



# Constraints to mobilizing sustainable biomass supply chains – the ecological perspective

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## Solving the problems with biomass?

- If we replace 20% of the worlds gasoline consumption with 2nd generation bioethanol or BTL fuel – how much do we need?
- ~750 million tons of biomass yr-1
- This amount we can get from:
  - 125 mill ha of forest (6 tons ha-1 yr-1) or
  - 40-60 million ha of well managed agricultural land (12-19 tons ha-1 yr-1)
- Globally we have 4 billion ha of forest and 1,5 billion ha of crop land...

Claus Felby, University of Copenhagen



# Biomass plans and partnerships

- **Governmental biomass action plans and visions**
  - **EU Biomass Action Plan** (69 to 150 Mtoe),  
[http://europa.eu/legislation\\_summaries/energy/renewable\\_energy/l27014\\_en.htm](http://europa.eu/legislation_summaries/energy/renewable_energy/l27014_en.htm)
    - **National Biomass Action plans**  
[http://ec.europa.eu/energy/renewables/bioenergy/national\\_biomass\\_action\\_plans\\_en.htm](http://ec.europa.eu/energy/renewables/bioenergy/national_biomass_action_plans_en.htm)
  - **US DOE billion-ton vision.** Biomass Supply for a Bioenergy and Bioproducts Industry (214 to 1000 mill tons of biomass)  
[http://www1.eere.energy.gov/biomass/pdfs/billion\\_ton\\_update.pdf](http://www1.eere.energy.gov/biomass/pdfs/billion_ton_update.pdf)
- **Partnerships**
  - **The Southeast Partnership** for Integrated Biomass Supply Systems (IBSS), <http://www.se-ibss.org/>
  - **The Intelligent Energy Europe "FOREST project":** A pan-European project focused on working with business in the biomass heating supply chain to develop a more profitable and successful business sector, <http://www.forestprogramme.com/about/>
  - **Ten million-tons project** in Denmark (partnership between University of Copenhagen and Dong energy).  
[http://nyheder.ku.dk/alle\\_nyheder/2011/2011.12/partnerskab\\_med\\_dong\\_om\\_biomasse/](http://nyheder.ku.dk/alle_nyheder/2011/2011.12/partnerskab_med_dong_om_biomasse/)

