The Finnish Bioeconomy Strategy
–
Background and Implementation

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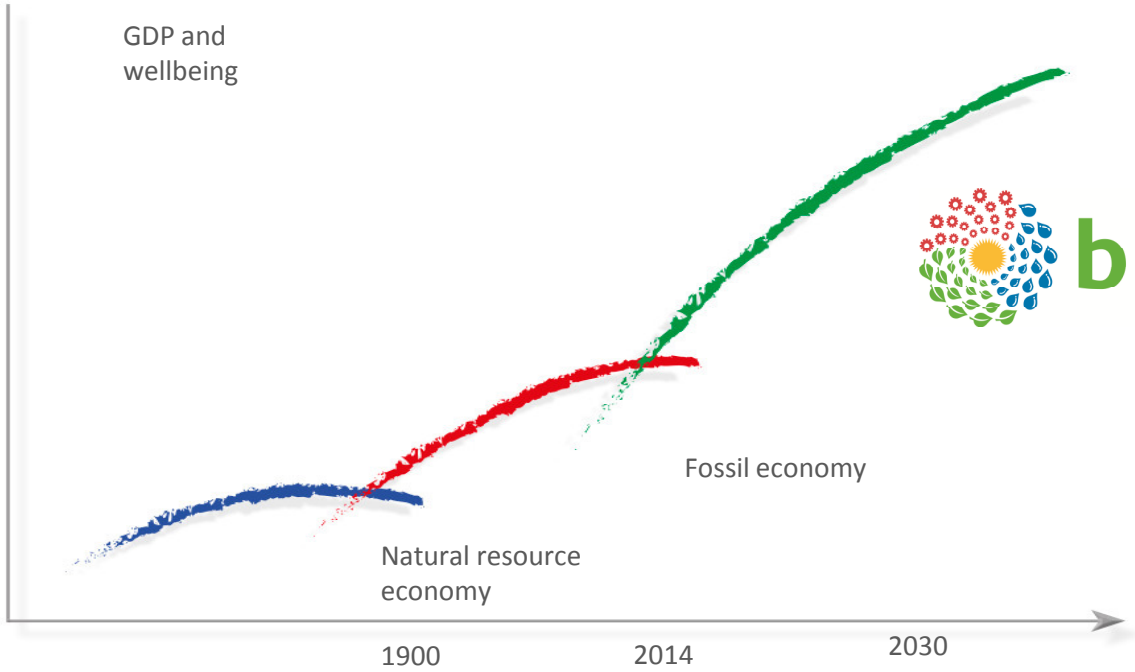
Bioeconomy: The next economic wave

