Scenario Sostenibilità Il caso Autonomia Energetica Altotevere
Fiera delle Utopie Concrete Città di Castello, 12 – 15 Ottobre 2006

'Distributed Economies ':

Transition Towards Innovative Sustainable Energy Solutions for Local and Regional Development in Europe

Prof Allan Johansson
The International Institute for Industrial Environmental Economi cs
POB 196
S-22100 Lund, Sweden

DeLabs

an iiiee initiative

Some anomalies of present paradigms

- Wealth polarization
- Urbanisation
- ’Globalization’ (fear of supranational powers)
- Lack of entrepeneurial and innovative sprit
- Unsustainability of material fluxes
- Rupture of social networks (social sustainability)

Combining megatrends

The world is in transition

-sustainable development
-quality of life issues
-ethics
-decentralised decision making
-increased leisure time
-unemployment

Technology develops

-communication/informatics
-miniaturisation (nano technology)
-energy efficiency
-system optimisation/automation

Some characteristics of the new trend

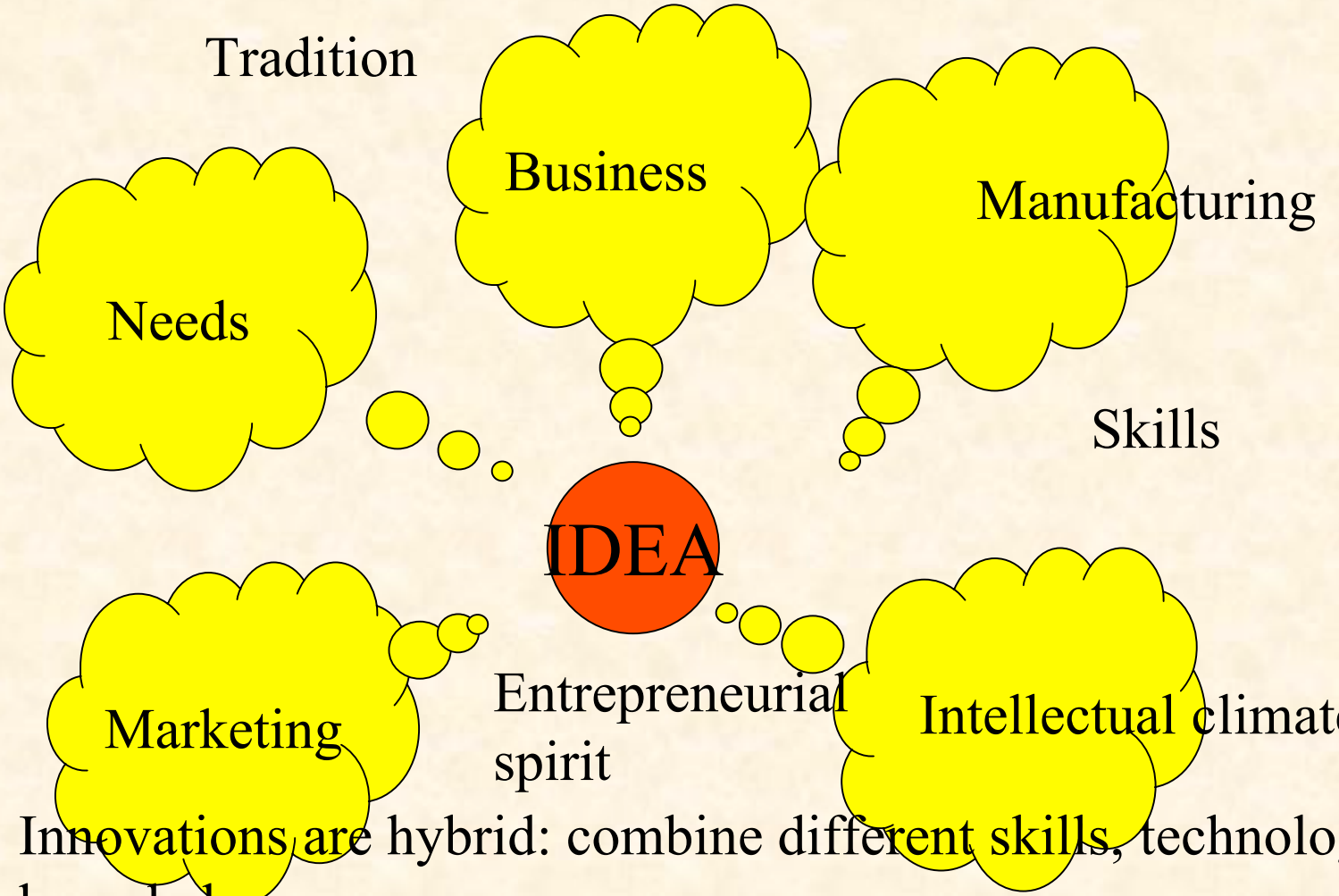
Enhanced importance of

-quality
-flexibility
-decentralised production
-efficiency of networks
-eco efficiency

As a consequence the importance of the SME sector increases !