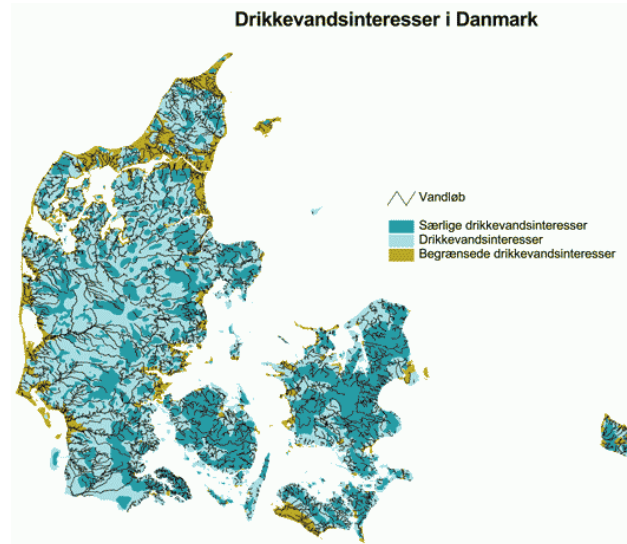
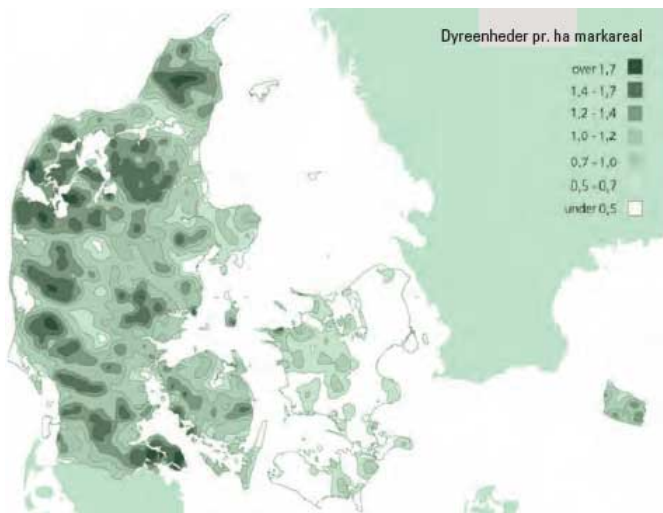
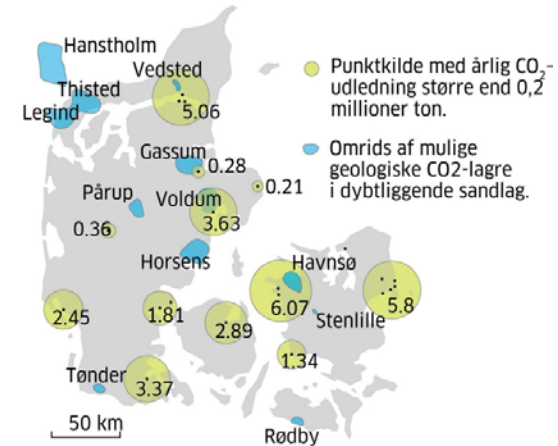
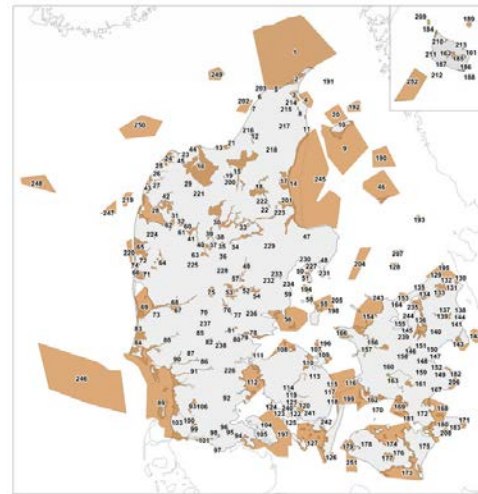
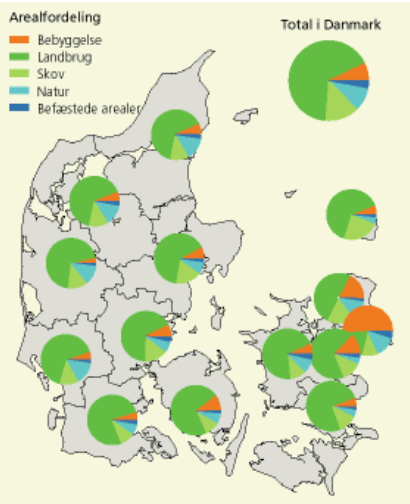


## How to increase biomass availability....?

- **Mobilise existing un-utilised biomass resources**
  - Readily available?
  - Technology development
  - Subsidies and taxation of competing fuels
- **Increase biomass production**
  - Crop and species change
  - Genetic selection (clones)
  - Silvicultural systems, e.g. nurse crops
  - Land use change (afforestation e.g. on abandoned land, SRC)
  - Fertilisation (sludge, manure)



# Ecological perspectives



## Constraints due to...

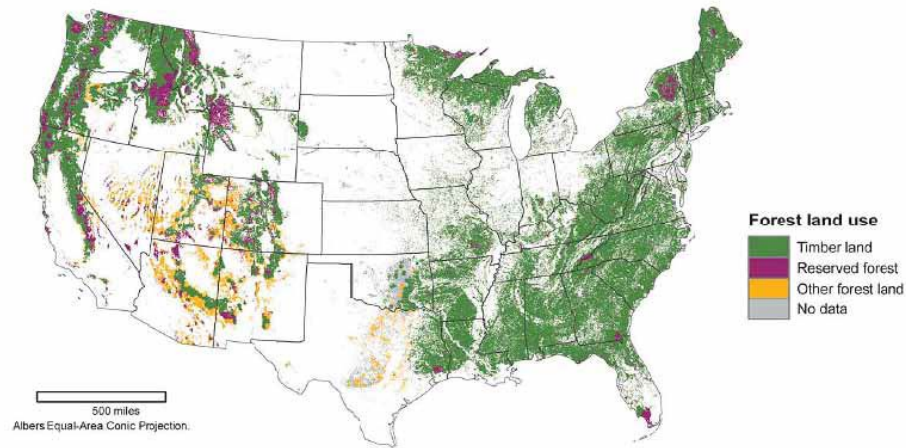
- Biological diversity
- Climate change mitigation/carbon stocks
- Soil
- Water

