



The background features a dynamic, abstract graphic of blue and white curved lines and geometric shapes, suggesting motion and technology.

# Team Finland Future Watch & Snapshots USA, Intia, Kiina & Venäjä

Teollisuuden vanhan kumous – Teolliset symbioosit 4.4.2013  
Jaani Heinonen TEM

# Industrial Symbiosis – USA



## Bioenergy Linking Strategies

Finland is already part of the U.S. bioethanol research agenda, and Finnish biofuels-related companies have ties to the USA. The key is to find the appropriate entry points for potential collaboration in an expanded U.S.-China linkage.



### Bilateral Partnerships

#### Finland

##### Biofuels Cooperation

EERE is working with the VTT Technical Research Centre of Finland to conduct a technical and market analysis of the use of biomass pyrolysis for energy applications.

Pyrolysis involves the thermochemical conversion of solid biomass, such as agricultural or industrial waste, into an easily stored and transported liquid, or "bio-oil". Bio-oil can either be upgraded to liquid transportation fuels, or used directly as a fuel to generate electricity.

This project examines methods of utilizing biomass pyrolysis in both Finland and the United States. Researchers in both countries match biomass resources with processing locations, and examines several scenarios for chemical conversion. For example, the research will determine whether it is more feasible to transport all the biomass to a large central site for processing or to generate bio-oil at smaller, distributed sites before transporting the bio-oil to other locations.

<http://www1.eere.energy.gov/international/europe.html>

December 2010

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### Cleantech Finland: Biofuels & US Connections

Metso	Neles & Jamesbury valves have significant penetration into U.S. biofuels plants, which accounts for most of Metso's sales in this segment of their business.
Metgen	Board & Management have ties and/or experience in the USA.
Neste Oil	U.S. HQ in Houston, Texas; December 2010 ranking in <i>Biofuels Digest</i> as one of the "Top 50" companies for its renewable diesel business.

NOTE: Larox has been actively involved with BueFire in the USA.

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# Industrial Symbiosis – USA

## USA:n mahdollisuudet:

**“During a series of meetings and conversations with my colleagues, we came to the conclusion that with regard to what is going on in Finland, the best U.S target area is in the Southeastern USA’s forest & paper industry region, which stretches from East Texas to the western parts of the Carolina’s and Georgia. In developing any business in this area for Finland, the approach would be with the technology companies that support the developing value chains for woody biomass harvesting and processing as well as the conversion of old kraft mills to biorefineries.”**

# Industrial Symbiosis – India

## India overview

- The widely used name for industrial symbiosis is ‘Eco-industrial development’
- Thinking is starting to spread, but taking a long time to move into action
- Current Special Economic Zones (SEZ) are interested in becoming Eco-industrial Parks (EIP)
- New SEZs that follow holistic industrial symbiosis thinking are called Special Industrial Regions (SIR) in Gujarat state to make a point about eco-industrial holistic approach
- Capacity development about eco-industrial thinking is under work in some of the states: Gujarat Cleaner Production Center (textile, pulp & paper), Bangalore region (electronic waste), cluster consortiums under development in different industries
- Energy, water and waste are the biggest interests. The lowest hanging fruit at the moment is energy efficiency as it shows a direct benefit.
- A goal is to build 32 smart cities to new special industrial regions in next 10 years



Spent Acid Recovery

Iron Sludge

Renewable Energy

Energy Van

Industrial Symbiosis

Fly Ash

Waste Museum



## Case Naroda: changing into into Eco-Industry Park

Includes today 30 different types of industries

[http://www.unep.fr/scp/cp/RECPnet/2011/pdf/Day\\_2/Session\\_4/Eco\\_industrial\\_parks/NCPCGujarat\\_EIP.pdf](http://www.unep.fr/scp/cp/RECPnet/2011/pdf/Day_2/Session_4/Eco_industrial_parks/NCPCGujarat_EIP.pdf)



# Industrial Symbiosis – China

## Kiinan haasteet ja mahdollisuudet:

- Tarvitaan platform, jonka varaan teollinen symbioosi voidaan kehittää ja johon toisiaan tukevat yritykset voivat liittyä
- Kiinassa suurin osa suurinvestoinneista (joissa mukana pitkät arvoketjut) on hoidettu joko valtionhallinnon tai yksityisten developereiden kautta (tai molemmat mukana) – näihin ulkomaalaisen “niche”-toimittajan on vaikeaa päästää mukaan
- Kiinassa edelleen valtavasti valtiojohtaisia monialayrityksiä, jotka pystyvät yksin hoitamaan koko ketjun
- Kiinassa ei vielä laaja-alaista ymmärrystä teollisista symbiooseista vaikka esimerkkejä löytyy jopa historiasta (esimerkiksi urean käyttö)
- Kuitenkin myös moderneja esimerkkejä löytyy

# URBANISAATIO KIINASSA



**25 - 25 - 25**

# Industrial Symbiosis – Russia

## Background:

“Rosprirodnadzor” is a government regulator.



“Pay as you pollute” principle doesn’t work in Russia. Existing fines and other economic stimulus are not enough to push companies towards IW symbiosis with others. Getting rid of hazardous waste for a.m. reasons may be an incentive.

Ecosystem or concept of Industrial Symbiosis is not relevant for Russia as such. Construction industry is probably the only example of IS, utilizing mining and energy industry waste. However, the volumes of such symbiosis dropped 2-2,5 times in the last 20 years and now only applies to local SMEs.

# Industrial Symbiosis – Russia

Nevertheless, successful examples of utilization of valuable IW are found in certain industries. Examples of such symbiosis:

Biogas from manure: only 2 considerable size plants  
in Kursk and Belgorod region (2,2 and 7,4 MWt/y)



Forest waste: Few plants  
1200 t/month pellet plant



Team Finland Ennakointi Visio 2013



## Future Watch

# Kohdemarkkinoiden parhaaseen älyyn kytkeytyminen ja tiedon siirto

## Kohdemarkkinoiden muutossignaalien analysointi suomalaisen innovaatioympäristön tarpeisiin

# Tiedon hyödyntäminen

## Keskeisen tiedon siirto Suomessa hyödynnettäväksi

## Suomen tiedontarpeisiin vastaaminen

## Keinoina esim. Future Sessiot, työpajat, seminaarit, SoMe ja raportit

# Suomen innovaatiojärjestelmän edustaminen

## Verkottumisen tuki tuki



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