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NORWEGIAN INSTITUTE OF
BIOECONOMY RESEARCH

The Norwegian bioeconomy strategy – structural changes and green shift in the economy

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Director of Research Arne Bardalen

Norwegian Institute of Bioeconomy Research (NIBIO)

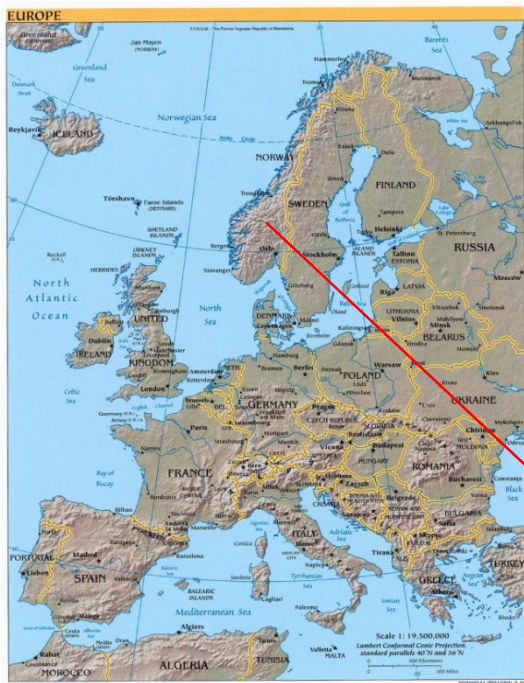


NIBIO - Norwegian Institute for
BIOeconomy Research



One of the largest R&D organisations in Norway

- Governmental organisation – under The Ministry of Agriculture and Food
- Total staff 700
- 18 offices and research stations



NIBIO - Norwegian Institute for
BIOeconomy Research



Key Thematical Areas

Environment and natural resources

Geography and statistics

Food production and society

Forestry and forest resources

Biotechnology and plant health



NIBIO - Norwegian Institute for
BIOeconomy Research

Established July 1, 2015

A merger between:

- Bioforsk - *Norwegian Institute for Agricultural and Environmental Research*
- Norwegian forest and landscape institute
- NILF - *Norwegian Agricultural Economics Research Institute*



Establishing NIBIO is a part of the Governments strategy to strengthen the scientific capacity to develop a competitive Norwegian bioeconomy and a circular, low carbon society

Outline

- Norwegian economy, driving forces, trends and challenges
- Norwegian economy in transition, need for structural changes
- Norwegian bioeconomy, volume, value and potential, some reports
- The Governments approach and ambitions
- The bioeconomy strategy process in Norway
- Challenges in the process
- Other relevant processes and reports
- The expert committee on green competitiveness
- Integrated approach to Bioeconomy **and** Climate, Green shift, Circular economy, Resource effectivity, Low carbon society

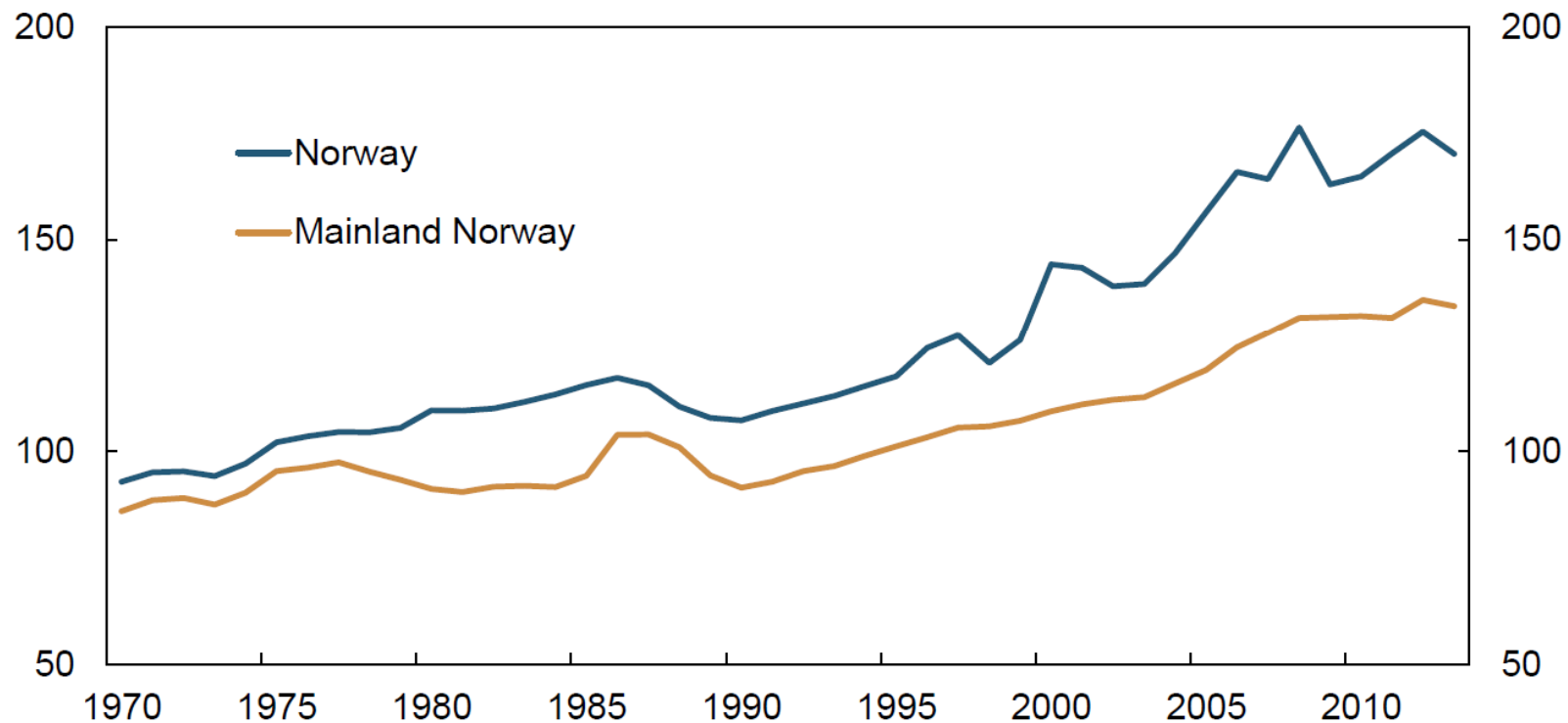
Post-industrial economic development in Norway

- Oil and gas industries, high income, low unemployment
- High cost of living
- Low competitiveness of "mainland" industries
- The role of the public sector in transition
- Continuous urbanization
- Taxation, economic and social objectives, redistribution of income – a hot debate
- The future of the welfare state is threatened (?)

