Lessons learnt from the Kapfenberg case

The Kapfenberg frontrunner case shows the value of starting transformation planning from an existing local evidence base.

Learnt From the Frontrunner Case:

A central lesson is that **industrial waste heat should be treated as the backbone** of the transformation pathway where such a source is technically and contractually available. In Kapfenberg, the modelling approach therefore prioritised waste heat and assessed how additional flexibility options, storage use and limited electric heat affect dispatch and costs. Comparing operation with and without dispatch priorities proved useful for making the economic effect of operator-defined priorities transparent. The resulting cost impact was small, but the comparison helped distinguish between purely cost-optimal operation and operation reflecting strategic, contractual or security-of-supply preferences.

The analysis also demonstrated that **P2H should not be sized against peak demand alone**. Its economic relevance depends strongly on utilisable low-price electricity hours, storage interaction, grid tariff structure and the selected market-price threshold. The PV-only option is limited by the relatively small PV capacity, while PV + grid operation requires careful treatment of grid-related costs.

Sensitivity analysis was essential. Variations in demand profiles, electricity-price thresholds and dispatch assumptions changed the utilisation of production units and the economic role of flexibility options. For follower cases, this confirms that a single "best" scenario is insufficient for investment planning. Instead, a small and transparent set of operator-validated scenarios should be assessed, including baseline operation, priority dispatch, flexibility options and relevant demand or price sensitivities.

Recommendations for Follower Cases:

1. Start with a validated baseline and clearly document operator-defined dispatch priorities.
2. Use an existing masterplan or GIS/source register where available, but update it for investment-grade modelling.
3. Assess flexibility options such as P2H only as part of the overall heat-production portfolio.
4. Use sensitivities for either demand-profiles or price-threshold (or both) before fixing plant capacities.