# The biobased Economy in Europe –

# Hype or realitiy ?
# Perspectives for the baltic regions

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# Bioeconomy since 2005

The Bioeconomy of the last 11 years draws on two main pillars:

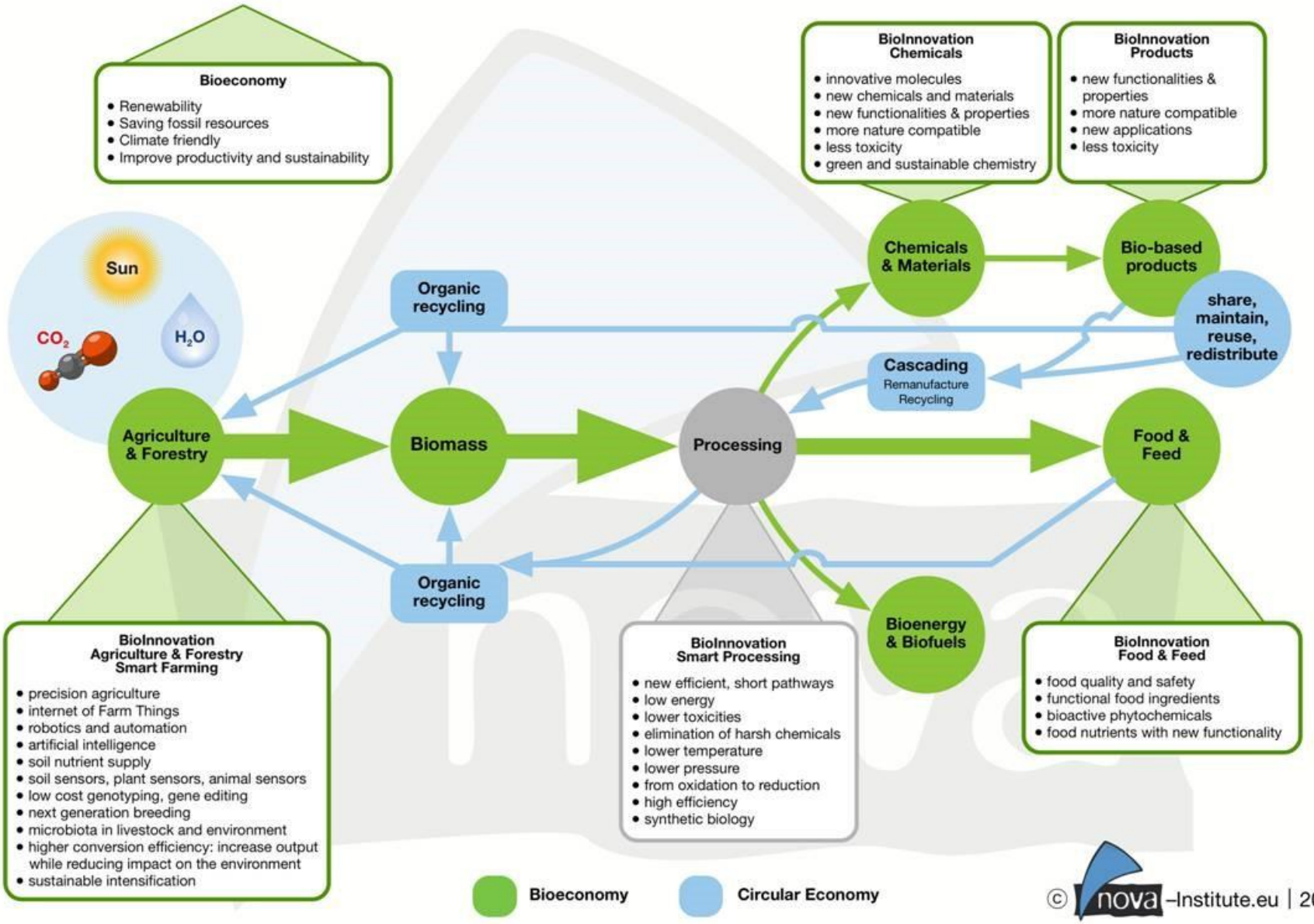
- The potential of biological resources
- The integration of new knowledge stemming from various disciplines, linking it with biotechnologies and life Sciences

# Features of biological resources

The uniqueness of some remarkable features of biological resources makes them attractive for becoming the possible fundament of an economy:

