Aarhus Vand A/S

Non-Revenue Water, Pipeline Asset Management, Tariffs

Webinar, February 11th 2021

Marmara Union of Municipalities, Royal Danish Consulate General and Turkish Union of Municipalities

Flemming Fogh Pedersen, Director, Operations

Aarhus Vand A/S

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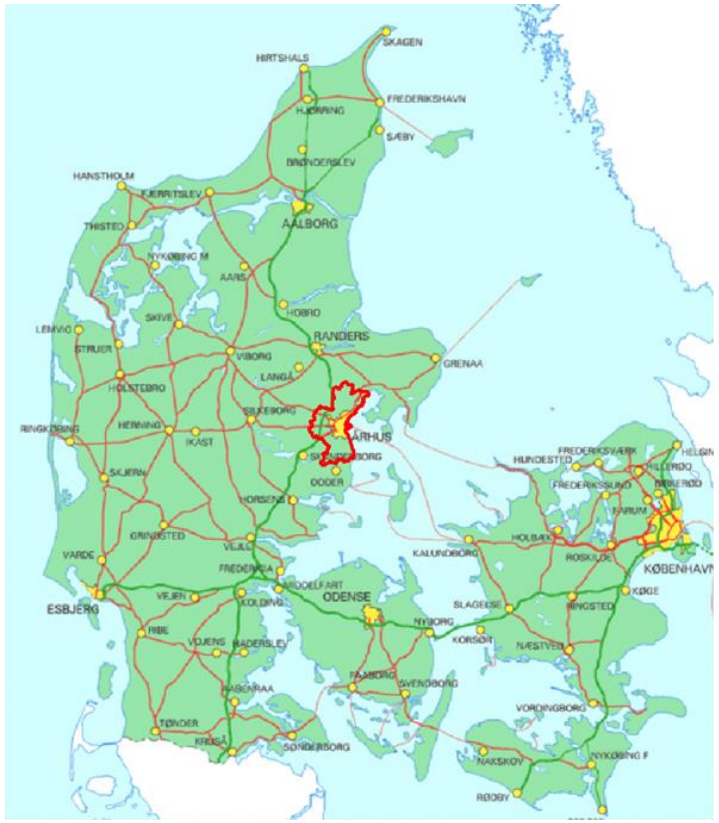
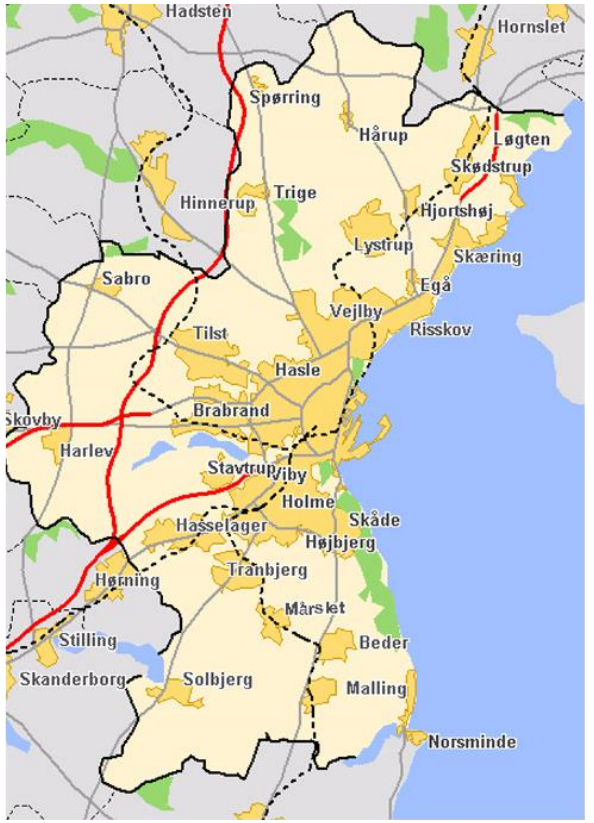
Settings of Aarhus





Area	43.000 km^2		468 km^2
Population	5.5 mio		0.3 mio
Population density	127 /km^2		629 /km^2

Introduction

Our purpose is to create health through the supply of clean water – for people and the planet

Our vision is to create a national platform as a driver for local and global solutions for a healthier water cycle

Our mission is to offer and develop resource-efficient services throughout the entire water cycle, creating a climate-adapted, sound environment, growth and export, all of which will be of benefit to customers and stakeholders

We adopt water knowledge by

- A holistic approach to the entire water cycle
- Forming innovation partnerships
- Forming international alliances that support knowledge exchange around intelligent, sustainable and efficient water solutions
- Operating and developing state of the art resource recovery plants that recover resources and produce energy from wastewater
- Protecting groundwater to ensure future high quality and safe water supplies
- Automating and digitalizing in order to achieve an intelligent efficient water system
- Separating storm water from wastewater

Key figures

230
competent and dedicated employees

15
mio. m^3 of drinking water a year

30
mio. m^3 of purified wastewater a year

1,500
kilometres of pipeline network

2,800
kilometres of mains network

350,000
citizens in Aarhus Municipality

SDG in everything we do

The first water company in the world to be certified according to the UN's Global Goals for Sustainable Development.

The global goals are met in a number of areas that are central to us. This includes:

SDG 6 Clean water and sanitation

SDG 11 Sustainable cities and communities

SDG 13 Climate action

SDG 17 Partnerships for the goals

Compliance with international ISO standards

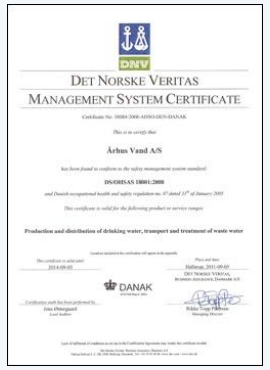
CSR (DS 49001)

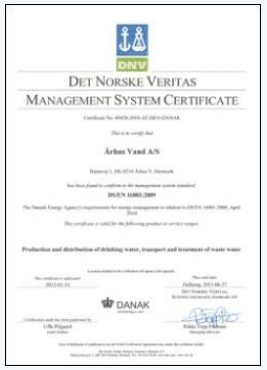
DRINKING WATER QUALITY (ISO 22000)

ENERGY MANAGEMENT (ISO 50001)

THE WORKING ENVIROMENT (DS/OHSAS 18001)

ENVIROMENTAL MANAGEMENT (ISO 14001)


