

BACKGROUND

The Irish power system is an islanded synchronous system which in many ways acts as a test bed and a first location for high levels of wind generation penetration.

The Irish power system currently operates with 40% annual generation from wind and solar sources. By 2030, the system aims to achieve 80% generation from wind and solar sources. This increase will primarily be driven by the addition of 5 – 7 GW of offshore wind on a system with a peak demand of 6 GW. The integration of such a comparatively large amount of offshore wind onto the system will create both challenges and opportunities.

OBJECTIVE

A detailed power system analysis has been carried out to establish a pathway for the Irish power system to achieve 80% renewable generation. The challenges and opportunities were analysed with a possible pathway to delivering the ambitious 2030 targets developed. The key focus of this work was to deliver a credible pathway from the use of mature and readily available technologies.

METHODS

Power System Needs Assessment

The needs of the future offshore wind dominated power system were identified through detailed analysis in PSSE.

Power System Network Build Assessment

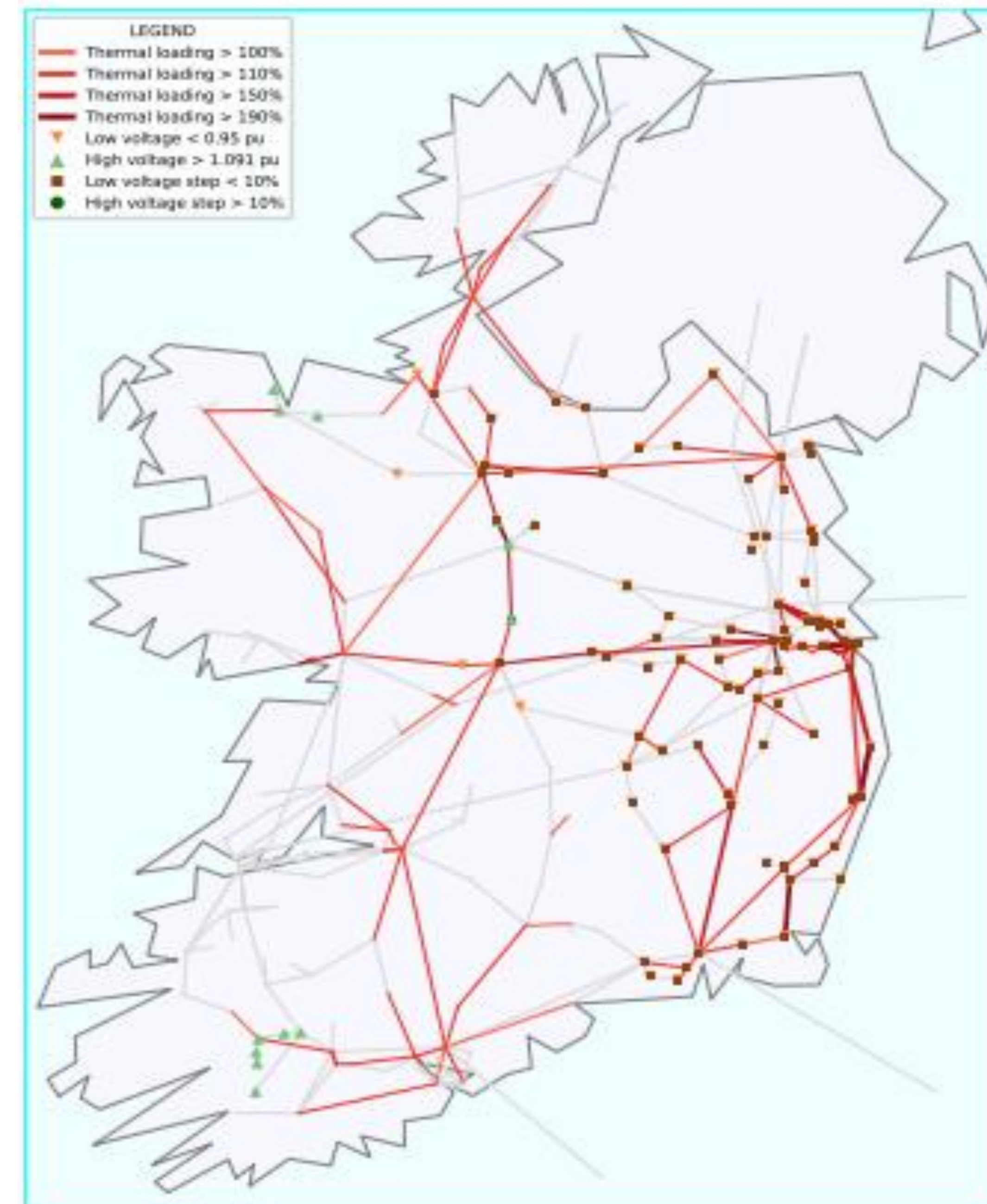
After the needs were identified, potential network solutions were examined. Key to this was determining what areas could benefit the most from new or updated circuits. Grid build out was necessary for areas which saw the highest overloads during the needs assessment.

Technology Utilisation

With limited resources, it is only possible to build a certain amount of transmission grid by 2030. Public acceptance of new grid also presents a significant challenge. Technologies have been identified in key areas of the grid where they could have the most benefit and could facilitate the greatest increase in renewable generation.