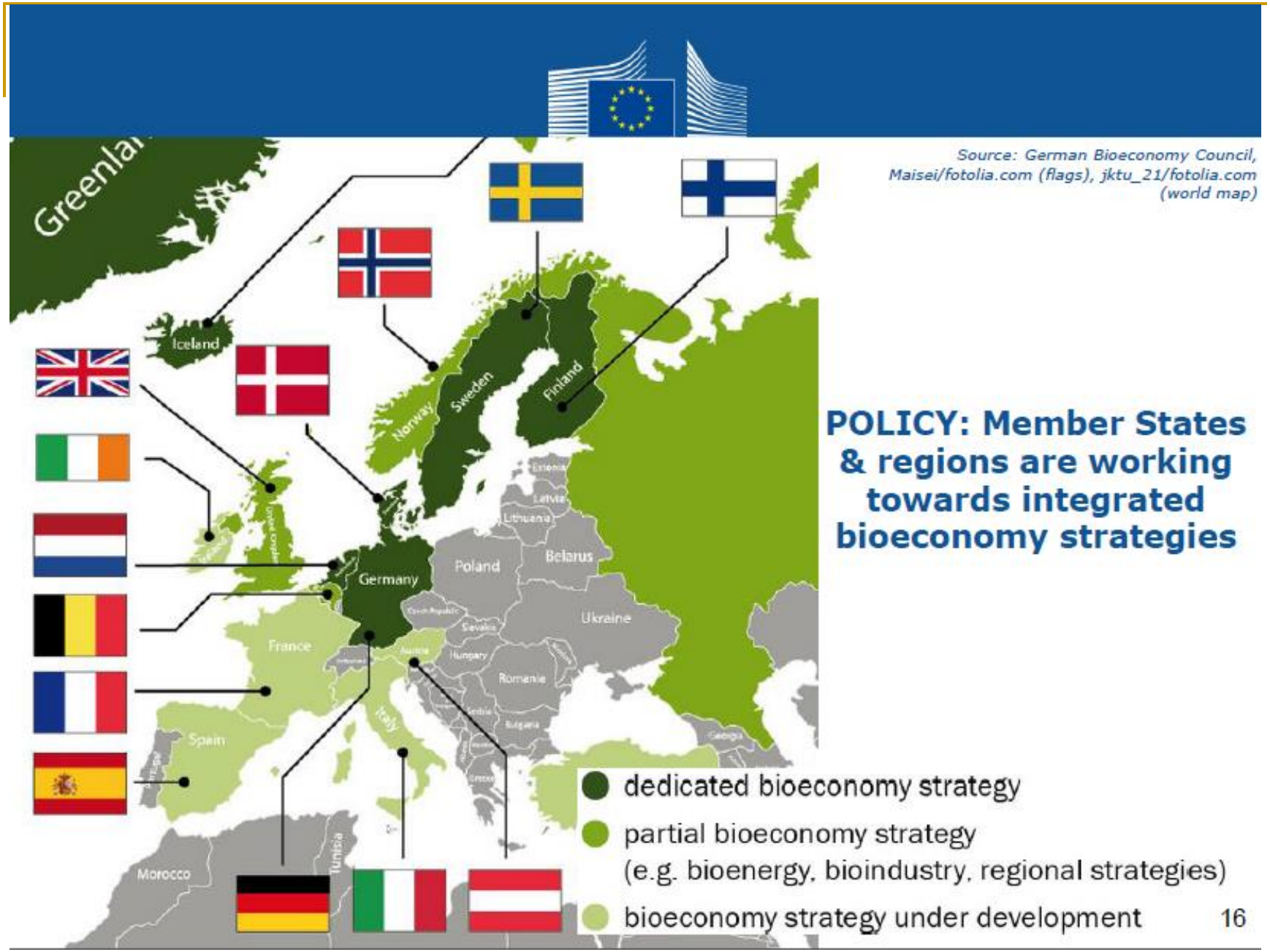
- Their Renewability
- Their $C0_2$ -“ friendliness” or even sometimes carbon neutrality
- Their Re-use or multiuse , also in the format of cascades
- Their potentials for new, better functions in their products, like higher stability, longer life, stronger endurance, less or no toxicity, less water etc.