DET NORSKE VERITAS
MANAGEMENT SYSTEM CERTIFICATE
Århus Vand A/S
DS/OHSAS 18001:2008
Production and distribution of drinking water, transport and treatment of waste water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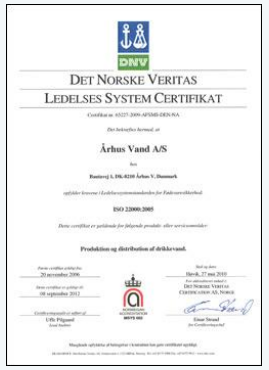
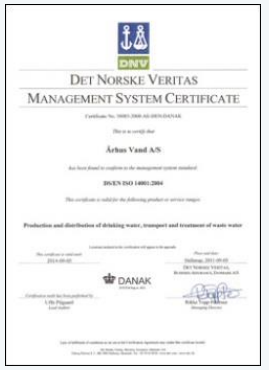
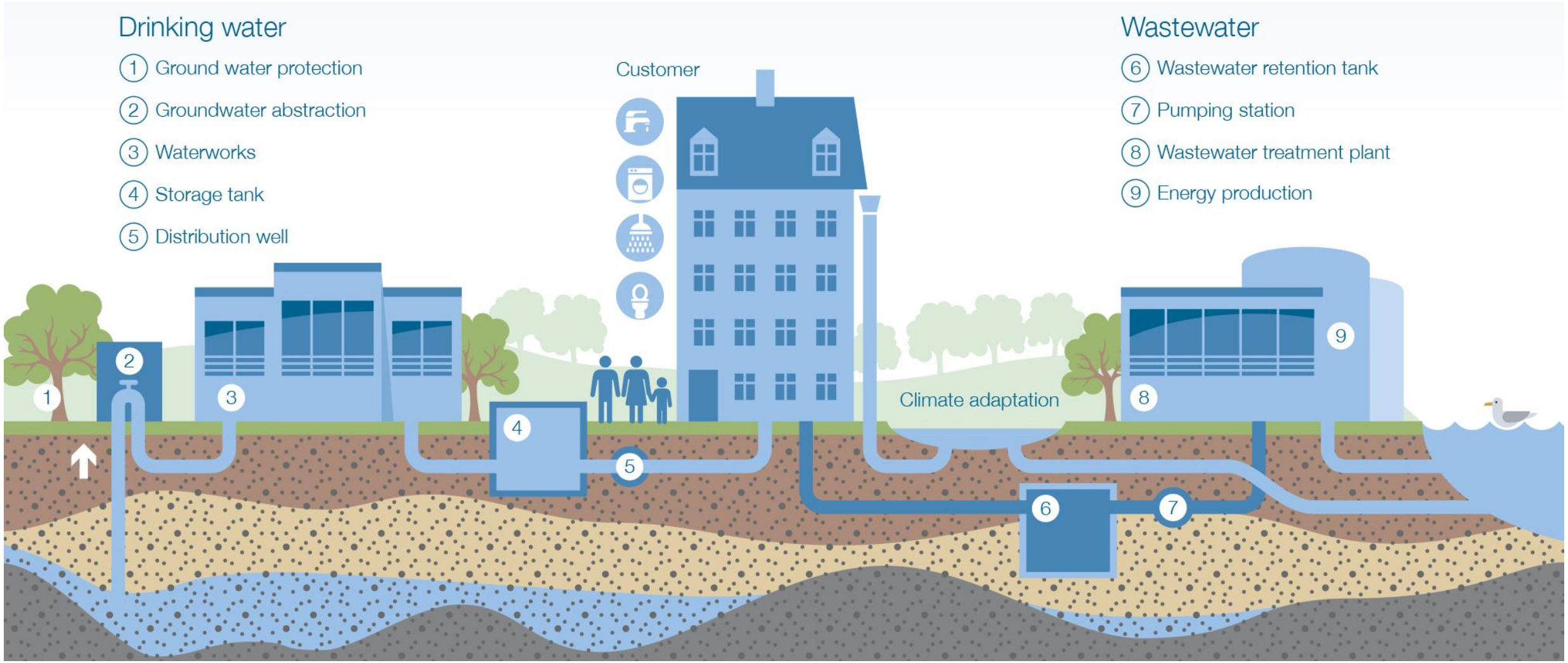
MANAGEMENT SYSTEM CERTIFICATE
Århus Vand A/S
DS/EN 16001:2009
Production and distribution of drinking water, transport and treatment of waste water


DET NORSKE VERITAS
LEDELSES SYSTEM CERTIFIKAT
Århus Vand A/S
ISO 22000:2005
Produktion og distribution af drikkevand.


DET NORSKE VERITAS
MANAGEMENT SYSTEM CERTIFICATE
Århus Vand A/S
DS/EN ISO 14001:2004
Production and distribution of drinking water, transport and treatment of waste water

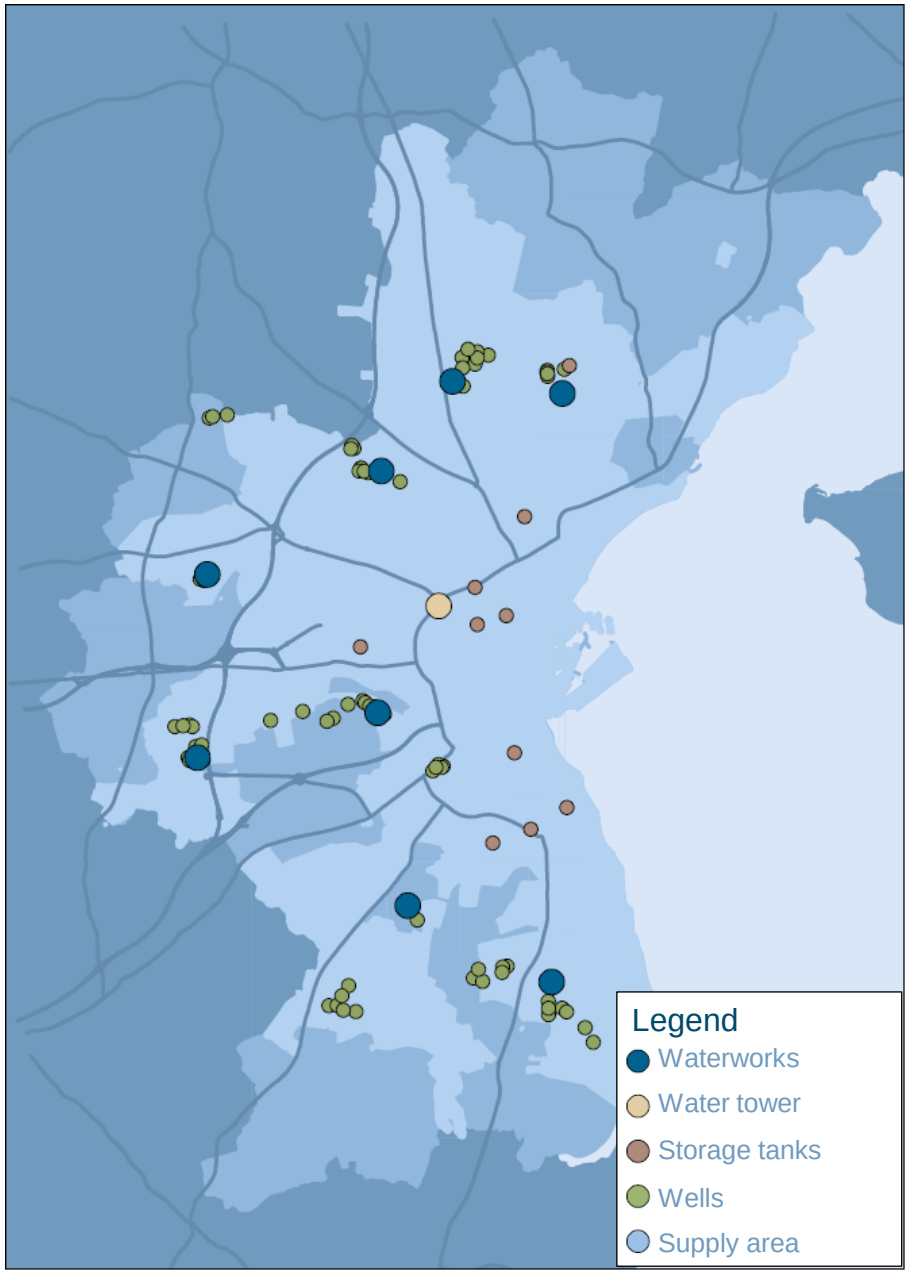

DET NORSKE VERITAS
LEDELSES SYSTEM CERTIFIKAT
DS 49001:2011

Operator of the water cycle



Drinking water

- 85% of inhabitants in Aarhus Municipality
- 275.000 customers
- 15.000.000 m^3/year
- 1.500 km supply lines
- 90 production wells
- 8 waterworks
- 11 elevated storage tanks/pumping stations
- 1 water tower
- 62.000 water meters



Water tariffs 2020

Elements of the water tariffs	DKK/m³	EUR/m³	TRY/m³
Production of drinking water	8,14	1,09	10,42
Wastewater treatment	22,62	3,03	28,94
Government water tax	6,37	0,85	8,15
VAT	9,28	1,24	11,87
Total water price per m3 incl. VAT	46,41	6,21	55,39

