With only three BZs, **the average BZ generation increases**. For demand, the min-BZ **increases significantly**, the average increases somewhat and the max-BZ decreases slightly.

Generation



Demand



Note:

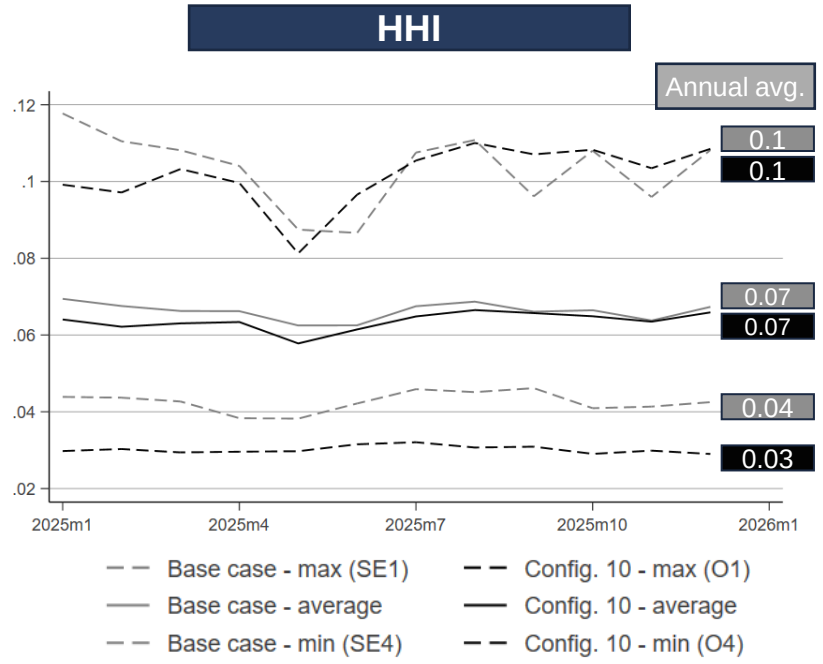
- The analysis is based on averages across all climate years. All variables are analysed separately. The figures display monthly averages.
- The lines indicated as **averages** in the legend represent the monthly **averages across all zones**. The lines for **min** and **max** display **the monthly averages of the indicated BZ**. The min-BZ and max-BZ was identified based on the lowest and highest annual average among BZs.
- The boxes give the annual average of the plotted line.

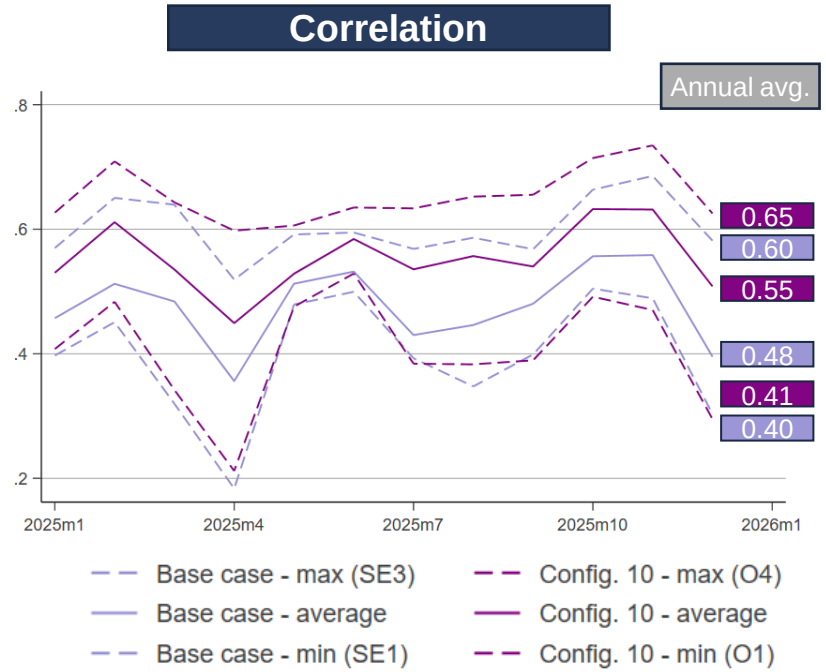
Source: Compass Lexecon analysis based on Svk simulated data
Note: Svk results are preliminary and quality checks are ongoing

Disclaimer: work in progress

Analysis of simulated data for Sweden – Config. 10 (1/2)

The averages and observed extremes slightly increase for **correlation** while remaining stable for the average and maximum **HHI**.





