From Waste to Transport Fuel

W-FUEL

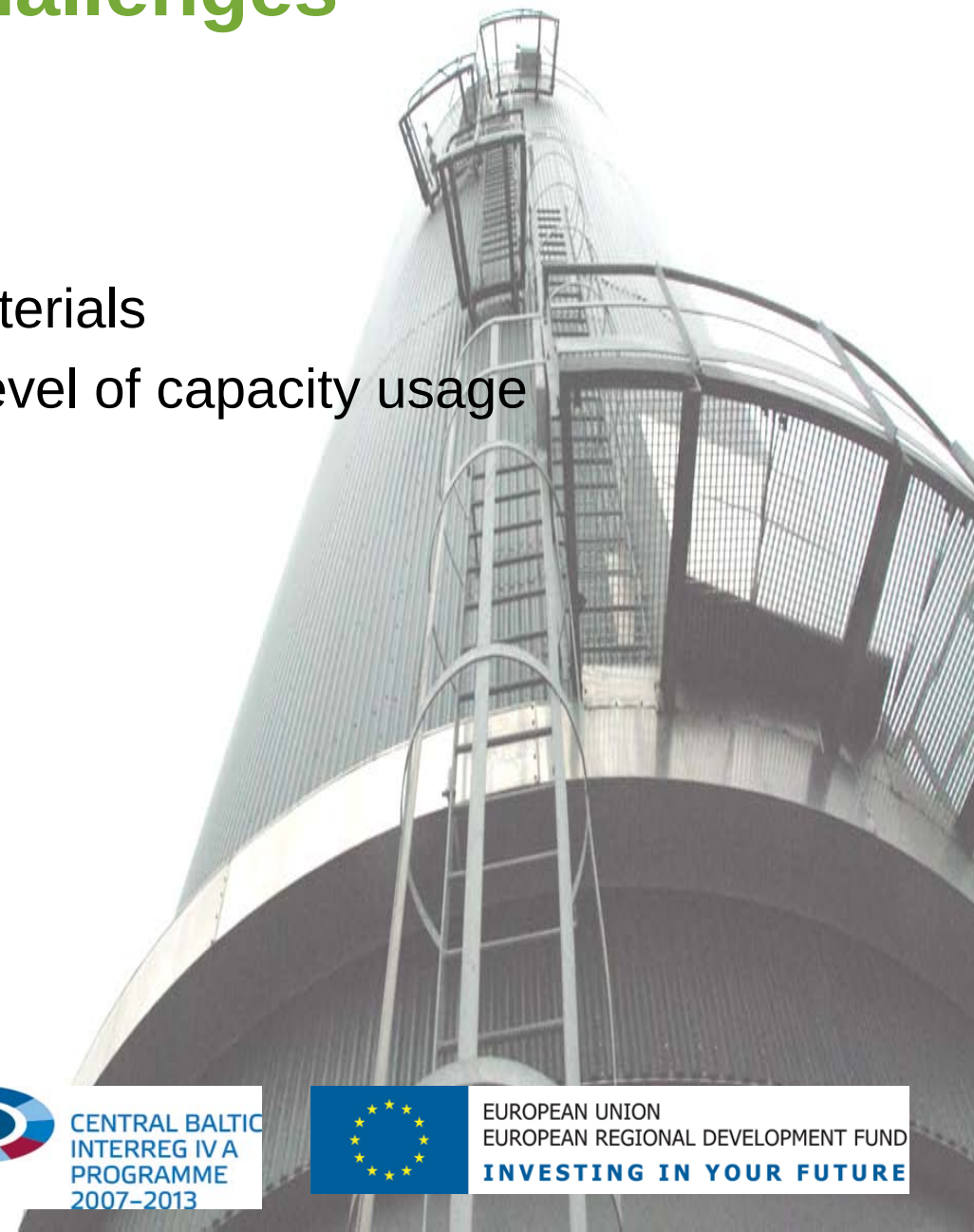
Economy of biomethane production – possibilities and challenges

12.3.2012 Säätytalo

Esa Aro-Heinilä
MTT Economic research

Possibilities and challenges - themes

- Scale of production
- Economic status of raw materials
- Consumption growth and level of capacity usage
- Support scheme



