A Supplementary Material

A.1 Plant operation under MPC

These figures are shown in the body of the report for a hybrid site that uses both wind and solar. The figures included here are at the other two sites which were analysed in detail, which use wind only (top) or solar only (bottom).

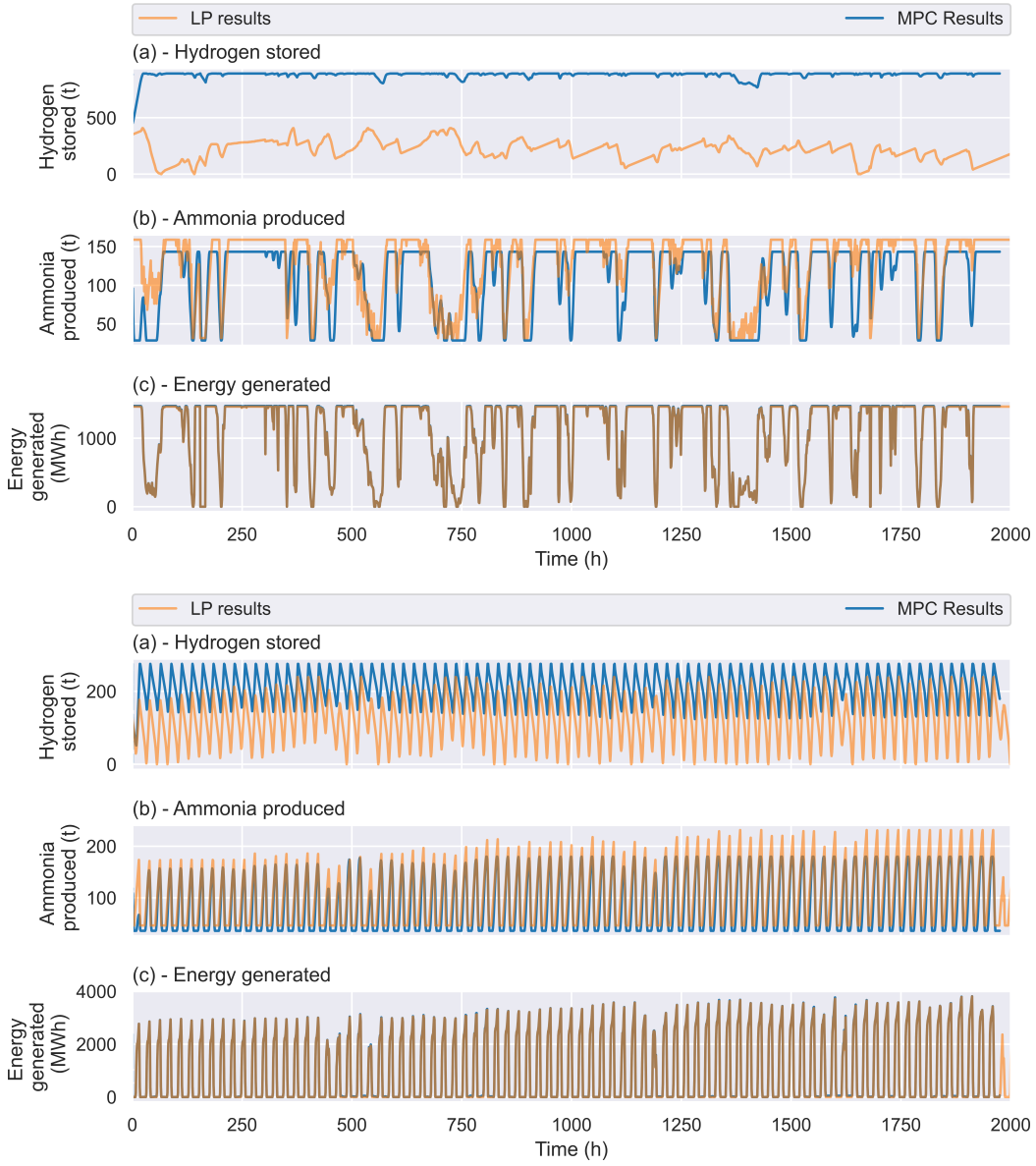

Fig. A.1 Plots comparing the operation of the MPC controller with the LP optimisation for a wind-dominated site (**top**) and a solar-dominated site (**bottom**), for 2022. These plots are produced without significant tuning of parameters which is described in the article; for instance the tuning penalty in both plots is most likely too high, as the hydrogen storage is emptying much less frequently than occurred for the LP case.

A.2 Plant failure frequency - 2022

Equivalent plots for a wind-only site in 2022 are included in the body text; these figures are for hybrid wind-solar and solar-only sites.