Note:

- The analysis is based on averages across all climate years. All variables are analysed separately. The figures display monthly averages.
- The lines indicated as **averages** in the legend represent the monthly **averages across all zones**. The lines for **min** and **max** display **the monthly averages of the indicated BZ**. The min-BZ and max-BZ was identified based on the lowest and highest annual average among BZs.
- The boxes give the annual average of the plotted line.

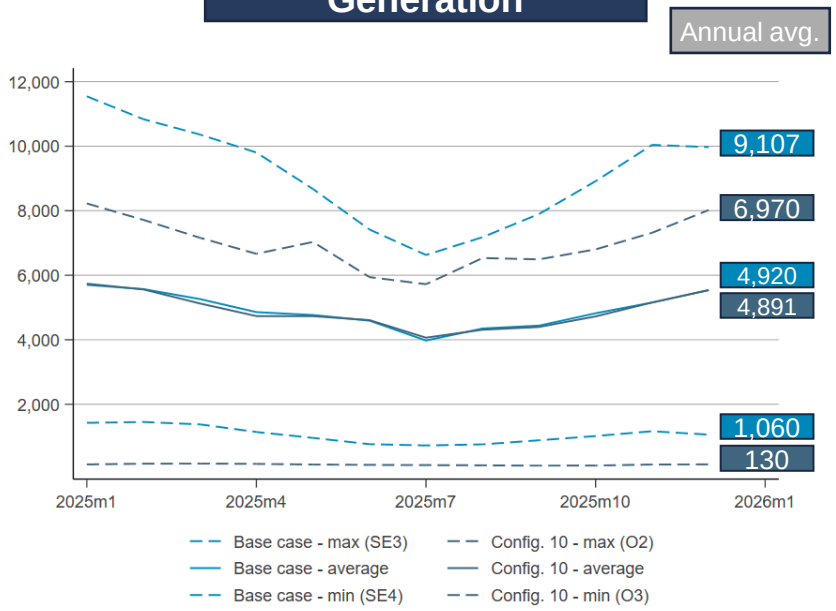
Source: Compass Lexecon analysis based on Svk simulated data
Note: Svk results are preliminary and quality checks are ongoing

Disclaimer: work in progress

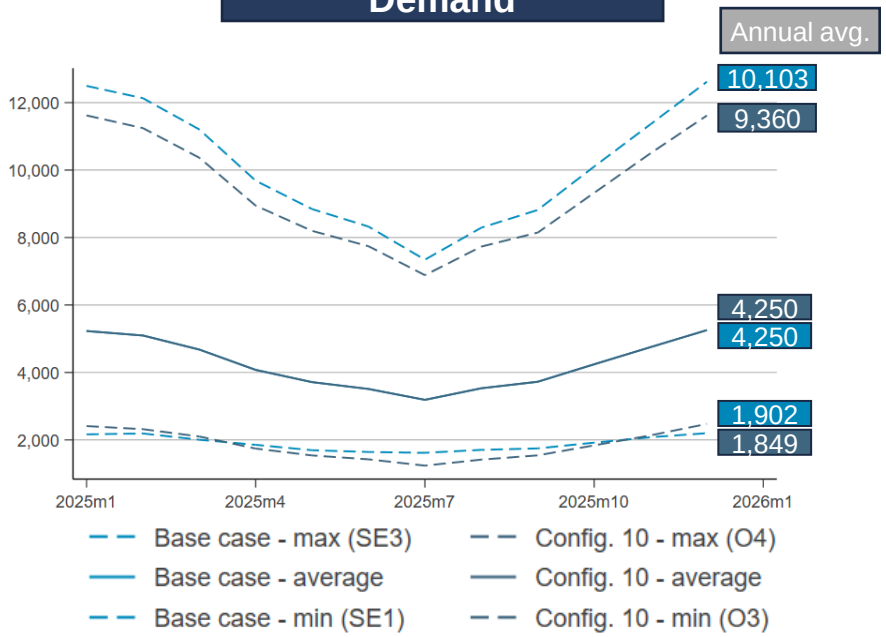
Analysis of simulated data for Sweden – Config. 10 (2/2)

The generation in the min-BZ (i.e. with lowest generation) is **significantly reduced** in Config 10 compared to the equivalent in the Base case. The generation in the max-BZ (i.e. with highest generation) is reduced, while the average values are approximately the same. The changes in demand are small.

