| | ENHANCED FREQUENCY CONTROL | | | |
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| **#** | **Name** | **Description** | **Categories** | **Feedback** |
| 1 | **Appropriate comms standards for different sizes of resources** | Your home car charger isn't on the OpTel network. That's just about ok at the moment, but with things like ZCO coming through, it will soon be a problem. There is a need for communications standards that cascade appropriately, as in metering. | Comm Network | Open Points |
| 2 | **what kind of communication is required?** | 500ms response will require very fast and reliable mean of communication | Freq. Respo. | Open Points |
| 3 | **Decreasing 500ms round trip** | According to 'call health', this teams call has 25ms round trip with 0.19% packet loss. Is there learning from the communications industry on minimising lag? It strikes me the benefit of additional speed would more than outweigh missing packets | Comm Network | Best Pract. |
| 4 | **Cost targets** | What are the cost targets for load controllers? Who would bear the cost? (High cost would exclude participants) | Freq. Respo. | Risks |
| 5 | **automation of instruction** | May be required to meet the latency requirements | Comm Network | Best Pract. |
| 6 | **C37.118 security** | Is this protocol secure for use on the internet? My understanding is this is designed for use in private network? | Tech Dev. | Risks |
| 7 | **Comms min requirements** | Will the comms requirements limit who can participate as local controller | Freq. Respo. | Open Points |
| 8 | **Interaction with grid forming inverters?** | Slide 26 shows interaction with other services but how does this 'play' with grid forming inverters? | Freq. Respo. | Open Points |
| 9 | **End user participation** | What would likely benefits be and therefore likely level of future participation- or would you expect it to be mandatory | Freq. Respo. | Open Points |
| 10 | **Link w market reform/rules** | Can aggregators overlap regions? Can local controllers participate with more than one aggregators | Freq. Respo. | Open Points |
| 11 | **Opportunity to test what needs to change in the market rules** | Test wind and battery together - change ROC or how other incentives need to change, split the up and down, etc.. | Freq. Respo. | Open Points |
| 12 | **Look at trading exchanges for architectural best practise** | If we consider requirement of real time monitoring of frequency, logic layer to determine next best action and dispatch instruction initiated/confirmed; this has many similarities to algo trading on commodity exchanges, with many participants. | Comm Network | Best Pract. |
| 13 | **Consider ireland** | Ireland has even greater penetration of non synchronous generation what lessons are being learned | Freq. Respo. | Best Pract. |
| 14 | **Mechanism for instructing smaller units** | Challenge of greater complexity - analogy to MDI | Tech Dev. | Open Points |

| # | Name | Description | Topics | Feedback |
|---|------|-------------|--------|----------|
| | VIRTUAL ENERGY SYSTEM | | | |
| 1 | Data Science Loops | ESO uses data science to create forecasts and operating plans. Others use these forecasts as inputs to their own models and plans. This invalidates ESO's starting assumptions - we have a loop. To avoid such loops, run models in the open. | Technology | Challenges |
| 2 | Starting the journey | Big challenge around starting without waiting for a perfect model to be 'designed' | BusinessCase | Challenges |
| 3 | Ownership and governance | Who will own the core of this and who will govern the access / exposure / security as it scales across the industry? | Gov/Reg | Challenges |
| 4 | Integration of competing solutions | Digital twins with competing solutions - EVs scale up vs I&C demand response/self-consumption vs distribution expansion | BusinessCase | Challenges |
| 5 | Third parties connect to the virtual system | The idea is that third party systems (e.g aggregator) can connect to test communications with the system, to virtually provide service (e.g DSR service) and see that everything is working, and virtualize their value. | BusinessCase | Challenges |
| 6 | Timeseries & resolution | Make sure the backbone is appropriate. Timeseries and ensuring 'when' data is available / published is a key foundation to ensure the VES will be representative | Technology | Challenges |
| 7 | Connecting to research organisations | What kind of relationships in research and innovation mode are needed | Technology | Engagement |
| 8 | Decision analysis and control approaches | Very different approaches are needed for planning, ops planning and ops.<br><br>In particular latter tends to involve passing of summary information rather than raw data - in technical terms this might be the Lagrange multipliers in an optimisation problem | Technology | Challenges |