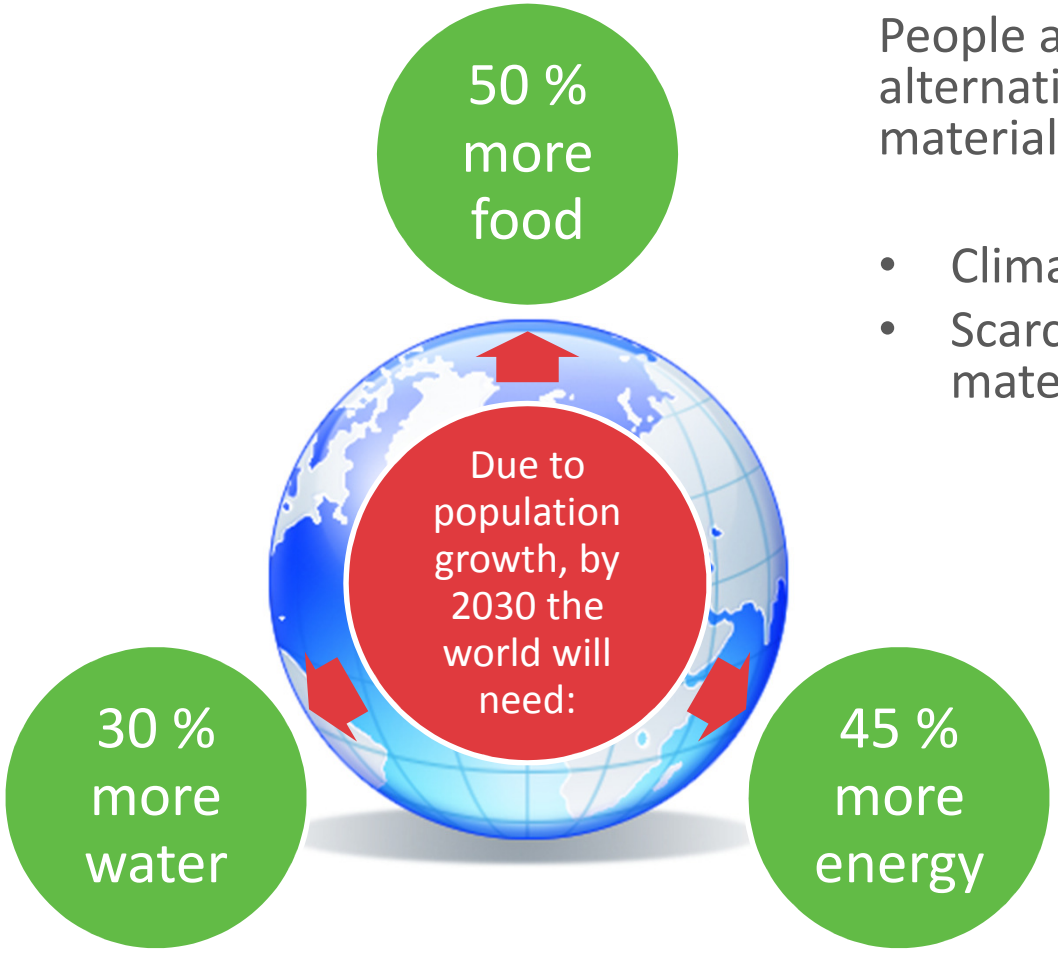


bioeconomy+

The next wave of economy is bioeconomy, which produces economic growth and wellbeing.

Finland is a bioeconomy forerunner. We have plenty of natural resources, expertise and agility.

Bioeconomy: Born from necessity



People are forced to find alternatives to non-renewable raw materials.