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Scale of production

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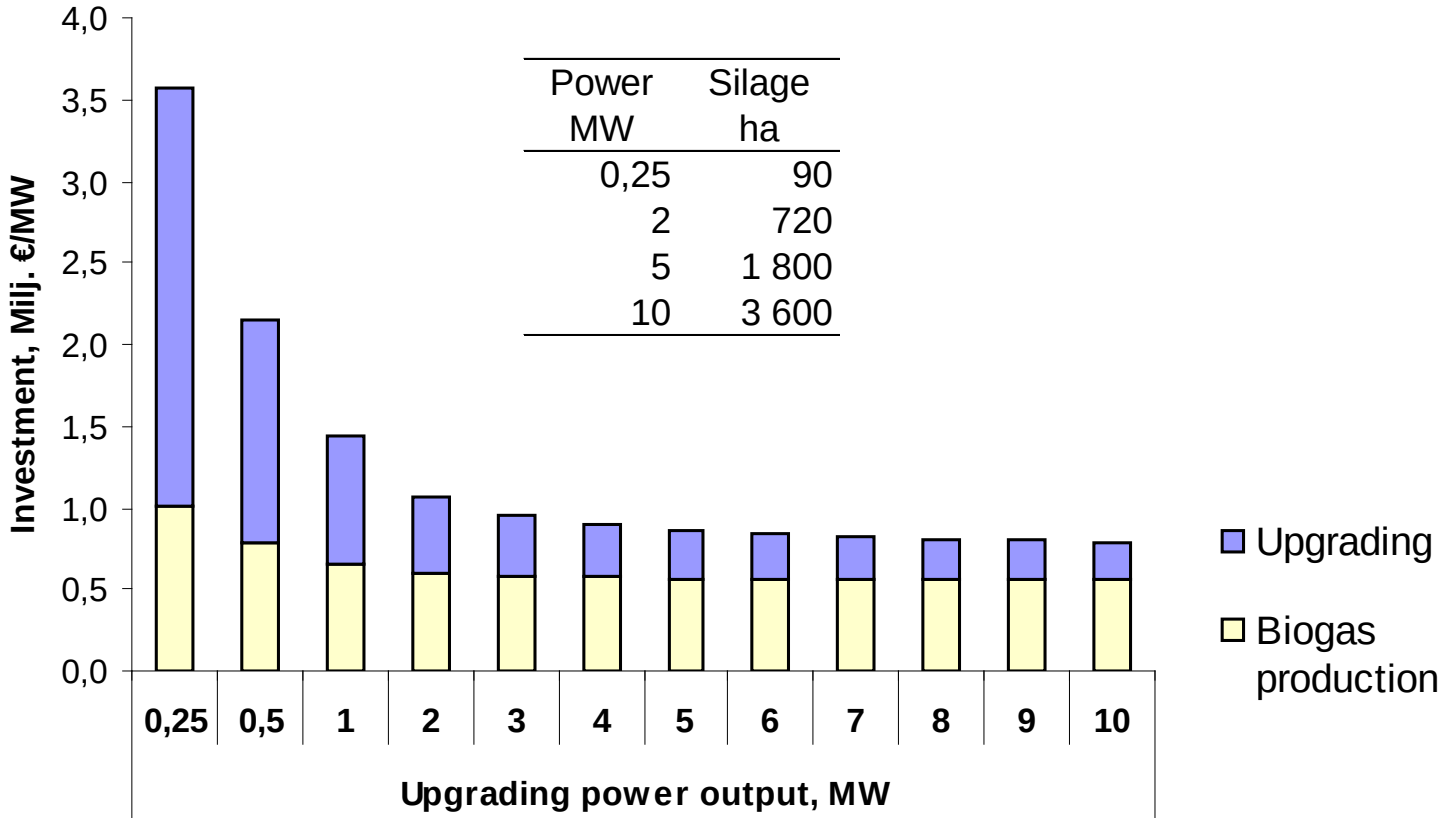

