

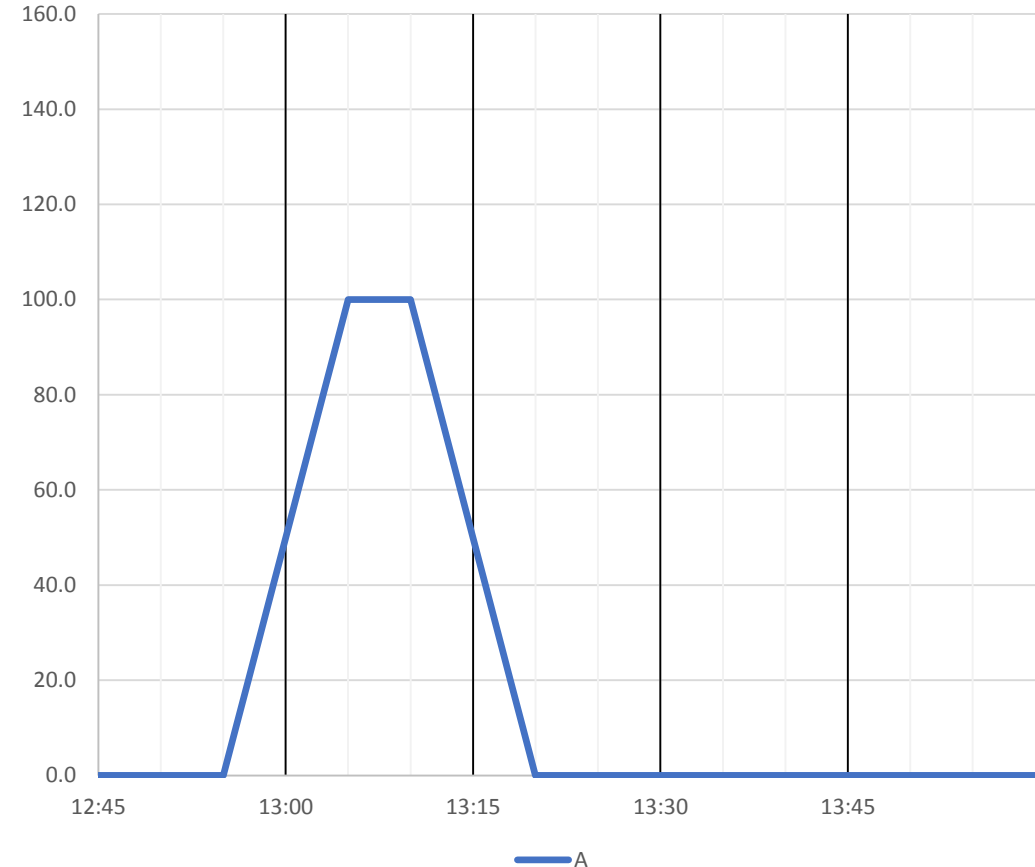
Cross border stacking of Scheduled and Direct Activations

Example scenario from MARI project

- A. Scheduled Activation of 100 MW from 13:00 to 13:15 (QH1)
- B. Direct Activation of 50 MW from 13:07 to 13:30 (QH1+QH2)
- C. Direct Activation of 20 MW from 13:10 to 13:30 (QH1+QH2)
- D. Scheduled Activation of 11 MW from 13:15 to 13:30 (QH2)
- E. Direct Activation of 33 MW from 13:21 to 13:45 (QH2+QH3)