- Climate change
- Scarcity of non-renewable raw materials etc…

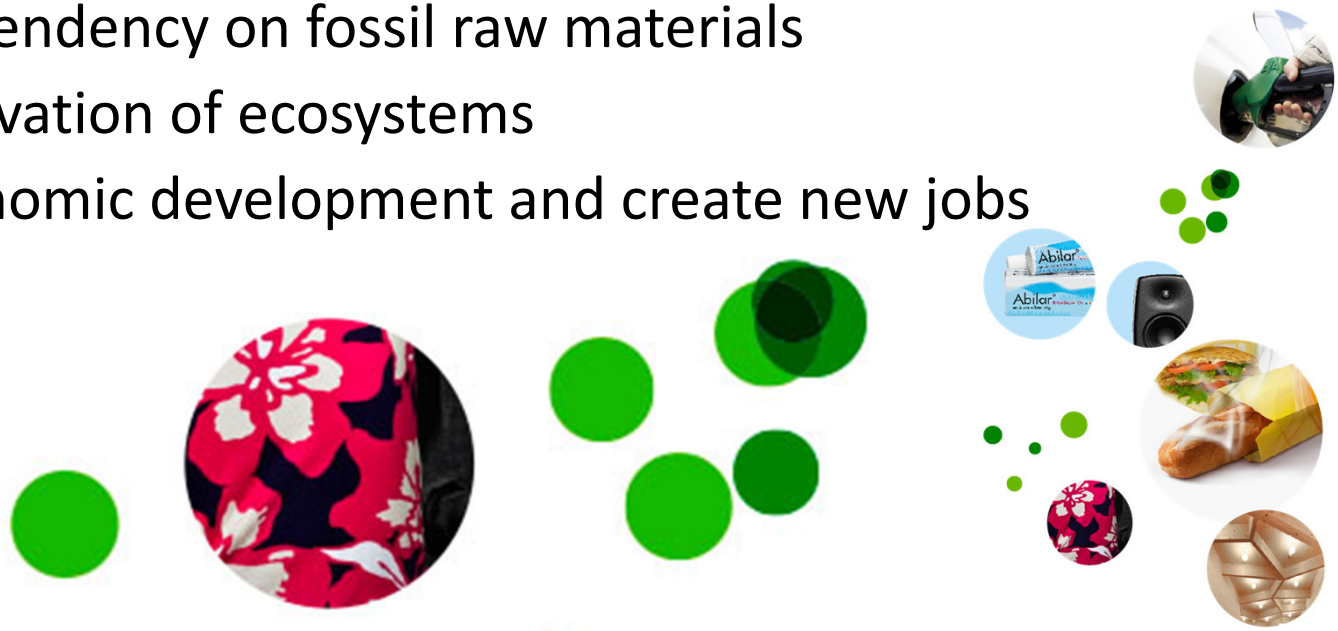
Bioeconomy is the solution

Bioeconomy:

- Sustainably uses biological natural resources to produce goods, energy, food and services

Aims:

- decrease dependency on fossil raw materials
- prevent deprivation of ecosystems
- promote economic development and create new jobs



Bioeconomy's significance for Finland

Turnover €64bn

Share of employment 11%

Share of exports 26%

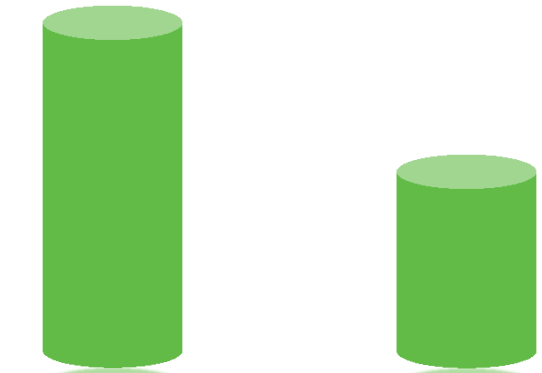
Finland seeks to increase its bioeconomy output to 100bn euros by 2025 and to create 100,000 new jobs in the process.

Bioeconomy combines wood processing, chemistry, energy, construction, technology, food and health.

Forest based bioeconomy accounts for 2/3 of the turnover

Forest bioeconomy

- Of our total land area, 80% is covered by forest, which is managed so that it produces significantly more wood than we currently use.
- The forest-based industry is a Finnish pioneer in bioeconomy. It utilizes renewable natural resources while incorporating economic, social and ecological sustainability in its activities.