Power MW	Silage ha
0,25	90
2	720
5	1 800
10	3 600

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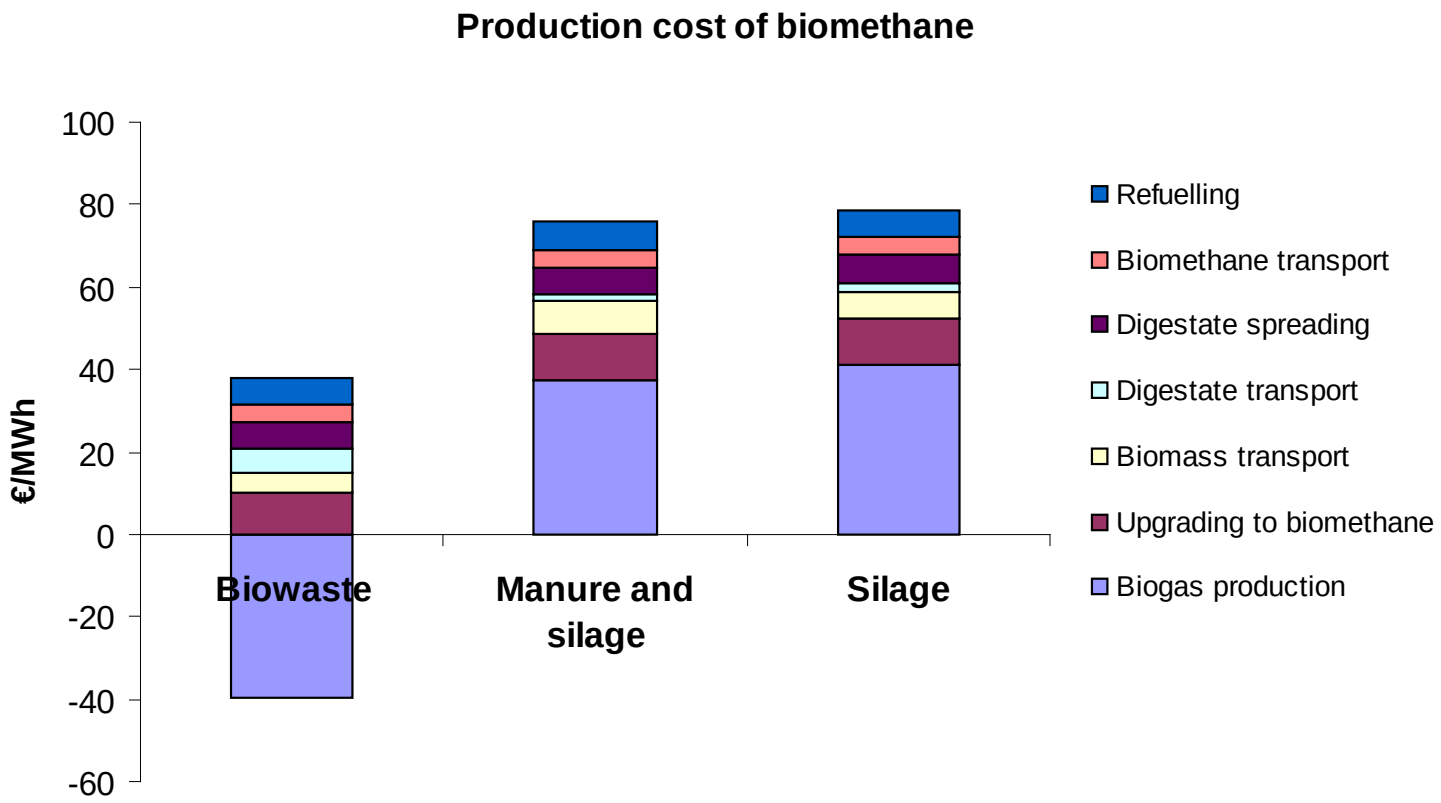
Economic status of raw materials

The question is weather your get paid for handling the raw material or you must pay for it



