



NOMINET

SPECTRUM
MANAGEMENT

CONNECTIVITY | INCLUSIVITY | SECURITY

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CONNECTING EUROPE

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TODAY'S TALK

- 1 About Nominet
- 2 Our role within TVWS
- 3 The opportunity for TVWS across Europe
- 4 A closer look at France, Germany and Sweden
- 5 Key takeaways





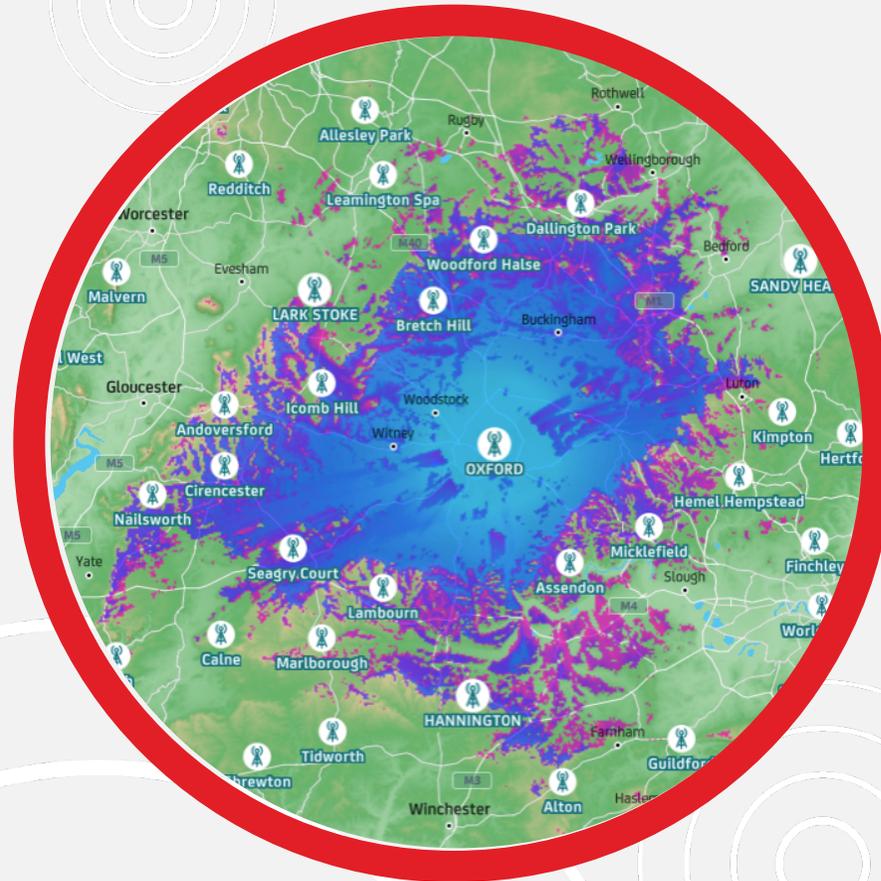
ABOUT US

We're responsible for a vital part of today's UK internet infrastructure. Building on this expertise, we're developing leading-edge technologies to support the internet of tomorrow.

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NOMINET'S ROLE IN TVWS

- Operational database available in the UK
- Operational database implementation with the DSA model rules
- Collaborating with partners and regulators in Africa to enable TVWS
- Submitted petition to FCC to operate in the US
- Collaborating with radio manufacturers to allow hassle-free solutions that enable scale deployments



REAL DEPLOYMENTS



1st European commercial TVWS network on the Isle of Arran (Scotland)