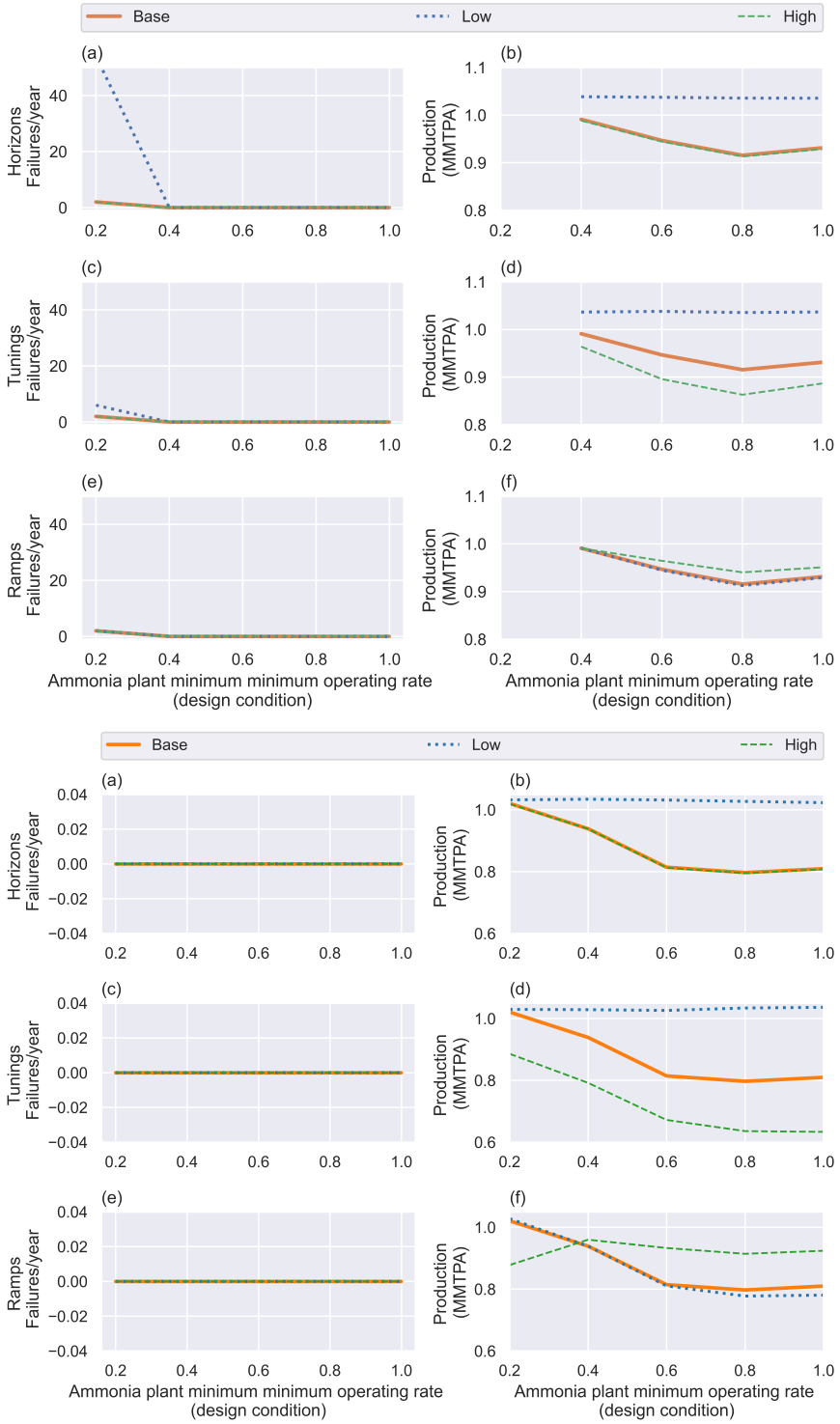

Fig. A.2 Plots of the failure frequency (**left**) and production (**right**) using the same parameters as described in Figure **??** for a hybrid wind/solar site (**top**) and a solar dominated site in 2022 (**bottom**)

