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| Joint triangular operation between the Norwegian, Swedish and Western Danish subsystems | | | | |
| Appendix 7 to SOA Annex OS (NO, SE and DK1) | | | | |
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| [http://www.fingrid.fi/_layouts/Fingrid.Internet/images/logo.png](http://www.fingrid.fi/en/) | C:\Users\tsk\AppData\Local\Microsoft\Windows\INetCache\Content.Word\Energinet_primaer_RGB.JPG |  |  | Ein Bild, das ClipArt enthält.  Automatisch generierte Beschreibung | |

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| ****Approval date**** | ****Entry into force**** | ****Revision**** |
| **2022-06-22** | **2022-06-22** | **Initial version based on old SOA** |
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# Transmission facilities triangularly linking the subsystems Sweden – Western Denmark – Norway

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| **Facility** | **Voltage kV** | **Other information** |
| Hasle-Borgvik | 400 kV AC | Part of Haslesnittet |
| Halden-Loviseholm | 400 kV AC | Part of Haslesnittet |
| Lindome-V Hassing | 285 kV DC | Konti-Skan 1 |
| Lindome-V Hassing | 285 kV DC | Konti-Skan 2 |
| Kristiansand-Tjele 1 and 2 | 250 kV DC | Skagerrak 1 and 2 |
| Kristiansand-Tjele 3 | 350 kV DC | Skagerrak 3 |
| Kristiansand-Tjele 4 | 500 kV DC | Skagerrak 4 |

# Principles for the distribution of exchange plans on the links

The NEMOs utilizes the trading capacity which the system operators have set in order to try to avoid price differences between the bidding zones.

Energinet’s Control Centre at Erritsø sets a trading capacity to and from the bidding zone in Western Denmark, DK1, which can entail a limitation of the trading capacities between the bidding zones Western Denmark – Norway, DK1-NO2, and Western Denmark – Sweden, DK1-SE3. Distribution between the interconnectors takes place on a pro rata basis, depending on the DC links’ trading capacities. In the event of a price difference between the zones, the trading capacity will be redistributed so that it is increased from a low-price area to a high-price area within the framework of the overall trading capacity.

For ramping on the interconnectors, Svenska kraftnät, Statnett and Energinet agree to follow the methodology for Ramping Restrictions.

Based on hourly plans from the NEMOs, Energinet’s Control Centre at Erritsø draws up preliminary power plans on the DC links towards Sweden and Norway with ramping transitions between the different power levels, taking into account the agreed ramping rate. Energinet also has an opportunity to minimise network losses in the triangular link. Energinet’s Control Centre at Erritsø is responsible for the plans meeting the stipulated requirements.

The RGCE system has a requirement that the entire regulation must be completed within ±5 minutes at hour shifts.

Transits through Western Denmark entail that power plans and regulations for the DC links reflect the RGCE requirement.

These power plans can later be re-planned as a result of exchanges of supportive energy, either bilaterally between two of the relevant system operators or between all three system operators.

The exchange of equal volumes of supportive energy between all three system operators in a triangle (DC loop) is used to relieve heavily loaded links on the network, to obtain scope for regulating the frequency and to minimise the need for counter trading. All three system operators can take the initiative as regards supportive energy trading via the relevant DC links or the Hasle constraint. Statnett has a co-ordinating function. Triangular trading requires the approval of all three Parties.

Energinet’s Control Centre at Erritsø is responsible for drawing up new power plans for the DC links in accordance with the stipulated requirements and for informing the other system operators.

All Parties shall be informed about the potential transmission capacity of all three links as regards the allocation of balancing energy and supportive energy.