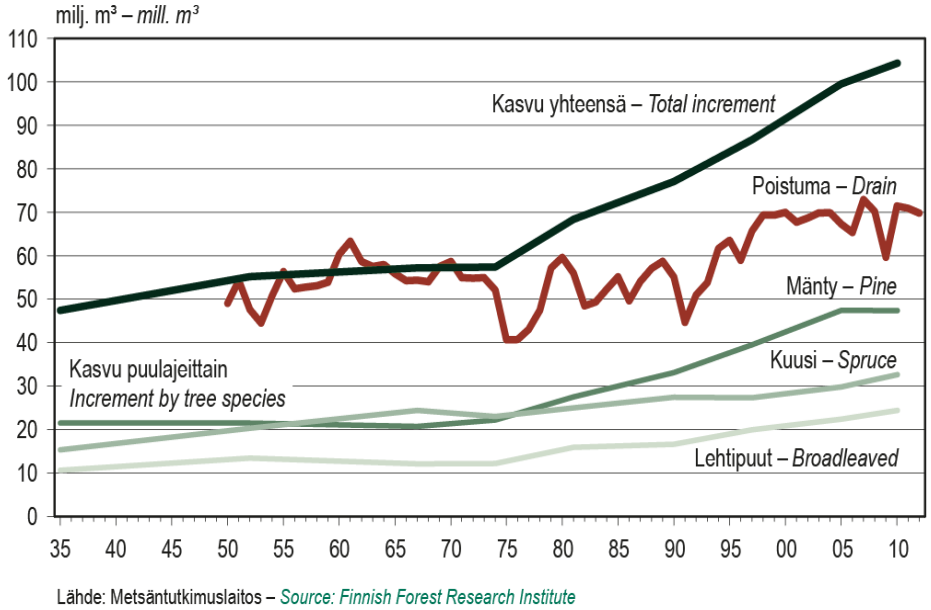


The annual *growth* of *Finnish* forests 100 mill m³

Annual industrial use 55 mill m³

The potential of Finnish forests

Finland's well-being is based on our ability to use renewable resources efficiently and sustainably. Forests and clean nature have always been the basis of our existence.



Lähde: Metsäntutkimuslaitos – *Source: Finnish Forest Research Institute*

Puuston kasvu ja poistuma
Annual increment of growing stock and drain

Metsätilastollinen vuosikirja 2013

Finland's bioeconomy strategy

Prime Minister's Office:
"Bioeconomy in Finland
– evaluation of the need of a national strategy
Final report of the Bioeconomy Working Group
30.9.2010"

"Bioeconomy is sustainable management and use of renewable resources, production of products and services from them, as well as use of biological and technical methods in the production"

"The country that first is able to conclude the right path leading to bioeconomy, will gain a longstanding competitive edge"

Finland’s bioeconomy strategy

(adopted by Government on May 8, 2014)

Strategic goals

1. COMPETITIVE ENVIRONMENT FOR BIOECONOMY
2. NEW BUSINESS FROM BIOECONOMY
3. STRONG KNOW-HOW BASE FOR BIOECONOMY
4. USABILITY AND SUSTAINABILITY OF BIOMASS

Implementation and monitoring

Sustainable bioeconomy solutions are the basis of Finland’s welfare and competitiveness.

Implemented actions Q2/2014 – Q2/2015

Focus areas; Investments, regulation and export

1. **Boosting investments – An International Biorefinery Competition**
2. **Finnish bioeconomy priorities for the EU defined**
3. A regulatory survey on ”Bioeconomy bottle necks and boosters”
4. Biomass Atlas combining public data on biomass resources
5. Promotion of exports of biobased products and technologies

Supportive actions

6. A communication and media action plan
7. Tools for promotion and a public discussion

International Biorefinery Competition

- First of its kind in the world
- Entries represented investments of 1.5 B€
- Winners
  - Spinnova – fibre yarn
  - Biovakka Suomi – transportation fuels and nutrients
  - Kemijärvi consortium – new pulp products and chemicals

Outcomes from the Strategy

- A strong national will to develop the bioeconomy
- Effective co-operation model between ministries and stakeholders
- A positive outlook for the future which can be seen in increase of investments
- Increased interest from non-forest industries to utilise biomass
- Public investments into the bioeconomy and infrastructure
- Increased public acceptance for use of biomass

Recent large investments

Metsä Fibre Äänekoski Mill (Source: Metsä Group)

Lappeenranta biorefinery

(Source: UPM)

Wood will serve many functions in the future

Examples of products :

Intelligent packaging that monitors the intake of medicine or edibility of food products

"Remote-controlled" paper price tags

Sound systems and car parts made of wood composite

Biodegradable packaging materials

Flexible screens made of nanocellulose

Chemistry enables bioeconomy

Finland has plenty of expertise in chemistry, biochemistry and processes connected to handling biomasses.

