The DVB-T experience in the Netherlands

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Content

The DVB-T experience in the Netherlands

- Television market
- Digital television offer
- Roll out
- Network
- EMC

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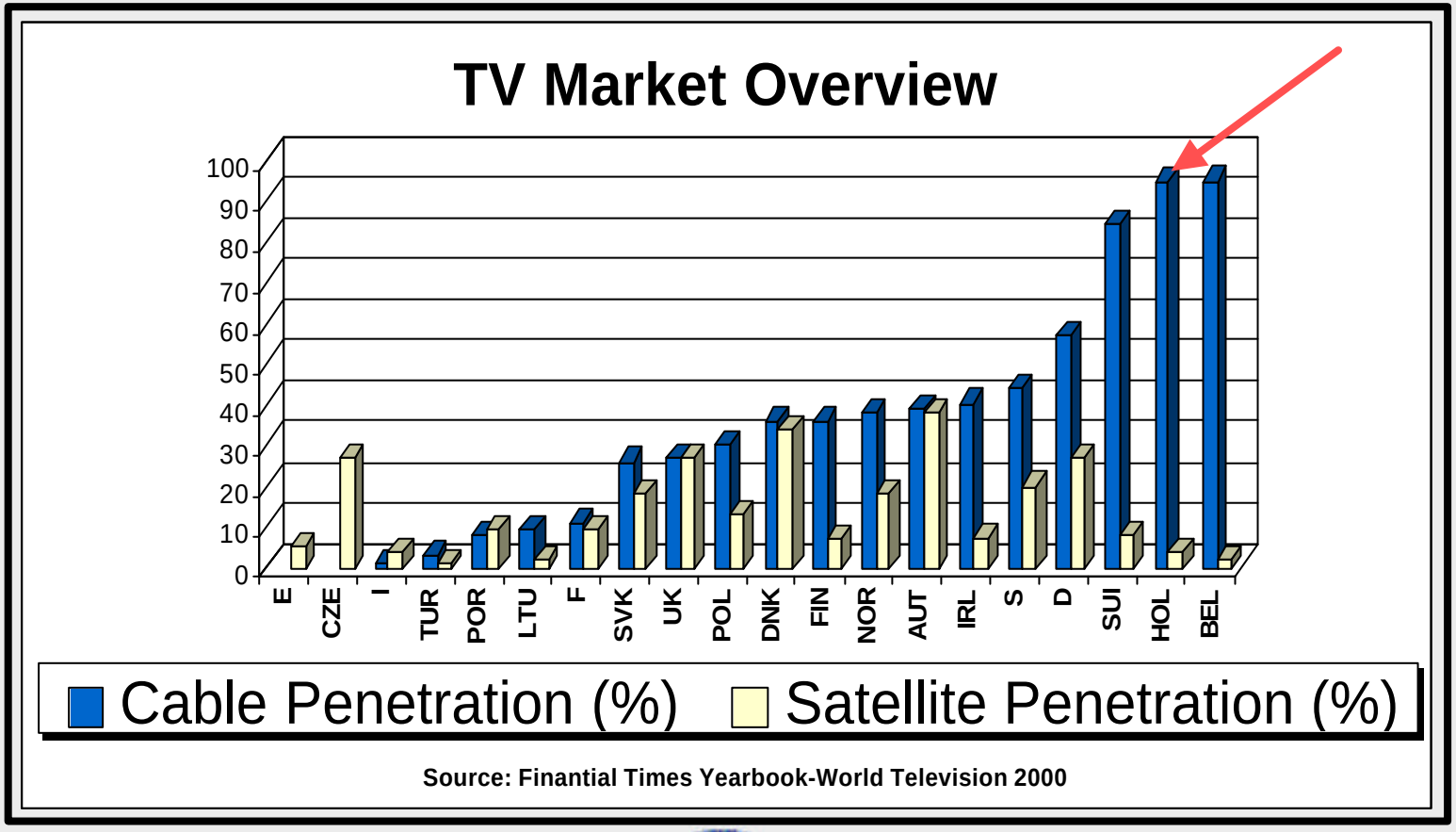
Television market (1)



Source: Finantial Times Yearbook-World Television 2000

Television market (2)

Consequences
of high cable penetration

- Almost no roof-top antennas
- High number of services (up to 30)
- Common to pay monthly subscription for delivery of services

DVB-T :
➢indoor reception by means of simple antenna
➢at least 20 programmes

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Television market (3)

Market research

Penetration:
10 - 20% households
after 10 years

Provided:
- indoor reception
- at least 20 services
- competitive price

Parameters influencing market penetration:
- subscription fee
- renting and subsidising STB's
- promotion
- new services
- availability of integrated digital television sets