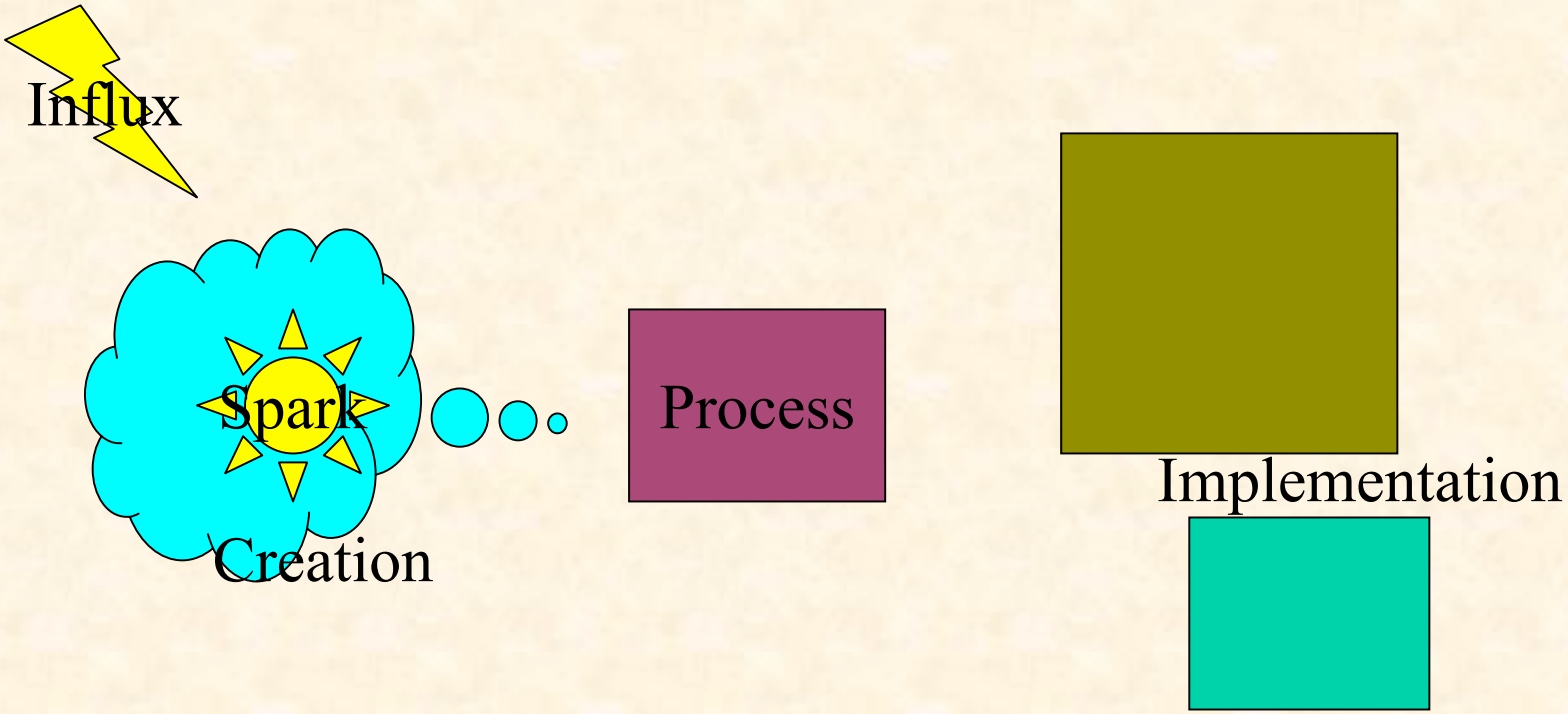
The whole system design is wrong!

The innovation 'landscape'



Innovations are hybrid: combine different skills, technologies an knowledge

The ’process’



First step (almost) always local!

The Process

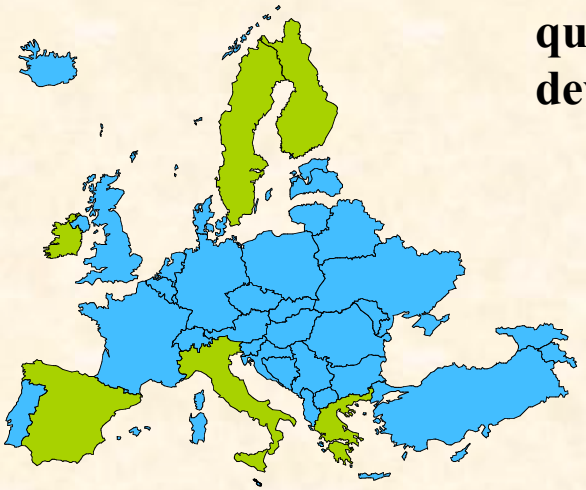
Local start

Globalization comes later
-because (if) there are
generalities in the system

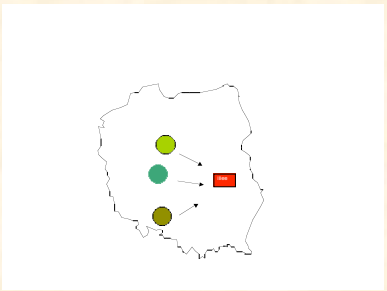
Flow of logic

Increased export, employment opportunities, decreased load on environment -vital elements of a BETTER NEW WORLD!

The regions are in the focus!



The institutional network provides support and adds quality to the regional development programmes.