Generation



Demand



Note:

- The analysis is based on averages across all climate years. All variables are analysed separately. The figures display monthly averages.
- The lines indicated as **averages** in the legend represent the monthly **averages across all zones**. The lines for **min** and **max** display **the monthly averages of the indicated BZ**. The min-BZ and max-BZ was identified based on the lowest and highest annual average among BZs.
- The boxes give the annual average of the plotted line.

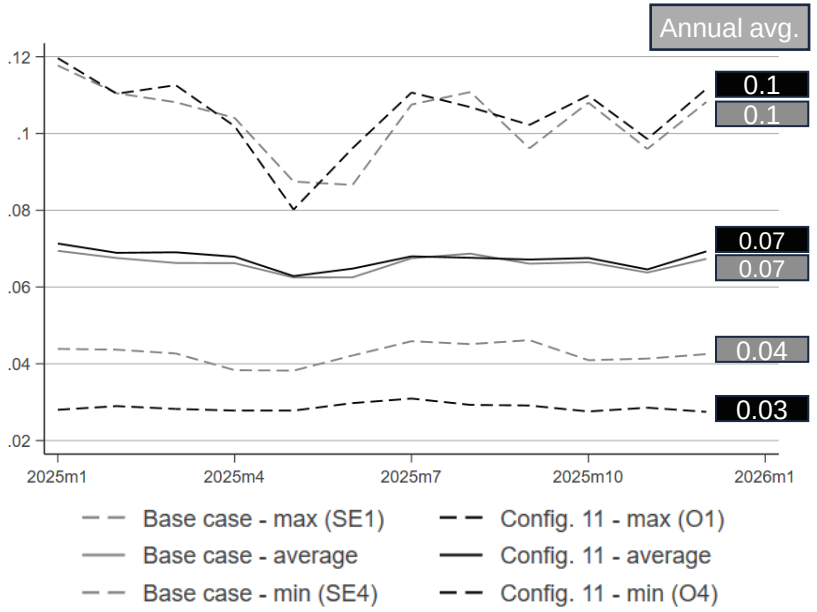
Source: Compass Lexecon analysis based on Svk simulated data
Note: Svk results are preliminary and quality checks are ongoing

Disclaimer: work in progress

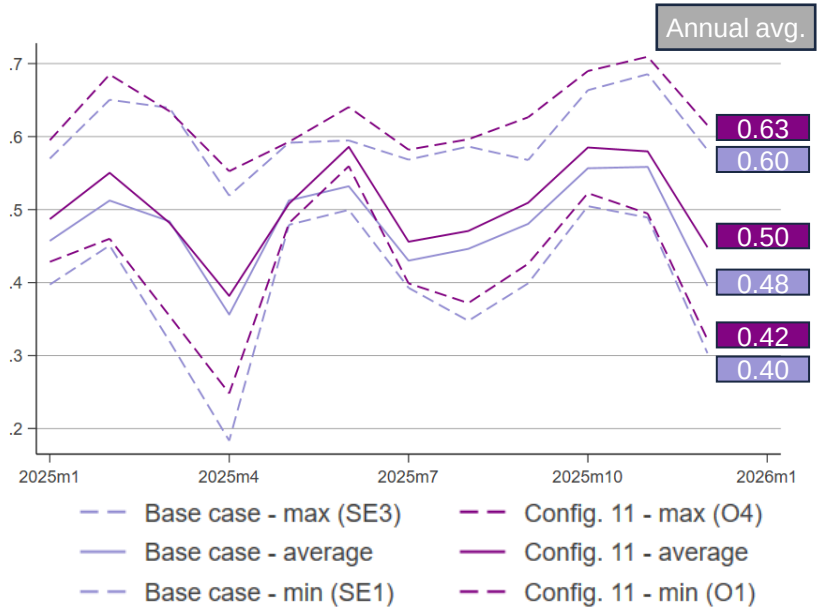
Analysis of simulated data for Sweden – Config. 11 (1/2)

The average and extreme values of **correlation** slightly increase in comparison to the base case, thereby indicating a liquidity increase. The picture is mixed for the **HHI**.