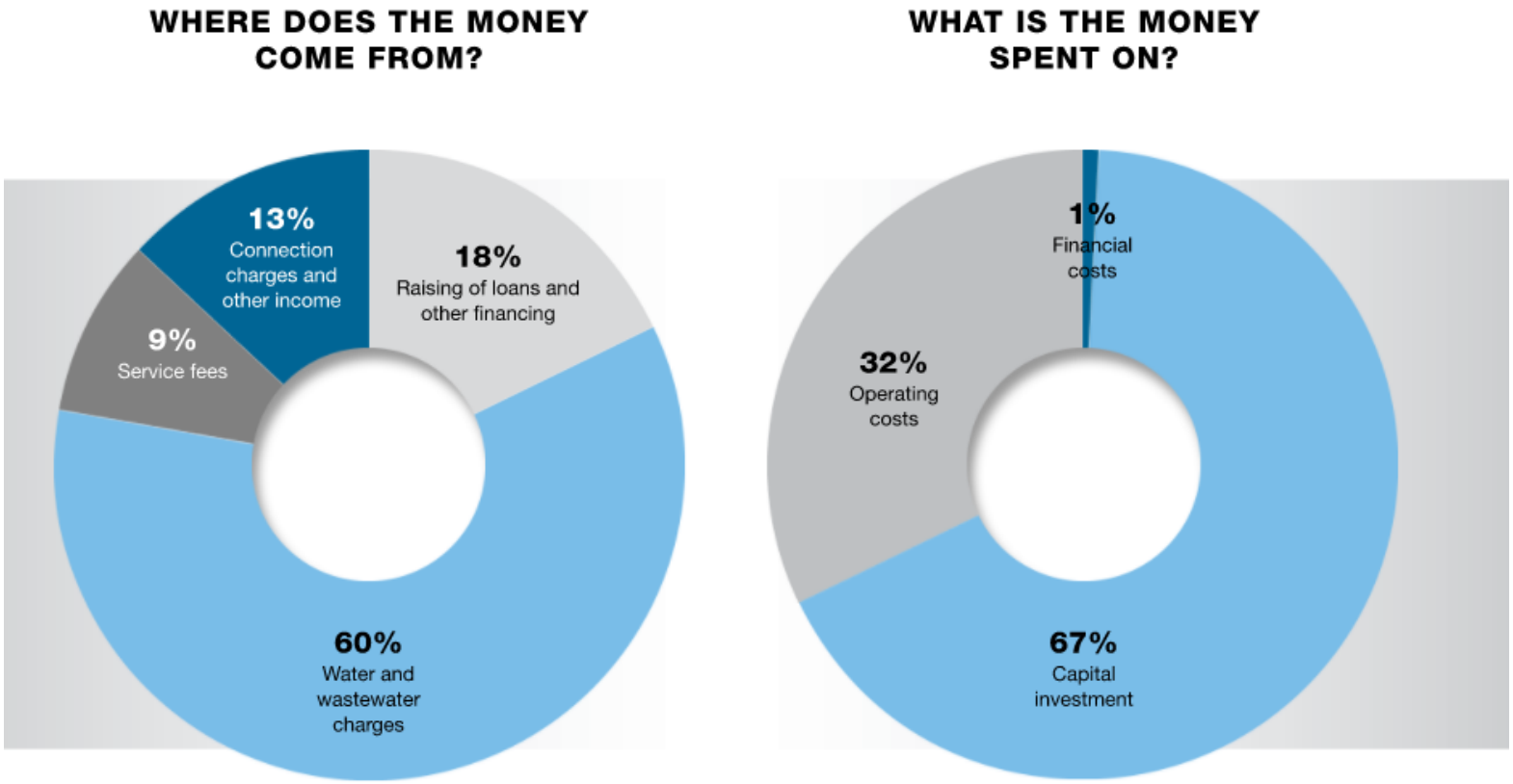
- Average per capita comsumption 99 l/pers/day
- Complete cost recovery by the tariffs, including operations, investments (depreciation) and re-investments
- All larger Danish water utilities are subject to benchmarking and annual savings on OPEX/CAPEX of around 2%

Operating and cash budgets

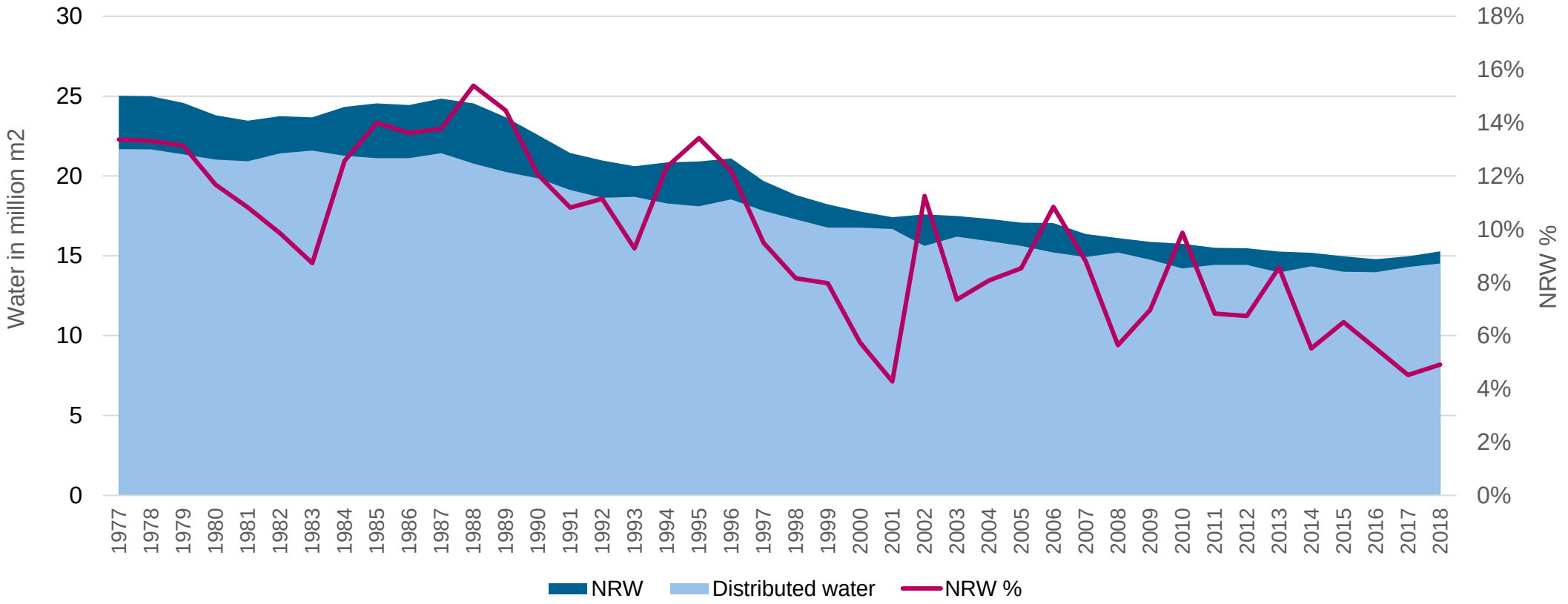
Operating and cash budgets for 2021:

DKK 1,000	OPERATION	LIQUIDITY
Water and wastewater charges	468,300	468,300
Service fees	70,200	70,200
Connection fees and other income	105,600	105,600
Total income	**644,100**	**644,100**
Operating costs	-228,930	-248,500
Depreciation	-314,000	0
Profit/Loss before financial income and expenses	**101,170**	**395,600**
Other operating items	0	0
Financial items	-9,500	-10,500
Operating profit/loss for the year	**91,670**	**385,100**
Investments		-524,300
Repayment		0
Positive/negative cash flow for the year (borrowing requirement for the year)		**-139,200**