A.3 Plant failure frequency - 2050

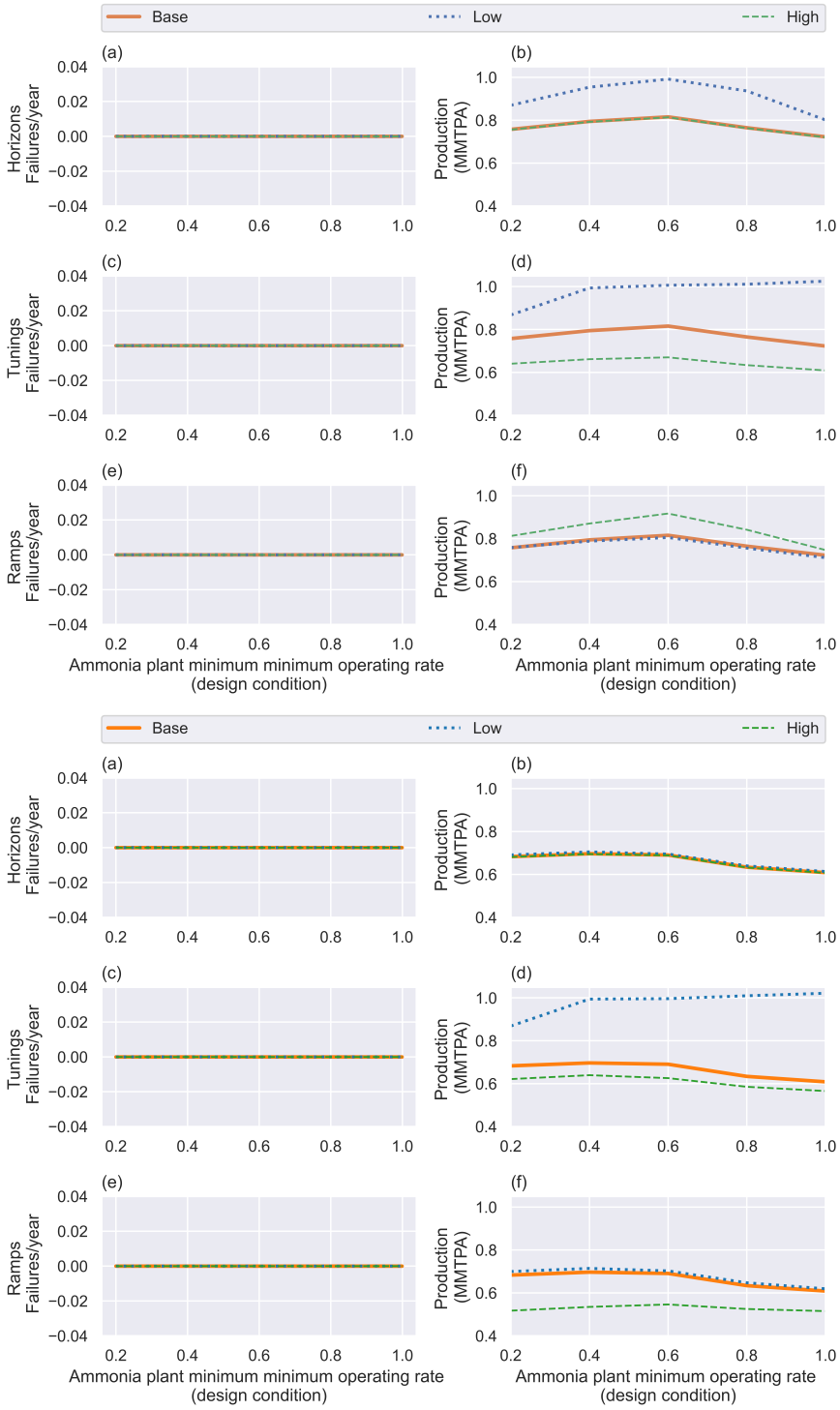

Fig. A.3 Identical plots to those shown on the previous page, except using data from 2050. Plots of the failure frequency (**left**) and production (**right**) using the same parameters as described in Figure 6 for a hybrid wind/solar site (**top**) and a solar dominated site in 2050 (**bottom**)

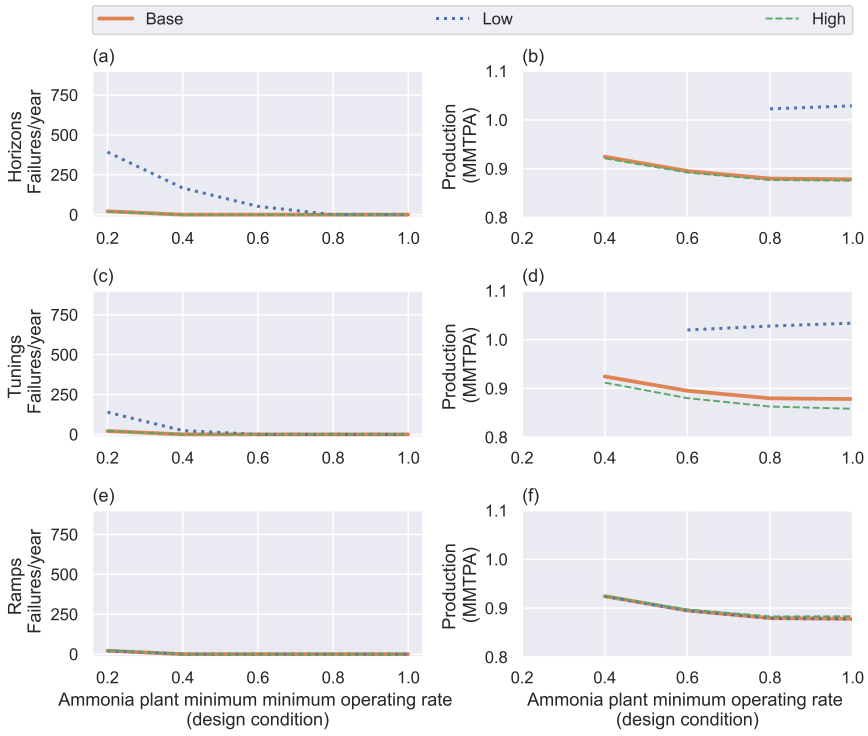

Fig. A.4 Plots of the failure frequency (**left**) and production (**right**) using the same parameters as described in Figure 6 for a wind site in 2050.