About a third of chemical industry companies use bio-based raw materials. The use of these and biotechnology are on the increase.

Smart refinement and use of biomasses, recycling and water purification.

Biobased chemistry

Examples close to consumers:

Paints containing binders based on vegetable oils

Advanced biofuels

Cellulose gum as yoghurt thickening agent and tall oil products for glues

Car tyres containing natural rubber and oils

Cosmetic creams containing forest berry ingredients

Biobased materials for packaging and medicine

The Government's vision for 2025: Secure, renewing, sustainable Finland as part of Europe

Bioeconomy and clean solutions - objectives of the new government

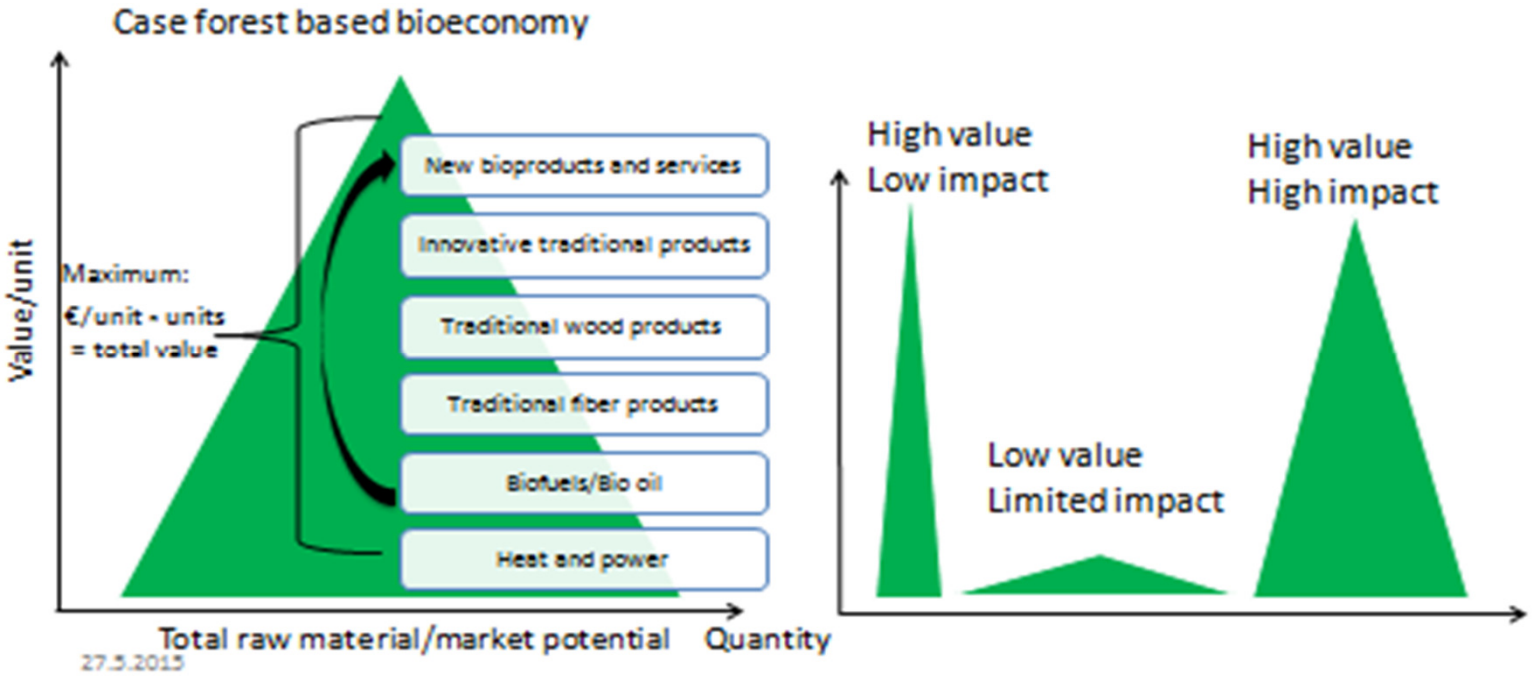
- Bioeconomy and clean solutions is one of the five strategic priorities of the new government
- Themes:
  - Cost-efficient carbon-free, clean and renewable energy
  - Wood on the move and new products from forests
  - Circular economy and improvement on water quality
  - Profitable food production
  - Nature policy
- Funding 300 M€ for the government term (2016 – 2018)