Financial operations



Non-Revenue Water in Aarhus



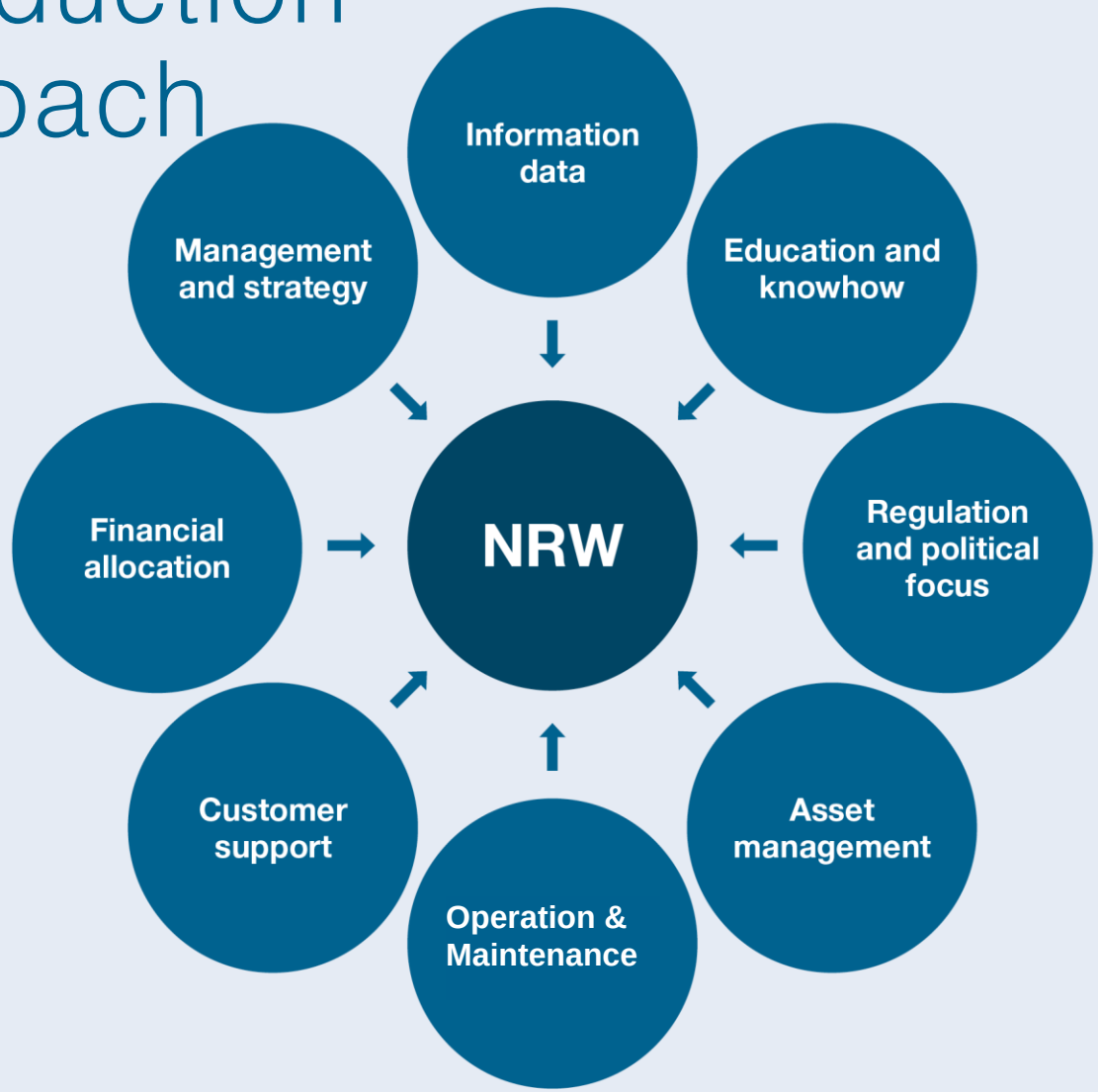
IWA Water Balance – Aarhus Vand 2018

<table>
<tr><td rowspan="8">System Input Volume
15.27 mio. m³</td><td rowspan="4">Authorized Consumption
14.53 mio. m³</td><td rowspan="2">Billed Authorized Consumption
14.52 mio. m³</td><td>Billed Metered Consumption
14,52 mio. m³</td><td rowspan="2">Revenue Water
95.09 %</td></tr>
<tr><td>Billed Unmetered Consumption
0 m³</td></tr>
<tr><td rowspan="2">Unbilled Authorized Consumption
8,520 m³</td><td>Unbilled Metered Consumption
0 m³</td></tr>
<tr><td>Unbilled Unmetered Consumption
8,520 m³</td></tr>
<tr><td rowspan="4">Water Losses
0.74 mio. m³</td><td rowspan="2">Apparent Losses
0 m³</td><td>Unauthorized Consumption
(+/-) 0 m³</td><td rowspan="4">NRW (Non Revenue Water)
4.91 %</td></tr>
<tr><td>Customer Meter Inaccuracies
(+/-) 0 m³</td></tr>
<tr><td rowspan="3">Real Losses
0,74 mio. m³</td><td>Leakage on Transmission and/or Distribution Mains
0.68 mio. m³</td></tr>
<tr><td>Leakage and Overflows at Utility's Storage Tanks
4,050 m³</td></tr>
<tr><td>Leakage on Service Connections up to point of Customer metering
61,992 m³</td></tr>
</table>

Non–Revenue Water reduction through a holistic approach

Several aspects need to be addressed to reach low NRW levels and ensure continuous success

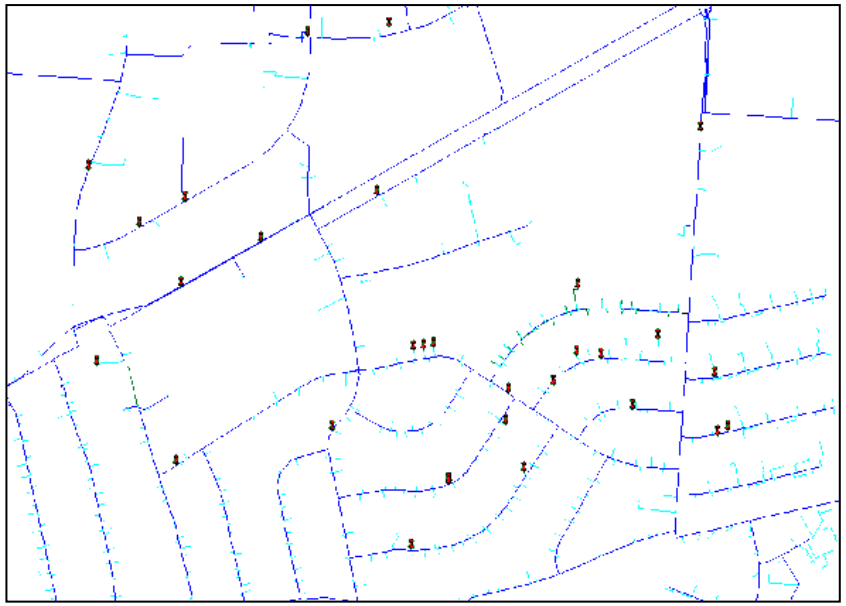
– from the initial planning phase to the day to day operations, the use of high quality installations, good workmanship and etc.