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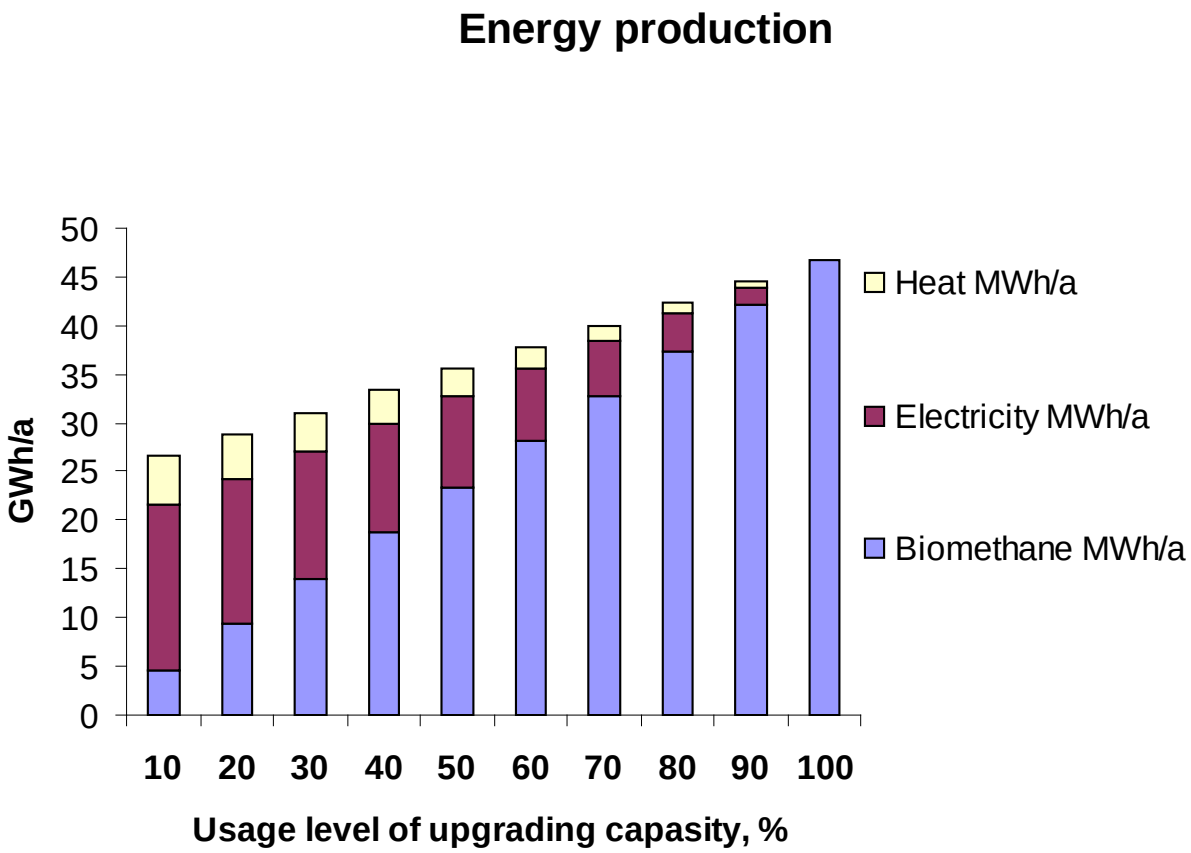
Capacity usage level