GDP per capita Norway 1970-2015

GDP per capita

Relative to OECD. Index. OECD = 100

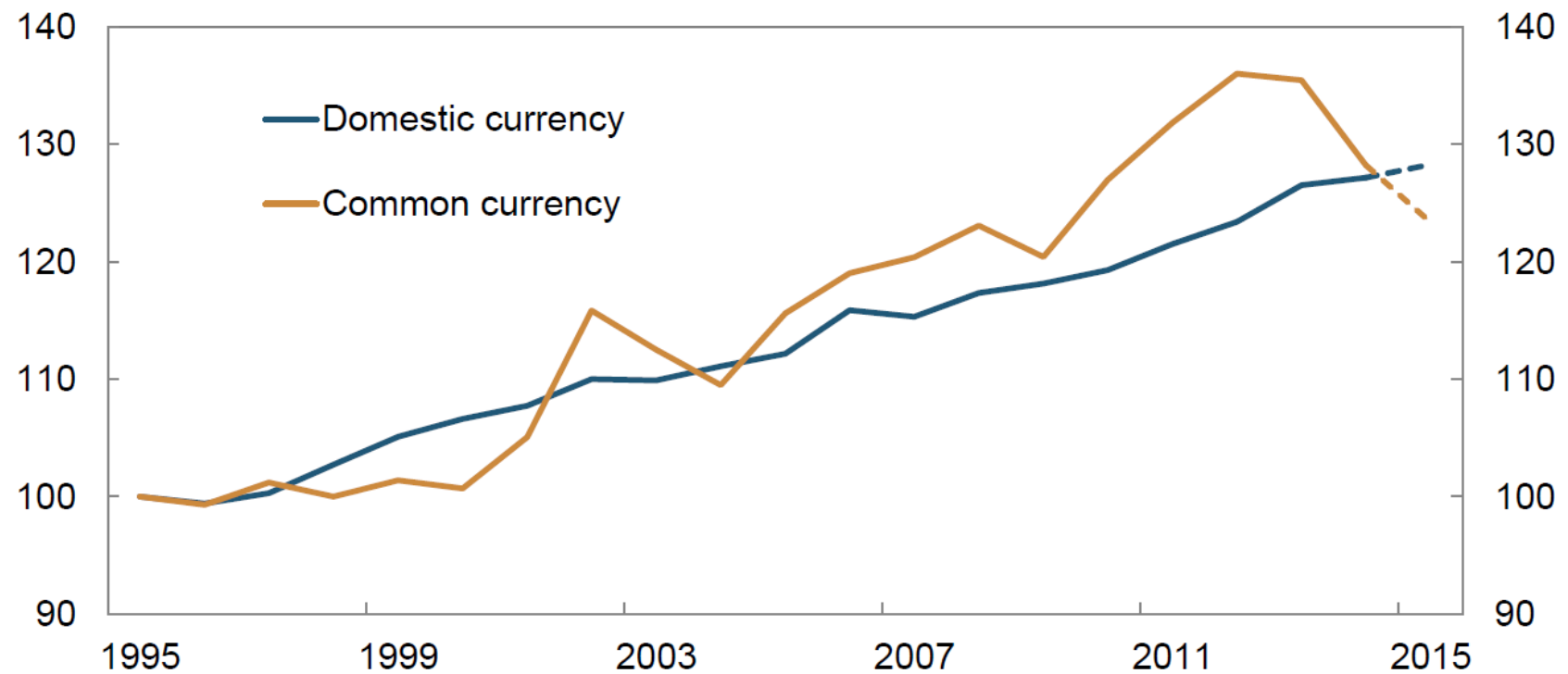


Sources: Statistics Norway, OECD and Norges Bank

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Labour cost relative to trading partners

Hourly labour costs. Index. 1995 = 100. 1995 – 2015¹⁾



1) Projections for 2015

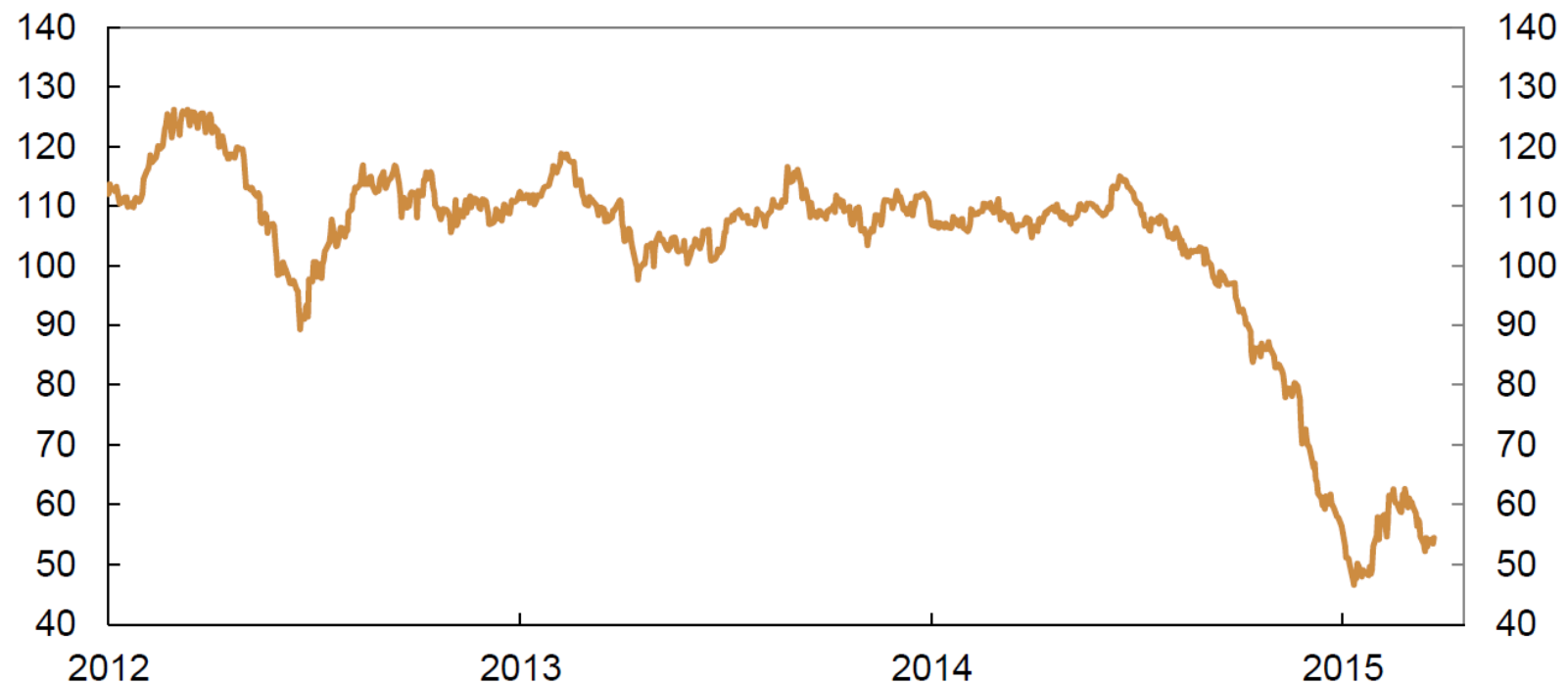
Sources: TBU, Statistics Norway and Norges Bank