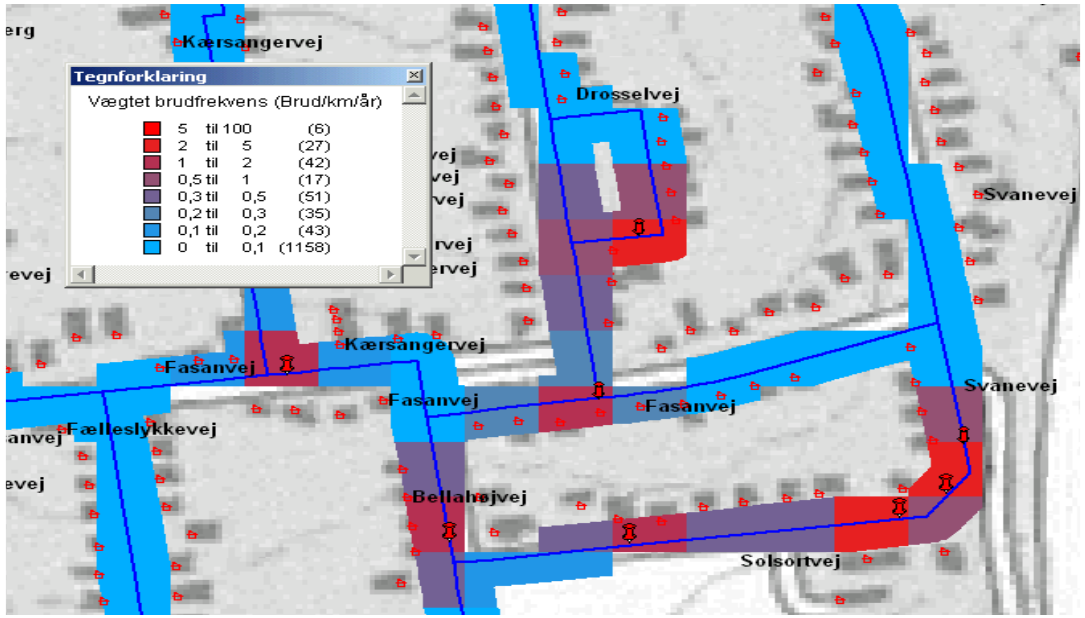
Use of burst registration

- GIS-visualisation of bursts and information
- Spatial evaluation of hot spots
- Calculation of spatial burst ratios
- Statistical analysis by material, year laid etc.