## Possibilities to...

- Restore degraded land



## US DOE billion ton and sustainability - forestry

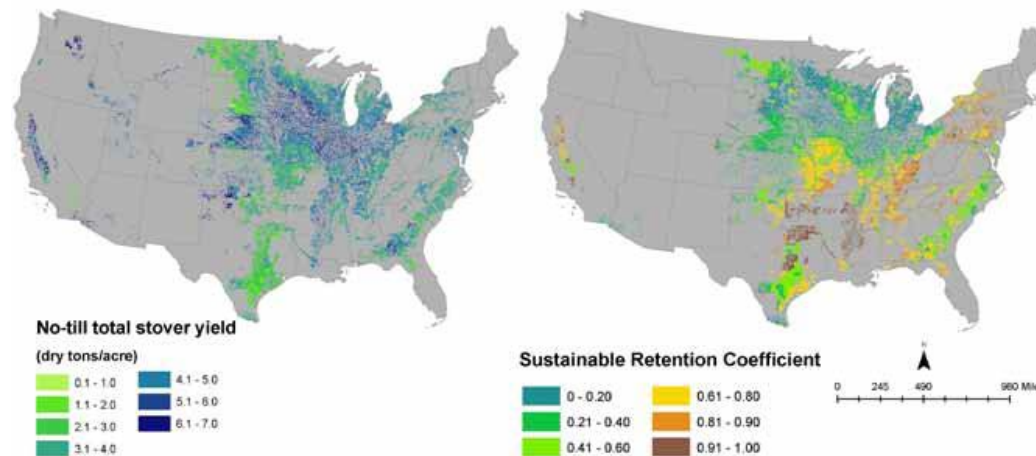


### Ecological perspectives - forest residues:

- **Reserved forest lands** excluded (wilderness and national parks)
- Inventoried **roadless areas** excluded (possibly qualifying for wilderness or other conservation protections)
- **Wet areas**
- **Leaving one third of the logging residues**, but more on slopes



## US DOE billion ton and sustainability – agriculture



### Ecological perspectives to agricultural residues – stover:

- **Conventionally tilled acres:** No removal of stover
- **Reduced or no-till:** Stover retention coefficients calculated based on crop management zone, modelled soil loss and wind erosion, soil condition index and cropping rotations for low-, moderate-, and high-harvesting systems and for corn and small grain.





## US DOE billion ton and sustainability - energy crops

### Constraints to conversion of cropland:

- Subject to meeting demands for food, feed, industrial stocks, and exports
- Excludes forestland and Conservation Reserve Program (CRP) land
- Only 10% of cropland each year (only 25% in any given county)

### Constraints to conversion of pastureland:

- Limited to counties east of the 100th meridian except for the Pacific Northwest
- Intensifying pasture needed to replace lost forage
- Only 5% of permanent pasture/20% cropland pasture in a given year (max 50% in any given county - assumed doubling of forage through intensification)



## EU RED - Biodiversity

Exclude feedstock from (§3)....

- Natural undisturbed forest
- Areas designated by law + international agreements on protection of rare, threatened or endangered ecosystems or species - **unless production does not interfere with the nature protection.**
- Highly biodiverse natural grassland
- Non-natural grassland which is species-rich and not degraded - **unless necessary to preserve its grassland status.**



## EU RED – high carbon stock

Exclude feedstock from converted land (since 2008) with previous high carbon stock (§4)....

