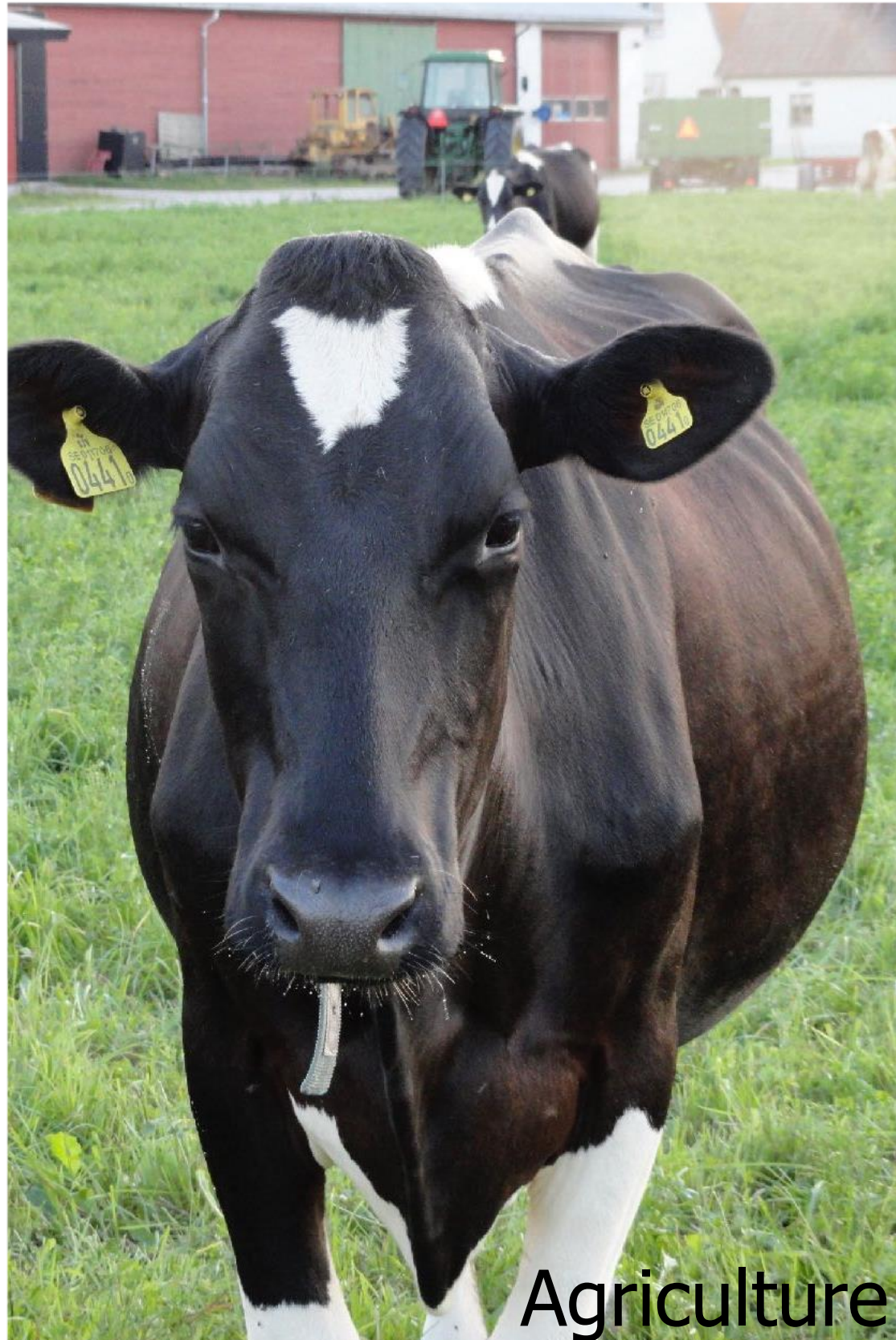


Fiber Roll-out To All Of Region Gotland



Agriculture



Fiber



In the midst of Baltic Sea

In 2010 - Our Prerequisites

57.000 inhabitants

28.000 households, of which 20.000 in rural areas

23.500 houses in the countryside

9.000 of these holiday homes

12.000 houses in Visby

+ about 15.000 companies (not very interested)

Estimated total market volume

max 40.000 units

about 50% already had ADSL

only 8 none-wired telecommunications stations out of <70

Our challenges

The houses are geographically widely spread

Very many holiday homes in several parishes

Many places with ancient remains

Many areas with high natural values & Natura 2000

We needed to include holiday homes for financial balance !

