1. From each of the topologies, output voltages will be:

Single Phase Half-Bridge Controlled Rectifier:

With α=0°, Output voltage will be 0.45\*Vs, and maximum output voltage we achieve will be 180 V while Vs is line-line Voltage. Since this topology cannot reach 500 V, we will not choose it.

Single Phase Full-Bridge Controlled Rectifier:

With α=0°, Output voltage will be 0.9\*Vs, and maximum output voltage we achieve will be 360 V while Vs is line-line Voltage. Since this topology cannot reach 500 V, we will not choose it.

Three Phase Half-Bridge Controlled Rectifier:

With α=0°, Output voltage will be 1.17\*Vs, and maximum output voltage we achieve will be 269 V while Vs is phase Voltage. Since this topology cannot reach 500 V, we will not choose it.

Three Phase Full-Bridge Controlled Rectifier:

With α=0°, Output voltage will be 2.34\*Vs, and maximum output voltage we achieve will be 538V while Vs is phase Voltage. In this topology, we observed an output voltage greater than 500 V, so this topology is suitable.

1. Cosα = 500V/538V, cosα = 0.93 so α = arccos(0.93) = 21.57°.