- Wetlands
- Forested areas or other wooded land **unless the carbon stock of the area before and after conversion fulfils the GHG emission reduction criteria (§2)**

Exclude feedstock from....

- Peatland which involves drainage of previously undrained soil.

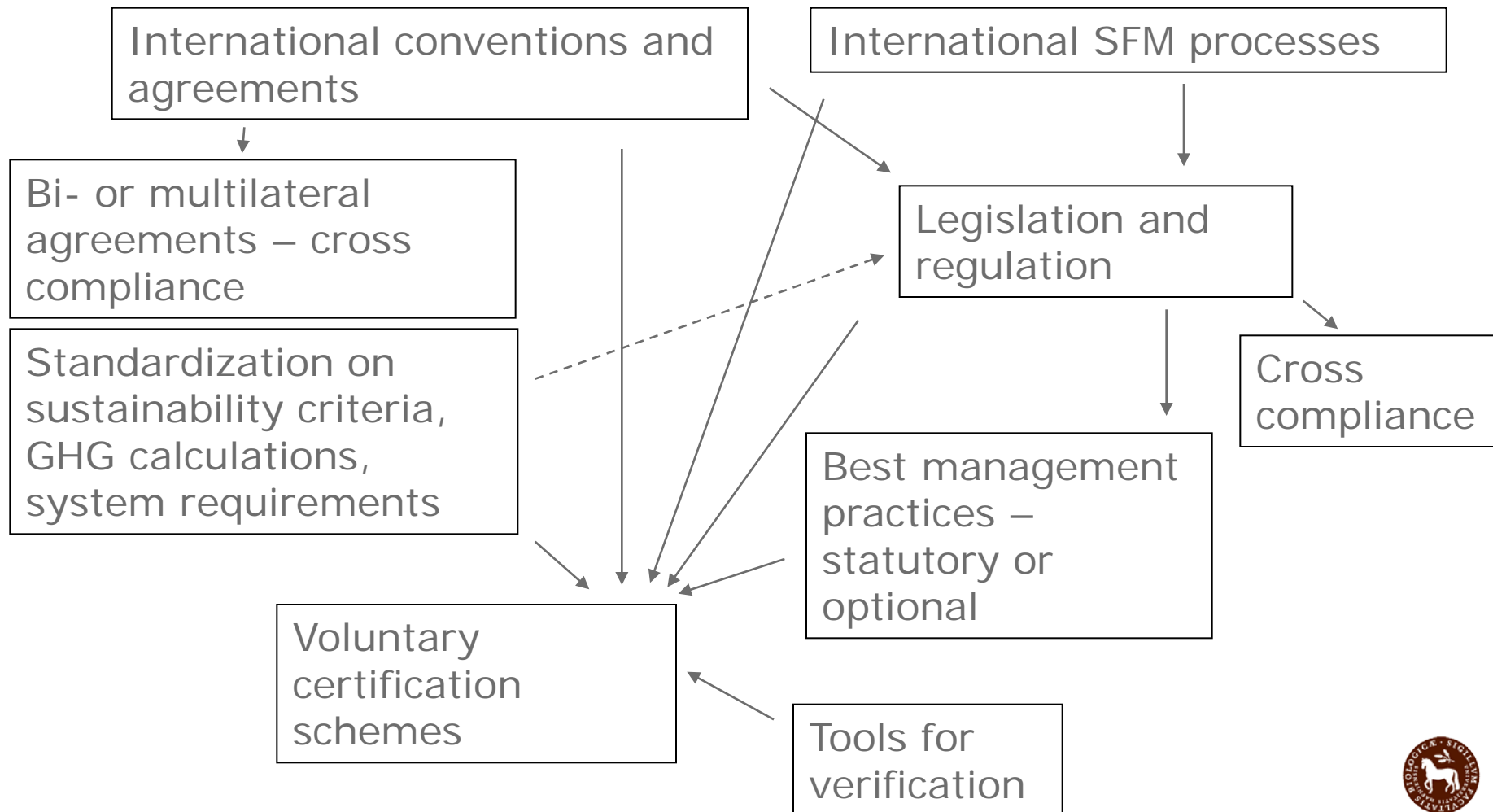


## EU RED – Agricultural management

- Council Directives on wild birds, natural habitats, flora and fauna, soil when sewage sludge is used, water
- Cross-compliance under Common Agricultural Policy (CAP):
  - Soil erosion, soil organic matter, soil structure
  - Landscape connectivity and habitats
  - Avoid unwanted vegetation and protection of pasture
  - Water