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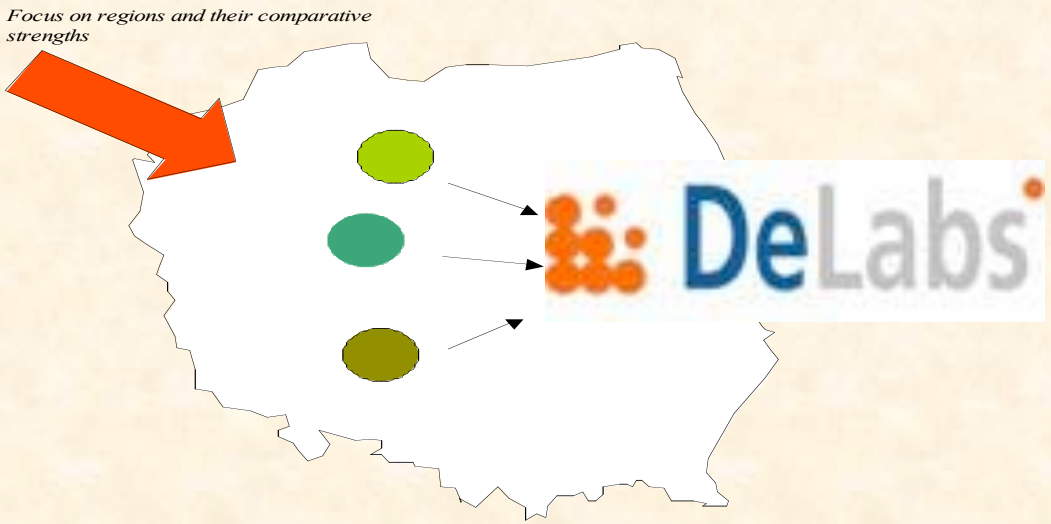
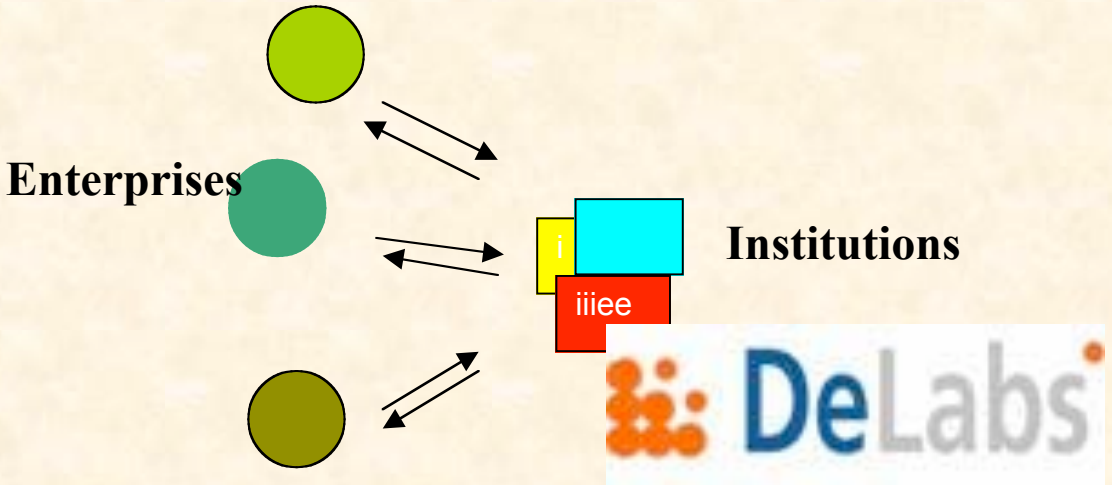
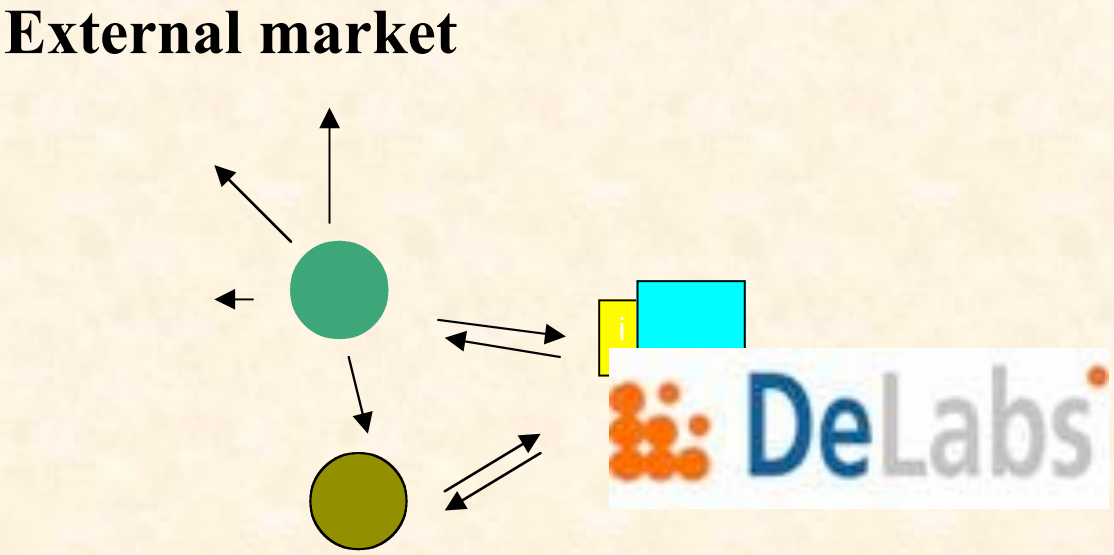
Focus on specific regions and their comparative strengths



