

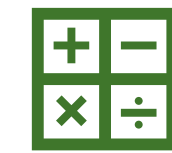
# EERI: Energy-Efficient and Resilient Internet



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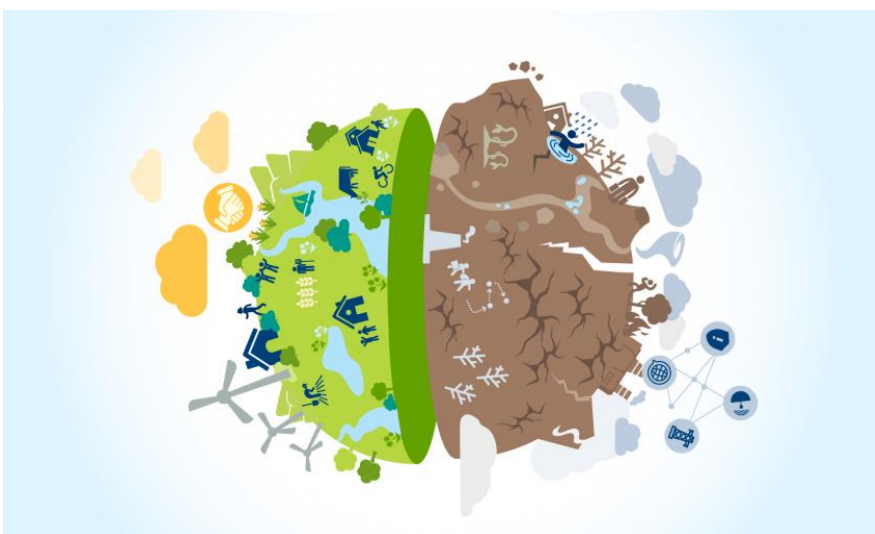
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The Internet will use a fifth of all the world's electricity by 2025. How can we reduce its energy footprint and make it resilient against risks like energy failures and climate-induced disruptions?

How resilient are our cellular networks, especially against climate-induced effects?



Investigate the resilience of 5G technology to (climate-induced) failures by using a network model, combined with realistic random failure models.

## Research questions/goals

Is 5G more energy-efficient?



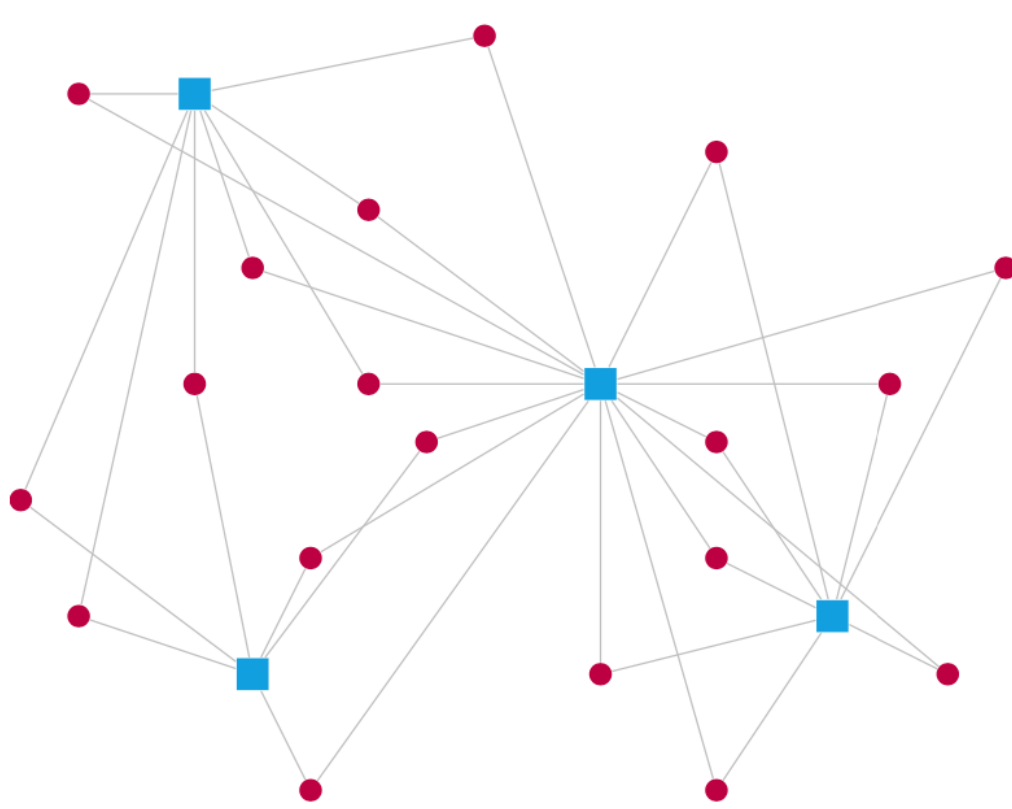
Investigate the energy-efficiency of 5G and beyond networks and design more energy-efficient wireless protocols and hardware