Sufficient skills ?



Achieving An Ambitious Goal

With A Limited Budget

Engagement

Collaboration

Political consensus

Bottom-up

Unconventional

Knowledge Dissemination



Broadband Strategy - Adopted In 2010

Fiber to ALL >100 Mbps / symmetrical + in node / house available **>1 Gbps**

Operator neutral & open network (if possible)

All parishes (92) should have been built by 2015

Visby not included in the strategy - expected to be dealt with by the market

Fiber-parish-model (tested 2009) expected 30-40 projects

Target set at 90% of the permanent households should have fiber 2020

Use 3 days of manual labour by each house

We shouldn't pay for the use of land

Estimated production cost 2 - 2.500 € / house

Estimated total cost, excluding free manual labour, ca 50 million €

Estimated public funding 3 - 3.5 million €

Plans: Approximately 60% of households directly join if a connection fee of 1.5-2.000 €
Approximately 90% is reached at a connection fee of 1-1.500 €

2010 only one market actor (Telia) was at long last, hesitantly, interested



www.bredbandgotland.se

2017 Fiber Roll-out on Gotland

All our 92 parishes have fiber + Visby

All houses have been offered to be connected
Those who want to connect in the future can do so

In addition, we have full coverage for fixed mobile broadband
(we are ready for the copper decommissioning)

Network owners

31 parishes + 4 leading Swedish market actors

Many service providers

Technically, no capacity barrier ...

2010 ... 100/10 3Play

2015 ... 250/100 Mbps ... <4 or 12 Gbps

Back bone dimensioned (today's known needs + 20%)

3Play most often for 350 kr / month fixed price 10 years
"Off-on" subscription possible (most vacation home)