HHI



Correlation



Note:

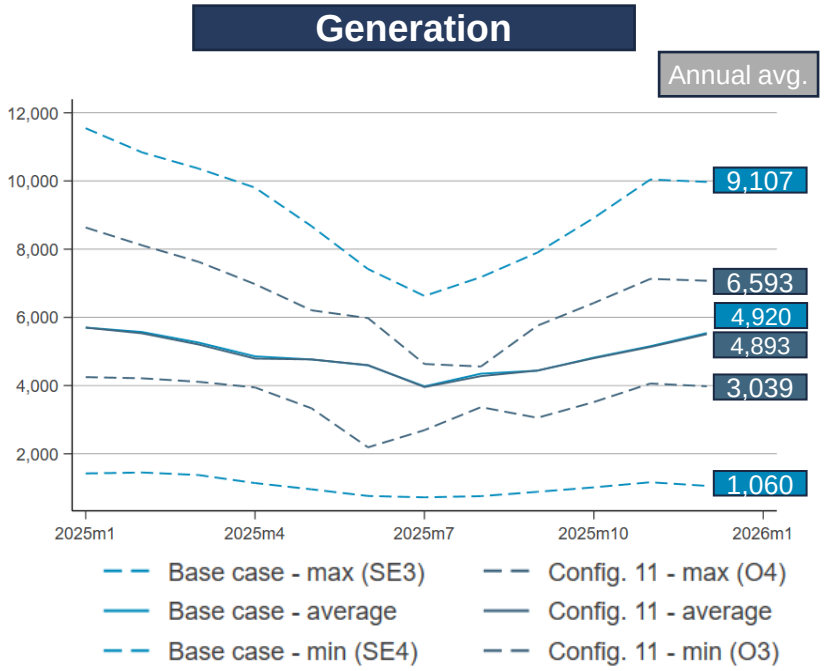
- The analysis is based on averages across all climate years. All variables are analysed separately. The figures display monthly averages.
- The lines indicated as **averages** in the legend represent the monthly **averages across all zones**. The lines for **min** and **max** display **the monthly averages of the indicated BZ**. The min-BZ and max-BZ was identified based on the lowest and highest annual average among BZs.
- The boxes give the annual average of the plotted line.

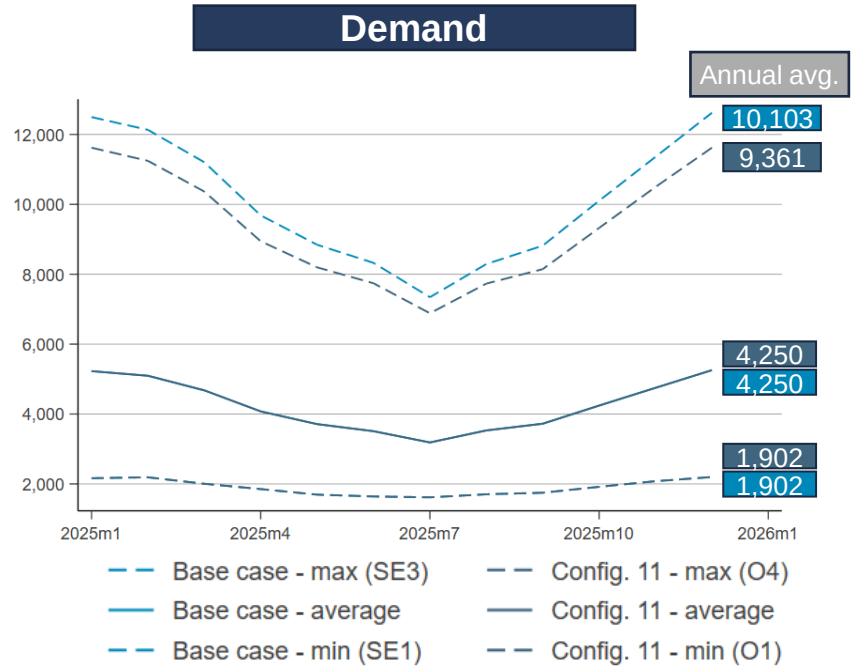
Source: Compass Lexecon analysis based on Svk simulated data
Note: Svk results are preliminary and quality checks are ongoing

Disclaimer: work in progress

Analysis of simulated data for Sweden – Config. 11 (2/2)

The generation in the min-BZ (i.e. with lowest generation) **increases significantly** in Config 11 compared to the equivalent in the Base case. The generation in the max-BZ (i.e. with highest generation) decreases. The average BZ generation is about the same. For demand, both the min-BZ and average demand is the same, while the max-BZ demand decreases slightly.





Note:

- The analysis is based on averages across all climate years. All variables are analysed separately. The figures display monthly averages.
- The lines indicated as **averages** in the legend represent the monthly **averages across all zones**. The lines for **min** and **max** display **the monthly averages of the indicated BZ**. The min-BZ and max-BZ was identified based on the lowest and highest annual average among BZs.
- The boxes give the annual average of the plotted line.

Source: Compass Lexecon analysis based on Svk simulated data
Note: Svk results are preliminary and quality checks are ongoing

5. Public Consultation

5. Public consultation

The comments from both ACER/NRAs and the Consultative Group have been considered in the final questionnaire.