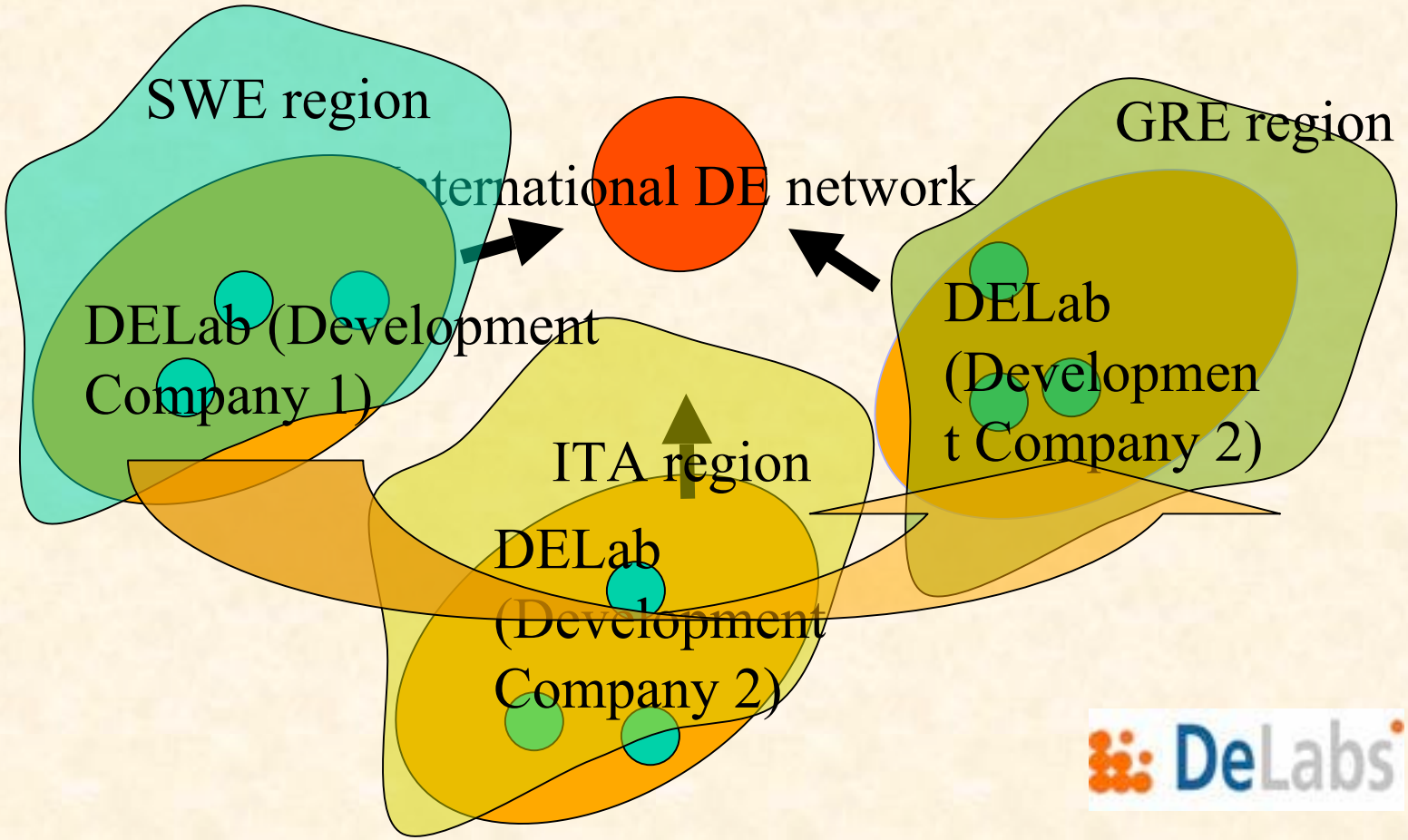
Close interaction between expert institutions and SME enterprises



Economy of size through networking



Generator of regionally based innovative business-Network of Excellence and Style



Important questions for DE

- How to develop successful attempts fast
- How to make mistakes cheap?
- How to terminate unsuccesful attempts
- How to learn from mistakes i.e. build theory

Conclusions

- Alternative and complement rather than subsitution
- Basis for strategy to start small
- Opportunity to preserve and profit from cultural memory

Decentralised production- the energy sector as an example

Combined heat and power production is an efficient energy production method

but

as the demand for electricity increases heat demand becomes the limiting factor, electricity is easy to transport heat is not

but...

A decentralised energy production allows the use of even small heat loads, with the result that the power to heat ration no longer is a critical technical parameter

In domestic use the major part of the energy consumption goes to heating

Thus...

A decentralised micro power plant allows efficient production and use of combined heat and power

<u>in fact it is the prerequisite for</u>

the efficient use of renewable (disperse) energy sources, i.e. biomass, solar power, wind

Security from distributed generation - a smart combinatation of all renewable production and conversion technologies

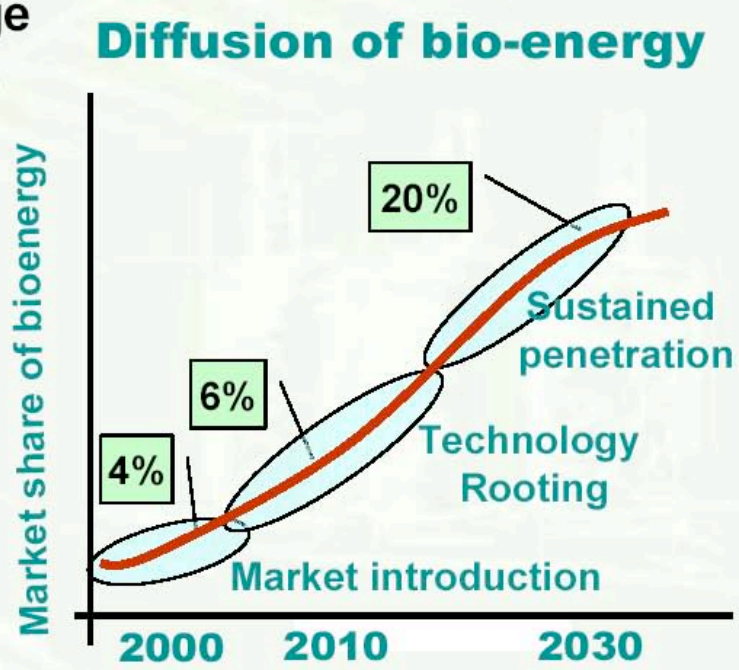
- wind
- solar
- biomass
- waste

and

- fuel cells
- combustion engines
- micro turbines
- etc

European challenge: market penetration of bio-energy

- Fact 1: large infrastructures change slowly and main barriers are costs
- Fact 2: bio-energy is <4% of EU energy, goal is 6% in 2010, but potential is much higher
- Fact 3: MS and EU actions strive for market impacts and effective resource utilization



⇒ How to accelerate the commercialization of bio-energy?