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Oil Price 2012-2016

Oil price

USD per barrel. Brent Blend. 1 January 2012 – 25 March 2015



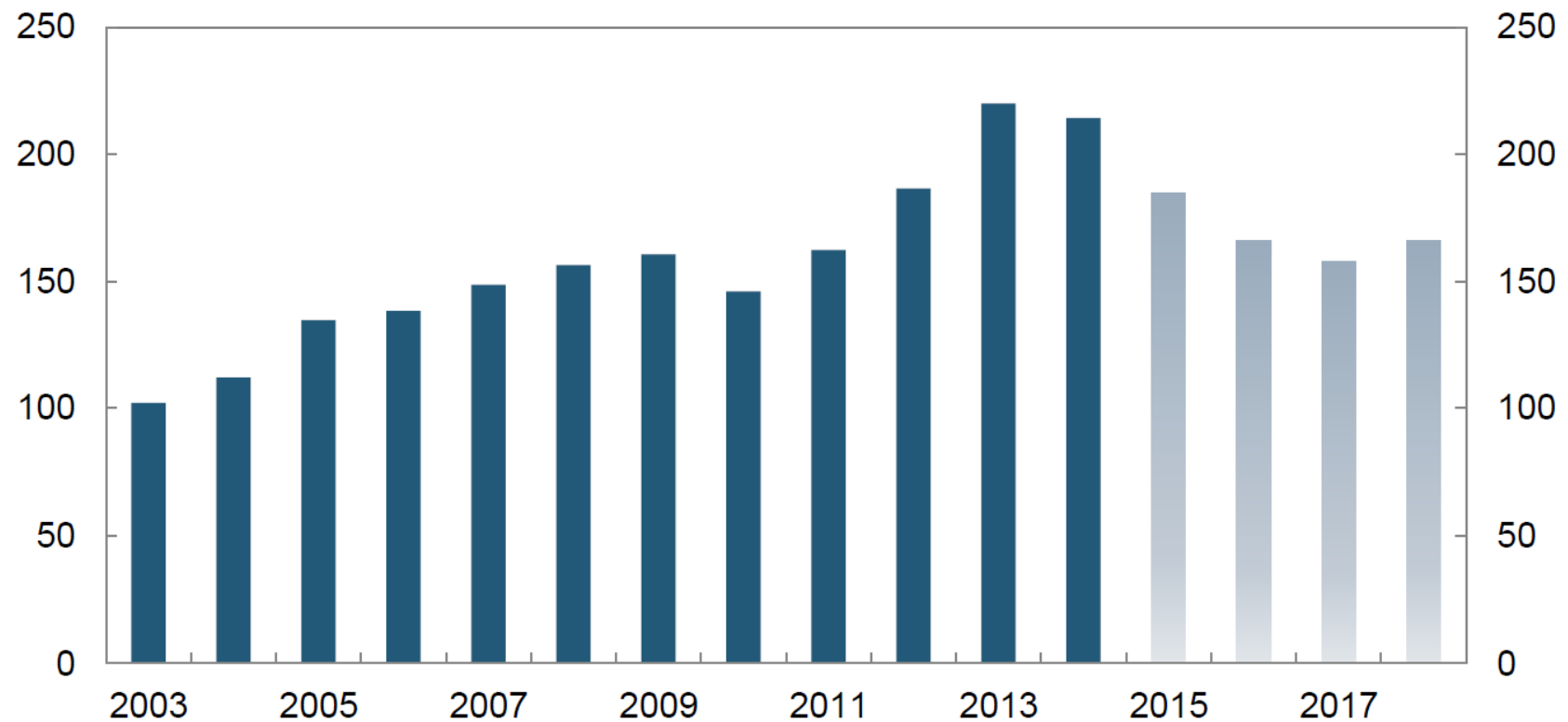
Source: Thomson Reuters

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Petroleum Investment in Norway