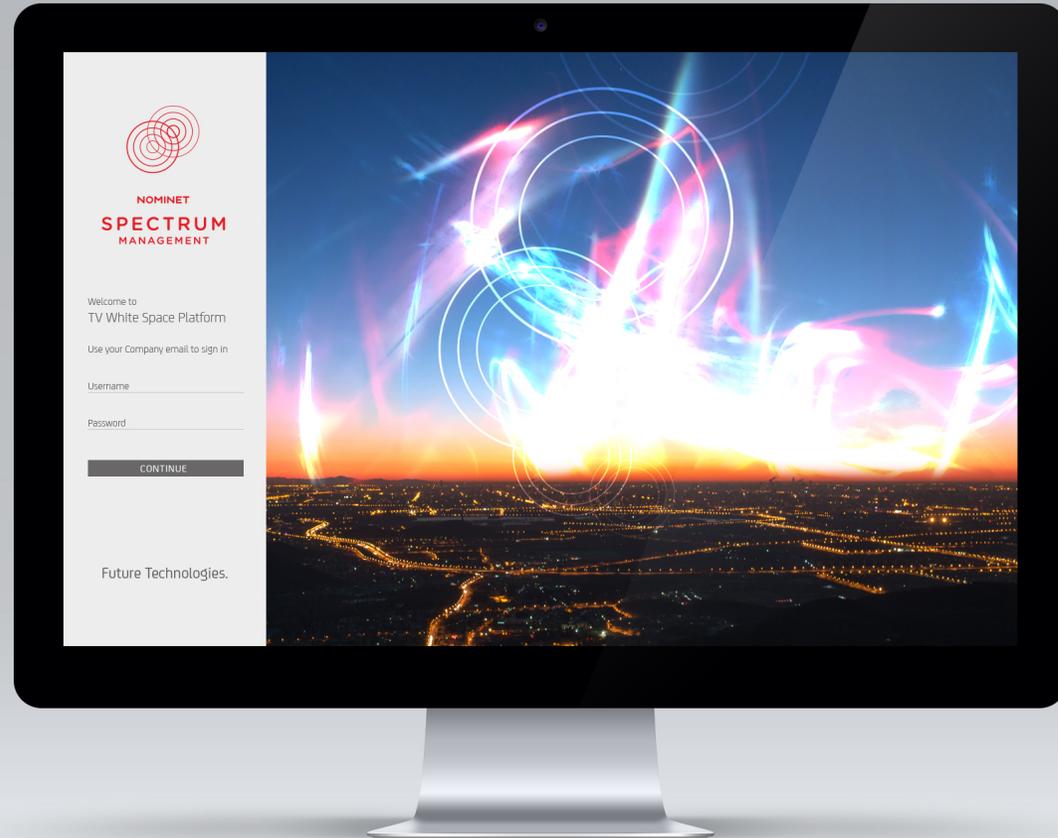
Bringing connectivity to Llanarth (Wales)

Bringing connectivity to Loch Ness (Scotland)

BROADWAY PARTNERS

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Nominet has built a global platform for dynamic spectrum management.



TV WHITE SPACE

TV white space (TVWS) refers to frequencies not used by incumbent services in the TV band (e.g. TV services)

Some of these frequencies could safely be used by other users without risk of interference with incumbent services.

TVWS is the first implementation of dynamic spectrum sharing through geo-location databases.



Microsoft TVWS pilot projects – more than 20 projects connecting 185,000 people

TVWS: Superior propagation characteristics

- Line-of-sight not required
- Up to 30 Km outdoor

TVWS: Enhanced indoor connectivity

- Great performance
- Broadband-comparable performance

TVWS: Carrier-grade radios

- Competitive cost
- No need for complex infrastructure (like 3G/4G)

THE EUROPEAN
OPPORTUNITY.



INTRODUCTION

Up to 10 million homes and businesses in Europe are outside the footprint of 2Mbps (downstream, even less upstream often).

As an indication in Europe, Poland, Estonia and Slovakia have a particularly high proportion of households which are not able to access broadband with at least 2Mbps download speeds – 19%, 15% and 11% respectively.

All markets would benefit from more efficient use of spectrum and exploiting the Digital Dividend.

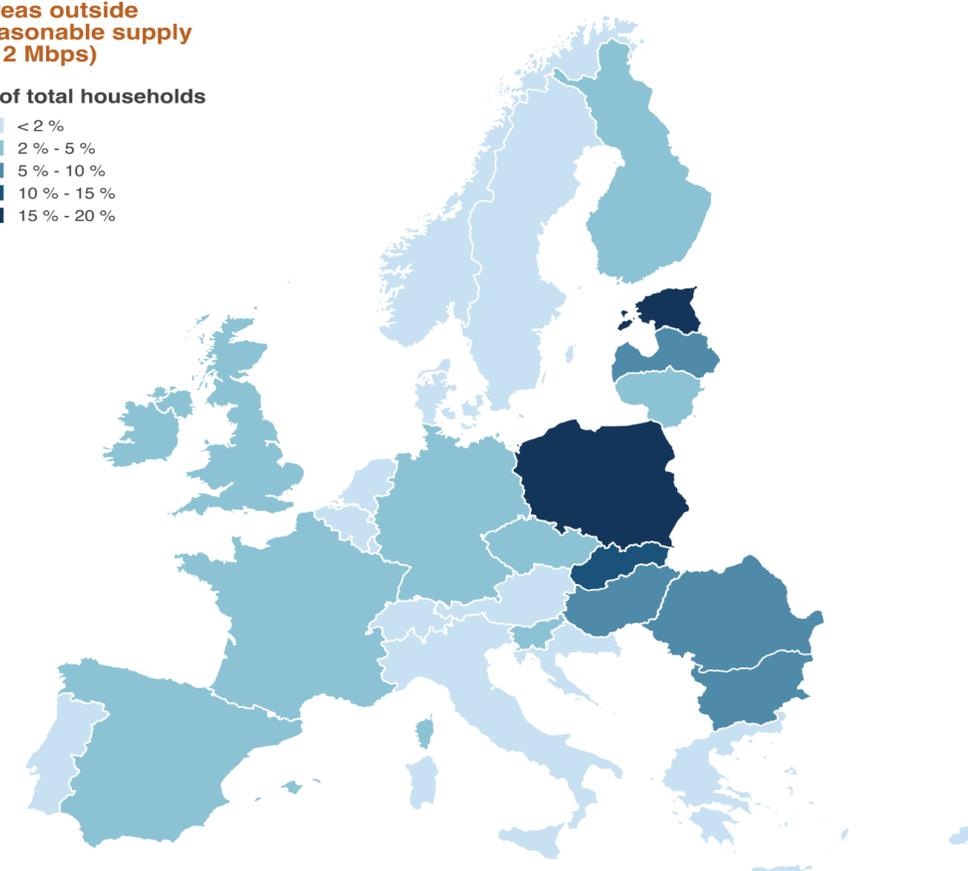
This could extend to 40 million as the technology develops.