Example:
-5,8 MW plant in Turku region



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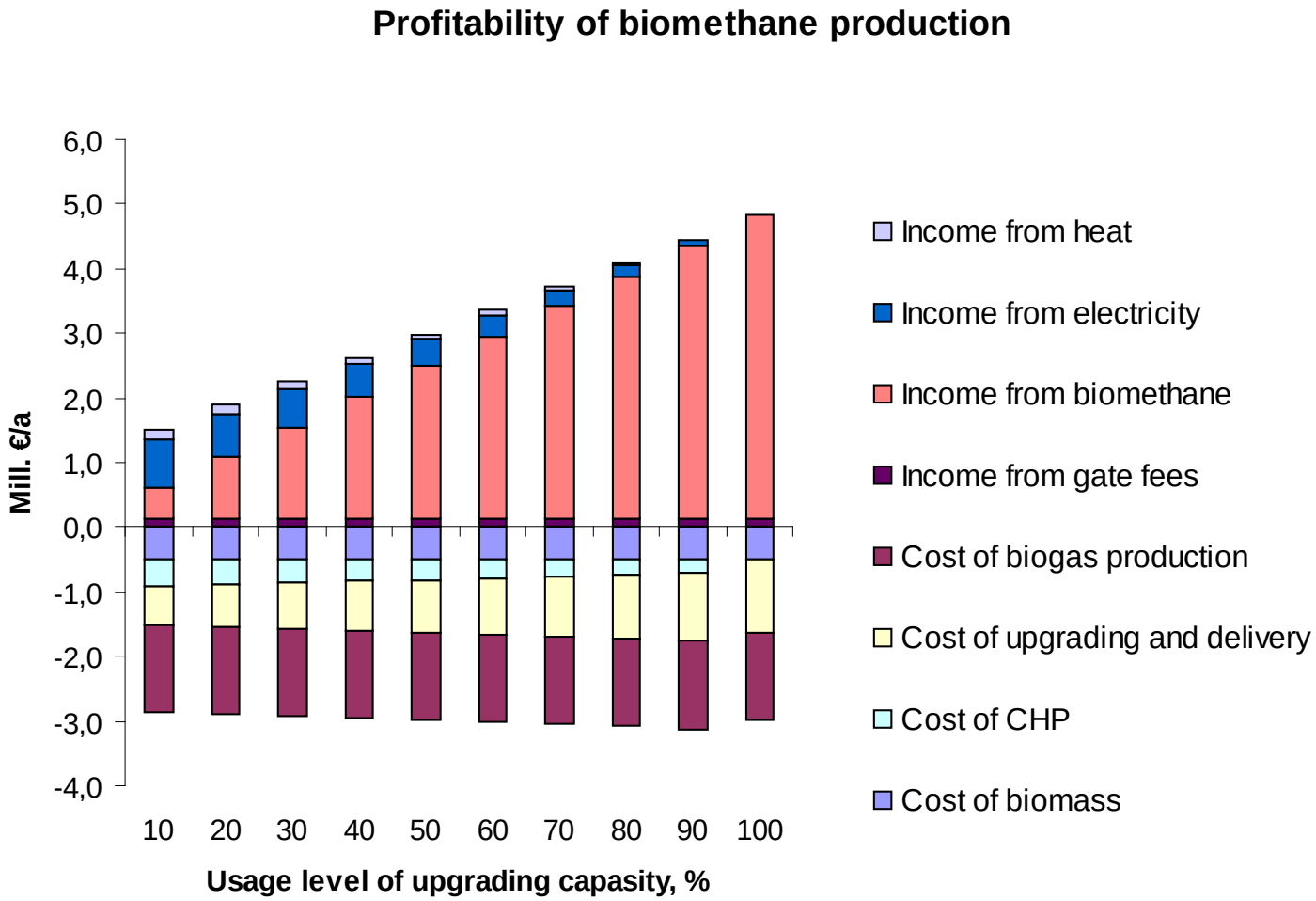