Petroleum investment

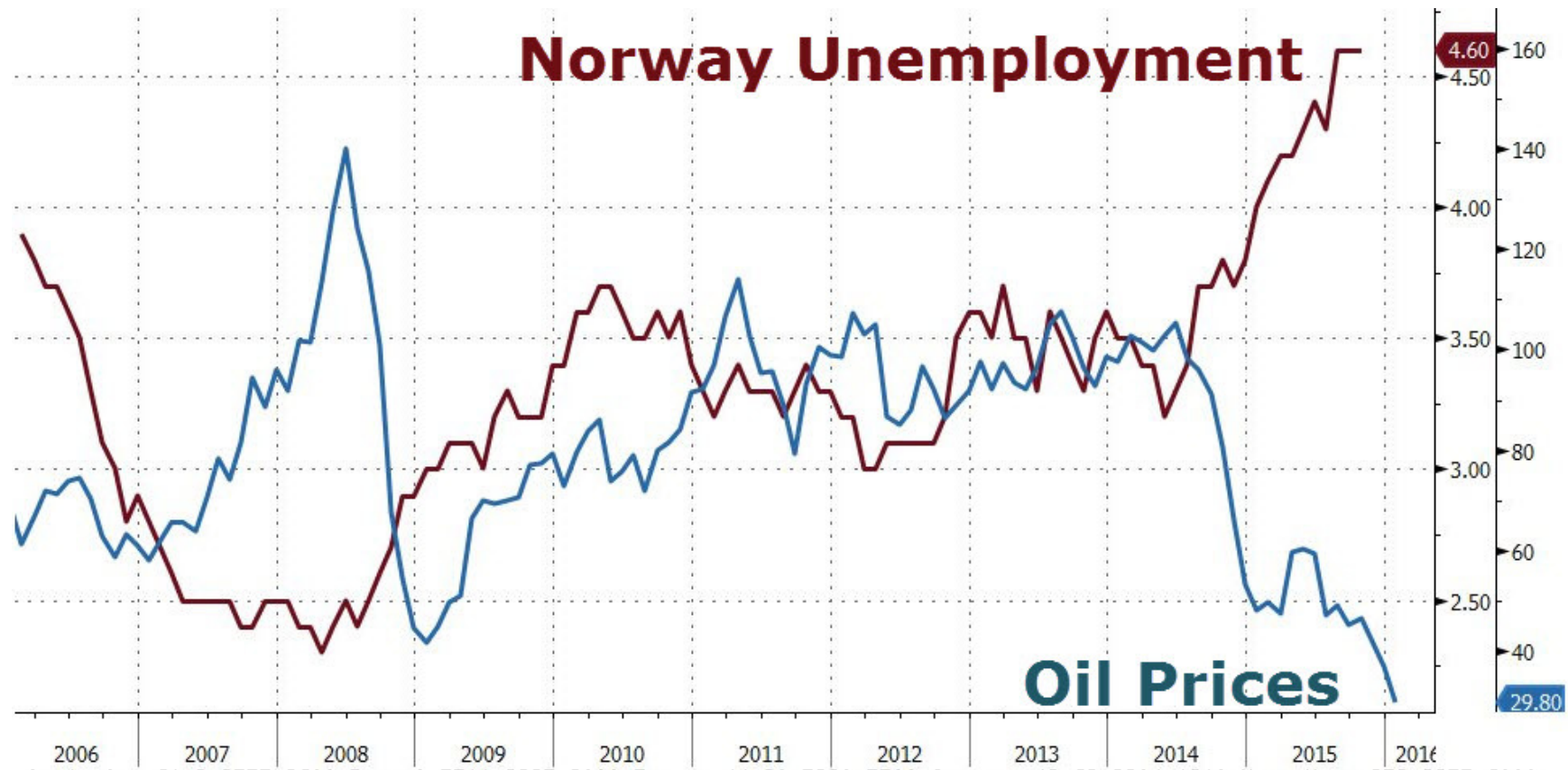
Constant 2015 prices. In billions of NOK. 2003 – 2018



Sources: Statistics Norway and Norges Bank

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Norways future welfare - huge challenges



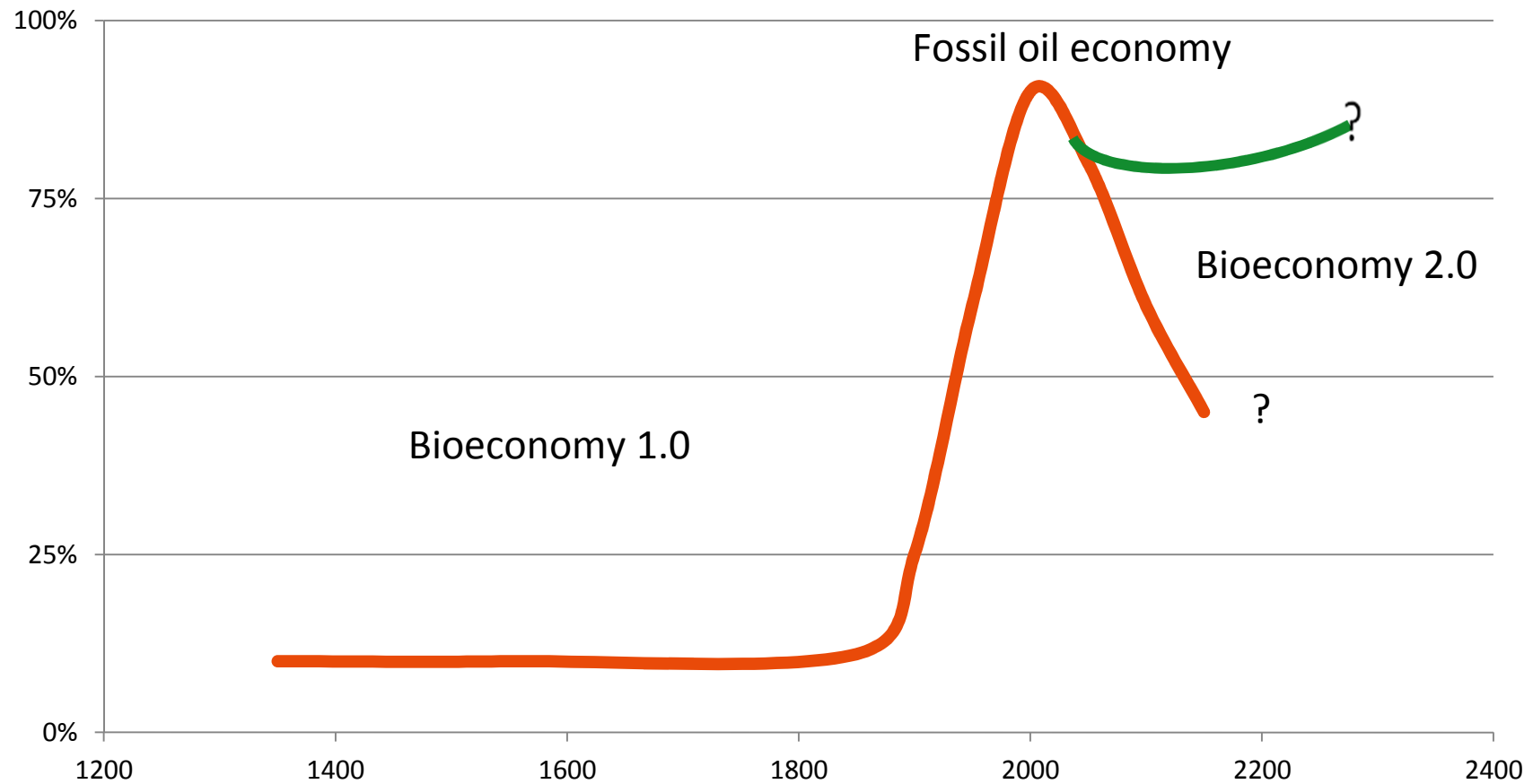
Grand global Challenges

- Population growth
- Urbanisation
- Migration
- Political and social instabililty and conflicts

