

**Table 2-5: Planning for HRS Operations – Challenges and Best Practice Solutions.**

Challenges	Best Practice Solutions
<ul style="list-style-type: none"> <li>• <u>Risk</u>: Determining risk sharing among the local partners can be difficult because you need to specify the equipment and its capabilities to know the risk, and you need to know risk to specify</li> <li>• <u>Determining Size</u>: Optimising size (not too big not too small); forecasting size of hydrogen storage required now, <b>and in the future</b>, as well as planning for seasonal fluctuations in usage can lead to specifying unnecessary capacity resulting in additional cost; suppliers may offer equipment with “locked specifications”, so no scale up is available later on</li> <li>• <u>Design and Location of HRS</u>: Identifying the right location that meets the operator requirements; siting determines the HRS planning and HRS and FCB operational constraints and costs</li> <li>• <u>Numbers and Complexity of Decisions</u>: Most PTOs and PTAs lack experience with HRS hardware and H<sub>2</sub> fuel supply, especially with location /permitting/regulations issues; setting HRS supply contract terms &amp; conditions is complex; technical planning can be affected by changing national regulations</li> </ul>	<ul style="list-style-type: none"> <li>• <u>Specify for Local Needs</u>: As part of the dialogue among local stakeholders, review and refresh local needs such as HRS ideal location(s); be aware that a HRS requires a considerable area of a bus depot if that is where it is to be located; work out supply chains for H<sub>2</sub>, <b>including back up supply</b> (numerous sites have mentioned that at the Operations stage this has been essential to smooth operations; see section 4.2)</li> <li>• <u>Inform yourself of the Legal Framework</u> in which the HRS will operate, certification and permit requirements for the new technology and fuel; be prepared for lack of knowledge among regulators</li> <li>• <u>Use Pre-Tender Processes</u> such as Requests for Information; the limited and non-standardised market means that you will not be overwhelmed with information, but early necessary decisions will become clearer; try to get technical concepts from more than one potential supplier in the pre-tender stage</li> <li>• <u>H<sub>2</sub> Supply</u>: All H<sub>2</sub> supplied must be ‘green’ to fully address climate issues in particular; definitions of Green H<sub>2</sub> are still developing and in the short term green supply may not be possible (see Table 3-3); consider all supply pathways offered and source well to wheel investigations of emissions - there are quite a few available that may be adaptable to your context; encourage the industry to provide the solution i.e. make it an industry problem not an operator problem; make sure you understand the pros and cons of on-site and off-site production of the hydrogen; think about the need for redundancy of components in the HRS (e.g. compressors, dispensers, piping etc.)</li> <li>• <u>Make early Decisions</u>: Define "must haves" to guide decisions; decide on scale; know permitting requirements; develop strategies to address TCO (price of the H<sub>2</sub> can be pivotal here); note any imperatives for location and design</li> <li>• <u>Options</u>: Consider turnkey suppliers to buy a HRS from <u>OR</u> simply tender for a H<sub>2</sub> per kg price at the nozzle with the HRS built and operated by a contractor; there are also leasing models emerging which give the PTO full use of an HRS for a number of years, including maintenance and possibly the option to increase</li> </ul>

capacity over time. Involve an Expert who supports you with their experience and know-how

- Plan for the Future: Scalability and flexibility of the HRS is important for growing fleets and, possibly, for joint use with other vehicles