⇒ Market transformation

Source: Peter Lund, Bioenergy Enlarged Perspective ,Budapest 16-17 Oct, 2003

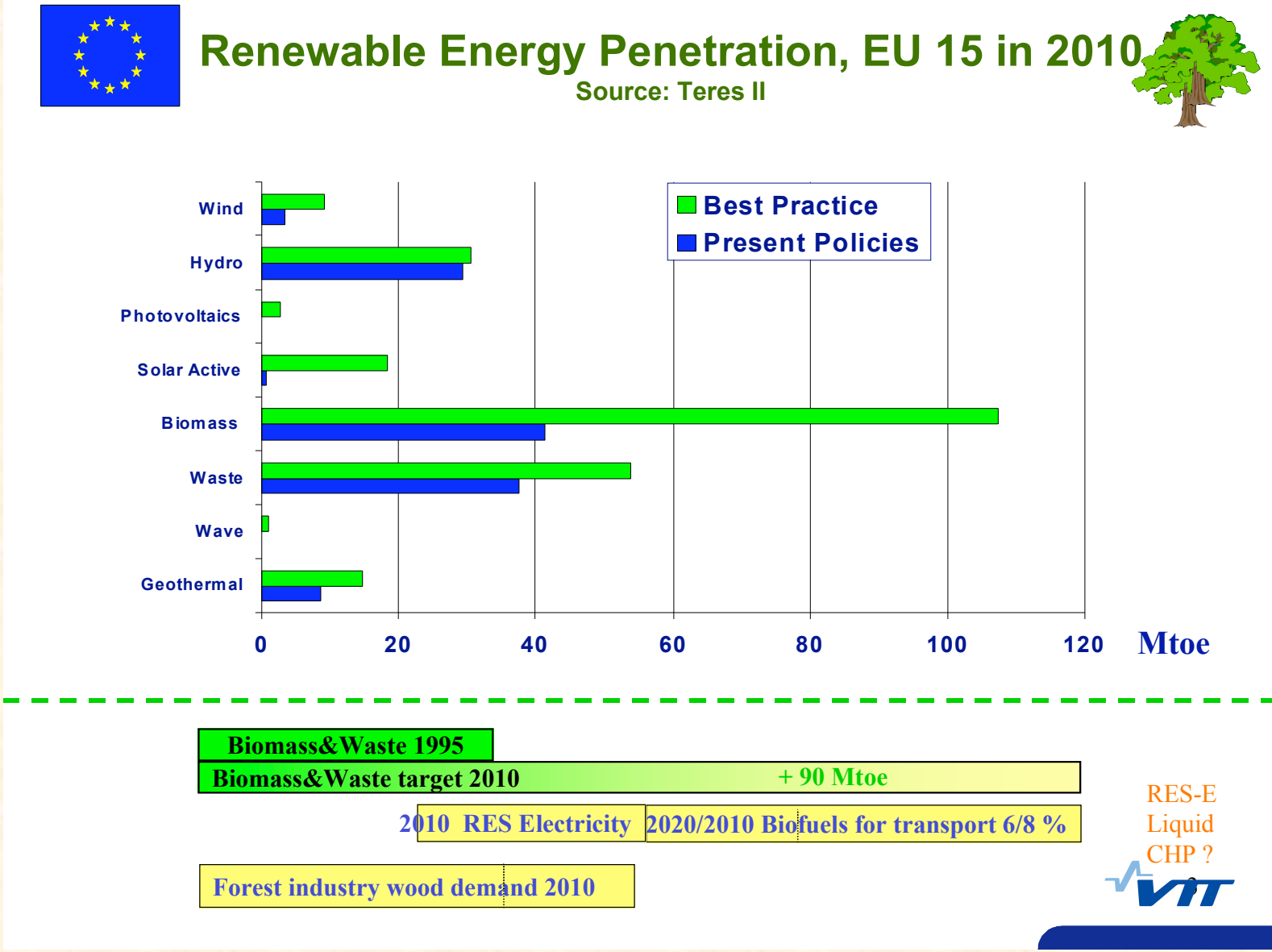
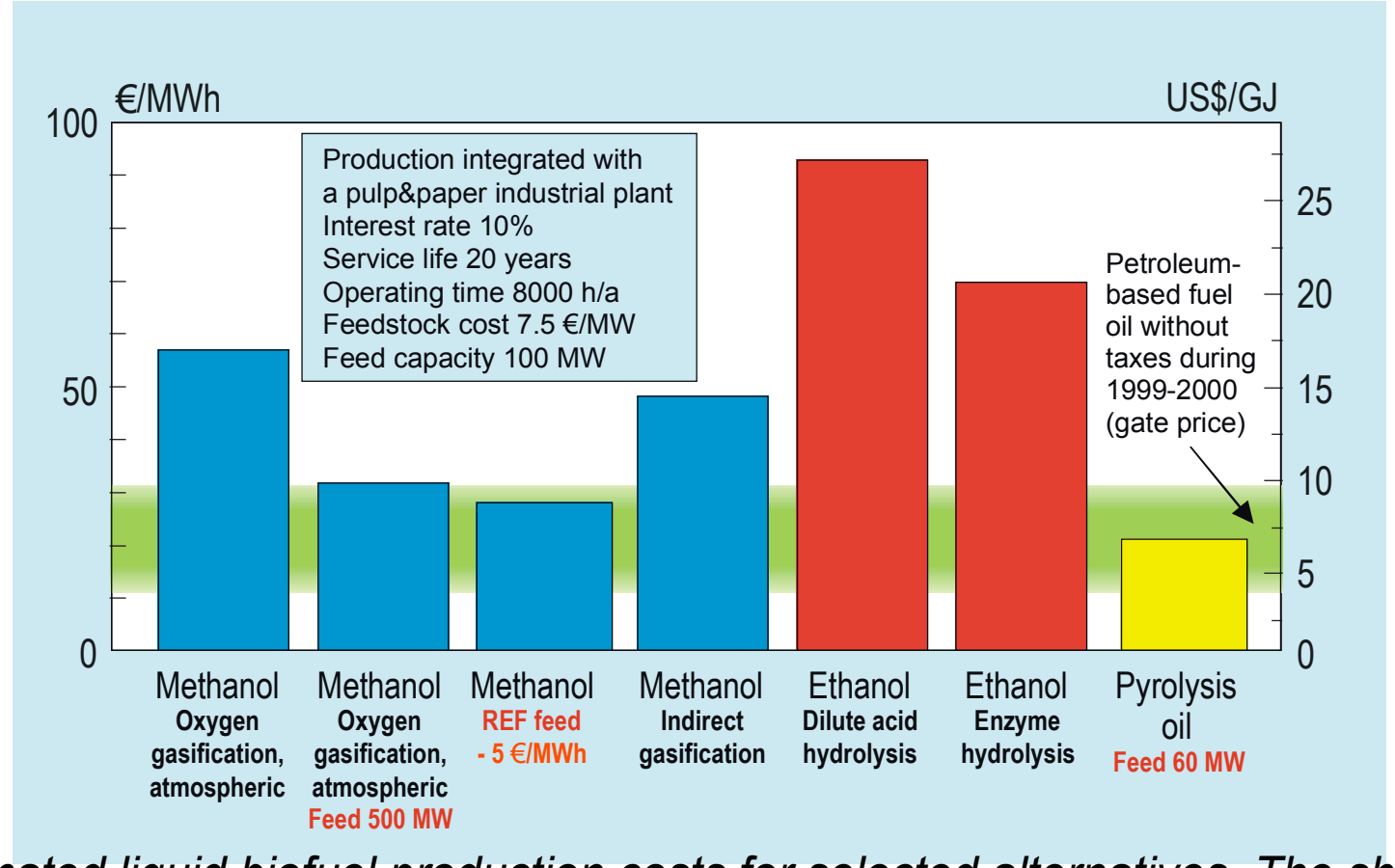