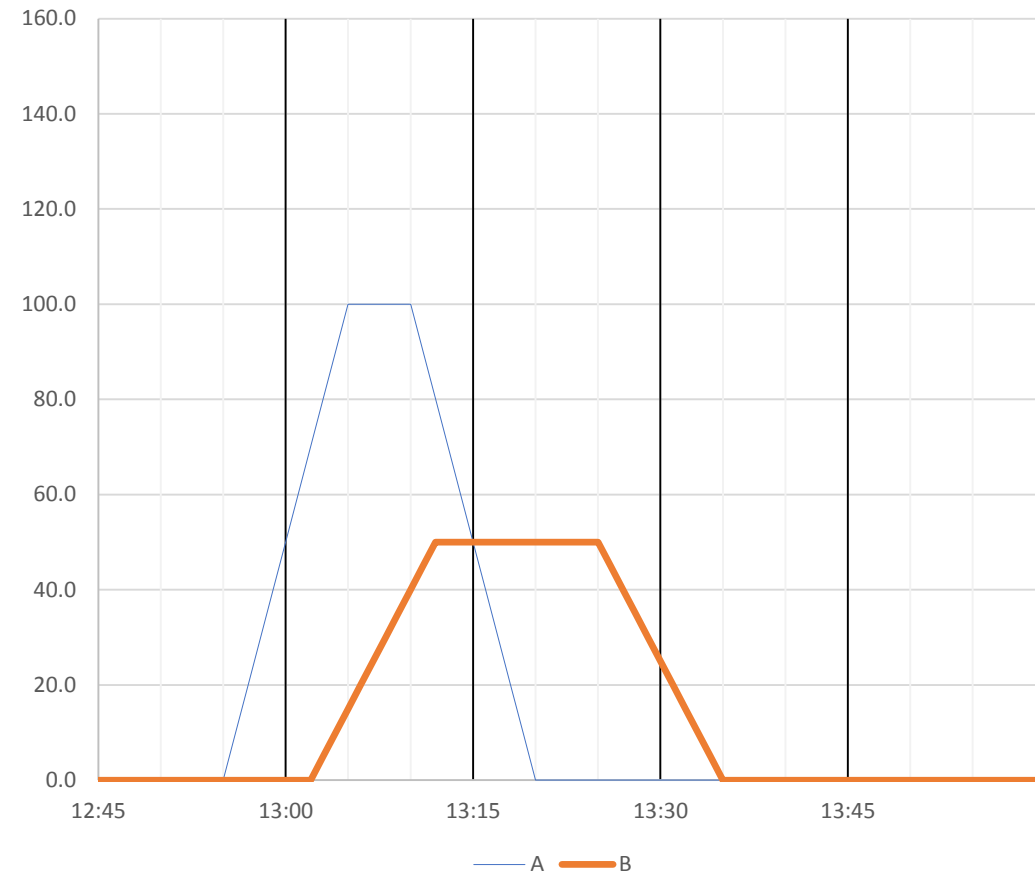
Calculation of VTL (Virtual Tie Line) and PTL (Physical Tie Line) (A)

- VTL and PTL is calculated from the sum of all Scheduled and Direct Activation for a given period
- Ramping rules are applied, starting 5 minutes before delivery, ramp for 10 minutes and similar for ramping back
- A single Scheduled Activation will be a simple shape as shown