Connection degree

Fixed accommodation 80 - 99%

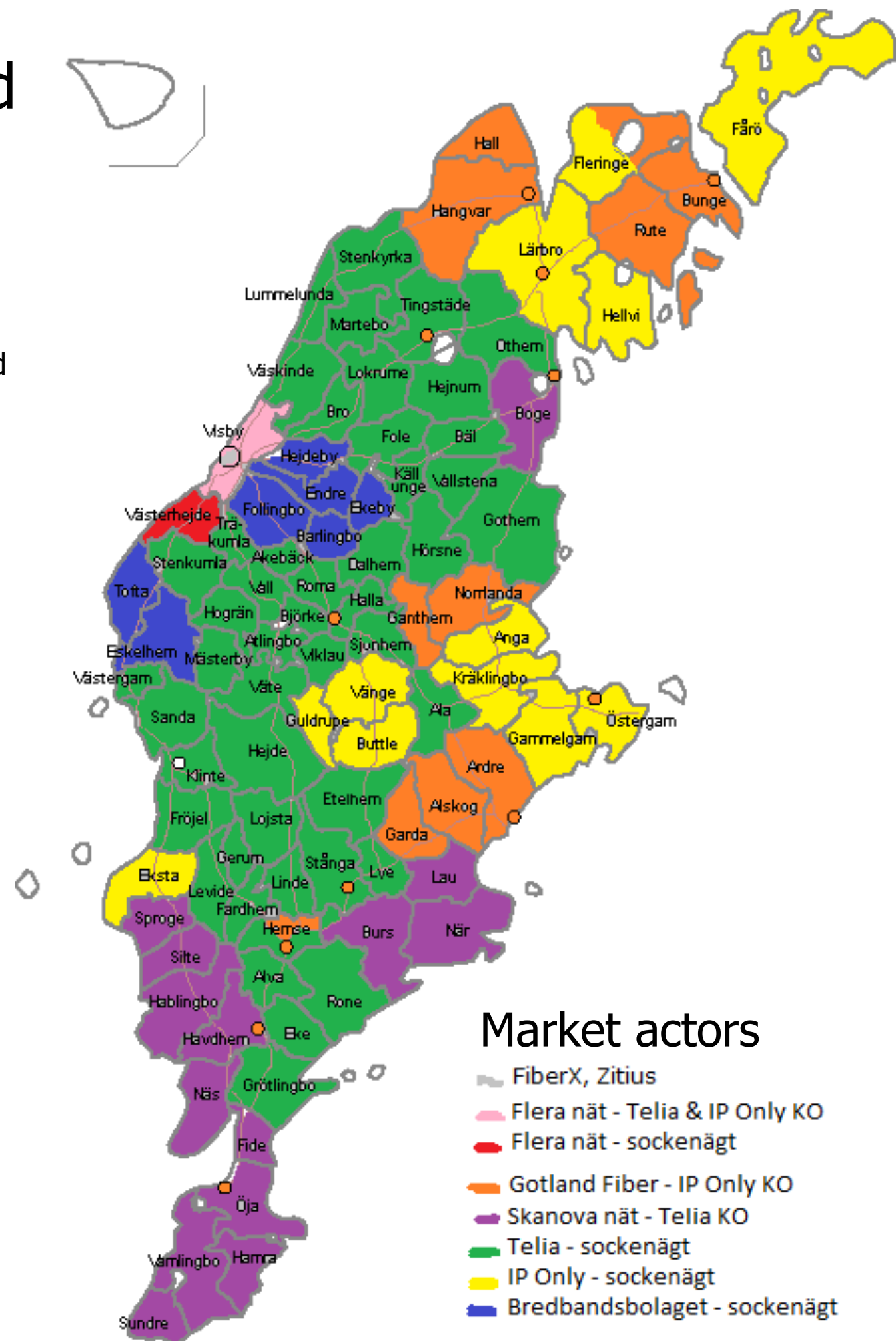
Leisure Living 55 - 99%

In Visby 85 %

Categories connected

+ 65 years have, to a large extent, fiber today

Those in the ages 35 - 45 "believe in mobile networks"



Fiber investments 2010-2020

2010 - July 2017 >>> A total of about **5.500 kilometer canalization**

	<u>In €</u>
Total fiber investment on Gotland to date	54.0 million
+ House owners 3 days of free labour (valued at 75 € / day)	22.5 million

Plan 2017 - 2018

5.400 rent apartments GotlandsHem (done)	xx
Fiber investment around data storage	xx
An additional fiber ring for robustness	xx
Densification project approx. 225 meters / house	xx

In total by 2020 about	100.0 million
------------------------	---------------

Price for a complete connection switched on

During the broadband campaign 10 € / meter

Later connections approximately 15 € / meter



Net cost for the property owner in €

Average cost directly paid per house 1.800 €

This is **falling** towards 1.600
as parish-fiber group are reaping members their surplus

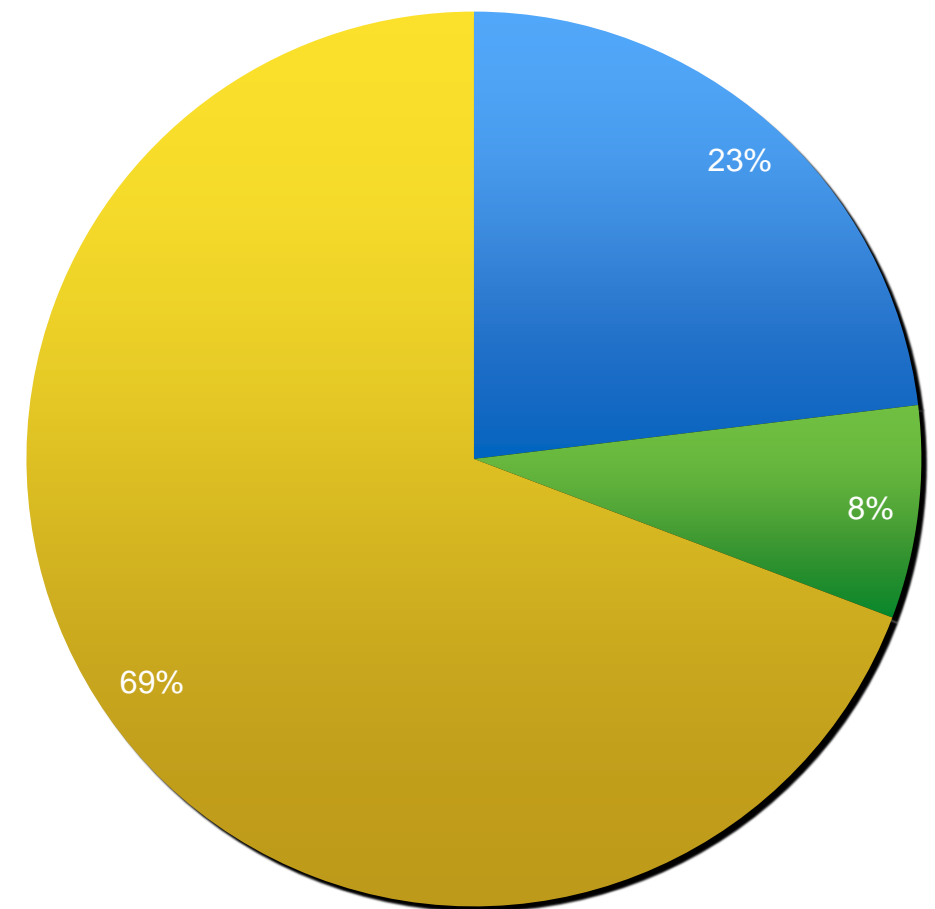
- Connection cost interval 800 < > 2.400

