Residential Flexibility, HEMS Interoperability and Energy-Intensive Appliances – RfI Findings

Introduction

Within the National Grid-Congestion Action Programme (LAN in Dutch), ElaadNL and FAN issued a Request for Information (RfI) to gather market feedback on their approach to improving interoperability between Home Energy Management Systems (HEMS) and energy-intensive appliances (see RfI). The RfI invited substantive comments on technical assumptions, the development approach (including open-source software), testing and demonstration plans, timelines and contractual arrangements. It also assessed interest in participating in the subsequent Request for Proposal (RfP).

Many (but Fairly Uniform) Respondents

A total of 27 submissions were received via the online form, originating from various market players. Notably, most were HEMS suppliers. Software vendors and a few manufacturers or importers of devices (such as heat pumps, home charge points and batteries) also contributed. This suggests strong interest among HEMS providers, while greater involvement from device manufacturers is desirable to achieve broad interoperability. Overall, respondents expressed enthusiasm for the proposed course and a willingness to collaborate on practical, scalable solutions.

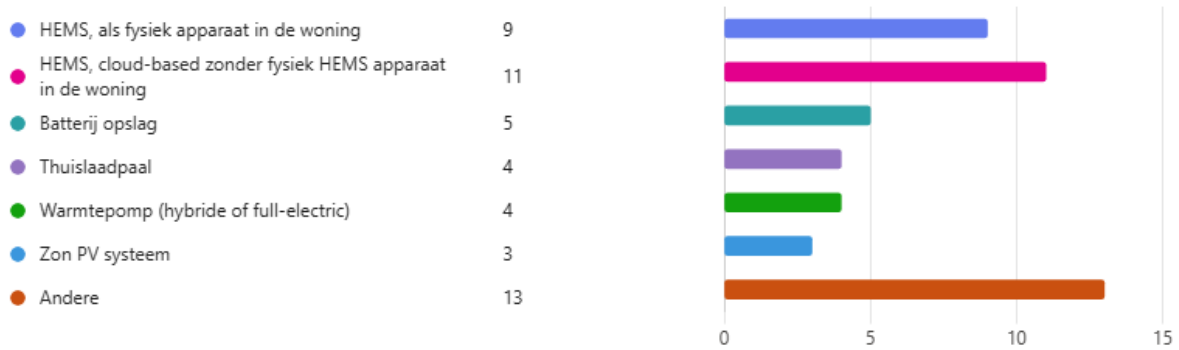

Figure 1: Overview of the products offered by the 27 participating parties.

Protocol Choices

Overall, respondents reacted positively to the proposed protocol set. They see the need for standardisation and value the decision to limit the number of protocols. OpenADR (for signals to the HEMS) is widely accepted as the logical choice. The device-side protocols S2, EEBUS, Matter, OCPP and Modbus also have support, though views differ on specifics. Some suggest adding KNX. Modbus is deemed essential for the installed base, provided secure integration and a clear mapping are defined. Matter is viewed more cautiously: adoption is still low and its inclusion may be

premature. Several parties note that obliging every HEMS to support all five protocols is ambitious; five mandatory interfaces could raise development and maintenance costs. A phased or reduced set of mandatory protocols is therefore recommended to keep participants on board.

Building Connectors as Open Source

The RfI revealed differing interpretations of "connectors." Not everyone shared the same view of the open-source connector's scope (e.g. a software wrapper/SDK vs. a generic EMS interface). Nonetheless, most respondents favoured jointly developing open-source components that implement the protocols. HEMS developers in particular said they could (help) build such connectors and welcomed a shared approach. None of the responding device manufacturers, however, expressed intent to develop an open-source connector for their products; they see their role more in adopting the delivered software.

Questions were raised about IP rights, warranties and maintenance of open-source code. Some doubted that open-source connectors would truly accelerate scale-up, given each HEMS's unique architecture and the complexity of maintaining five separate connector implementations. At the same time, many acknowledged they already build proprietary control software and that open-source collaboration presents both opportunities and risks.

Python and C/C++ were the preferred languages for connector development, matching the RfI suggestion.

Cloud-based HEMS solutions appear less directly involved at this stage. In short, the open-source route is viewed as promising, provided the deliverables, long-term quality, security and maintenance are clearly defined.

Testing Use-Cases and Interoperability

The two use-cases proposed in the RfI (grid-capacity control and dynamic-tariff control) were generally seen as a logical starting point. Respondents did wish to expand the scope later (e.g. self-consumption optimisation or energy-sharing between households). Such extensions need not hinder the kick-off with the two initial use-cases, but it must be clear these are merely the first step.

Nearly all respondents are willing to join collaborative tests in the ElaadNL Test Lab and welcomed the idea of multiple test days, potentially leading to a permanent interoperability test lab. For the next phase they advised elaborating the test scenarios and procedures and documenting them clearly. An agile approach, starting tests early (e.g. plug-fest style), received support.

Participation in the RfP, Collaboration and Compensation

Most parties indicated in their RfI response that they wish to take an active part in the planned RfP and follow-up project. The majority intend to submit a proposal to develop open-source components or integrate them into their own products. Several

respondents plan to contribute in other ways, e.g. by joining tests as a “launching customer.”

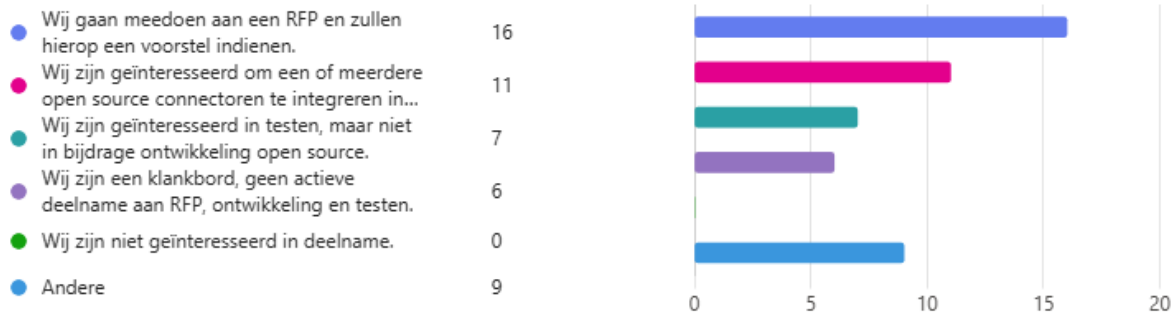

Figure 2: Responses on how parties wish to participate after the RfI.

The general attitude toward collaboration is positive; parties are open to joint development and knowledge-sharing in tests and demonstrations. Reimbursement and contract terms, however, generated mixed reactions. Estimated costs varied widely, and some said they could not yet provide an estimate based on the RfI information. While some foresee high effort (and costs), others expect far lower input. The takeaway: the RfP should specify precisely what must be built so bidders can budget more accurately.

On the proposed five-year contract for protocol support, some felt this commitment is lengthy; a shorter term (e.g. three years) could lower the entry threshold, although others acknowledged that a longer period may be needed to recoup investment and guarantee continuity.

Next steps

ElaadNL and FAN will incorporate the feedback to shape the RfP and the subsequent trajectory. The aim is to issue the RfP in July, allowing responses until mid-September. Before that, meetings and a workshop will be held so parties can clarify their RfI input and help refine the technical solution.

In the coming period the input will be processed into a follow-up plan. Based on the RfI results, ElaadNL will fine-tune the RfP’s scope and conditions (planned for June 2025). Further details on scheduling, consortium formation and participant roles will be shared later with the parties involved.

Thank you to all parties that responded to the RfI.

To be continued!