Figure 1. Biomass penetration in 2010 in EU-15 countries, including the effects of RES-E Directive and draft Directive on Alternative Transport Fuels. The forest industry wood demand is also presented as equivalent energy amount

Liquid Biofuels from Wood - Production Costs

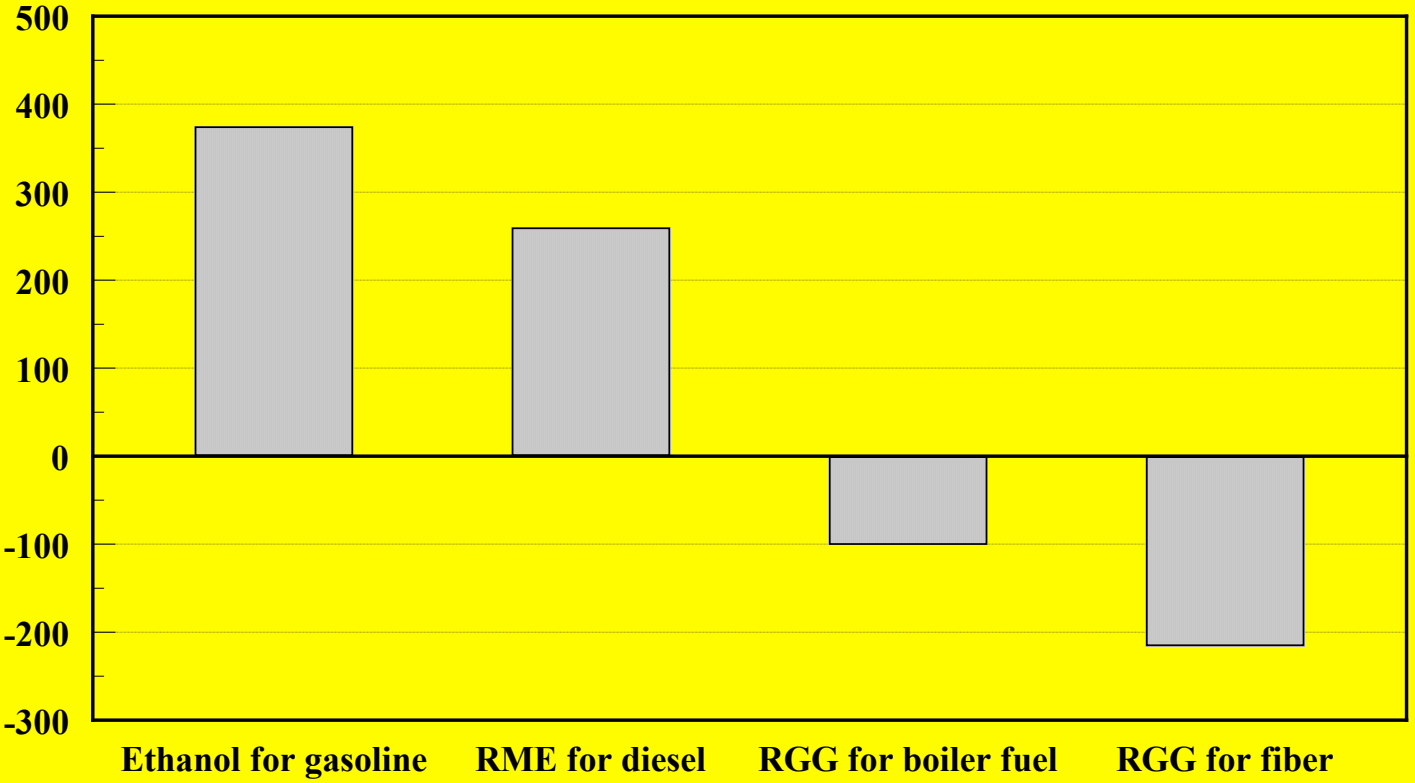


Estimated liquid biofuel production costs for selected alternatives. The shaded area shows untaxed price of mineral oil products in the year 2000.

VTT Energy, 2001. 94 p. VTT Tiedotteita - Meddelanden - Research Notes; 2074 ISBN 951-38-5780-8; 951-38-5781-6