# Bioeconomy: More than Circular Economy



# Present status of the bioeconomy

- About 50 states worldwide and half a dozen regions officially support the bioeconomy either via dedicated programmes, strategies, action plans, roadmaps etc. or via closely related political, programmatic and/ or strategic activities, the majority of them still in Europe.
- Many of these activities, however, are limited to biotechnology and/ or biofuels production and use.
- Today, 10 years after it‘s launch there is no more a single bioeconomy but there are many bioeconomies!
- This has an impact on the necessary frameworks, public funding, private investment and thematical content.


Source: German Bioeconomy Council, Maisei/fotolia.com (flags), jktu_21/fotolia.com (world map)
POLICY: Member States & regions are working towards integrated bioeconomy strategies
Greenland
Iceland
Norway
Sweden
Finland
Estonia
Latvia
Lithuania
Belarus
Poland
Germany
Ukraine
France
Spain
Morocco
Tunisia
dedicated bioeconomy strategy
partial bioeconomy strategy
(e.g. bioenergy, bioindustry, regional strategies)
bioeconomy strategy under development
16

# Present status (cont.)

- **Spain** has published its new national strategy in spring 2016.
- **France**, **Italy** and **Norway** published their strategies in November, December 2016.
- **Austria, Ireland, Czech Republic, Estonia, Latvia, Sweden** are working on their own strategies, as well; so does **Turkey, Canada, Argentina** and **New Zealand.**
- Interesting developments in the **VISHRAD Group (Poland, Czech Republic, Slovakia and Hungary),** focusing on regional and local bioeconomies, including biocities.

# Present status (cont.)

- **UK:** BBSRC and Department for Business, Innovation and Skills published in July 2016 a report “Evidencing the Bioeconomy”, impressively demonstrating the potentials of the bioeconomy for growth in the UK. For the time being an open consultation is under way to collect views and opinions of UK stakeholders, aiming at the elaboration of an UK strategy of its own, probably still in 2017.
- **G7** have been dealing for the first time with the bioeconomy upon German initiative in 2015.

# Present status (cont.)

- Within the **G20** group first similar activities have been prompted; **Germany** will have the chair of the G20 in 2017, Hamburg.
- First Bioeconomy Investment Summit was held by the EC in Brussels in Nov 2015; the second one will be held in Dec 2017 in Helsinki.
- First Global Bioeconomy Summit was organized in Berlin, issuing a communiqué which deserves to be studied (Nov 2015). Continuation of this process envisaged for the first half of 2018. The EC announced the establishment of an International Bioeconomy Forum (IBF) in October 2016 in Brussels.

# Present status (cont.)

- Numerous biobased products are already in or are being brought to the market, resp. are in the pipeline.
  A vivid example: a booklet “Bioeconomy in everyday life“ or the so called “Bioeconomy appartment/ flat“ recently exhibited at the Brussel‘s event on investment and during the „Grüne Woche“/ Green Week in Berlin.
- More than 50 chemical molecules are to be gradually replaced to be biobased, ranging from levulinic acid to succinic or acrylic acid etc.; very encouraging signs for the “greening“ of chemistry which will however be a long term process. A recent practical example: the commercialization campaign of biosurfactants by Evonik industries.

# New trends

- Industries broaden their portfolio of application more and more also to daily consumer goods, health care articles, cosmetics, cloths and garments. Examples go  from biobased PET and PEF-bottles , shirts, eye-wear, shoeshine articles, rollers of longboards to biobased mortar and heat-damming , non flammable foams.
- Strong trend to interesting cross-border cooperation and industrial take-overs, where Japan, ROC and Canada get more and more active.

# What can be concluded from these recent industrial developments inside and outside Europe ?

- There is a growing number of biobased production lines for intermediates and platform molecules, all focused around the renewable “C“ !

- There is a shift from science and research activities on the content of biological resources to more optimization of industrialized **processes (**hydrothermal, biological or combination of both).

- There is a shift from the cell factory to the real factory with the necessary growing attention on economics. This requires stronger attention also on elements of the back-end of value chains like norms, standards, marketing and consumer acceptance.

# Conclusions (cont.)

- In addition $CO_2$ turns out more and more to become a potential resource, as well as waste and proteins become important objects of the bioeconomy.
- The frontiers among chemical products, biofuels, proteins for food purposes start to become „blurred“! This might reach a new dimension by a stronger use of big data in the future.

# Conclusions (cont.)

- Large industrial companies are more prepared to invest in biobased production and processes but they are sometimes very hesitating to add to their activities the label „biobased“.
- There are however large deficits for funding for small and medium companies, aggrevated by present low costs of fossiles!