EU28, Iceland, Norway, Switzerland

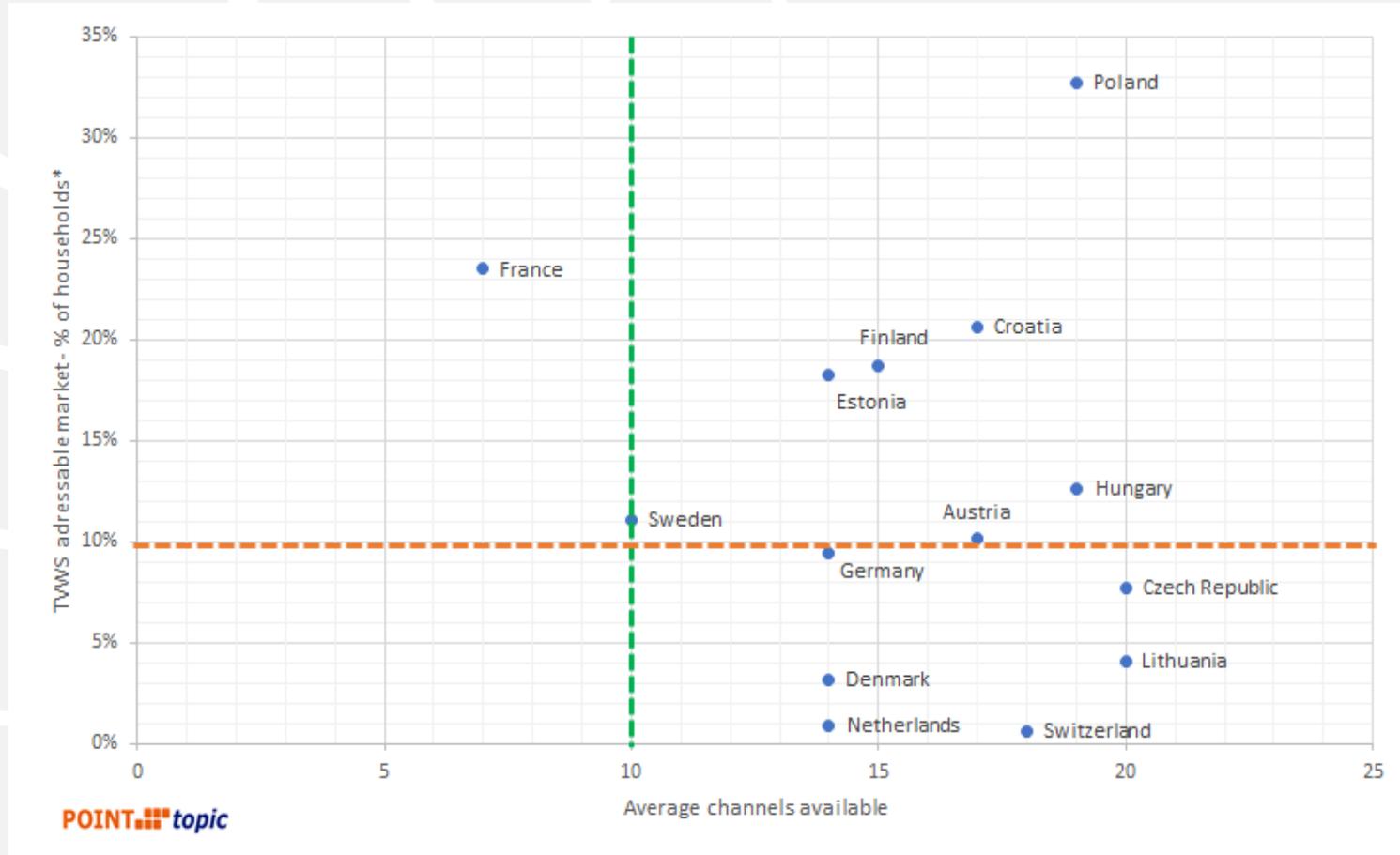
Areas outside reasonable supply (~ 2 Mbps)

