Type 4 Wind Turbine

1. Generator is a Permanent Magnet Synch MW (constant field excitation)

   - Machine side converter can be a diode rectifier
2. Generator is an induction machine (squirrel cage rotor).

- Asynchronous machine

- MSC is a voltage source converter

Control is similar to adjustable speed motor drive & controlled to set phase from winding.
Inject rotor current to move flux to be at optimal generator point (inject power to rotor) at wind speed point 1. Extract power from rotor such that rotor flux at optimal generator point at wind speed point 2.
Type 3 Wind Turbine
(Doubly fed induction generator (DFIG))

STATOR

STATOR WINDING

60Hz

P from GSC to RSC
Synch Synchronous Case

Rotor to Stator MVA

~30% of Stator MVA

Dynamic Braking (Type 2 WT)
GSC converter controls

1. Use to maintain power between RSC and M/C

2. Rotor side converter is a non-controlled machine
- Speed control
- T. speed control

(USC), somewhat prone to subsynchronous control interaction (SSCI)