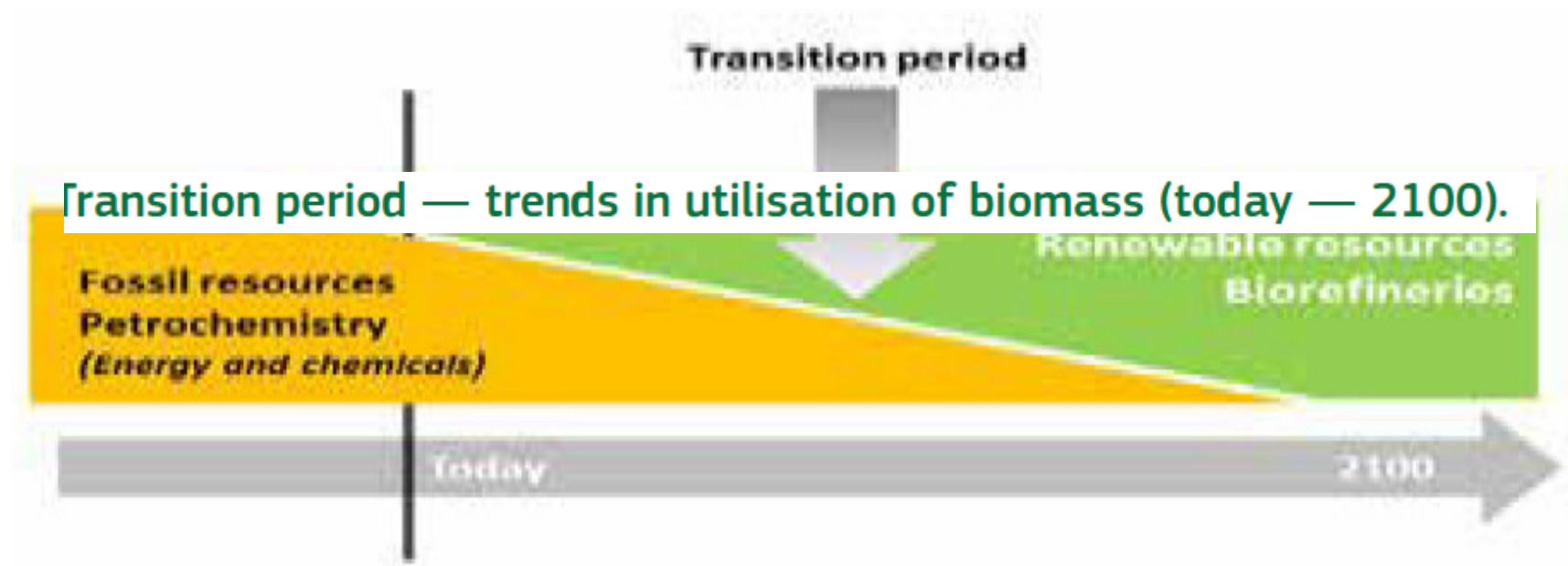
- Emmission reduction
- Climate change (extreme weather)
- Soil loss and degradation
- Water scarcity



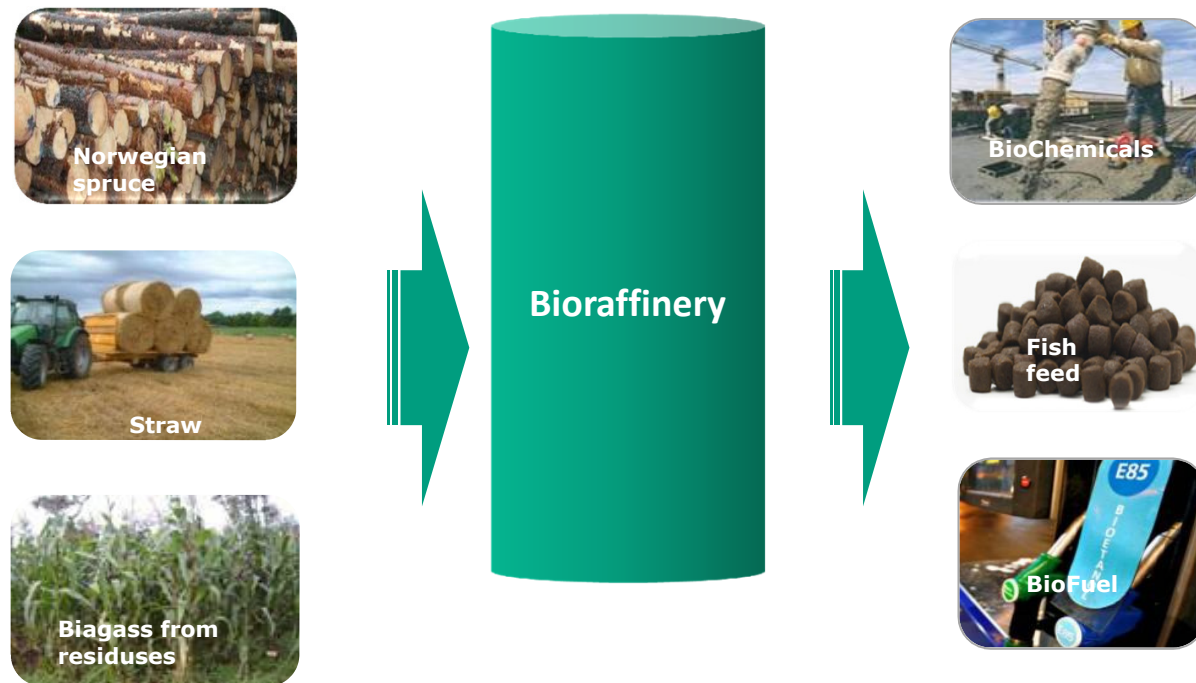
Future welfare – Bioeconomy 2.0 ?



Transition periode – trends in utilisation of biomass (today – 2100)