# Conclusions (cont.)

- There are strong private and sometimes private-public industrial investments in the U.S., in Canada (provinces of Alberta and Ontario, Australia with the provinces of Victoria and Queensland), China, but also in Europe (Bioproducts Mill by METSÄ Fibre in Änäkosti, Finland for 1,2 Mill. €).

  An additional recent example: strong financial investments into production facilities for biobased PHA's (Polyhydroxialkanoate )to replace hydro-carbonbased Polymeres as base for Bioplastics between Italian and French companies, ( Bio-on, CristalUnion and Eridiana Sodana ) as well as the recent cooperation between BASF and Avantium on biobased PEF bottles plus.

# Societal impacts

- Within societal strategic discussions on future and how to cope with global challenges, the bioeconomy only after 10 years has become a serious partner for dialogue with supporters of the **G**lobal **S**ustainability **D**evelopment to achieve their goals and also with the followers of a circular economy.
- Growing awareness that achievement of **GSD** goals and also of implementation of the circular economy will only be possible by an increased use of biological resources. But how to do this scientificly based and evidenced?
- Bioeconomy is the biological power engine of the circular economy, not just an integral part of it! There is more and more talk about the sustainable circular Bioeconomy!

# Practical lessons learnt in the last eleven years with relevance to new strategies and policies

- Biomass remains the primary natural resource of the bioeconomy, be it a carrier for energy or a modular part for chemicals, biochemicals, proteins or nutrients, etc..
- Recently, $CO_2$ is added to the portfolio of primary natural resources of the bioeconomy.
- Biorefineries will be the central production facilities of the bioeconomy. Their primary but not exhaustive feedstock will be biological waste resources and biomass: both of renewable nature.
- Carbonate processing facilities physically, hydrothermatically or biologicaly , like BIG-C (Germany, Belgium, Netherlands).

# Practical lessons learnt (cont.)

- Recycability and/ or multiple reuse of biomass in diverse forms including cascades, will be the prime functions along new value chains like „from fork to farm“ oder „farm to fork“, „gate to plate“ etc. . Recently, the potentials of resilience of biological resources are added to this discussion.
- Biotechnologies, in particular industrial biotechnology and focused new knowledge stemming from converted technologies, like nano-, info- or cognitive sciences will remain the technology drivers of this new form of economy.

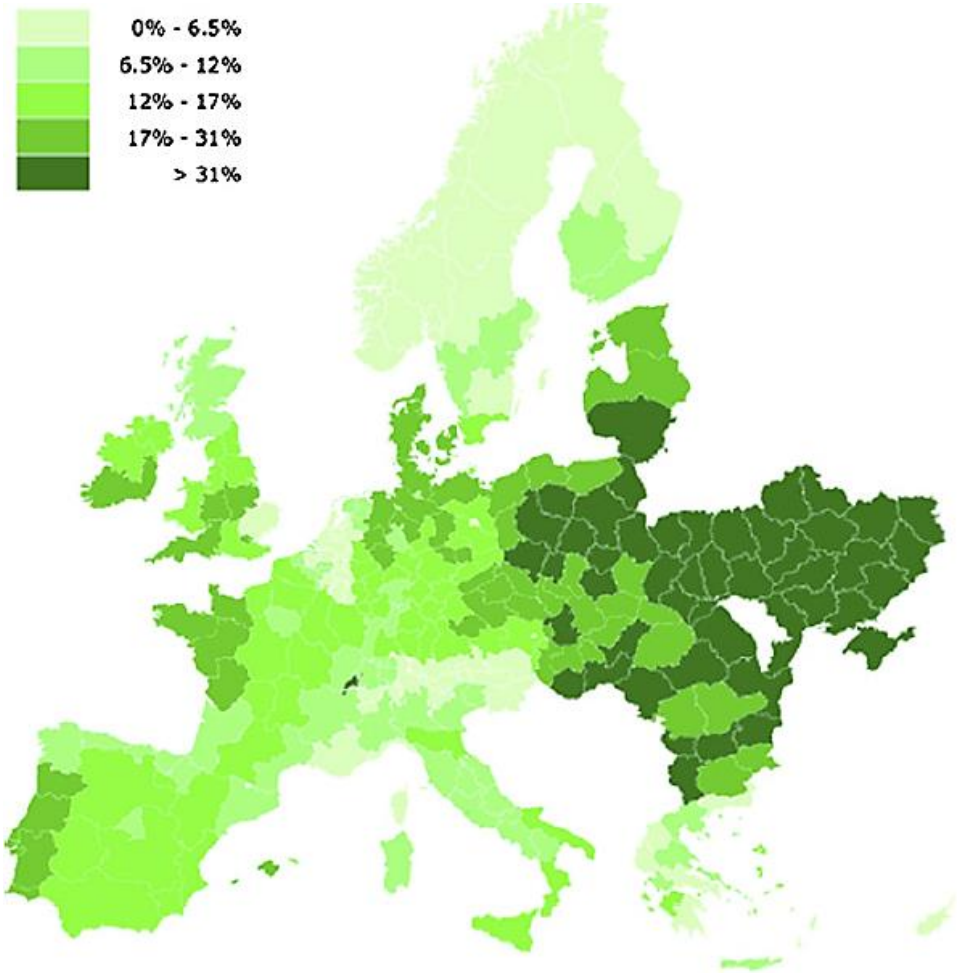
# Practical lessons learnt (cont.)

