

HeCSO: Heuristic for Configuration Selection in Optical Network Planning

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Key Message

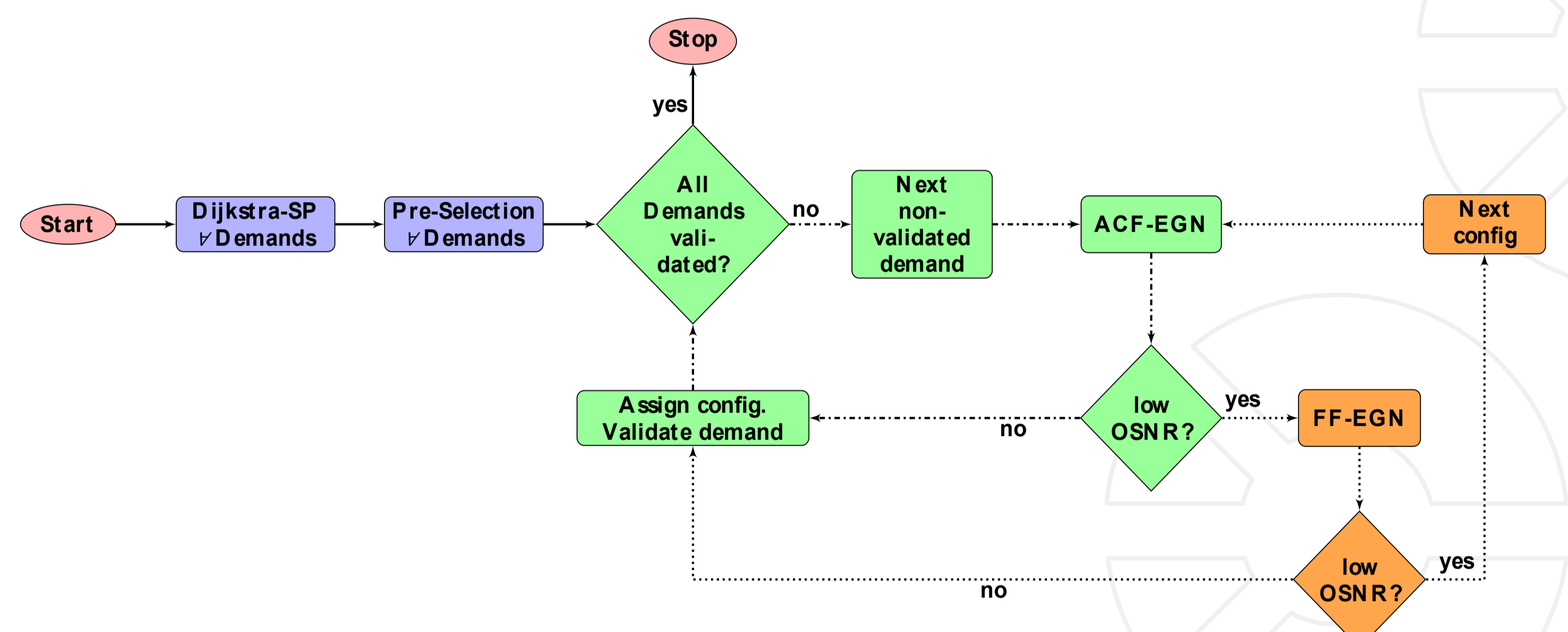
- Proposed transceiver configuration selection heuristic shows:
 - A 40% increase in network throughput compared to Accurate Closed Form Enhanced Gaussian Noise Model (ACF-EGN)
 - An 87% decrease in execution time compared to Full-Form EGN (FF-EGN)
- Network agnostic results
- Reproducible using open source reference network information [1]

Motivation

- TeraFlexTM [2] supports software tunable transponders
- Offline greenfield network planners aim to increase overall network capacity
- FF-EGN [3] based OSNR is accurate but complex calculations
- ACF-EGN [4] based OSNR is quick but approximate
- Need for both speed and accuracy