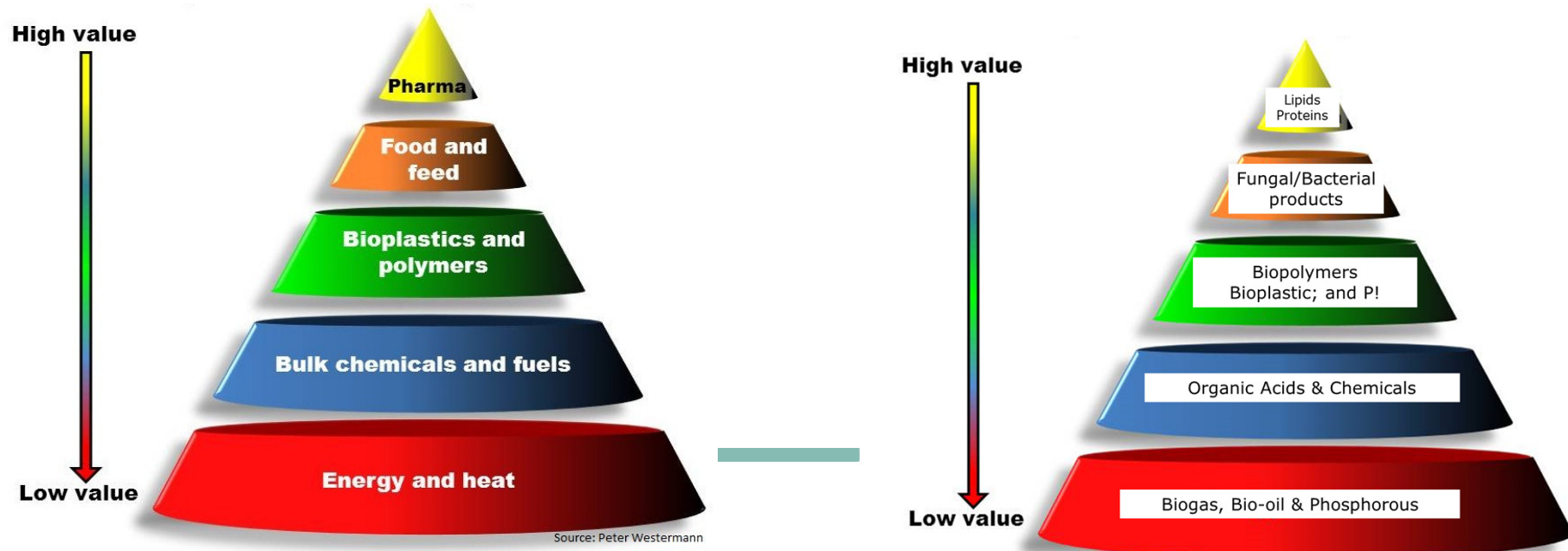
Future farmer, food producer and supplier of raw materials to advanced manufacturing



FARMER - Photosynthesis Innovator - plants as green factories

The potential for added value within the bioeconomy

- on one side a function of the **availability of renewable biological resources** and
- on the other hand our ability to **optimize the use and maximize value added** by a given amount of biomass.

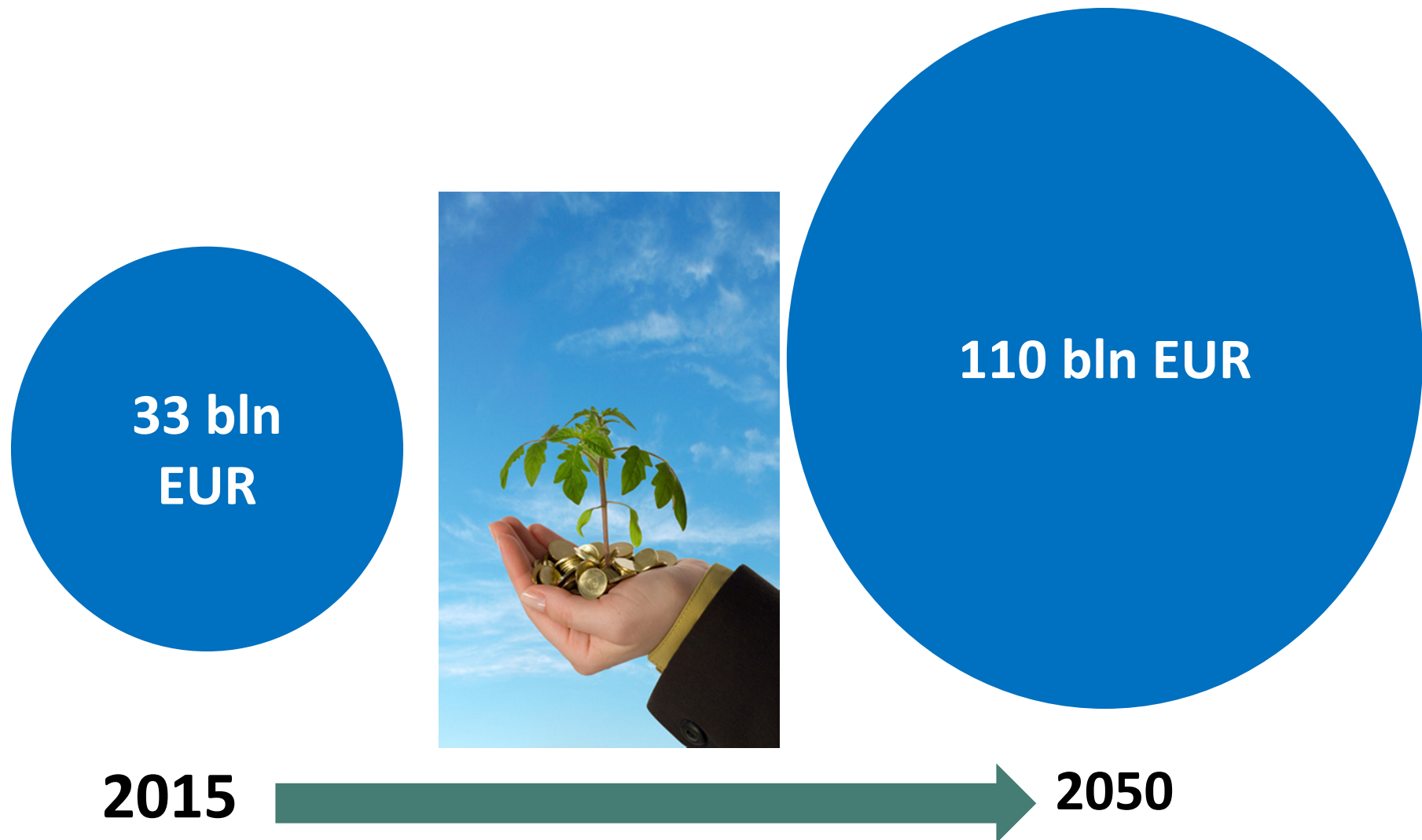


Norwegian bioeconomy today:

- 33 billion EUR
 - Agriculture and Food industry 15 billion EUR
 - Marin sector and aquaculture 10 billion EUR
 - Forest based sector 5 billion EUR
 - Other bio-industries 3 bln EUR
- Share of Norwegian economy: 6 %



Turnover potential Norw. Bioeconomy?



