Abstract This paper shares an evolving experience learned for modelling the thermal dynamics of buildings from live experiments run in Flexhouse1 at Risø Campus of Technical University of Denmark (DTU). Among different trials, circuit based grey-box models approach have been developed and improved from time to time. Although the intension of modelling the thermal dynamics of Flexhouse1 remains unchanged, the details of experiments and applied modelling approach do evolve over time due to the increase of knowledge and the improvement made to the experimental platform. In addition to presenting a summary of these details, additional suggestions on future improvements are discussed and preliminarily investigated.