% of total households

- < 2 %
- 2 % - 5 %
- 5 % - 10 %
- 10 % - 15 %
- 15 % - 20 %

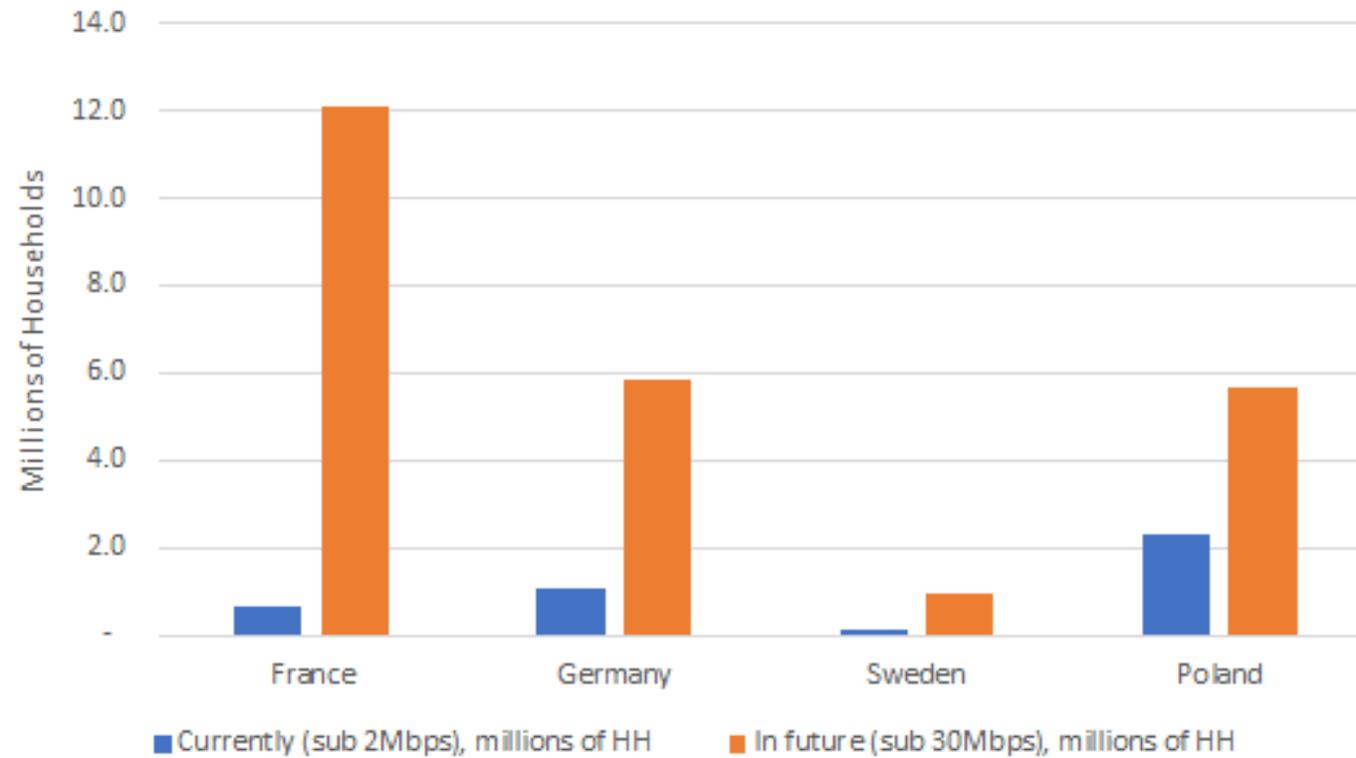


THE TVWS OPPORTUNITY – SELECTED MARKETS



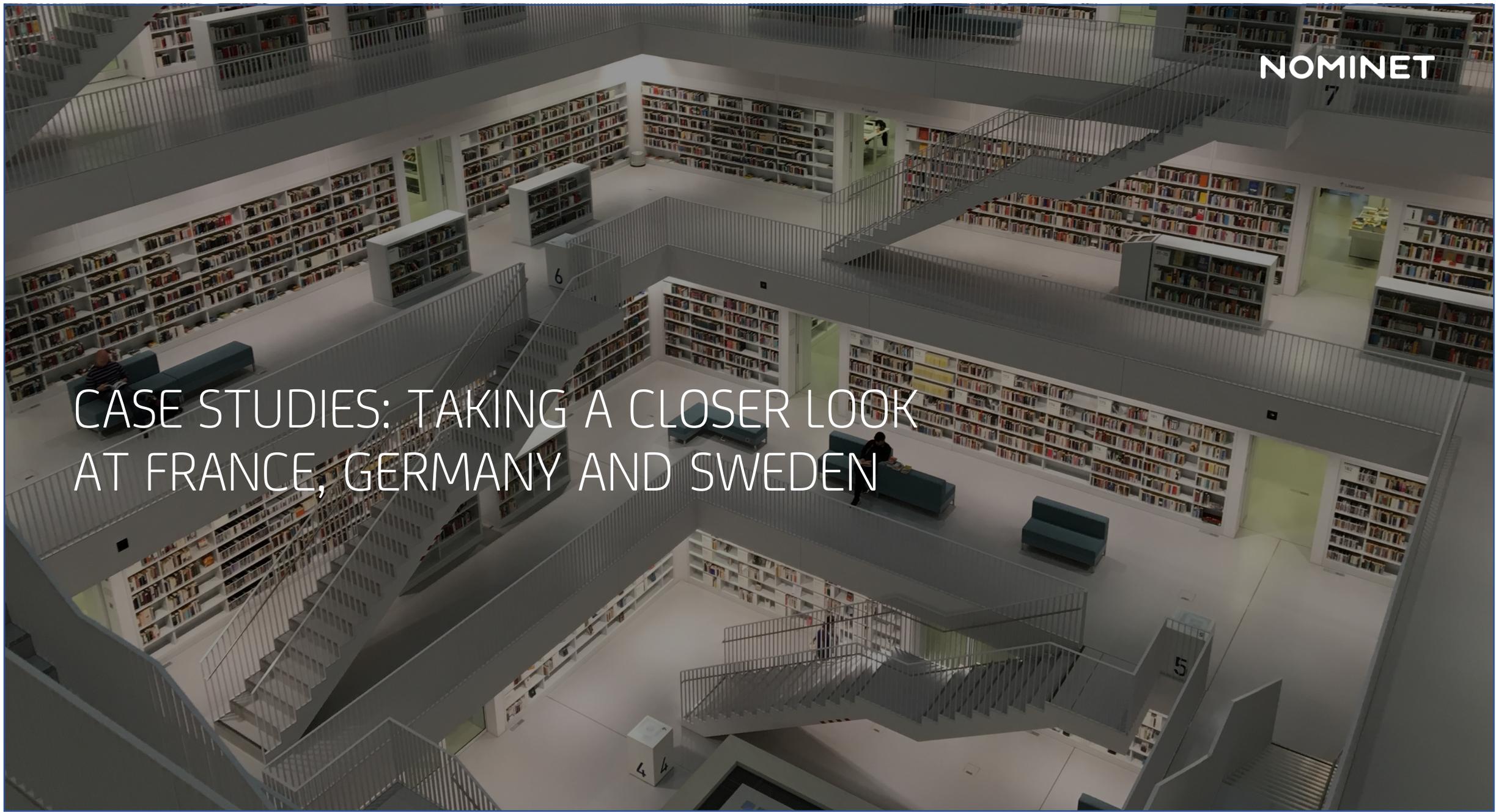
ADDRESSABLE MARKET FOR TVWS