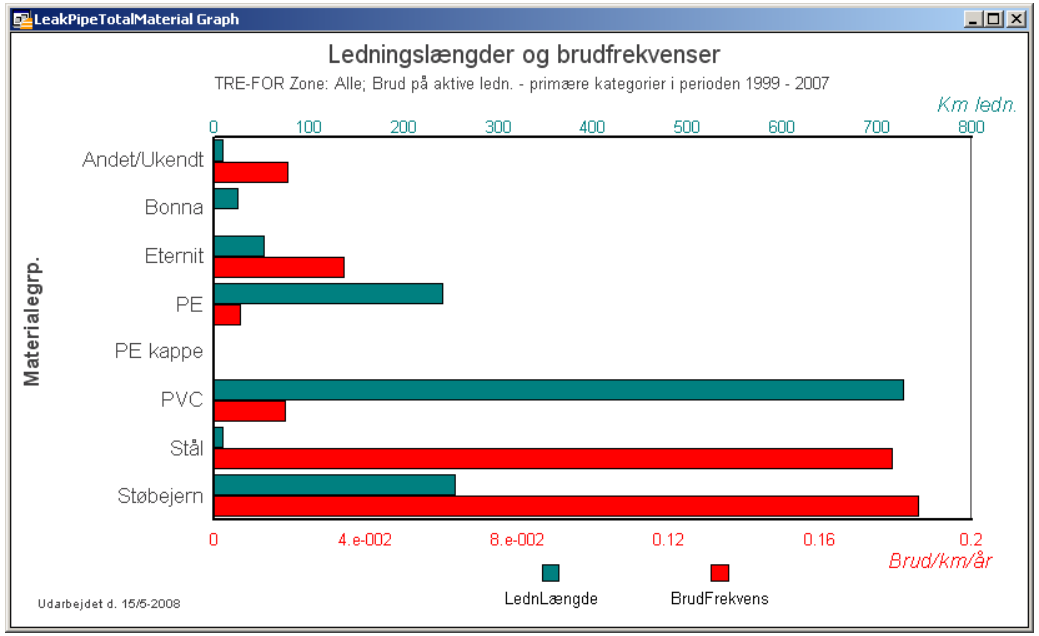
Burst report registration



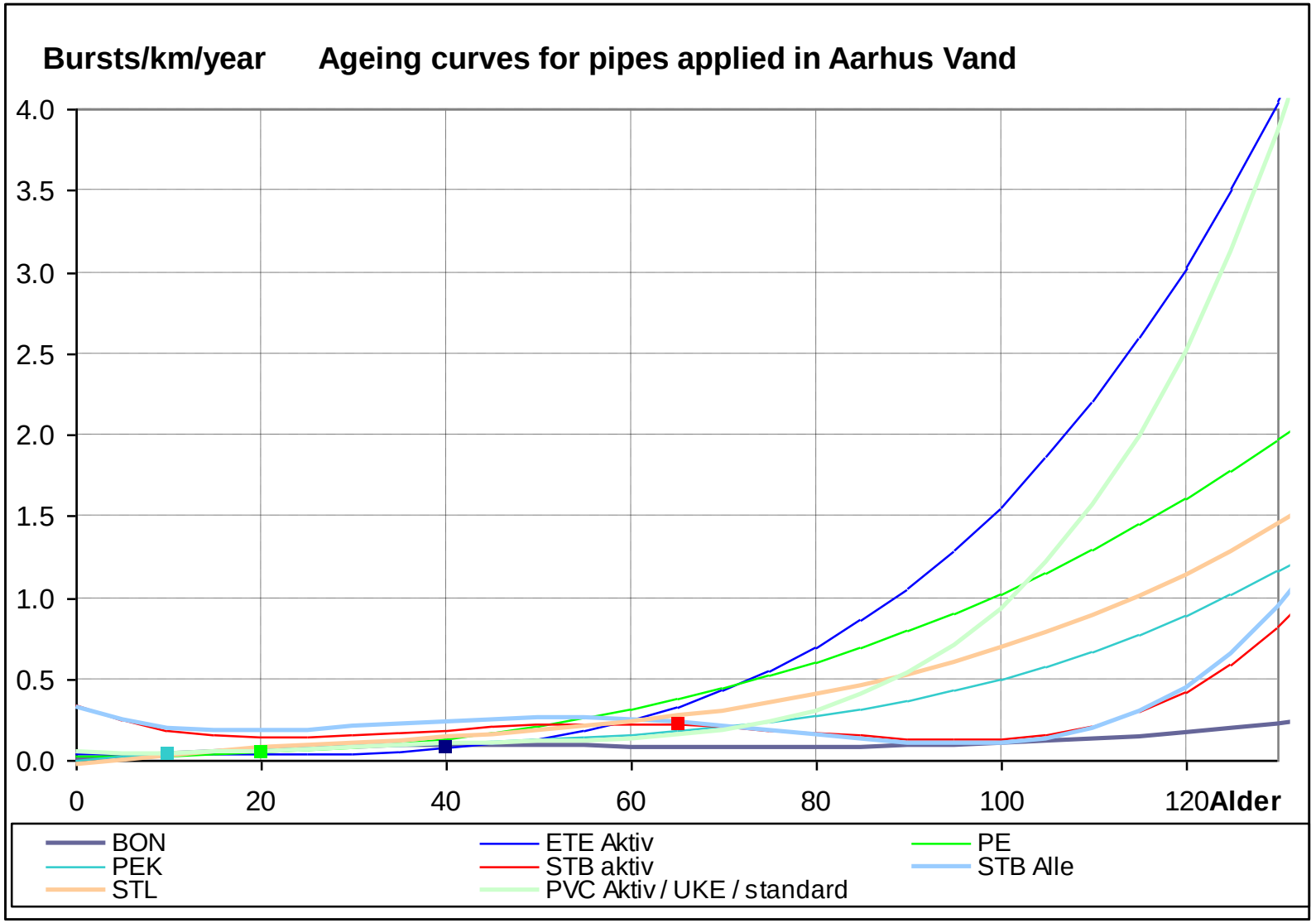
Burst ratio – hot-spots



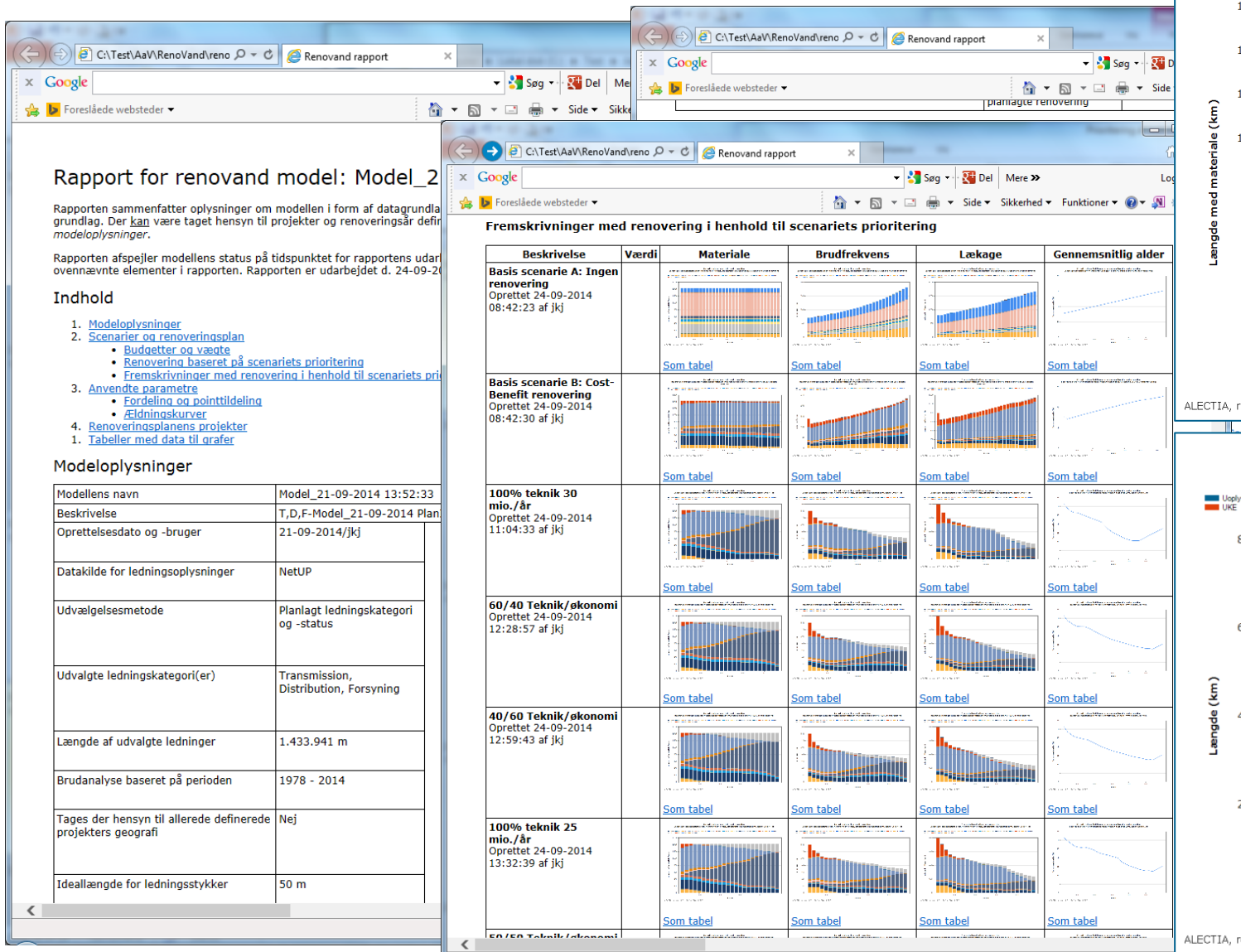
Burst ratio by material



Ageing curves



Reports in WaterRehab



Rapport for renovand model: Model_2

Rapporten sammenfatter oplysninger om modellen i form af datagrundla
grundlag. Der kan være taget hensyn til projekter og renoveringsår defir
modeloplysninger.

Rapporten afspejler modellens status på tidspunktet for rapportens udar
ovennævnte elementer i rapporten. Rapporten er udarbejdet d. 24-09-2

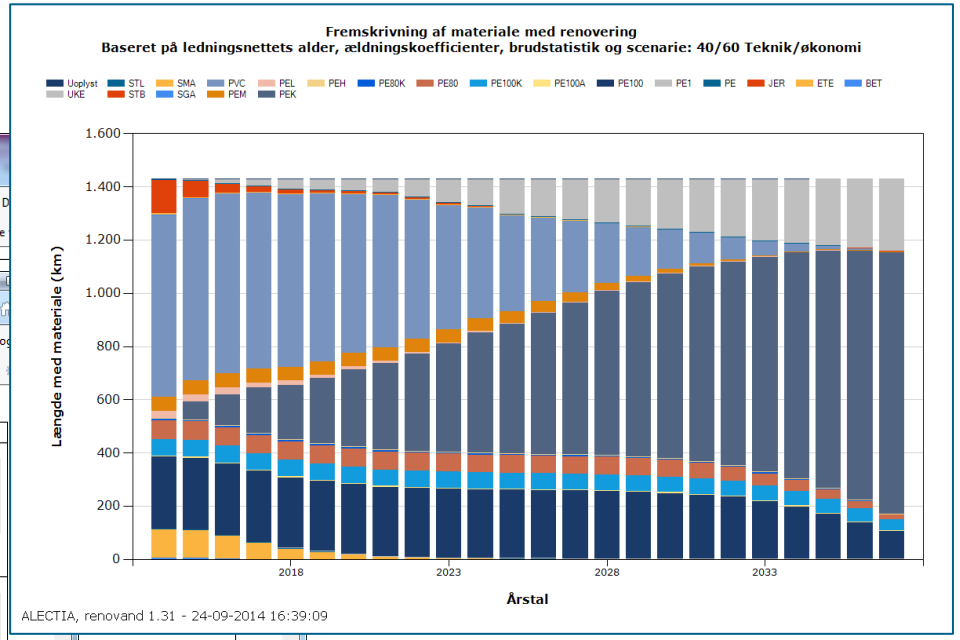
Indhold

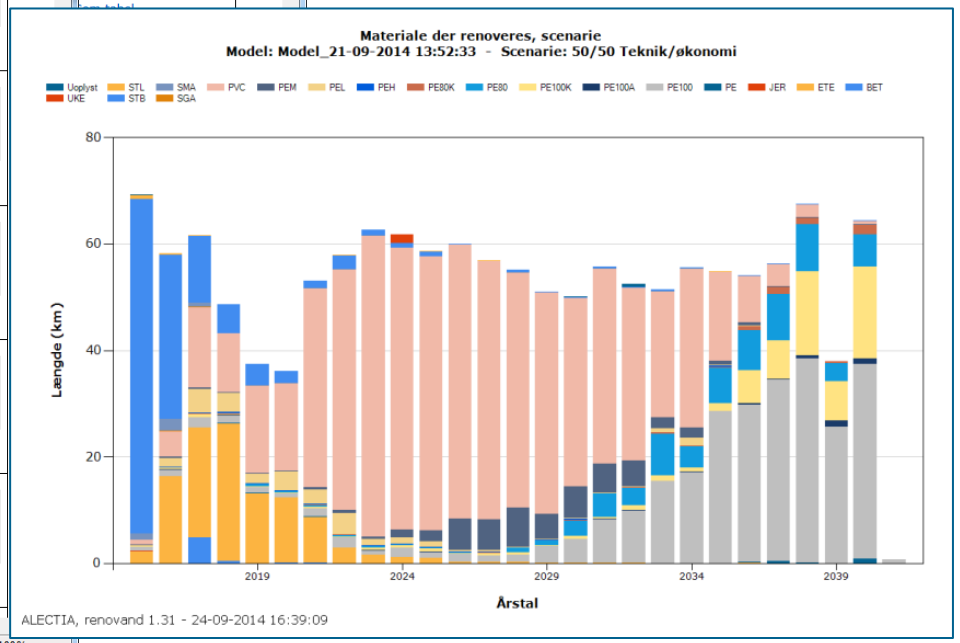
Modeloplysninger

Modellens navn	Model_21-09-2014 13:52:33
Beskrivelse	T,D,F-Model_21-09-2014 Plan
Oprettelsesdato og -bruger	21-09-2014/jkj
Datakilde for ledningsoplysninger	NetUP
Udvælgelsesmetode	Planlagt ledningskategori og -status
Udvalgte ledningskategori(er)	Transmission, Distribution, Forsyning
Længde af udvalgte ledninger	1.433.941 m
Brudanalyse baseret på perioden	1978 - 2014
Tages der hensyn til allerede definerede projekters geografi	Nej
Ideallængde for ledningsstykker	50 m