RESULTS

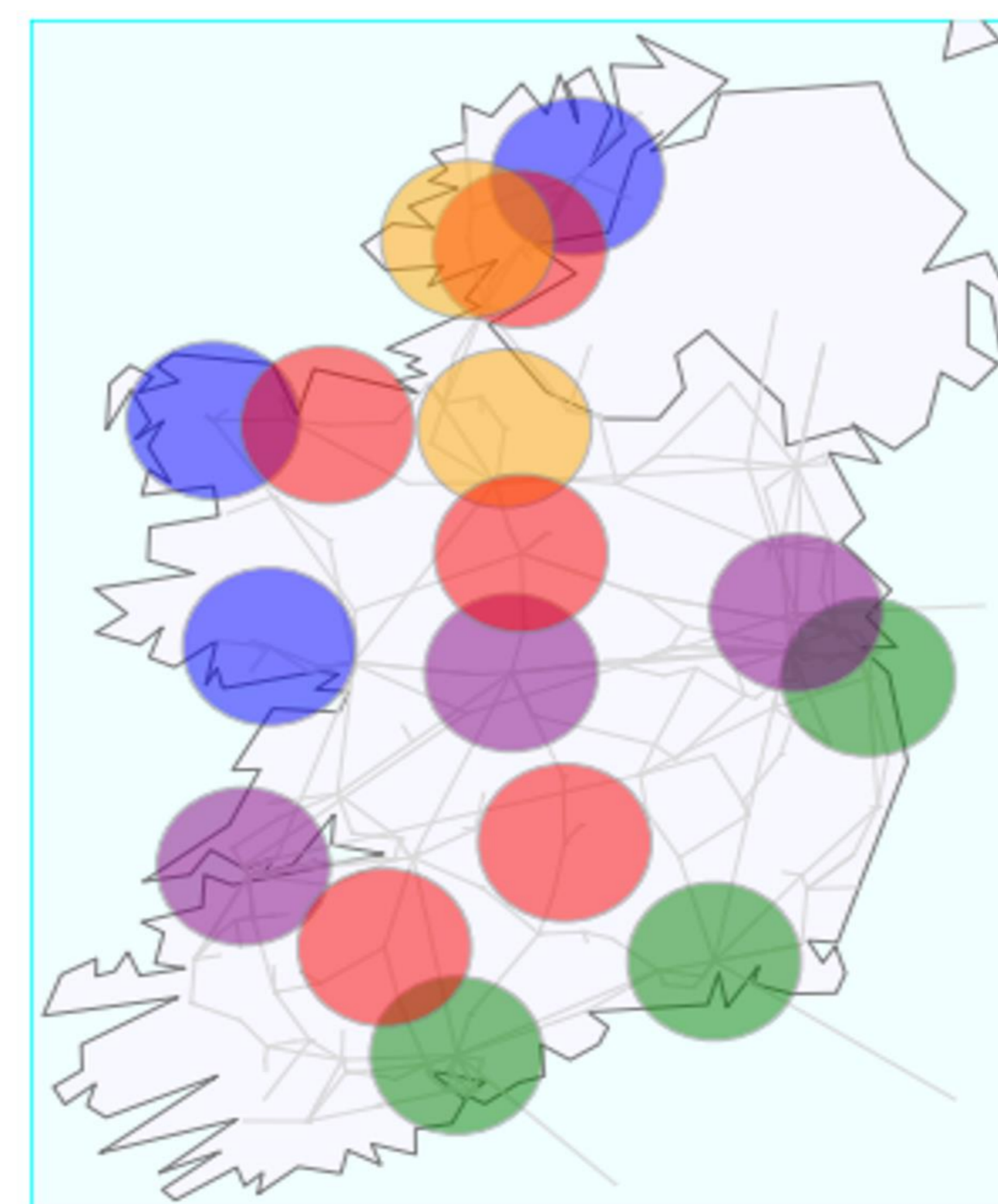
Power System Needs Assessment



Power System Network Build Assessment



Technology Utilisation



CONCLUSIONS

A new approach is needed

Facilitating large quantities of offshore wind generation requires a step change in transmission network design and operation. Detailed power system analysis has identified extensive needs on the Irish power system along with potential solutions.

Innovative technologies need to be deployed

Although part of the answer, new grid is no longer the only solution to the challenges posed by increased electrification. Our power system must operate in a smarter and more effective way, making better use of the current infrastructure. Technologies such as power flow controllers, statcoms, dynamic line rating, batteries, synchronous condensers and demand side management all have their role to play in achieving a net zero power system.

Grid build out is still necessary

A new approach and the use of new technologies is needed if a net zero power system is to be achieved. However, grid build out is still a critical aspect of transmission system development.

Offshore wind will dramatically impact onshore grid

The impact of offshore wind on the onshore grid will be dramatic. Huge quantities of new renewable generation will need to come ashore onto an already stressed network. The impact of this generation and the importance of ensuring the grid is ready and able to accommodate it must be a focus if offshore wind is to truly be the game changer that is needed for our greenhouse gas emissions.

CONTACT INFORMATION

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