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CASE STUDIES: TAKING A CLOSER LOOK
AT FRANCE, GERMANY AND SWEDEN



FRANCE

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FRANCE

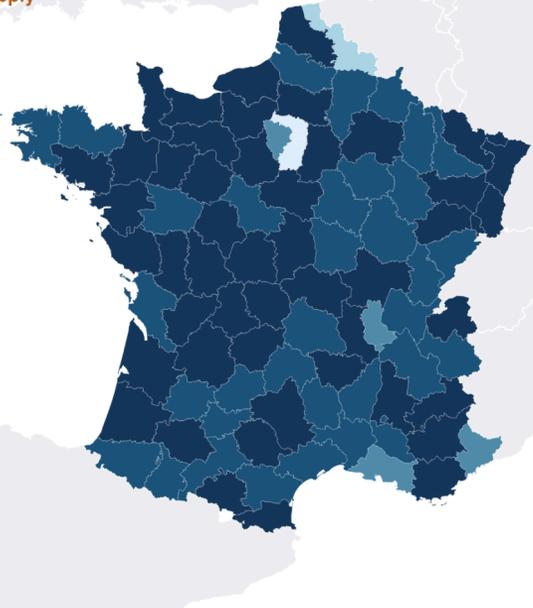
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France NUTS3 Map