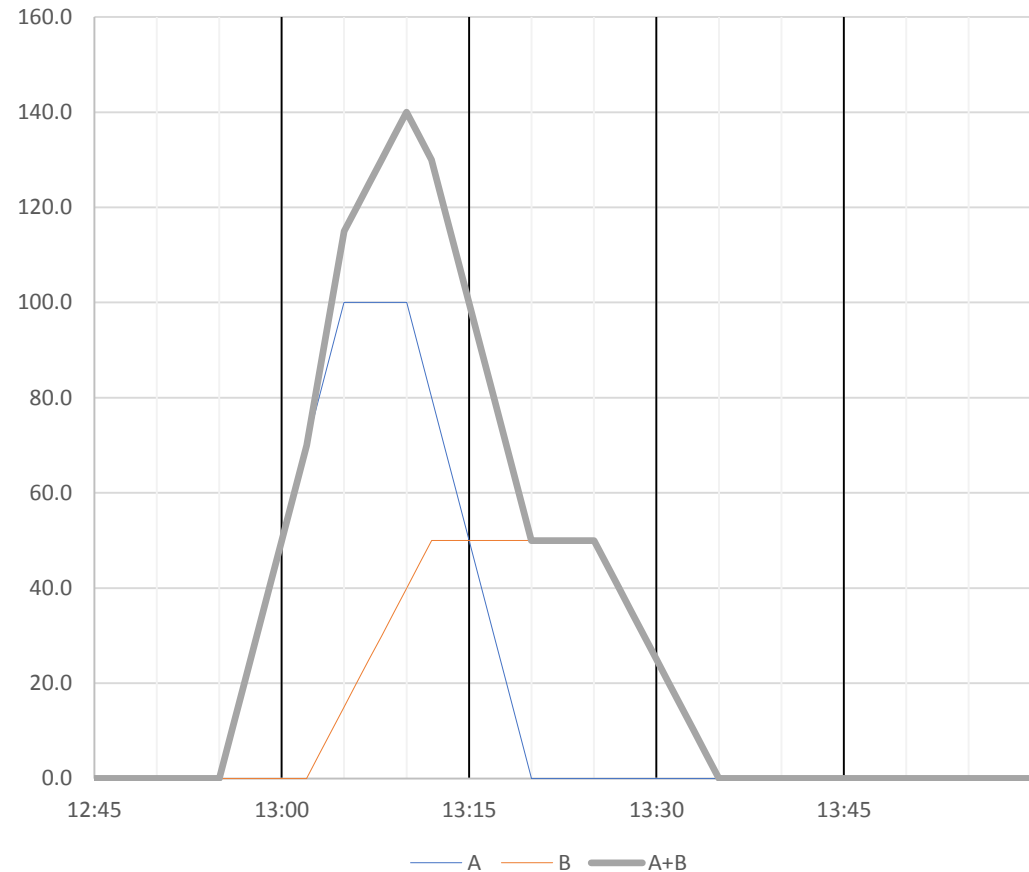
Calculation of VTL and PTL (B)

- A Direct Activation will have the same shape (10 minutes ramp in each direction), but a longer delivery time and the start can be anywhere within a quarter hour



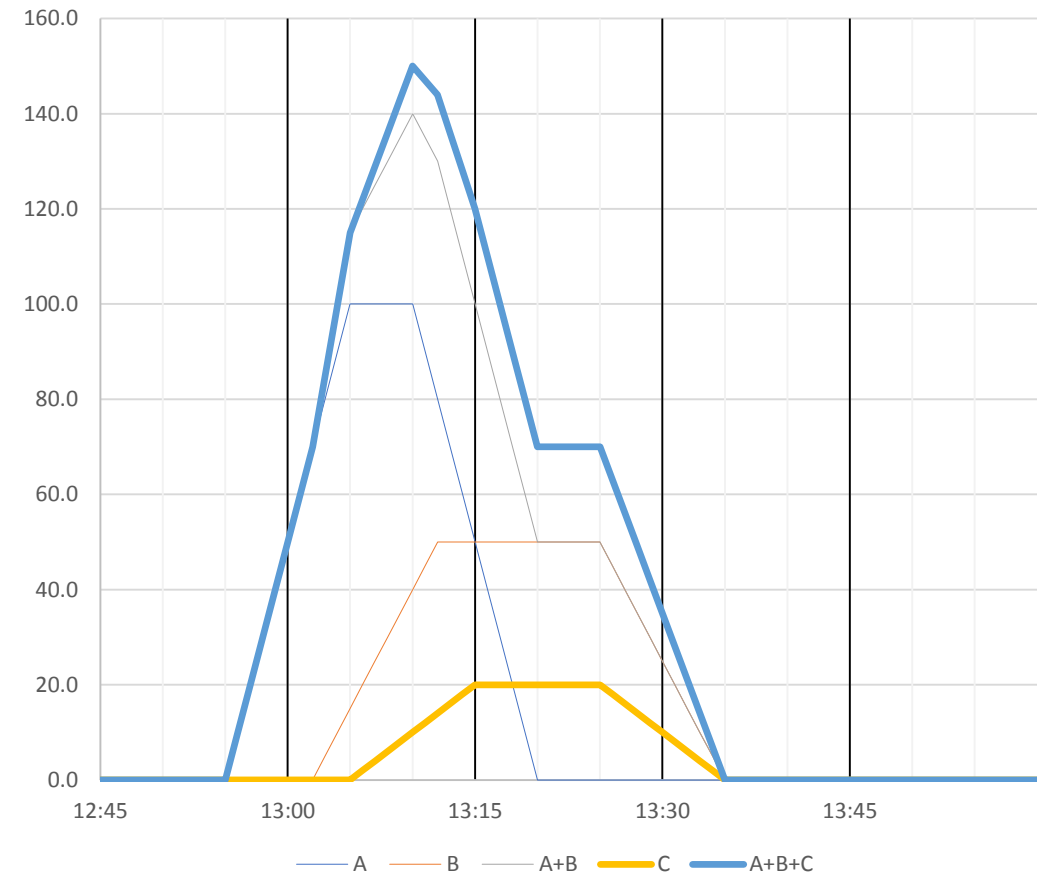
Calculation of VTL and PTL (B)