Norwegian bioeconomy 2050

- The report “**Turnover based on productive seas and oceans**” estimates increase in turnover from **10 to 60 bln EUR in 2050** (blue sector)
- The report “**National strategy for forestry and wood industries**” estimates an increase in turnover from **5 to 15 bln EUR in 2045**
- A new report on “**Agriculture and food sector 's contribution to growth in Norwegian bioeconomy**” estimates an increase in turnover from **15 to 27 bln EUR in 2050**
- **Total estimation 2050: 110 bln EUR**

Norway needs: Transition, innovation, strengthend competitiveness

- **The economy: Serious challenges as a result of declining oil and gas production and falling oil prices**
- The Climate challenge: Need for climate change mitigation, emission reduction, climate adaptation and risk reduction measures
- Thu business sector: Huge needs for innovation and transition processes
- The Governmental decision to develop a national bioeconomy strategy is a part of the efforts to deal with the current and future challenges
- Parallel to this, an expert committee appointed by the government is working on report on the issue «green competitiveness»
- **The overall expectation: Bioeconomy – important part of the future competitive low carbon, circular economy in Norway**

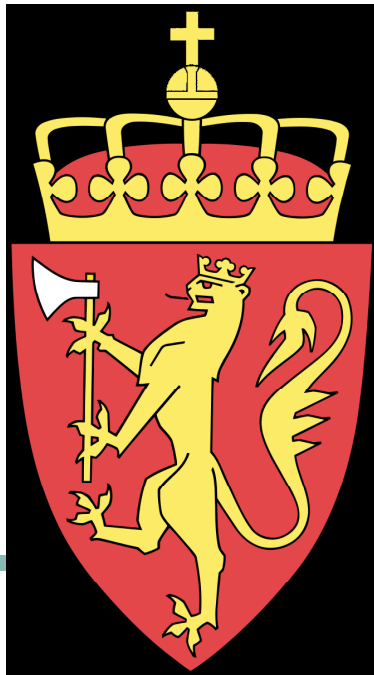
The Government: Why bioeconomy in Norway?

- Norway has **extensive natural resources** and a **knowledge base** that is **well suited to exploit the bioeconomy potential**.
- Through a targeted and coordinated effort Norway could be an **important contributor to the development of bioeconomy**.
- Norway needs **more efficient, profitable and sustainable production, harvesting and utilization of biological raw materials**.
- Norway has **great potential for economic growth based on renewable biological resources**
- A national bioeconomy strategy can contribute to **economic development and a green shift**.

Cross sectorial action

The task of developing a **national bioeconomy** strategy is given **to three ministers**;

- Minister of Industry
- Minister of Agriculture and Food
- Minister of Fisheries



The strategy is developed in collaboration between the 3 responsible Ministries and:

- Ministry of Foreign affairs,
- Ministry of Education and Research,
- Ministry of Climate and Environment,
- Ministry of Local Government and Modernization
- Ministry of Transport and Communication
- Ministry of Petroleum and Energy



Minister of fishery Aspaker, at the launching of the process:

“I hope that the strategy will create a common understanding of:

- What bioeconomy is,*
- What opportunities and challenges we face, and*
- What national goals we should have.*

Achieving this, we have reached good progress”

The strategy will identify overall priorities for national efforts in this area and formulate related objectives and measures in the long term.

The ministers have emphasized a close dialogue with relevant stakeholders in the strategy process.

Messages from the Minsters:

- “A key factor: **Extensive stakeholder involvement**”
- “Since this is the first time we're doing a bioeconomy strategy in Norway - it is **particularly important that the private sector, research, government and organizations provide input** on how they think such a strategy should look like”.
- “We need a **common ground and a common direction** for the future work of developing a bioeconomy in this country”.
- “We can create new businesses based on **exploiting the advantages** we have in Norway; **ample supply of blue-green raw materials, advanced manufacturing and world-leading expertise in key areas**”.

Organization and milestones

Organisation:

- The Ministry of Trade, Industry and Fisheries coordinates this project in close cooperation with the Ministry of Agriculture
- Inter-ministerial working-group with participation from 6 other Ministries
- Advisory Group with national experts.

Milestones:

- Governmental decision in March 2015 – starting point.
- National conference, regional meetings, and work-shop have been held. Written proposals have been received.
- Written reports from Innovation Norway, the Research Council of Norway and the Norwegian Environment Agency.
- Completion of the strategy in 2015 (delayed to 2016).

Stakeholder involvement and dialogue

- Input conference with nearly 200 participants.
- 60 different actors on stage to give the ministers their input and expectations to the strategy work.
- 6 regional input meetings around Norway.
- A number of written proposals from industry organizations, research institutions and NGO's
- All input, written and streamed are accessible on the Government webpage

What the stakeholders asked for:

- Wide definition of the bioeconomy
- Clear political intentions and strong commitment
- Stable and long-term framework-conditions
- Platforms for increased cooperation
- Regional innovation/infrastructure centres
- Support for up-scaling and commercialisation
- Market stimulating mechanisms
- National consolidation of the knowledge institutions
- Different regional capacities and needs

Challenges in the initial phase of strategy process

Create a **common understanding of the term bioeconomy**

- In the industries
- In the research institutions
- In the Ministries
- In the general public

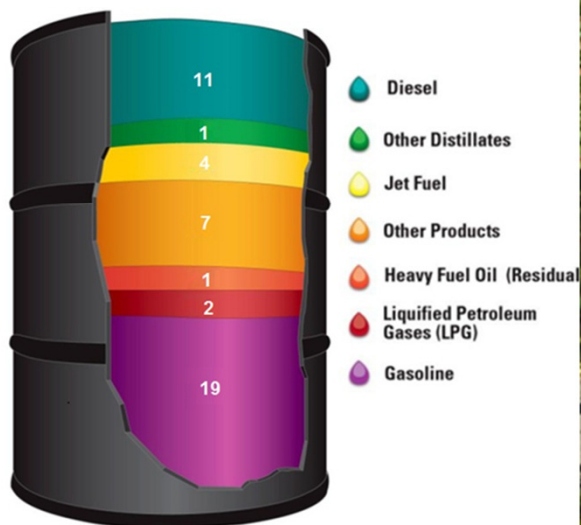
Establish a common understanding of the cross sectoral nature of modern bioeconomy

Understand bioeconomys role as only a part of the green shift and the circular, low carbon economy

Overarching goals for Norwegian Bioeconomy strategy:

1. Economy: Increased value added and employment
2. Climate: Reduction in greenhouse gas emissions
3. Scarcity: More efficient use of resources

Products Made from a Barrel of Crude Oil (Gallons)
(2011)



To main approaches to develop the Norwegian bioeconomy are focusing on

1. Long-term optimization of the general measures
2. Integrated and targeted use of existing instruments (competence, legal and economic mechanisms)

It's **not yet clear** if the strategy will put much emphasis on prioritizing thematic strategies (ex blue sector – aquaculture and ocean, forest, agriculture and food, industrial biotechnology,)

1. Long-term optimization of the general measures:

- **Continuous improvement and adjustment of the general and sectorial instruments**
 - based on an assessment of the impact of the overall economic growth, employment, climate potential and economically efficient use of the availability of renewable biological resources.
- **Identify barriers to increased production, collection and utilization of renewable biological resources**
 - and clarify whether they are regarded as market failure, related to the mispricing, lack of information, bias in regulations, research and development etc.