The PC will be organized in 2 parts in order to allow the Nordic region to deliver in March.

The scope of the first part will be:

- Transition cost report
- Liquidity and transaction cost report (excluding the CE expected liquidity developments)
- Mitigation measures and practical considerations

The target is to start the PC in the week before the Christmas holidays (i.e., 18 Dec 2023).

A public webinar will also be organized in the same week (preliminary date: 19 Dec).

The first part of the PC will be open for 6 weeks (due to Christmas period).

During the second part of the PC it will not be possible to provide (additional) comments on the parts that have already been consulted.

6. AOB

Formal answer to ACER and NRAs

Next BZR CG meeting

Next steps

ENTSO-E Mission Statement

Who we are

ENTSO-E, the European Network of Transmission System Operators for Electricity, is the **association for the cooperation of the European transmission system operators (TSOs)**. The 42 member TSOs, representing 35 countries, are responsible for the secure and coordinated operation of Europe's electricity system, the largest interconnected electrical grid in the world. In addition to its core, historical role in technical cooperation, ENTSO-E is also the common voice of TSOs.

ENTSO-E **brings together the unique expertise of TSOs for the benefit of European citizens** by keeping the lights on, enabling the energy transition, and promoting the completion and optimal functioning of the internal electricity market, including via the fulfilment of the mandates given to ENTSO-E based on EU legislation.

Our mission

ENTSO-E and its members, as the European TSO community, fulfil a common mission: Ensuring the **security of the interconnected power system in all time frames at pan-European level and the optimal functioning and development of the European interconnected electricity markets**, while enabling the integration of electricity generated from renewable energy sources and of emerging technologies.

Our vision

ENTSO-E plays a central role in enabling Europe to become the first **climate-neutral continent by 2050** by creating a system that is secure, sustainable and affordable, and that integrates the expected amount of renewable energy, thereby offering an essential contribution to the European Green Deal. This endeavour requires sector integration and close cooperation among all actors.

Europe is moving towards a sustainable, digitalised, integrated and electrified energy system with a combination of centralised and distributed resources. ENTSO-E acts to ensure that this energy system **keeps consumers at its centre** and is operated and developed with **climate objectives** and **social welfare** in mind.

ENTSO-E is committed to use its unique expertise and system-wide view – supported by a responsibility to maintain the system's security – to deliver a comprehensive roadmap of how a climate-neutral Europe looks.

ENTSO-E Mission Statement

Our values

ENTSO-E acts in solidarity as a community of TSOs united by a shared responsibility.

As the professional association of independent and neutral regulated entities acting under a clear legal mandate, ENTSO-E serves the interests of society by optimising social welfare in its dimensions of safety, economy, environment, and performance.

ENTSO-E is committed to working with the highest technical rigour as well as developing sustainable and innovative responses to prepare for the future and overcoming the challenges of keeping the power system secure in a climate-neutral Europe. In all its activities, ENTSO-E acts with transparency and in a trustworthy dialogue with legislative and regulatory decision makers and stakeholders.

Our contibutions

ENTSO-E **supports the cooperation** among its members at European and regional levels. Over the past decades, TSOs have undertaken initiatives to increase their cooperation in network planning, operation and market integration, thereby successfully contributing to meeting EU climate and energy targets.

To carry out its **legally mandated tasks**, ENTSO-E's key responsibilities include the following:

- Development and implementation of standards, network codes, platforms and tools to ensure secure system and market operation as well as integration of renewable energy;
- Assessment of the adequacy of the system in different timeframes;
- Coordination of the planning and development of infrastructures at the European level (Ten-Year Network Development Plans, TYNDPs);
- Coordination of research, development and innovation activities of TSOs;
- Development of platforms to enable the transparent sharing of data with market participants.

ENTSO-E supports its members in **the implementation and monitoring** of the agreed common rules.

ENTSO-E is the common voice of European TSOs and provides expert contributions and a constructive view to energy debates to support policymakers in making informed decisions.

Our values define who we are, what we stand for and how we behave.
We all play a part in bringing them to life.

EXCELLENCE

We deliver to the highest standardss. We provide an environment in which people can develop to their full potential.

TRUST

We trust each other, we are transparent and we empower people. We respect diversity.

INTEGRITY

We act in the interest of ENTSO-E

TEAM

We care about people. We work transversal and we support each other. We celebrate success.

FUTURE THINKING

We are a learning organisation. We explore new paths and solutions.

We are ENTSO-E