- After a Scheduled Activation (A) and a subsequent Direct Activation (B), the combined plan will be a sum of these
- Even though the shapes themselves are uniform, the combined plan is less well formed due to different ramping rates, start and duration



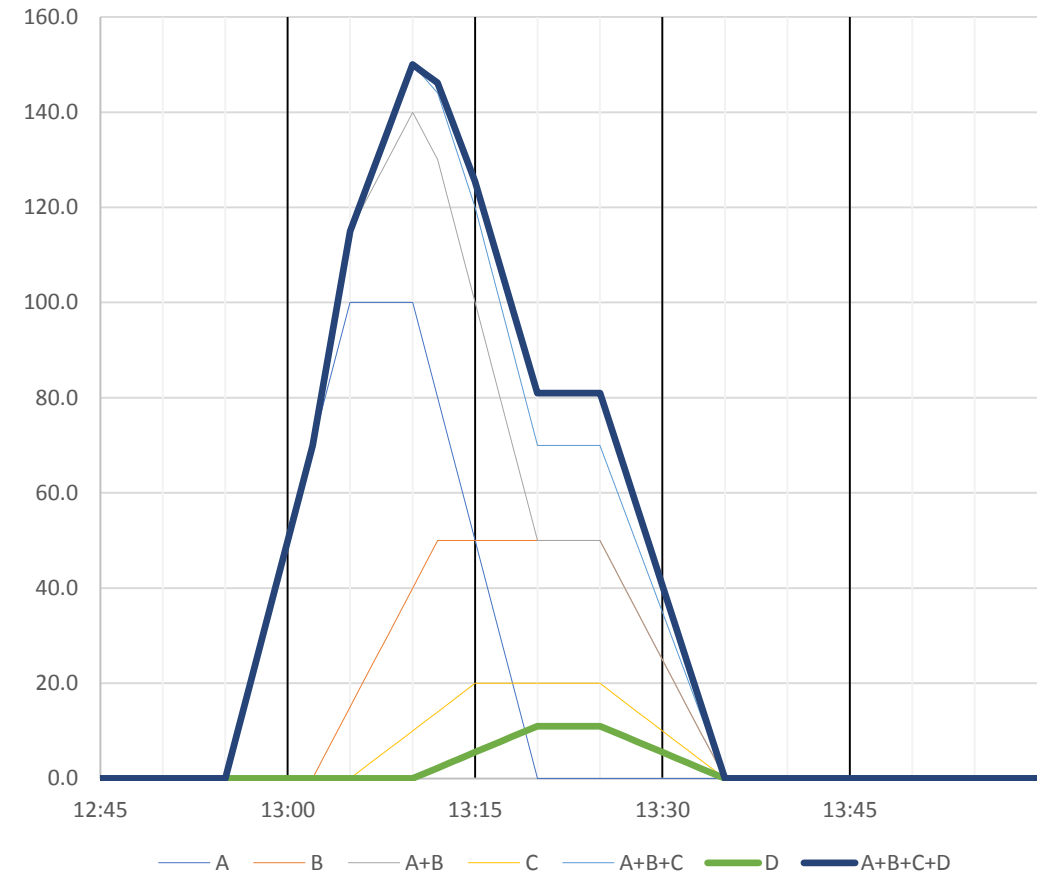
Calculation of VTL and PTL (C)