http://www.inf.vtt.fi/pdf/tiedotteet/2001/T2074.pdf

Energy and Other Products from Crops in Europe

EC CAP Subsidies and Non-Taxed Production Costs 1995 (Area A)



- EC CAP subsidies between 180 and 290 €/ha

Required subsidy of selected agro-biomass concepts. Transportation fuels need highest total subsidy. (RCG=Reed canary grass) Ref: K.Sipilä & A.Johansson, VTT

Biomass resources are essentially local, while the energy market is global.

How can this contradiction be resolved for bioenergy?

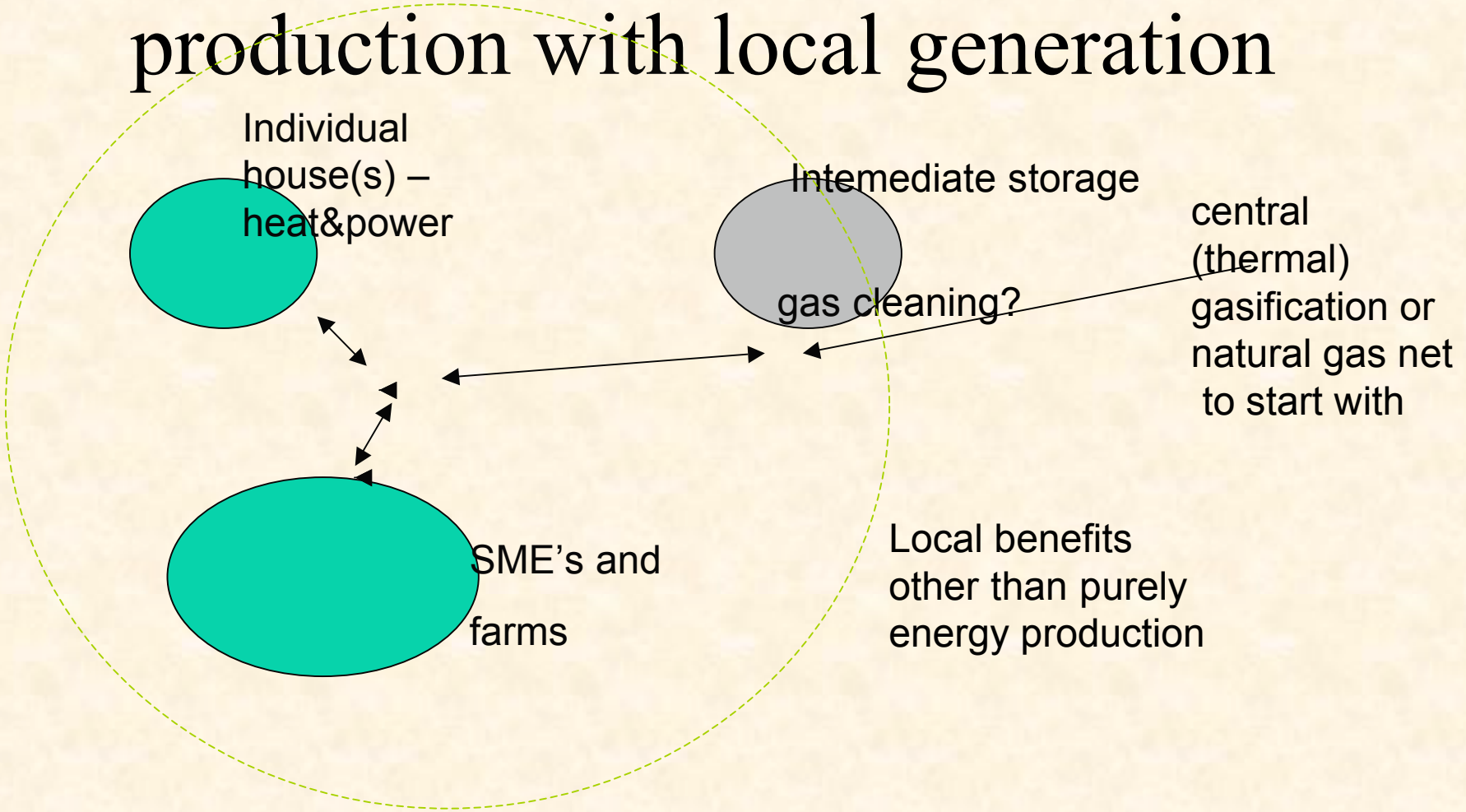
Think globally -act locally!

