

Table 4-7: Commissioning and Initial Operations: Refuelling – Challenges and Best Practice Solutions.

Challenges	Best Practice Solutions
<p>Technical Issues/Faults</p> <p>HRSs as of 2021 are still not standardised or fully mature. Operators have encountered a wide range of challenges, including:</p> <ul style="list-style-type: none"> • Component failure • Software failures • Safety check failures • Noise (chiller) and leakage issues • Clear need for backup plan for refuelling <p>Maintenance</p> <ul style="list-style-type: none"> • Lack of local maintenance expertise and slow response time from supplier to fix issues <p>HRS – Bus Interface challenges</p> <ul style="list-style-type: none"> • Communications • Pre-cooling <p>Data Logging</p> <ul style="list-style-type: none"> • Accessing data on refuelling has not always gone smoothly 	<ul style="list-style-type: none"> • Testing the refuelling process in slow and careful stages • Using contract requirements to ensure ongoing technical support from supplier • Check the H2 purity at the dispenser outlet after washing the system with nitrogen e.g., during initial start-up, until nitrogen concentration is below its threshold limit. • Having and using backup refuelling arrangements • Ensure there is an adequate monitoring system on the HRS with quick response to alarms – specify supplier’s response time to problems in hours. <ul style="list-style-type: none"> • Maintenance agreement should include: <ul style="list-style-type: none"> ➢ 24/7 service hotline ➢ remote access to the HRS ➢ local support (incl. flying doctor) ➢ Training of local technicians to support maintenance <ul style="list-style-type: none"> • Communication between bus and HRS is important to ensure quick and complete fills. If there is no data transfer between bus and HRS, a more rigorous/conservative fuelling protocol needs to be followed to ensure safe refuelling while slowing down the filling process. • While pre-cooling is still being standardised, one site – in cooperation with the HRS manufacturer – has reconfigured refuelling schedule to avoid the need to pre-cool as much as possible (at a reduced speed of refuelling). • In some instances, data from the buses have been used to gather refuelling data as an interim solution to secure meeting (part of the) reporting requirements from the institution providing co-funding