Households outside reasonable supply (~2Mbps)

% of total HH

- < 0.5%
- 0.5% - 1%
- 1% - 1.5%
- 1.5% - 2.5%
- 2.5% - 3%

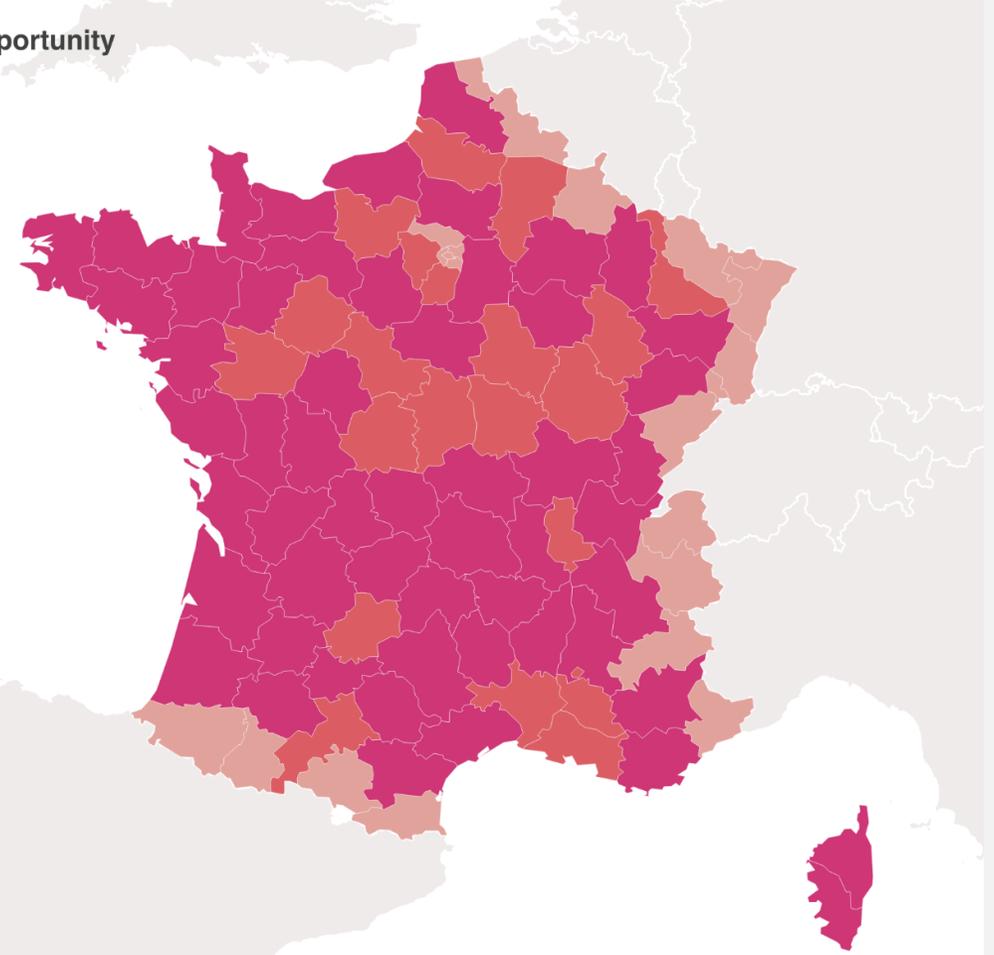


POINT.topic

France NUTS3 Map

Relative Opportunity for TVWS

Lower
Higher



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GERMANY

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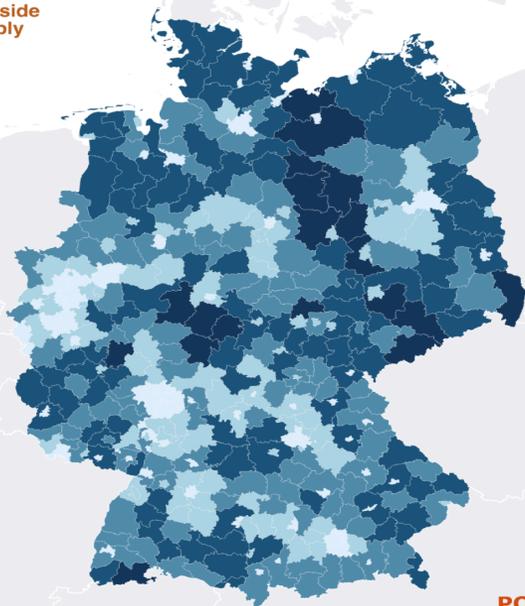
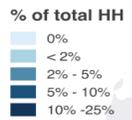