Contributions in € / to each house

- Public support **200 €**
- Up-front rent of "last-mile" net connection **600 €**

Production-cost of complete network / house

1.800 < > 3.000 €



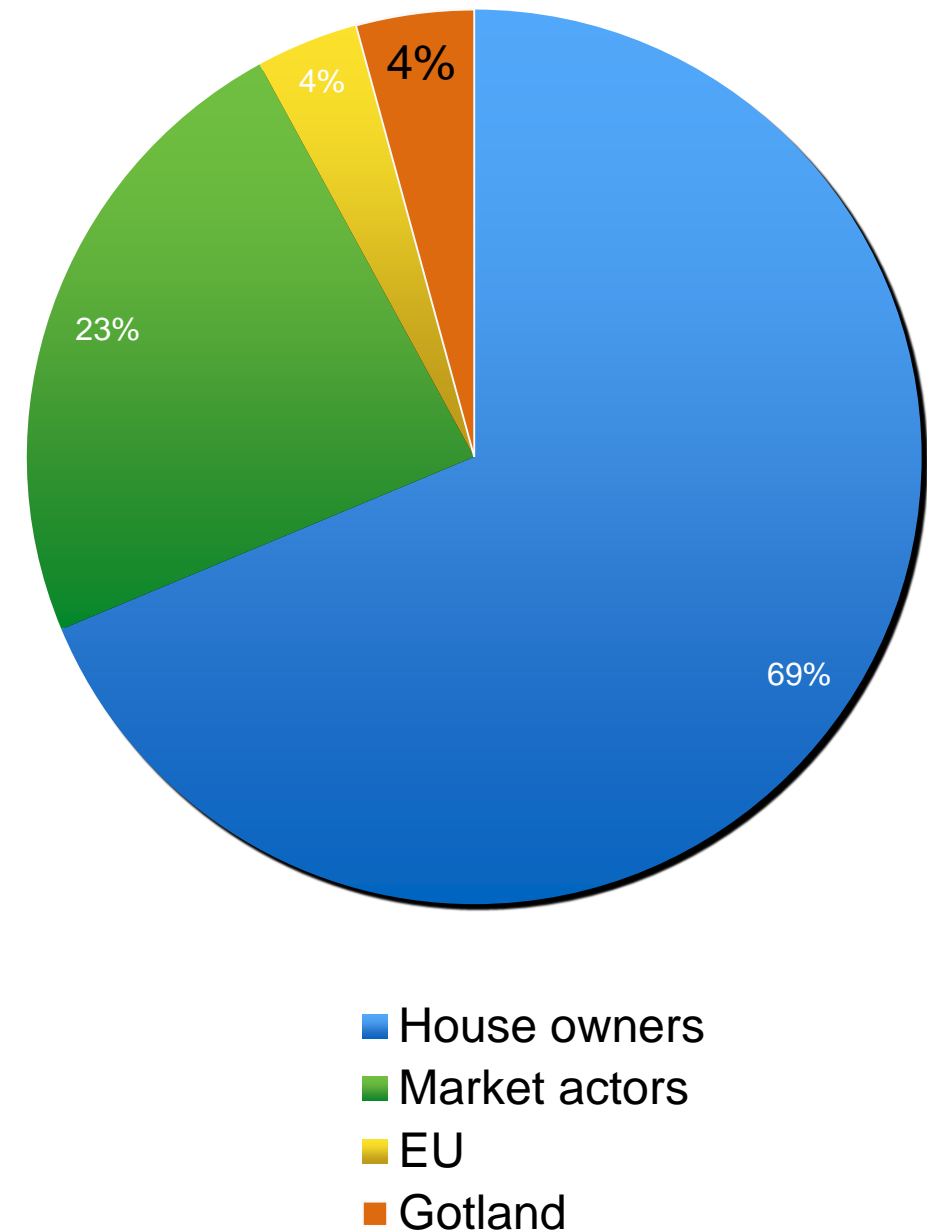
- Rent from market actors
- Public support
- Investment by the house owner