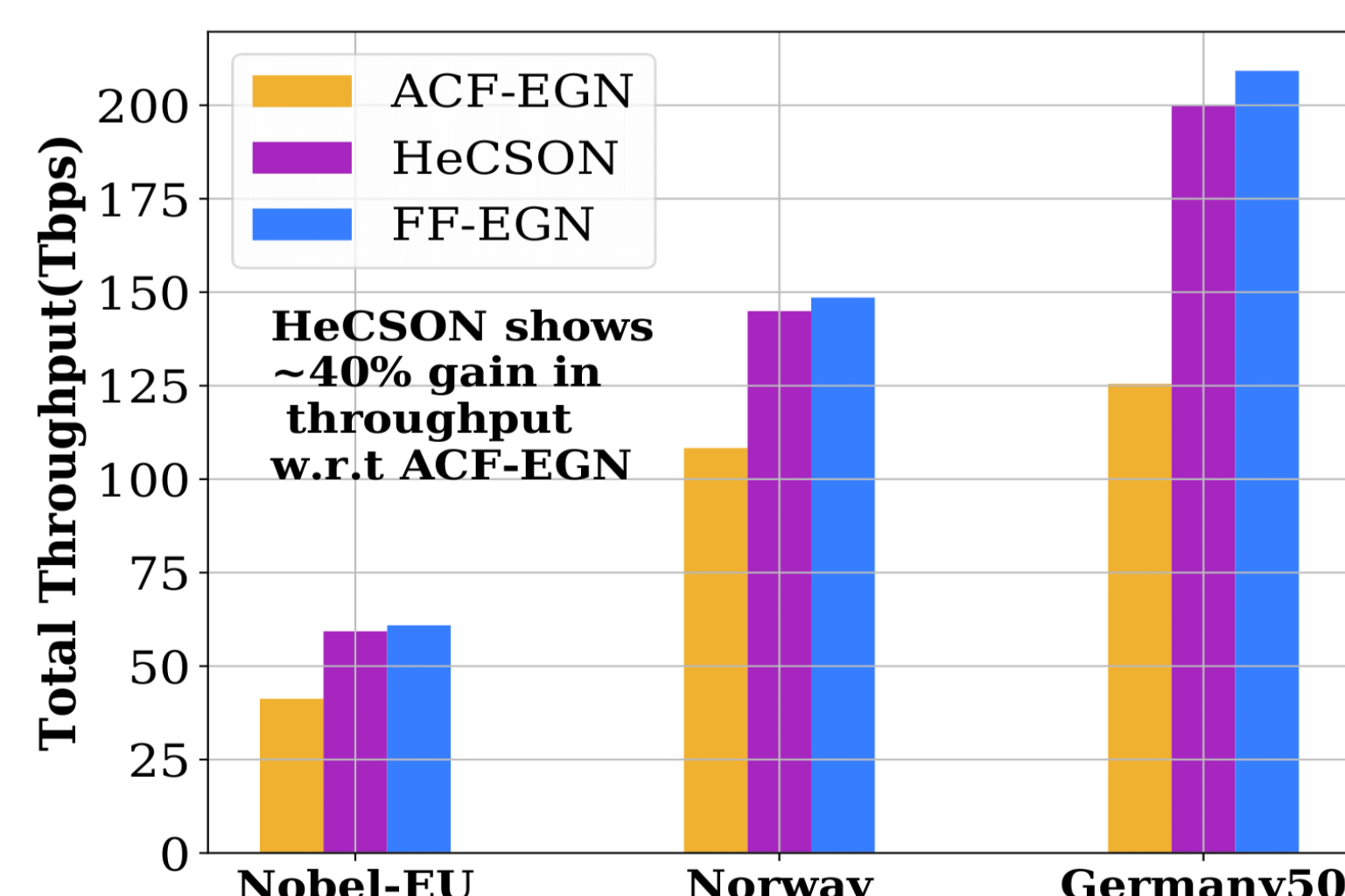
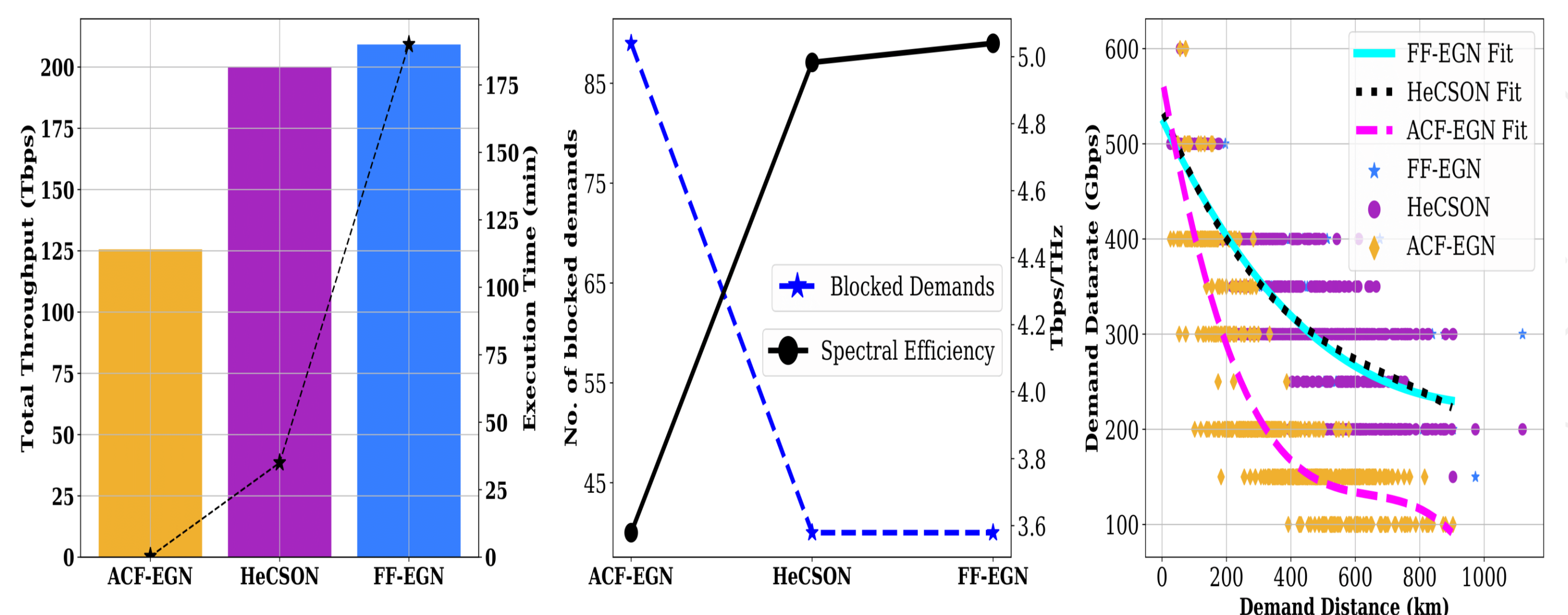
HeCSO Workflow