Selected actions from the government action plan

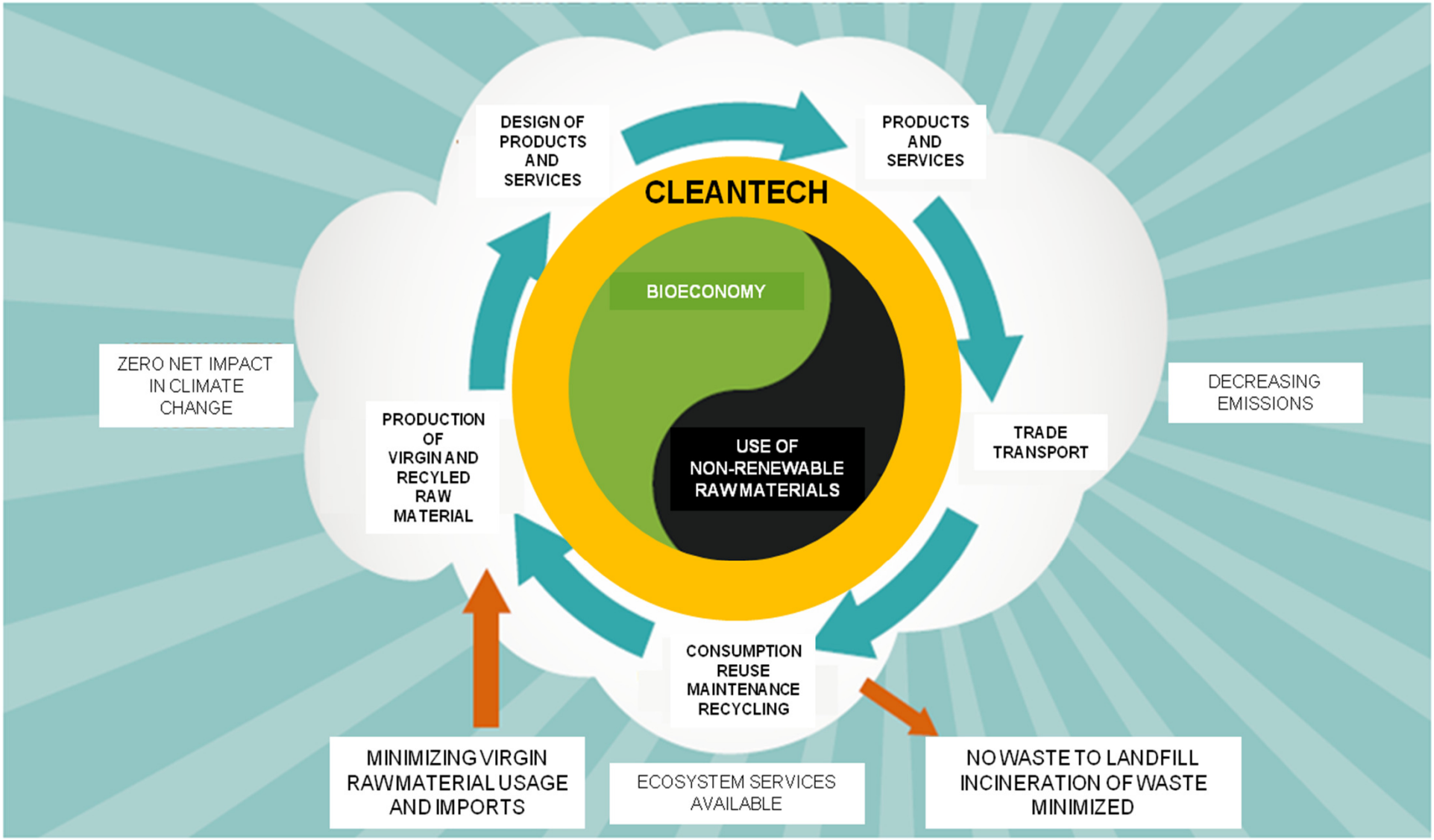
- Energy and climate strategy for 2030 and support measures to increase share of renewables in energy production and in traffic
- Increasing supply of wood and promoting investments in the forest sector
- Accelerating new innovations in bioeconomy and circular economy by piloting and demonstration using national and European financing, like BBI and EFSI
- Team Finland growth programmes to boost exports and international investments to Finland