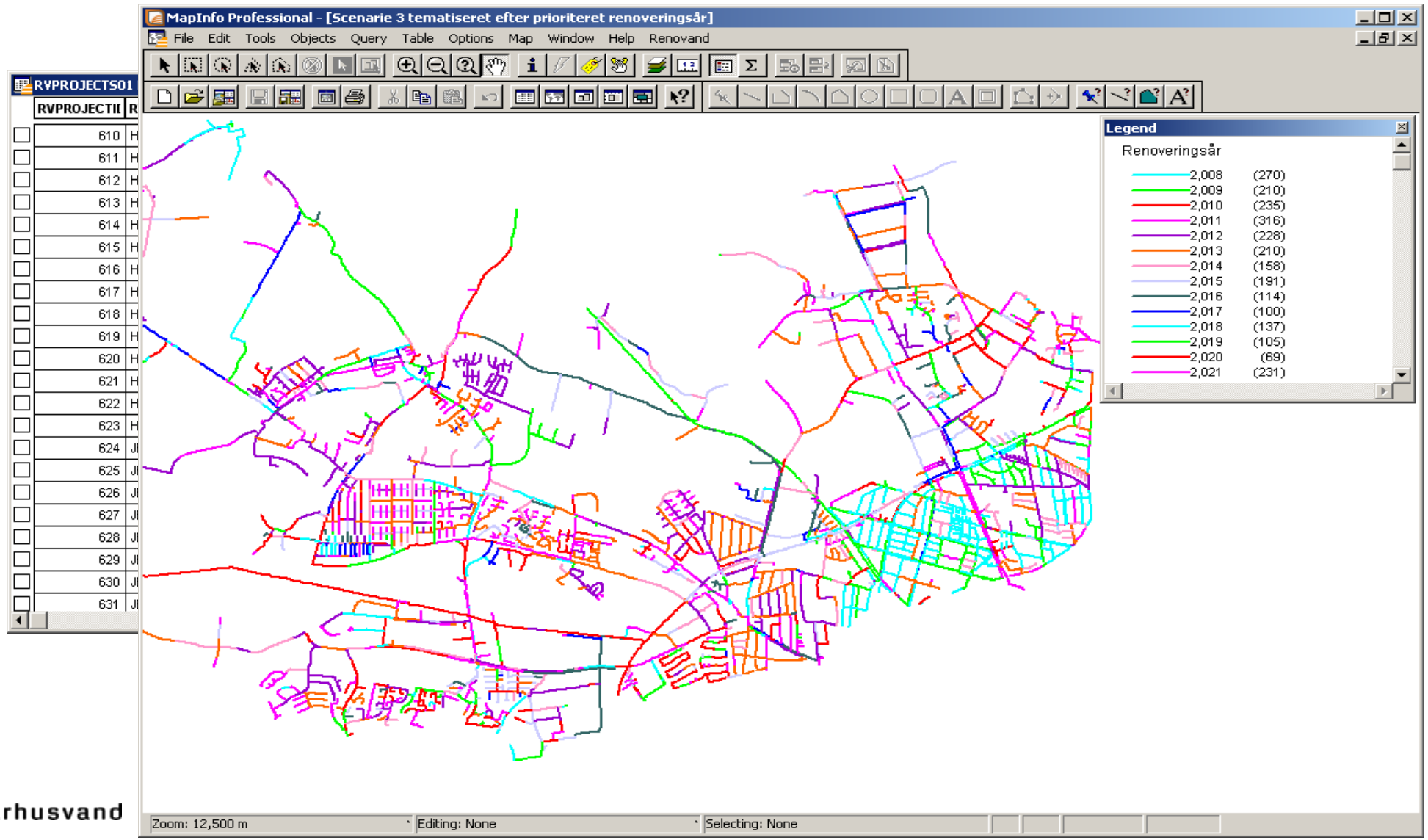
Fremskrivninger med renovering i henhold til scenariets prioritering

Beskrivelse	Værdi	Materiale	Brudfrekvens	Lækage	Gennemsnitlig alder
Basis scenarie A: Ingen renovering Oprettet 24-09-2014 08:42:23 af jkj		Som tabel	Som tabel	Som tabel	Som tabel
Basis scenarie B: Cost-Benefit renovering Oprettet 24-09-2014 08:42:30 af jkj		Som tabel	Som tabel	Som tabel	Som tabel
100% teknik 30 mio./år Oprettet 24-09-2014 11:04:33 af jkj		Som tabel	Som tabel	Som tabel	Som tabel
60/40 Teknik/økonomi Oprettet 24-09-2014 12:28:57 af jkj		Som tabel	Som tabel	Som tabel	Som tabel
40/60 Teknik/økonomi Oprettet 24-09-2014 12:59:43 af jkj		Som tabel	Som tabel	Som tabel	Som tabel
100% teknik 25 mio./år Oprettet 24-09-2014 13:32:39 af jkj		Som tabel	Som tabel	Som tabel	Som tabel





