

National BioEconomy Strategies IEA Bioenergy Implementing Agreement Countries

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Prepared by
Beermann M., Jungmeier G., JOANNEUM RESEARCH (AT)
Pignatelli V., Monni M., ENEA/ITABIA (IT)
edited by van Ree R., Wageningen UR (NL)
on behalf of IEA Bioenergy Task42

Goal

- Identification of major Bio(based) Economy strategies in the 22 member countries of the IEA Bioenergy IA
- Assessment of these strategies in relation to
 - Scope (governmental, regional, industry sectors)
 - Position of bioenergy (including biofuels) in a future BioEconomy
 - Main economic sectors in a future BioEconomy
 - Current focus of implementation (R&D, transition to markets, policy development)
 - Vision and (measurable) targets
- Overall summary and conclusion

Methodology (1)

- National IEA Bioenergy IA representatives (Task42 representatives and ExCo members) were asked to send relevant strategies, studies, reports
- Assessment by Joanneum Research (AT) and ITABIA (IT)
- Definition of scope:
 - BioEconomy (BE): **food and feed industries** (agriculture, forestry, horticulture, fisheries and aquaculture, plant and animal breeding, the nutrition and beverage industry) + **biobased economy**
 - BioBased Economy (BBE): **non-food industries** – chemical, material, medicine, pulp+paper and wood industries + **bioenergy** (including biorefineries)
 - BioBased Industries (BBI): **individual sectors of industries** – food, biochemical, biomaterial, biomedicine, pulp+paper and wood processing
 - BioENergy (BEN): electricity, heat, transportation biofuels, gaseous and solid energy carriers

In some countries (Germany, Sweden) the terms BioEconomy and BioBased Economy are used synonymously

- Economic sectors of a future BioEconomy
 - Current main carbon-dependent economic sectors of a country are assumed to also deploy future use of biomass in a BioEconomy
- Position of Bioenergy in a future BioEconomy
 - Besides Food, Feed and Wood fibre, the Bioenergy sector significantly contributes to the use of biomass in most countries (due to policies and regulations related to GHG reduction, financial incentives, etc.)
 - In a future BioEconomy competition for certain types of biomass could increase and lead to a shift of priorities from Bioenergy to higher-value chains (especially when domestic biomass is scarce)
 - Strategies were assessed for information if Bioenergy in a future BioEconomy is seen equally important to other sectors or not (priority or less important)

Task 42 Biorefining

Assessment scheme

Austria		Info available	Country specific descriptive information
		√ x	
1	Scope of strategies *		Description of scope considered (national, regional, name of industry sectors)
	Bioeconomy (BE)		Food and feed industries (agriculture, forestry, horticulture, fisheries and aquaculture, plant and animal breeding, the nutrition and beverage industry) + Biobased Economy
	Biobased economy (BBE)		Non-food industries: Biochemical, biomaterial, biomedicine, pulp+paper and wood industries + Bioenergy (including biorefineries)
	Biobased industries (BBI)		Individual sectors of Non-food industries: Biochemical, biomaterial, biomedicine, pulp+paper and wood industries
	Bioenergy (BEN)		Electricity, heat, transportation biofuels, gaseous and solid energy carriers
2	National strategies **		National strategies by government, ministries
a	Document name		
	Scope		
	Published by		
	Year		
	Priorities		
	Language		
	Other documents ***		Strategies and reports by industry, research and consulting, governmental responses to such strategies
b	Document name		
	Scope		
	Published by		
	Year		
	Priorities		
	Language		
	Websources		
	Title		
	Owner		
	Link		
3	Vision ****		Only if there is a national BE/BBE strategy
4	Targets ****		Only if there is a national BE/BBE strategy
	General target		
	Measurable targets / indicators		
5	Adressed economic sectors		References to documents listed above
	Forestry		
	Agriculture		
	Food and feed processing		
	Pulp+Paper		
	Woodworking industry		
	Chemical industry		
	Materials manufacturing		
	Bioenergy		

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List of countries assessed

Task 42

partnering countries (11)