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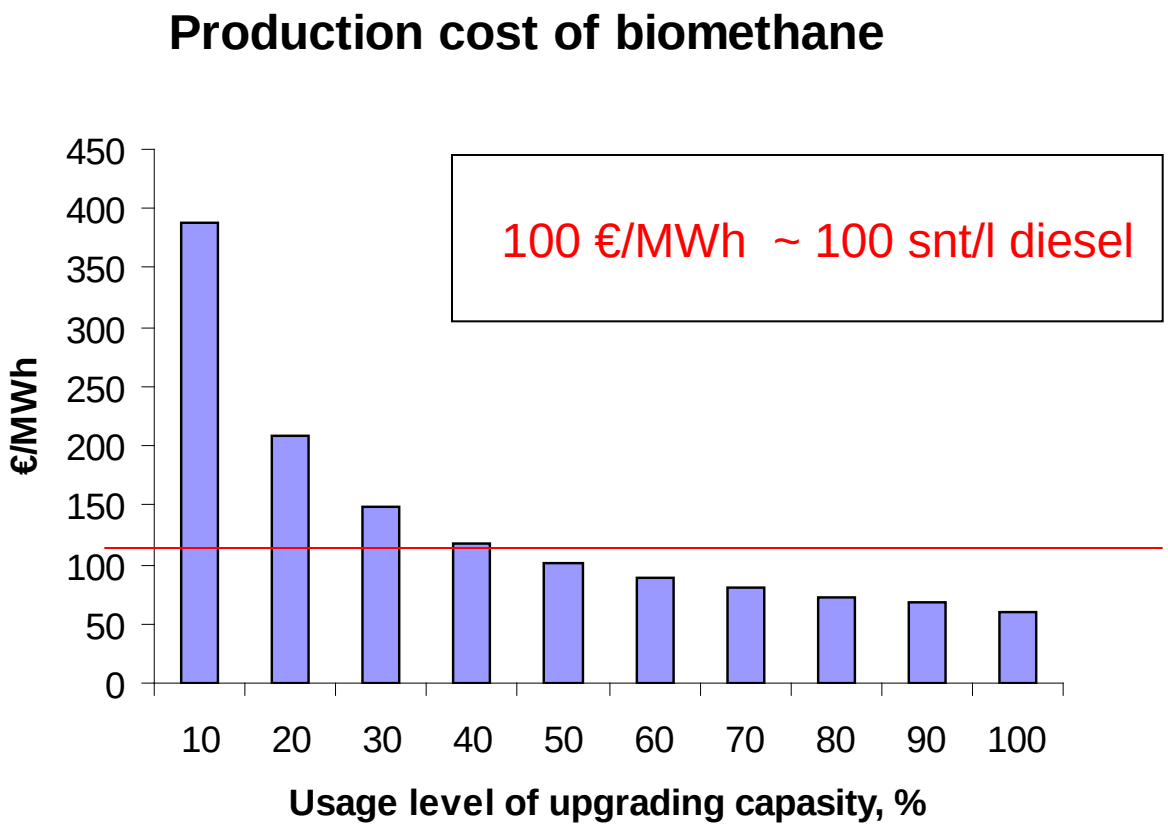