Planning of rehabilitation investments



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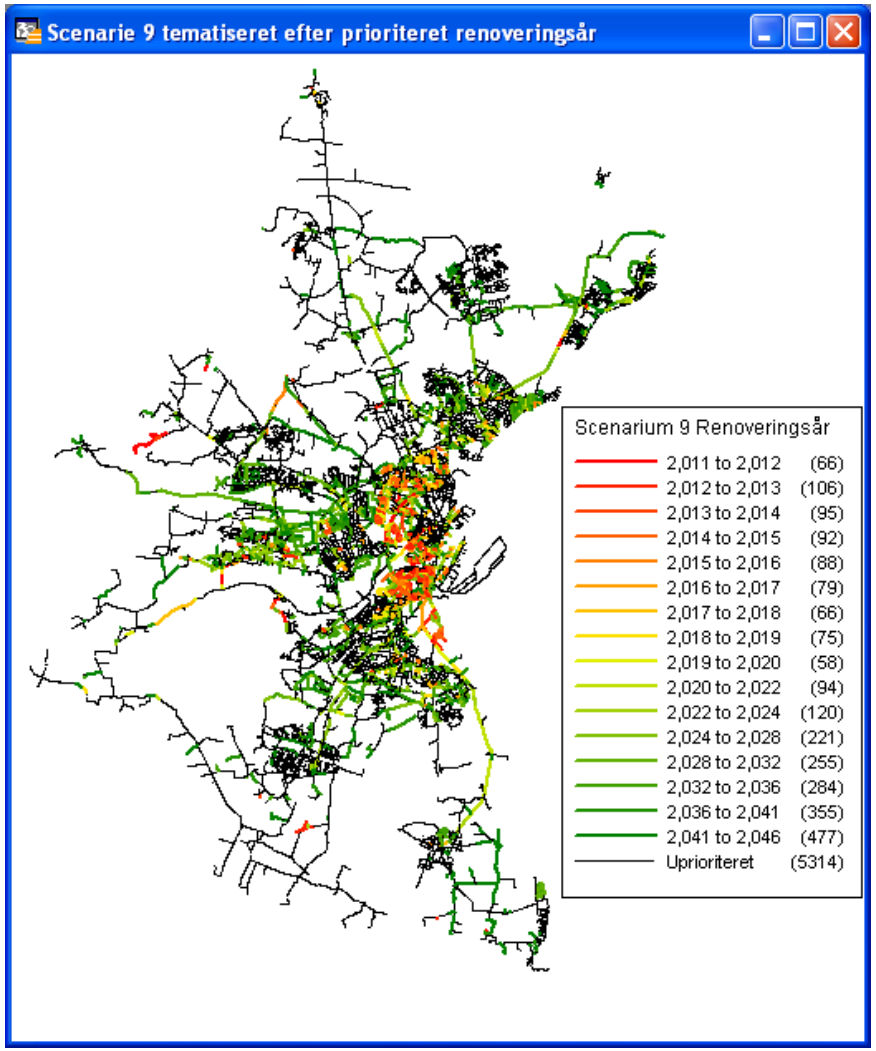
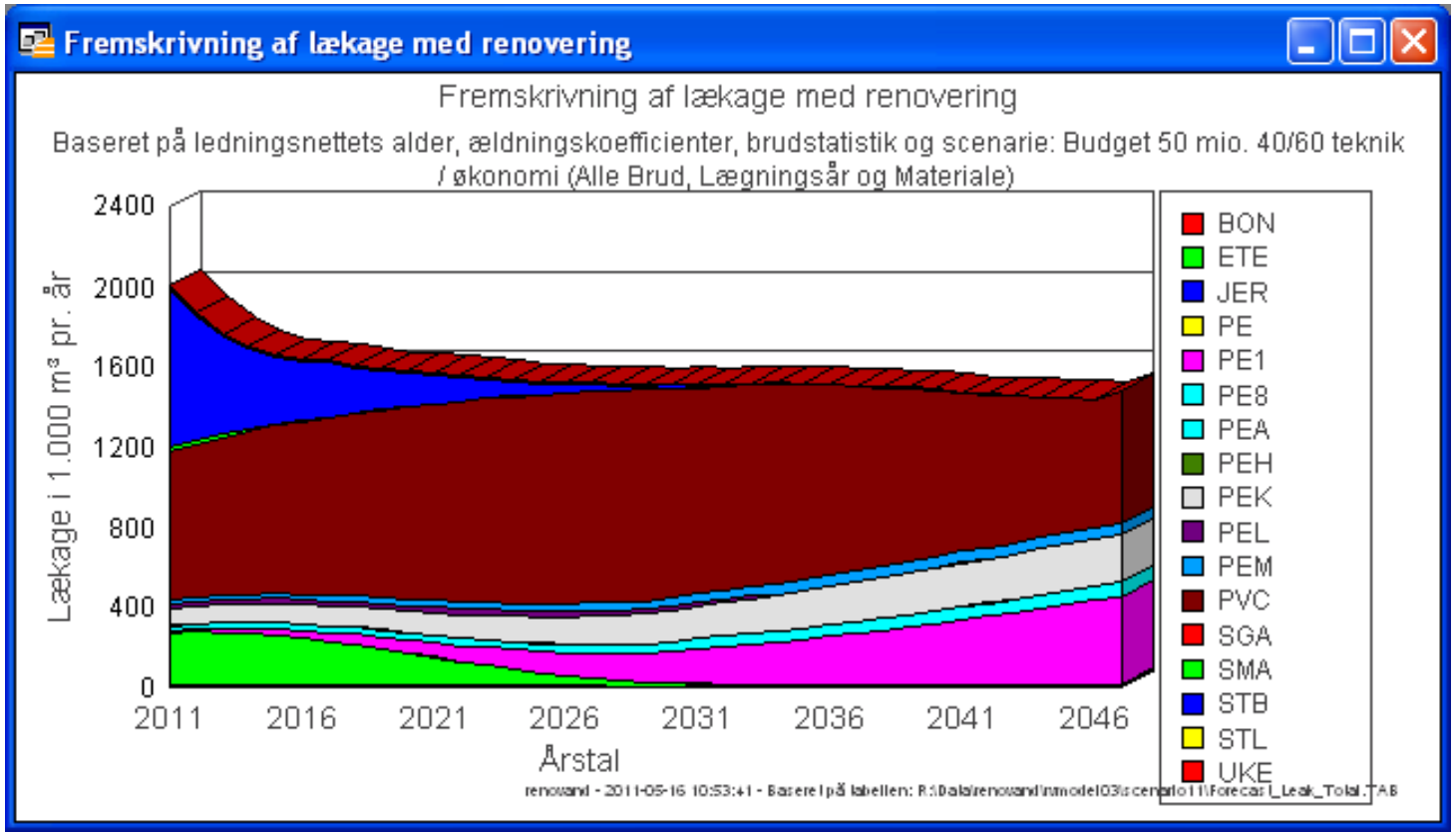
Prioritization of rehabilitation





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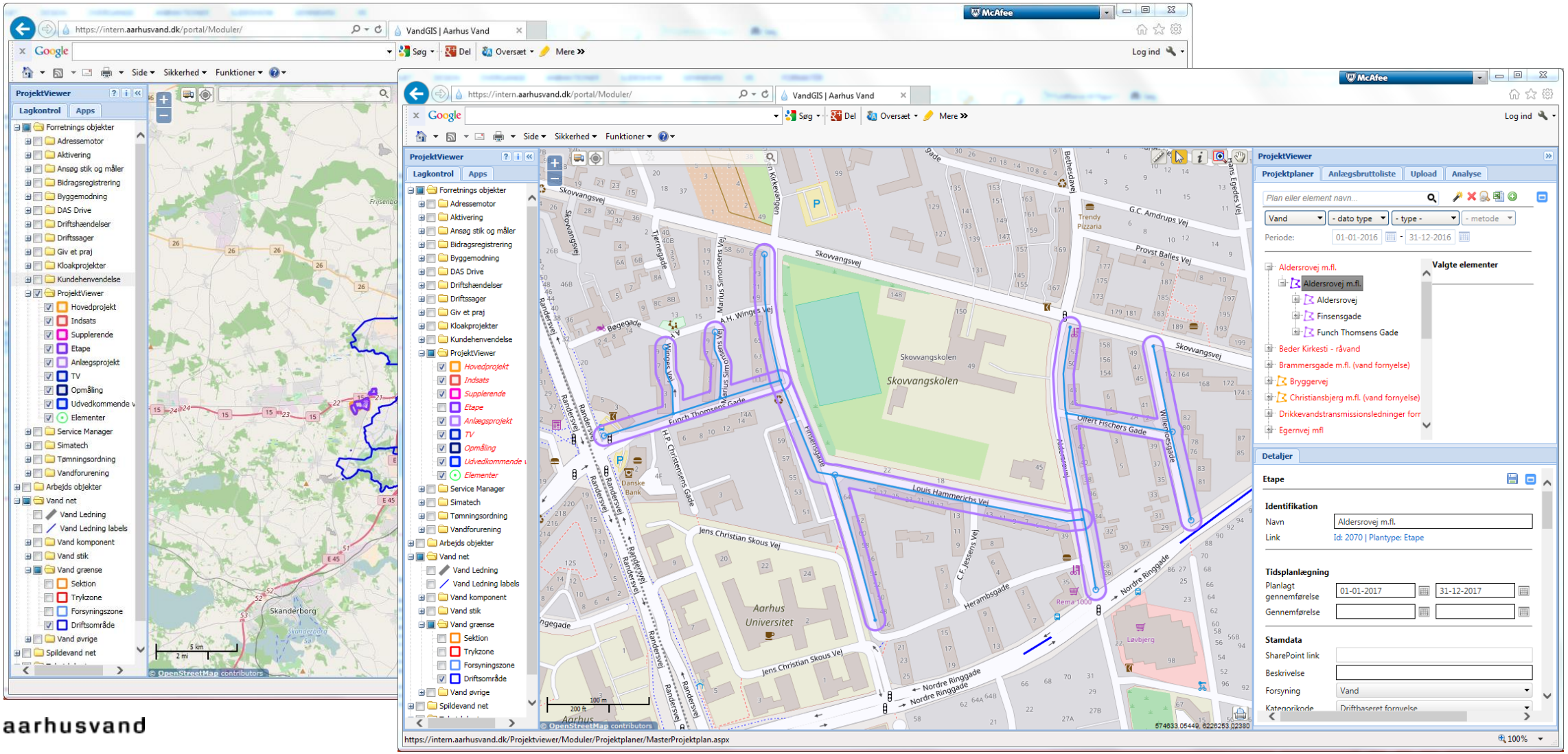
Project–view



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Thank you for your attention

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