

Interoperability studies require extensive offline and HIL with real-time simulations. Are there any other options to simplify and speed up the development time of multivendor HVDC systems ?

Example of some options to simplify and speed up the development time of multivendor HVDC systems

Making the VSC-HVDC system specifications standardised and open is essential to simplify and speed up the development of the multivendor VSC-HVDC system.

The specifications should include the types and attributes of control and protection signals exchanged between a terminal controller and a high-level controller as shown in Table 1 and Figure 1. The specification should also cover the definition of variables for power to dc voltage droop characteristics. The simulation case scenarios should be well discussed before starting the simulations.

The simulation software of the same version should be used for exchanging black-boxed simulation models.

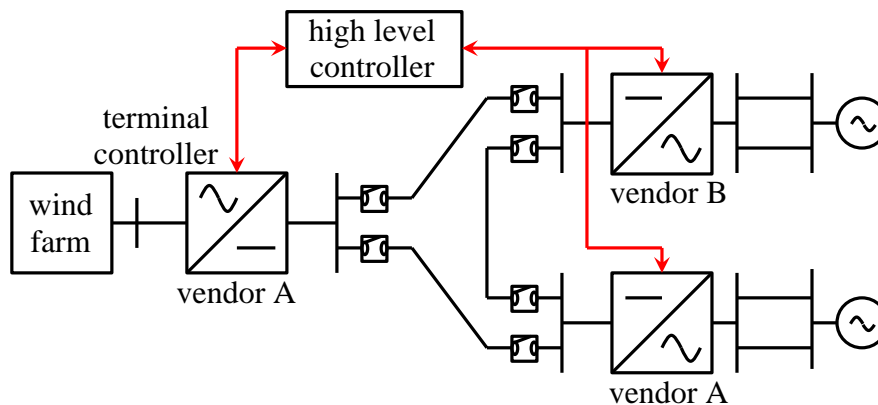


Figure 1 Signal Exchange between high-level controller and terminal controllers.

Table 1 Example of signals exchanged between high-level controller and terminal controller

signal type	attribute
start / stop command	0 & 1 flag
control mode switching	0 & 1 flag
droop slope value ($\Delta V_{dc}/\Delta P$)	analog
Pmax, Pmin limits	analog
Vdcmax, Vdcmin limits	analog
interruption signal for windfarm	0 & 1 flag