- The joint potentials, but also joint interfaces and touching points among the digitalisation and the biologisation of our economy  must be quickly further examined, made publicly aware to pressure groups and decision makers and , if possible, be translated into joined action plans and activities!
- This is not easy as digitalisation is more visible, less complex and less expensive than biologisation!
- There are other new trends emerging we must take into account:
  potentials of resilience of biological resources, aspects on health (“one health”) and last but not least big data.

# Practical lessons learnt (cont.)

- Closeness not only to the concept of sustainability but also the relationship to the content of the circular economy are becoming more and more important strategic elements in the discussions of the bioeconomy to be a factor for the future.
- All these lessons and changes learnt are influenced by one common denominator:
  the need to create level playing fields among the diverse camps of application!

# Exploiting potentials in regions .....

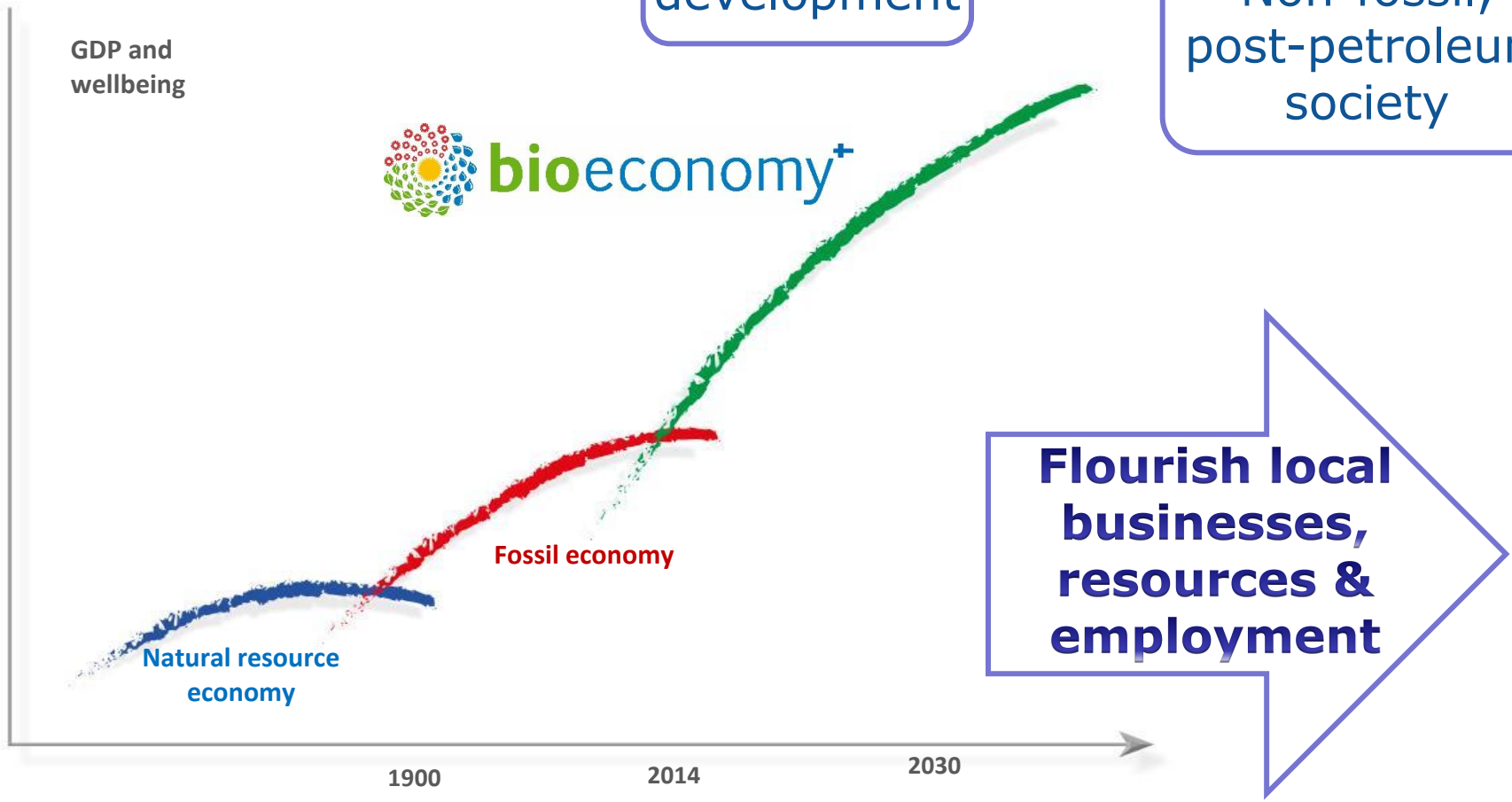



*2010 'The **'surplus' land** potentially available for the production of biomass by 2030' Wit+ Figure 8*

*"The production costs at which biomass resources are available in Europe are variable, with significantly lower costs in CEEC than WEC"*

Sustainable development

Non-fossil, post-petroleum society




**Flourish local businesses, resources & employment**

*Source: Finnish Bioeconomy Strategy, 2014*

# What does this all mean for the Baltic regions?

- The Baltic regions offer a very good pole position to maximise and optimise the increased use of biological resources for new, maybe better sustainable and eco-friendly products and processes.
- Reasons:
  - Large and yet largely unexploited reservoir of biomass, including organic waste and industrial residues.
  - Impressive coastal lines with yet untabbed potentials for blue Bioeconomy.
  - Relatively large reservoir of forests and wood.

# What does this all mean for the Baltic regions?

- Reasons (cont.):
  - Good scientific and technological knowledge on bioechnologies and converted technologies, like info and nano.