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Consumption growth

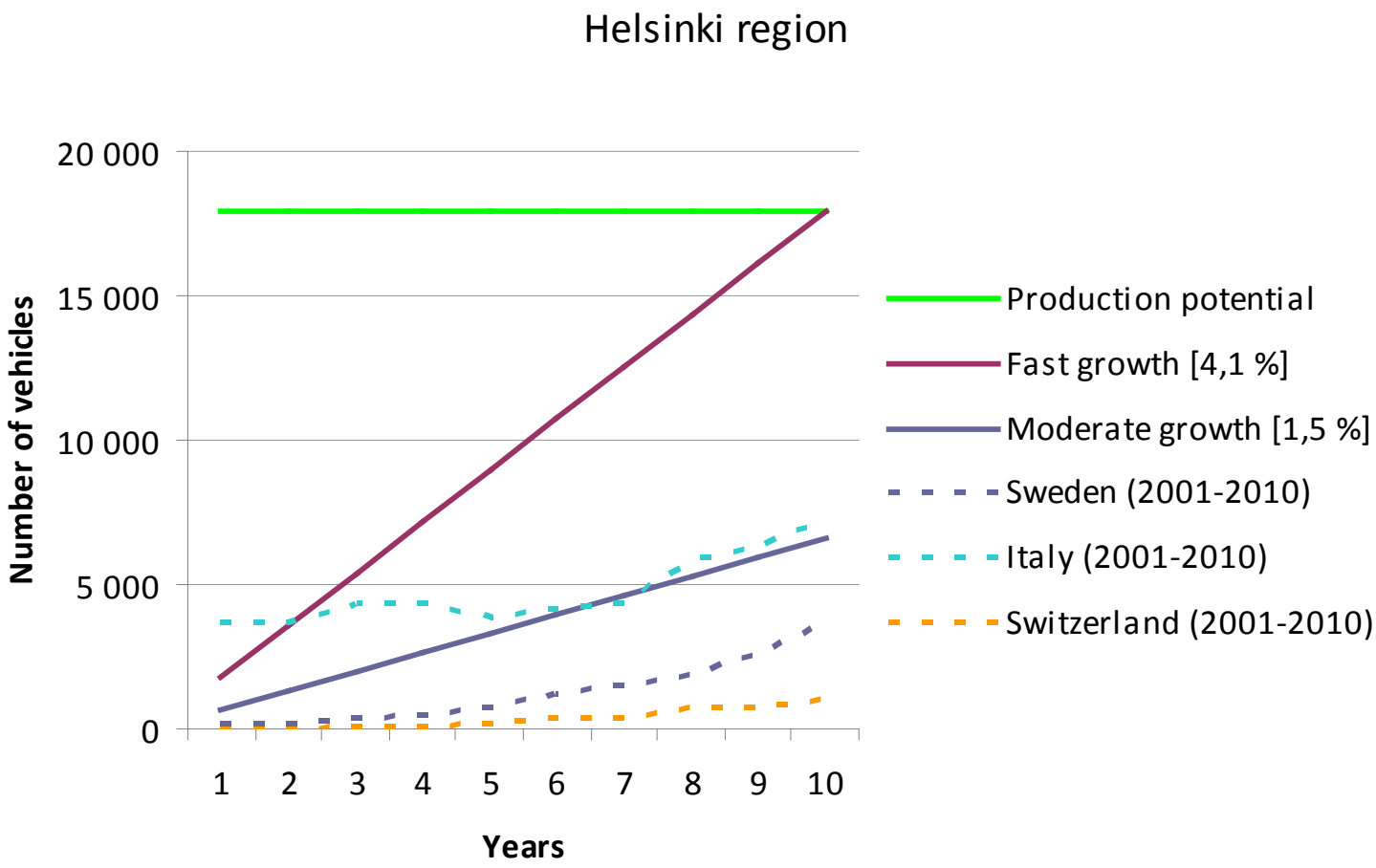
Growth rate of methane driven vehicles has been fast in last ten years period. Vehicle stock has multiplied for example in
- Switzerland 35 times
- Sweden and Finland 20 times
- Italy 1,28 times

But high growth figures results from low beginning level. Share of methane vehicles was year 2010
- Switzerland 0,22%
- Sweden 0,82%
- Italy 1,66%

in the areas where methane refuelling were available.