## Measures to safeguard sustainability



# The EU process

## All biomass fuels

- July 2008-September 2008: Public consultation on requirements for a sustainability scheme for energy uses of biomass
- July 2009: Report on results from the public consultation

## Liquid biofuels:

- April 2009: EU RED with sustainability criteria for bioliquids
- December 2009: Technical report on applicability of existing certification schemes + identification of feasible verification options for woody biomass
- December 2009-February 2010: Public consultation on biodiverse grasslands, biofuels and bioliquids
- July 2011: EU approves 7 certification schemes for liquids
- Sometime in 2012: The first report on national measures taken to respect the sustainability criteria §2-5 and for soil, water and air protection (and impact on social sustainability and biosafety) – significant source countries, third countries and Member States (reporting every second year).



# The EU process

## Energy uses of biomass other than liquid biofuels:

- April 2009: EU RED requires report on requirements for a sustainability scheme for solids and gaseous by end 2009.
- February 2010: Report on sustainability requirements for the use of solid and gaseous biomass sources in electricity, heating and cooling. Requires reporting by end 2011.
- February 2011-March 2011: Public consultation on additional sustainability measures at EU level for solid and gaseous biomass
- July 2011: Report on the results of the public consultation
- April-May 2012: Report on:
  - whether national schemes have sufficiently addressed the sustainability of biomass from inside and outside the EU
  - whether schemes have led to barriers to trade or to the development of the bio-energy sector.
  - if common sustainability criteria at EU level are appropriate.
  - how international climate change instruments (including LULUCF and REDD) relate to the sustainable production of biomass, whether used for energy, food, feed or fibre.



# Public consultation on additional sustainability measures

- **Developments in the bio-energy sector**
  - Increasing biomass imports from third countries (wood pellets and wood chips)
- **New policy developments related to biomass sustainability**
  - EU Timber Logging Regulation, the EU Flagship Initiative on Resource Efficiency, and the upcoming negotiations on a pan-European legally binding agreement on forest - can play a positive role.
  - Mainly NGOs and citizens: new policy developments not sufficient
- **Impacts of national biomass sustainability schemes**
  - Sustainability schemes in place or under development in a few Member States, SFM regulations some other countries (indirectly address biomass).
  - National sustainability rules have negative impacts on biomass costs and trade
- **Consideration of additional EU measures**
  - Mainly positive response to establishment of binding sustainability criteria
  - NGOs and some citizens: SFM certification for fuelwood
  - Mainly of public authorities from forest-rich Member States did not agree to introduce additional measures





## Visions of the German Advisory Council on Global Change

- Globalization
  - Gradually introduce a minimum standard for bioenergy and sustainable land use (until then: anchoring in bilateral agreements)
  - Institutional framework for the globalization of standards (via GBEP)
  - Set up a global commission for sustainable land use
  - Set up a global land-use register
- Establish certification schemes for sustainable bioenergy carriers
- International agreements
  - Ensure WTO conformity of environmental and social standards
  - Utilize the opportunities presented by the CBD
  - Comprehensive agreement on the conservation of terrestrial carbon reservoirs
  - Improve water and soil protection
- Strategically manage the use of biomass as an industrial feedstock
- Developing countries should be offered technical and financial assistance (certification systems, monitoring bodies, implementation)



## Challenges....

- How to ensure alignment between macro-scale agreements and micro-level requirements?
- How to increase transparency and create the Single Market?



## Which problems and solutions do you see?

What is the minimum needed to protect ecological values (and provide proof of this)?

Do current or proposed systems cause unintended or unreasonable barriers to utilisation of biomass from some land areas?

Thank you!

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