  - Good educational infrastructures all over the regions.
  - Closeness to the Baltic sea region as such and the Nordic council regions which offer by far the highest concentrations of states and regions owning already their own bioeconomy strategies
  - Build-up of a new Hansa-like cooperation net within all these regions
  - Benefit from these unique closeness and from the public openness and awareness of the potentials of the bioeconomy for these regions which prevail in that neighbourhood

# Some obstacles to overcome

- Little and rather undeveloped awareness among stakeholders on potentials of the bioeconomy for the Baltic and its regions.
- Strong dominance of hitherto traditional agriculture and food industry as well as forestry and fisheries.
- Strong dependence on fossil energies in some regions which will not easily and quickly changed in spite of general openness towards the increased use of renewable energies.
- Deficit in private and  also public capital to invest in RTDI and emerging industries.

# What are potential measures to be undertaken?

- Mapping of your strengths and weaknesses, also in combination with an differentiated in-depth analysis on the different potentials in the various regions.

  **There are good practices**: Nordrhein-Westfalen, Dutch provinces, Flanders, Mecklenburg-Vorpommerania, Nordic regions, like Iceland, Farör etc., Bavaria, Piemont and Emiglia-Romana in Italy, Champagne and Picardie in France.

- Look for practices outside the Baltics and join forces in joint bi-and multilateral endeavour or with the assistance of EU, ESIF, EFRE, Horizon 2020. **Do act!**

# What are potential measures to be undertaken?

- Mobilize existing Committees and strategic bodies nationally to introduce potentials of the biobased economy, in relation to SD, Climate Change, Biodiversity, SME-support etc.
- Focus on national advisory bodies.
- Don’t forget educational measures, check potentials for master courses in circular and Bioeconomy or introduce relevant content into existing Curricula.
- Start a public awareness campaign with politicians and NGO-s, if appropriate.
- Mobilize old Technology platforms and modernize them !

**Thank you very much**

**for your attention.**