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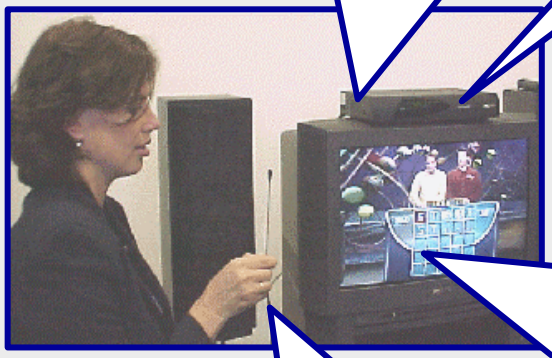
The Digitenne offer (1)

stichting Digitenne

- Monthly subscription
- Rental STB
- Competitive price

- Return path via PSTN

- Multiplex operator
- Consortium consisting of main market players



- 20 most popular tv services
- 15 radio channels
- 3 pay-tv channels
- Enhanced teletext
- EPG, weather and traffic info
- Additional innovative services in a second phase (shopping and info channels, games, internet tv)

- Indoor reception
- 5 multiplexes

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… The Digitenne offer (2)

Reception

Car

Tram

Boat

- Rooftop antenna

- Simple antenna
  - ➡portable
  - ➡mobile

Indoor stationary

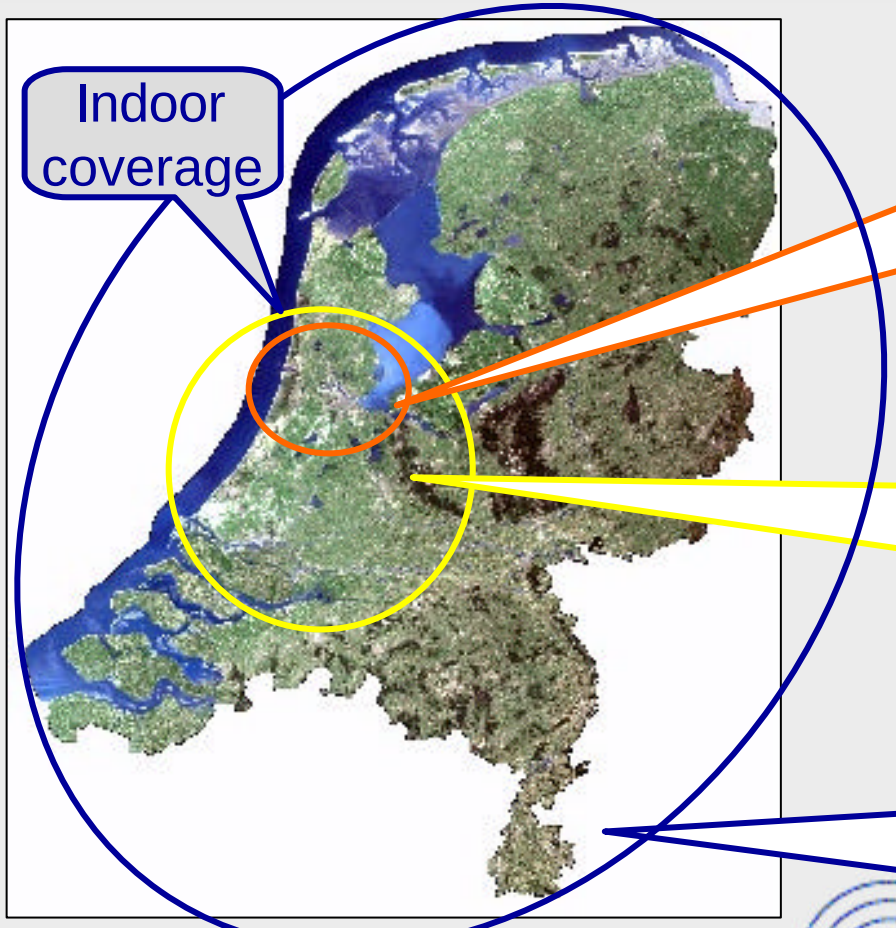
Portable receiver

The roll-out (1)

Introduction has been delayed

- Government policy
  - considerable political debate on licensing mechanism: auction or “beauty contest”
- International frequency co-ordination
  - negotiations with neighbouring countries started in 1996
- Technical developments
  - sometimes better to wait for new developments
- Licenses for construction and modifications of masts

The roll-out (2)



Greater Amsterdam
20% population
May 2001
5 multiplexes

Randstad
50% population
Q4 2001
5 multiplexes

Whole country
After analogue switch off
(2003 - 2010)
6 multiplexes

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The network (1)

Requirements

Commercial:

- ➢Indoor reception
- ➢Package of 20 programmes

Technical:

- Transmitter sites in or near urban areas to achieve good indoor reception
- As far as possible use of existing sites (television, FM, or telecom)
- More or less equal coverage of the five(later six) multiplexes
- A regional structure of the multiplex for the public services