Cash contribution in €

- Private investments 37.1 million
- The market actors 12.6 million

Contribution:

- Public "EU" 2.0 million
 - Public Gotland 2.3 million
- 54.0 million



Our experience

Low production costs

Finished network 8 - 10 €/meter

Digging 3.5 - 5.5 €/m

3 day free manual work, well organized, **save a lot of money**

Collaboration with entrepreneurs and market

- Work **with the market** and **develop together**
- Machines well matched to **local conditions**
- Gotland **customized methods**
- GPS measurement (**now not later**)
- Demands set on **documentation**
- **Price level kept at-bay** over project period

Public authorities

- Effective **collaboration** County Council - Region Gotland*
- Great efforts to **simplify** paper-work
- **Lantmäterit** - A new simplified and cheaper model
- **VAT authorities** - Revision enabled associations to lift the VAT
- **PTS** (Post & Telecommunication Authority) -
always helpful and ever prepared to **increase our know-how**

As a bonus

- We got **more local activities** and cooperation in the parishes
- Those **owning holiday homes stay longer** periods of time



* Region Gotland is an all-in-one Municipality and Region of Gotland

Gotland's Digital Road

1995 **Tjelvar - FirstClass Network** with 23.000 users out of 57.000 inhabitants "The digital light comes to Gotland"

2001 Decision on IT infrastructure program for Gotland "I-net"

2003 Swedish broadband - canalisation funding gave us 98% coverage of the island with FWA & DLS + fiber to all telephone stations except 8 small ones

(In total 6 million € investment out of which 1 million € from municipality, 2 million € electricity company GEAB)

2010 Decision: Fiber to all houses outside Visby > **Telia** deliver services

2010 **4G** in Visby (early Swedish implementation)

2011 Diploma for the ambition to "wannabe" all fiber region

2011 Broadband coordinators star with **control of fiber work implementation**

2011 **Skanova open network** > enters the market

2012 **Bredbandsbolaget** > enters the market

2013 **IP Only / Gotland Fiber** > enters the market

2014 **Micro-trenching** in Hemse and Visby

2014 Visby finally joins in fiber roll-out

2015 Gotland top of the Swedish list: Best fiber in sparsely populated region

2015 **FiberX/Visby Stadsnät - Zitius** > enters the market

2015 **Regional Digital Agenda** (RDA) is adopted

2017 **Broadband strategy - completed - Fiber roll-out all over the island**

2017 Decision on advanced data storage on Gotland

2017 Resilient and robust network work - sharp mode

2017 Densification project starts



Now We Have Fiber- Next Steps ...

Densification project starts

Together with Our market actors and their service providers

... "soft landing" towards **copper decommissioning** (1/3 Dec 2018)

Resilient and robust

- All networks should be equally robust
- Additional **crossover points between operators & towards the mainland**
- **Local switching of telephone and public digital services** keeping traffic alive if Gotland is cut off from the mainland
- **UPS 4 + 4 hours** & in the home (already available in most parishes)

Mobile network

Completion with mobile master

5G + public WiFi

Internet-of-Things - LoRa technology

Implementing Gotland's Regional Digital Agenda

- Digitally supported entrepreneurship
- e-services
- broadband
- Increased IT usage
- e-health
- Digitally supported community planning
- Digitally supported education

www.digitalagotland.se



For Additional Information

Visit us at

Broadband: www.bredbandgotland.se

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