- The next Direct Activation (C) will have the same shape and be added in the same way



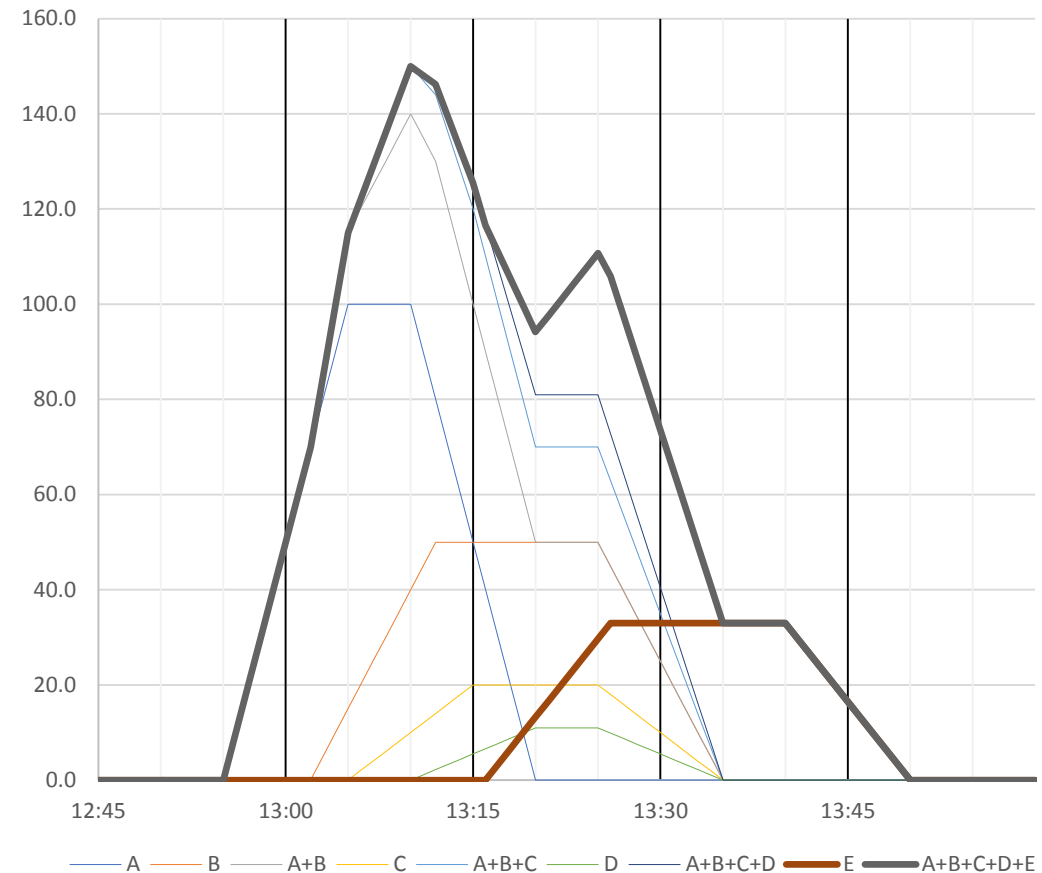
Calculation of VTL and PTL (D)

- The next Scheduled Activation will be added in the same way



Calculation of VTL and PTL (E)

- The next Direct Activation will ramp up within one quarter hour and down in the next quarter hour



Representation of VTL and PTL as breakpoints

- The plan can be represented using breakpoints
- A value at any time between two breakpoints can be linearly interpolated