Source: NGV- International Association fro Natural Gas Vehicles

Consumption growth



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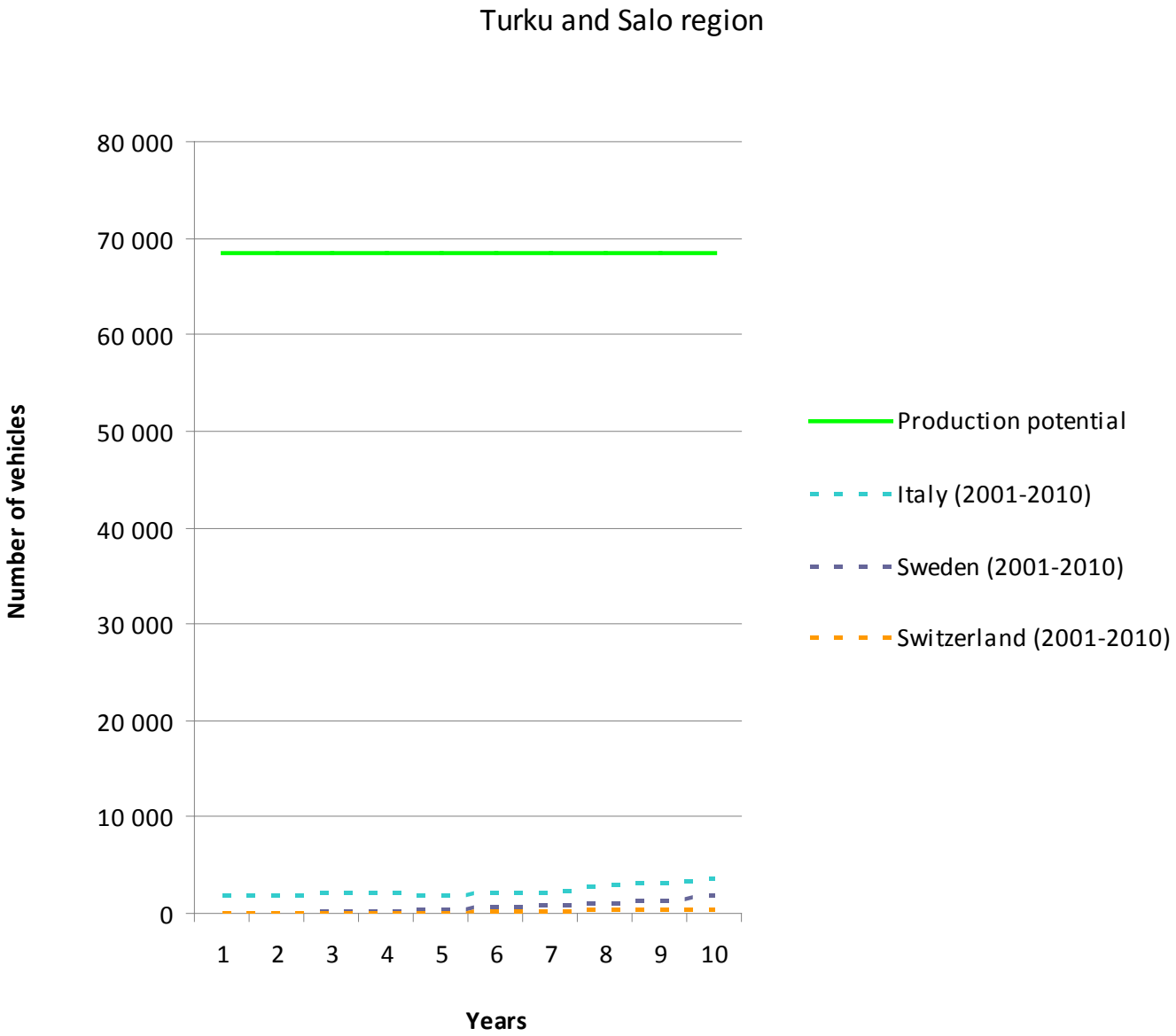
Consumption growth



Support scheme

- Delivery, refuelling and consumption infrastructure is based on liquid fuels making it as a standard
- Being standard may not mean that technology is superior, but technical compatibility restricts introduction of alternatives.
- To get into market development of gaseous fuel's deployment needs clear incentives, both for consumption and production sides.

Support scheme

Existing support

Investment aid 30%

→ **5** €/MWh$_{th}$ within 15 years economic lifetime of the plants

Agricultural support 550 €/ha

→ Silage crop 22 MWh/ha

→ **25** €/MWh$_{th}$

Support scheme

Need of additional support ?

100 €/MWh ~ 100 snt/l diesel

Cost/income		General costs	Biowaste	Municipal sludge	Liquid manure	Silage
Biomethane potential	MWh/t FM	-	0,97	0,42	0,10	1,04
Cost/income from treatment	€/t FM	-	**70**	**30**	**0**	**-21**
Cost/income from treatment	€/MWh	-	**72**	**71**	**0**	**-20**
Biogas production	€/MWh	-30	"	"	"	"
Upgrading	€/MWh	-16	"	"	"	"
Biomas transport	€/MWh	-14	"	"	"	"
Gas transport	€/MWh	-10	"	"	"	"
Refuelling	€/MWh	-10	"	"	"	"
Total	€/MWh	**-80**	**-8**	**-9**	**-80**	**-100**

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Conclusions

Development of infrastructure requires:

First step

- Harness the most profitable raw material sources (biowaste and sludge)
- Sufficient for local public transport and waste transport
- Requires only local political decisions

Second step

- Once local re-fuelling network exists, biomethane becomes more attractive option for wider amount of consumers
- Less profitable raw material sources (manure, silage, straw) comes into question
- To enhance production 30-50 €/MWh additional support is needed for 10 years transition period

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Thank you for your attention