Cascade use - Value added and impact from bioeconomy

- A multiple use by a market driven approach provides most added value and the greatest impact



Carbon Neutral Circular Economy



Source: SYKE

Future success depends on many factors

- ❑ Raw material availability and price
- ❑ Industrial infrastructure
- ❑ Competence base
- ❑ Willingness / ability to partner and seek new business
- ❑ Product markets
- ❑ Availability of private and public funding
- ❑ Political will

Conclusions

- Global drivers will force the transformation to a sustainable bioeconomy, based on use of renewable raw materials; the change is happening already
- The bioeconomy will not be a new industrial sector; it will rather bring together the forest, chemical, energy and building etc… sectors.
- Opportunities require renewal: new products and solutions meeting new needs, created through new cross-industrial partnerships
- The EU and member states have a common vision on bio and circular economies and there are a lot of plans and activities to speed up the change
- Consumer behavior will define the market. Any product and industry has to compete for consumers' interest and acceptance. Act sustainably, measure and communicate it.

Finland's bioeconomy strategy

The metrics

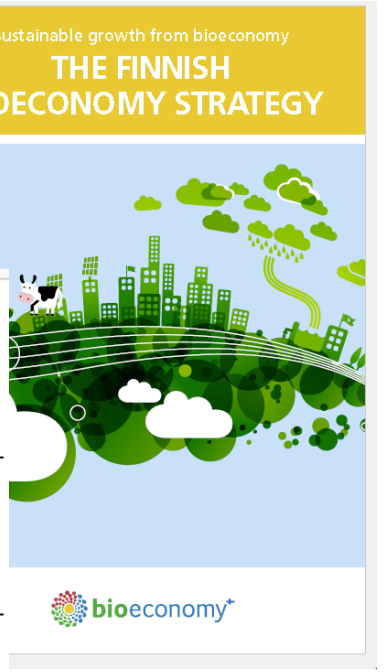


Table 2. Key figures, indicators and data sources for the implementation of the Bioeconomy Strategy.

Key figure to be measured	Indicators	Data source
Growth of bioeconomy and its significance in the national economy	Bioeconomy output/value added/ the number employed and their share in the national economy	Statistics Finland
Added value produced for natural resource use	Raw material input/value added to raw material streams	Finnish Environment Institute, Thule Institute, Statistics Finland
Environmental benefits from the bioeconomy	Raw material inputs used/greenhouse gas emissions avoided	Finnish Environment Institute Centre, Thule Institute, Statistics Finland
Sustainability of the bioeconomy	Total use of natural resources/ growth and harvested volumes of standing timber, cereal crops, fish bag, endangered species, urban waste	Statistics Finland, Luonnontila.fi
Sustainability of the bioeconomy	Indicators to be developed for ecosystem services, environmental and resource efficiency as well as wealth and environmental assets	Statistics Finland