Production units should be planned for the local supply of raw materials- and as far as possible taking into account local energy (heat and power) demand

Network structure built from local consumer demand

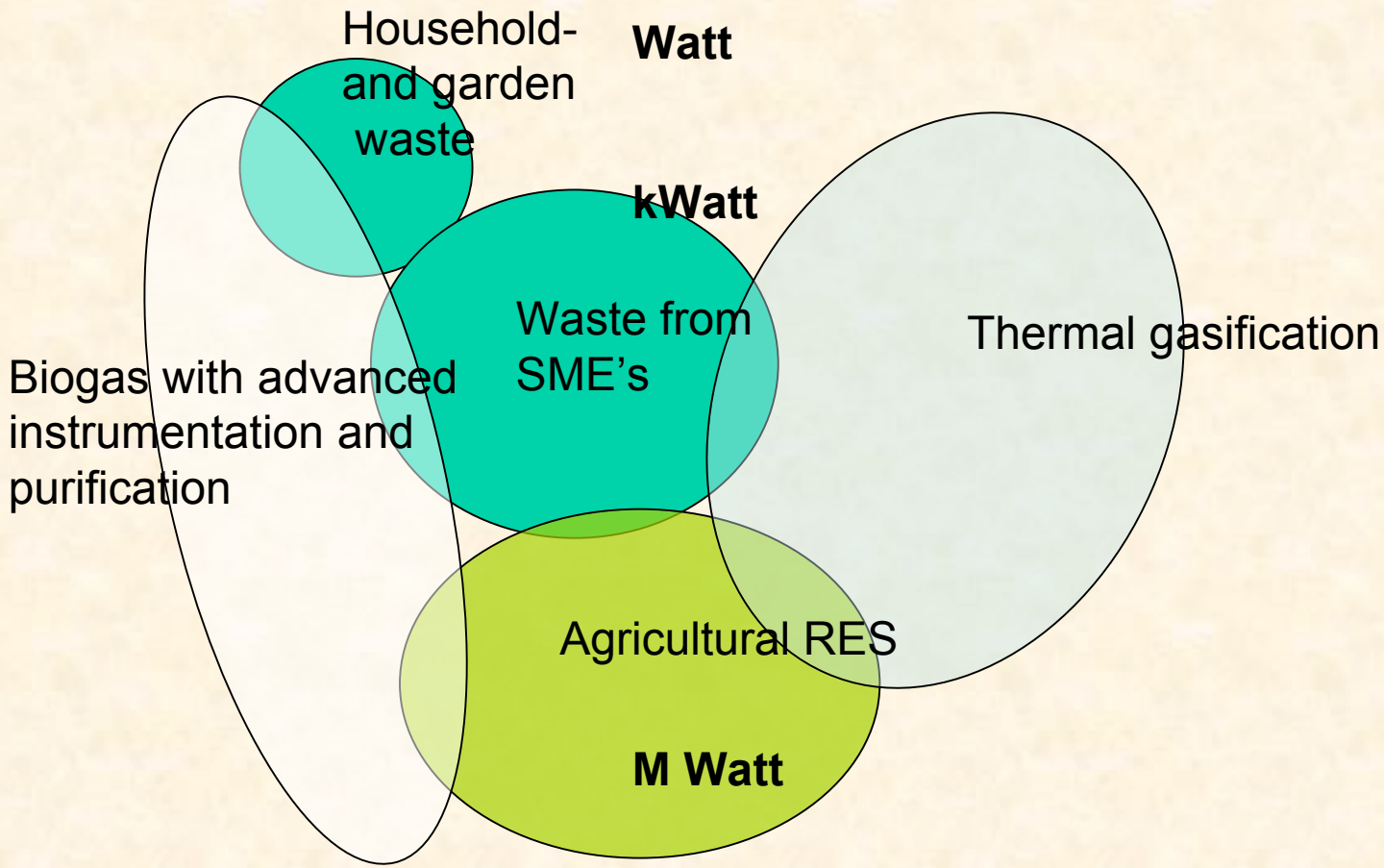
- In the following focus is on CHP and gas from renewables (biomass and waste)

Network combines centralised production with local generation



Supply grid with intemediate storage for security and as buffer for local generation

Right technology for right size



Proposed approach

- Standardised units adapted for multiple fuel use (agro- and forest residues, biogenic part of domestic waste)

- Well adapted into local market (possible local ownership)

- ‘economy of scale’ gained through networking different localities into one business chain (i.e. hamburger chains)

Final outcome- New business idea!

- Brand and credibility gained through the network identity
- Reduced managerial and maintenance cost
- Expert management and secured raw material supply through joint ownership, but one operator
- Success breeds success

Att:unverified numbers

The Future Home

Biogas:
4 persons
~~100m^3/a~~
=590 kWh
of gas for
cooking
(200kg/capita /a of degradable waste= 40m^{3}CH$_4$/a)

Wind: 100W*200d*24h=480kWh
Solar: 100W*200d*24h=480kWh

Compost

Bioelectric engine: 10kW of which 2kW electricity =>2kW*200d*4h =1600kWh
Total annual electricity production= 2560 kWh, storage in electric vehicle/tractor batteries for transport and power tools (next phase fuel cell powered vehicle- acts as
electricity supply)