GERMANY

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Germany NUTS3 Map

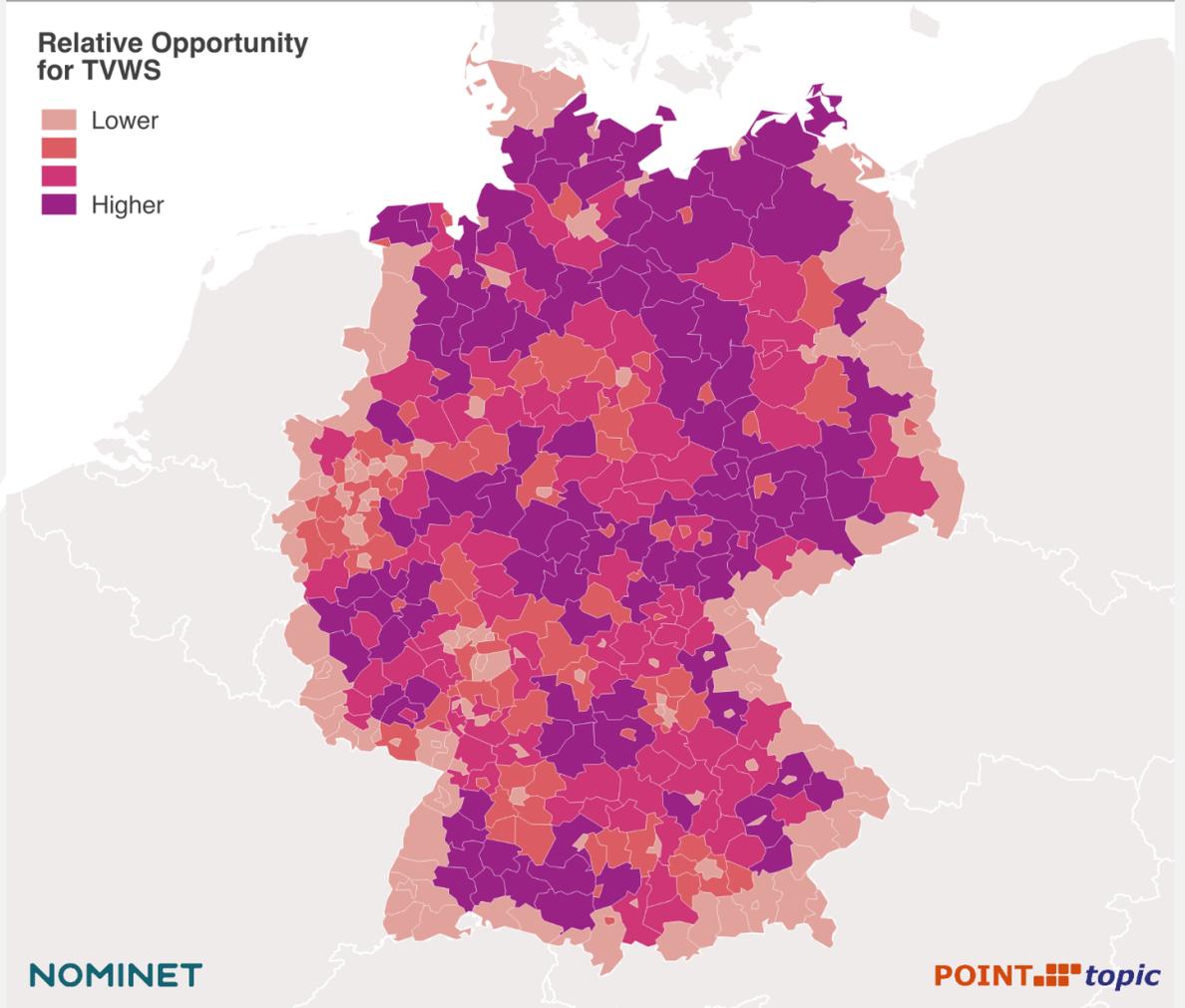
Households outside reasonable supply (~ 2Mbps)