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The network (2)

- >60 sites
  - now 10 sites with ERP > 1kW
- Small and medium size SFNs
- ERP 1 to 10 kW
- 64QAM 2/3
- Net bit rate 19.9 Mbit/s
- Statistical multiplexing

Net-work	SFNs	Tx/ SFN	Total tx
1	2	3: 11	14
2	3	5: 3: 6	14
3	2	1: 13	14
4	2	1: 13	14
5	2	1: 13	14

SFNs in Randstad area

The network (3)

2nd stage Randstad

3rd stage Whole NL

Investment tx network
? 40 mio

Item	Annual costs
Transmitter network	€ 12 mio
Running costs	€ 7 mio
Total	€ 19 mio

Costs

Investment tx network
? 115 mio

Annual costs tx network
? 41 mio

DVB-T⇔ Cable	Price/ household
DVB-T	**~ € 18**
DVB-T 10%	**~ € 180**
Cable	**~ € 900**

Investments in digital to be added

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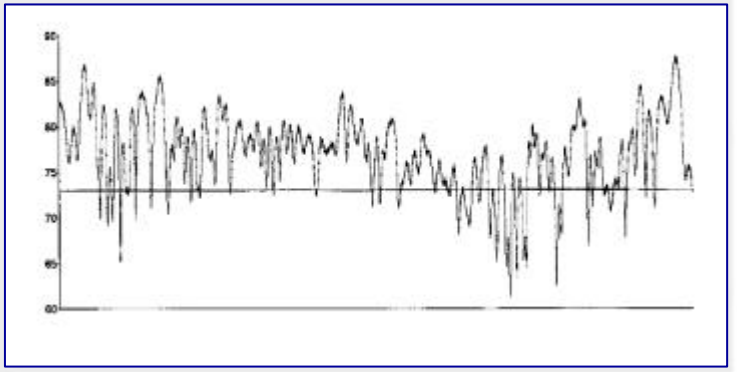
The network (4)

Tests

Some results

- Field strength highest near a window (even if window is not facing the transmitter)
- Moving people having minor impact on reception
- “Blocks” in picture (due to noise or interference) more harmful than reduction of bitrate
- Good indoor reception in all buildings difficult to achieve



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EMC (1)

The facts

- In cable up to 862 MHz
- Possibility of interference between off-air and cable channels
- Cable system itself ok
- Domestic installations often poor quality
- Connectors weakest part
- Solution in the past: don't use transmitted frequencies in cable!

The problem now

- With DVB-T more frequencies off-air
- Cable systems used to maximum capacity
- Cable companies not willing to adapt channels
- No legal means for government to enforce channel usage in cable
- Result: major problem

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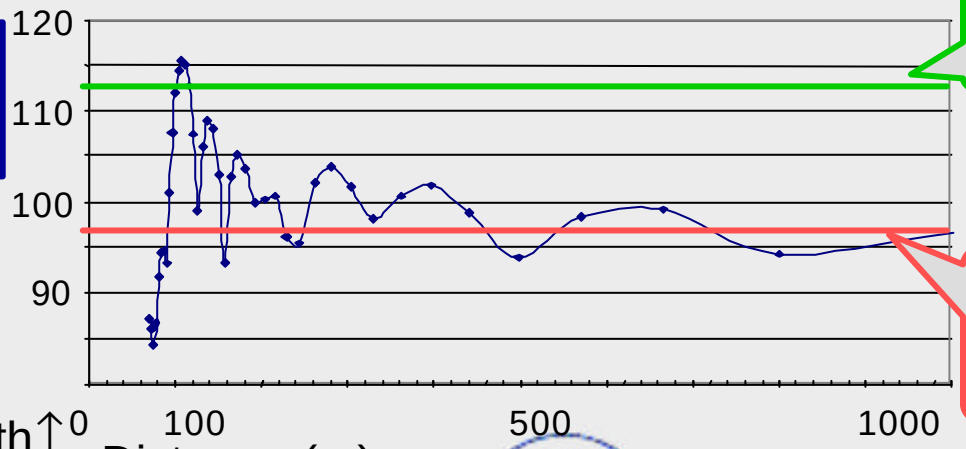
EMC (2)

Investigations

- 20 to 30% of cable households may have interference on one or more channels
- if poor connectors are replaced by good ones only 0,02% may have interference

ERP: 10kW
heff 100 m

Receiving
height 30 m



Good quality cable and connectors

"normal" (poor) quality cable and connectors

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Conclusion

The DVB-T experience in the Netherlands:

- Indoor reception is a must
- Costs much less than cable
- More delay than originally expected
- Dense network structure and use of SFN
- Difficult to implement nation-wide as long as analogue television is in operation
- Connectors of good quality in domestic cable installations are essential

THE END

Thank you for your attention