2. Integrated and targeted use of existing instruments:

- **Use of existing instruments in a more comprehensive and targeted way** to promote development within the bioeconomy.
- **Joint calls across relevant instruments**, where business and knowledge providers can get **support for the entire development process from research and development, innovation and market introduction**.
- Such initiatives can be **managed jointly by funding agencies** for example through a program council.

Prioritized field of action

A. **Markets** for renewable biobased products

- Strategy: Better information on biobased products
 - Measures and mechanisms
- Strategy: Reduced market uncertainty
 - Measures and mechanisms

B. Effective utilization and profitable processing of renewable biological resources

- Strategy: Increased processing towards products with high returns
- Strategy: Increased resource utilization and recycling

Prioritized field of action

C. Sustainable production and extraction of renewable biological resources

- Strategy: Increased production and extraction
- Strategy: Better frameworks for sustainable production and extraction

D. Collaboration across sectors, industries and disciplines

- Strategy: Increased cooperation within and between value chains
- Strategy: Increased interdisciplinarity and social dialogue

The Government policy, example

Field of action: Markets for renewable biobased products

- **Strategy:** Reduced market uncertainty

Based on written approaches and ambitions for the Government's policy on ex. the issue «reduce market uncertainty», the strategy will introduce

- Measures and instruments – «the bioeconomy toolbox»



Measures to reduce market uncertainty

- Evaluate how **capital instruments** supporting the development of new bio-based industries
- Evaluate stronger emphasis on environmental and climate considerations into **product requirements and technical regulations**
- Evaluate stronger emphasis on **environmental and climate considerations in public procurement**
- Consider the **exemption of tax on bio-based products** that can replace fossil products
- Assess the use of policy instruments to **support early users** of bioproducts
- Evaluate **risk reduction in full-scale production of bio-based products**
- Stimulate domestic and international markets through **international cooperation and agreements at government level, including the development of standards**
- Initiate an external assessment of the need for **updating the regulations for promotion of products based on renewable biological resources**
- Establish a mechanism for warning to relevant authorities about distortions in regulations that constitute barriers to renewable biological products
- Evaluate the appropriateness of introducing a fossil plastics fee
- Ensure that new biobased products are placed right in Tariffs and safeguarded in trade agreements

The bioeconomy strategy and related, interconnected national processes

- The bioeconomy strategy process
- The expert panel on green competitiveness
- The report on Climate mitigation measures and emission trajectories up to 2030
- The Report to the Minister of Agriculture and Food 2016: Knowledge base for agriculture and climate policy
- A white paper on agricultural policy - to be presented to the Parliament late 2016
- A White Paper on Circular Economy to be presented to the Parliament in 2017 (?)

Expert Panel for green competitiveness

- The Panel will present proposals for an overall strategy for green competitiveness.
- Green competitiveness is understood as the **private sector's ability to compete globally at a time when stronger instruments are applied to climate policy.**
- The committee will discuss the **characteristics of offensive, growth-oriented policies** for a stronger **green competitiveness** within the framework of an effective utilization of resources.

The Panel will address the following questions (1):

- Regulatory framework:
What are the most important global and regional change processes that constitute drivers and barriers for the green transition towards low-emissions society?
- Consequences:
What are the key challenges and opportunities for Norwegian business when facing these challenges?
Which areas of society and sectors will be most affected?

The Panel will address the following questions (continued):

- Competitive advantages:
In which areas has Norway best opportunities and what is our greatest challenges in meeting these processes of change?
- Priorities:
What should be the overarching priorities and initiatives to develop innovation and green competitiveness for Norway?

The panel will present the report in October 2016



Climate mitigation measures and emission trajectories up to 2030

- The report presents **new figures for historical emissions and projections** based on updated values for global warming potential (GWP) and **new emission projections**.
- It reviews measures that could be implemented by 2030 and the emission reduction effect **of three different mitigation packages**, split between the ETS and non-ETS sectors.
- The main report presents **84 measures, with emission reduction potentials and cost levels**.
- **Co-benefits** are also described, and possible consequences of the measures are assessed.



Climate mitigation measures and
emission trajectories up to 2030
Summary



Bioresources and climate impact

Increased exploitation and processing of renewable biological resources should **contribute to real emission reductions and do no harm to the environment**

Knowledge-based approach required, taking into account:

- sustainable management and harvesting
- greenhouse gas emissions in the short and longer time scales
- changes in natural store of carbon

Report to the Minister of Agriculture and Food 2016: Knowledge base for agriculture and climate

VEDLEGG

LANDBRUK OG KLIMAENDRINGER

RAPPORT FRA ARBEIDSGRUPPE

AVGITT 19. FEBRUAR 2016



Landbruk og klima – utredning fra arbeidsgruppe

UTREDNING OM LANDBRUKETS UTFORDRINGER I MØTE MED KLIMAENDRINGENE

FAGNOTATER SOM UNDERLAG FOR ARBEIDSGRUPPENS HOVEDRAPPORT

19. FEBRUAR 2016

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The key message: Contribution from agricultural sector to climate solutions

1. Contribute to food security by **producing more food**
2. Mitigate climate change by reducing greenhouse gas emissions
3. Mitigate climate change by increasing carbon storage
4. Deliver **climate friendly materials and renewable alternatives to substitute fossil energy**
5. Cope with **more demanding production conditions** resulting from climate change - adaptation
6. Protect **environmental values and ecosystem services**

Bioeconomy and “do-no-harm” principle

More intensive utilization of bioresources increases the **potential for conflict with important ecosystem services, biodiversity, economic disparity and food security**

Central to building knowledge in a bioeconomy strategy:

- prioritize and strengthen research on impacts that can be triggered for other important environmental and social interests when developing the bioeconomy
- review of legislation, public funding agencies and industry managed schemes to ensure long-term sustainability
- “do-no-harm” – a basic principle for bioeconomy strategy work

Key message

- Developing a profitable bio-economy include to learn and **develop new knowledge and business across established sectors and disciplines.**
- Development of **new sectoral value chains** will **challenge established patterns of interaction, management, regulation and funding structure.**
- This creates a **need for a holistic approach which will be promoted by the national strategy.**



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