- Dijkstra's SP routing of all demands
- Pre-Selection** of all demands based on linear OSNR
- For each demand:
 - Fast Configuration Selection** based on ACF-EGN
 - Accurate Configuration Validation** based on FF-EGN



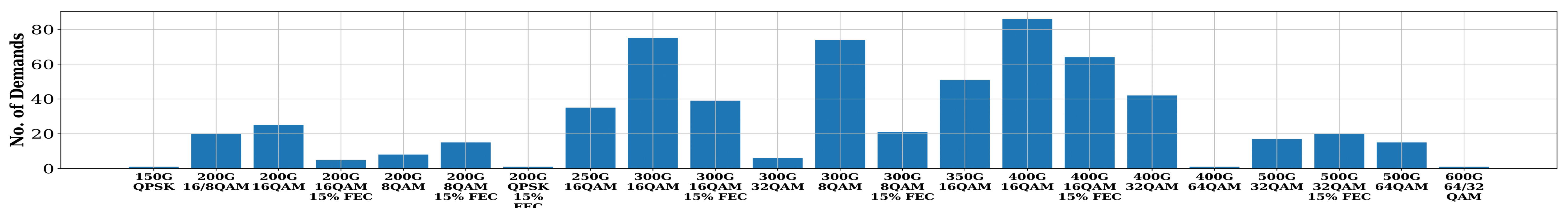
Selected Results & Conclusions

- For Germany 50
 - Throughput - 199.85 Tbps** (ACF-EGN 124.75 Tbps)
 - Execution Time - 35 mins** (FF-EGN 195 mins)
 - Most light-paths can be upgraded to **300-400 Gbps**
 - Spectral Efficiency and blocked demands similar to FF-EGN
- Comparable results for EU and Norway
- HeCSO offers:**
 - An estimate for network planners on configuration selection
 - Possibilities for disaggregated optical network planning



References

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- A. Carena et al, „EGN Model of non-linear Fiber Propagation“, Opt. Express 22(13), 2014
- M. R. Zafreh et al, „Accurate Closed-Form GN/EGN Model...“, IEEE Photon. Technol. Lett. 31(16), 2019



Acknowledgements

This work is partially funded by Germany's Federal Ministry of Education and Research under project OptiCON (Grant IDs #16KIS0989K and #16KIS0991)