POINT. topic

Germany NUTS3 Map

Relative Opportunity for TVWS



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SWEDEN



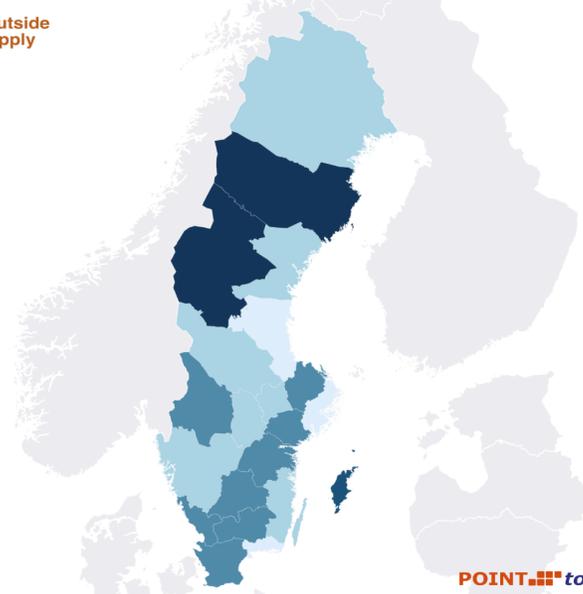
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SWEDEN

Sweden NUTS3 Map

Households outside reasonable supply (~ 2Mbps)

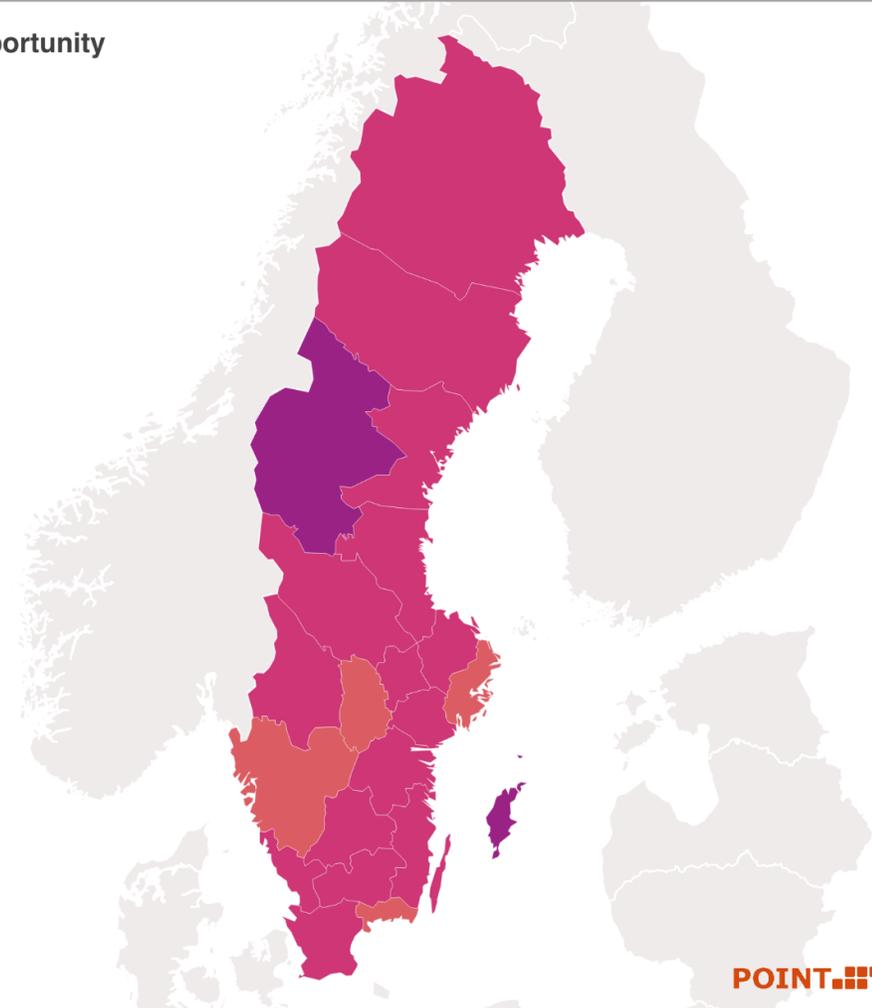
- < 2%
- 2% - 3.5%
- 3.5% - 5%
- 5% - 6.5%
- 6.5% - 8%



Sweden NUTS3 Map

Relative Opportunity for TVWS

- Lower
- Higher



KEY TAKEAWAYS

TVWS using the DSA model rules could improve the connectivity of up to 10 million households across Europe today.

Advances in TVWS technology could extend this to over 40 million households in the future.

Even in countries with limited channel availability there is still room for TVWS as an option for connectivity.

THANK YOU.

This report has been handcrafted for you to show what kind of data we can collect and analyse. If you have any suggestions or specific requirements, we'd love to hear from you.

To download a full version of the report please visit:

www.nominet.uk/ConnectingEurope



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