How does the highly crowded spectrum affect phone hardware?



Investigate how to integrate all the current radio standards into single hardware, improving their energy-efficiency.

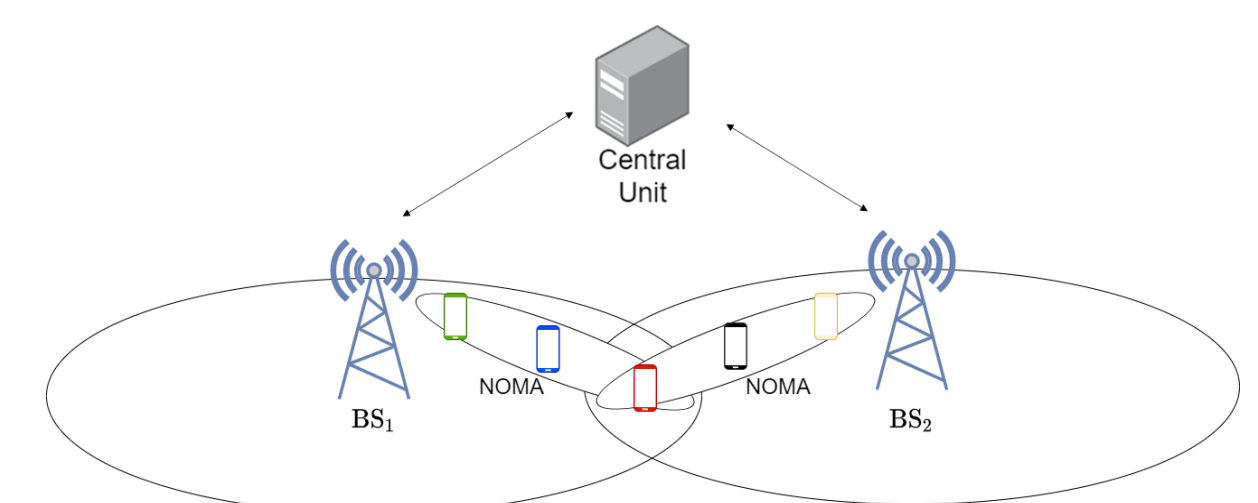
## Ongoing work



How does multi-connectivity, where users connect to multiple base stations, influence the resilience and quality of 5G cellular networks?



How can we make (Dutch) cellular networks more resilient? Which regions are vulnerable to potential risks? Which emerging trends should be applied for ensuring resilient cellular networks?

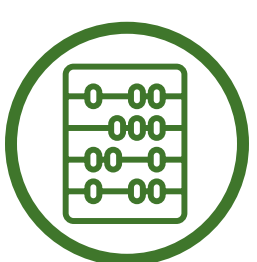


Are non-orthogonal multiple access systems energy efficient? Does joint transmission improve energy efficiency? What power consumption models (PCMs) are used in the literature? Does the use of an accurate PCM improve energy efficiency?

## We are looking for you!



How do the internet and the energy grid affect each other? Do you have experience in modelling energy supply/demand? We could use this for a multilayer approach to power-induced failures!



Can we improve the resilience of the internet by optimizing its power allocation or the locations of base stations? Do you have techniques for designing and solving such optimization problems or for using machine learning for optimization? We are currently working on this!



How can we make phone hardware more resilient, robust to aliasing while retaining their energy-efficiency? Do you have techniques or algorithms to optimize channel allocation based on signal-to-noise ratio and aliasing? We could use this to make the system robust!



Do you want to brainstorm on resilience concepts for (wireless) communication networks? Then, please contact us!

Contact us

<https://sites.google.com/eeriutwente>