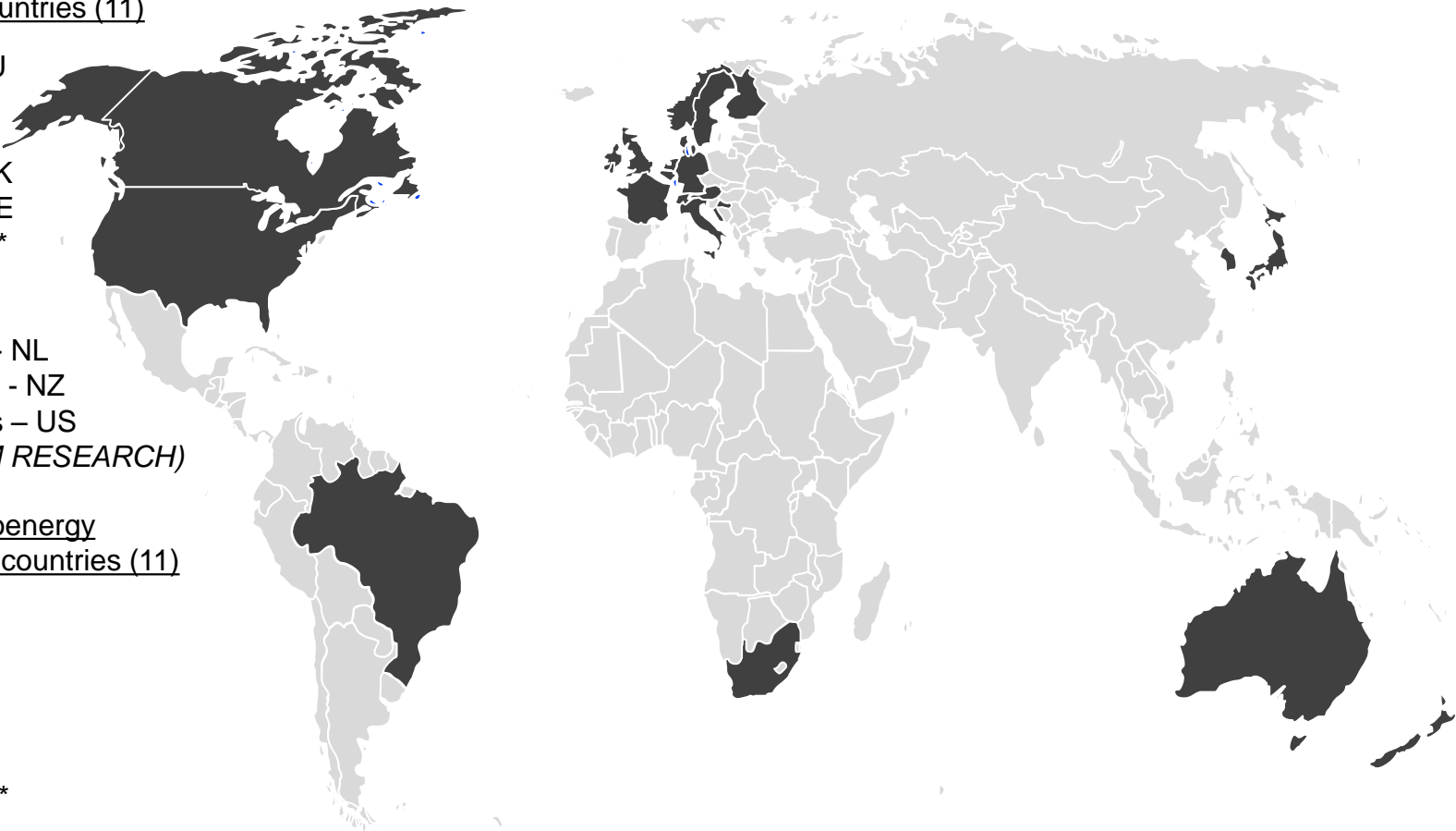
Australia - AU
Austria - A
Canada - CA
Denmark - DK
Germany - DE
(Ireland – IE)*
Italy - IT
Japan - JP
Netherlands - NL
New Zealand - NZ
United States – US
(*JOANNEUM RESEARCH*)

Other IEA Bioenergy

IA partnering countries (11)

Belgium - BE
Brasil - BR
Croatia - HR
Finland - FI
France - FR
(Korea – KR)*
Norway - NO
South Africa - ZA
Sweden - SE
Switzerland - CH
UK – GB
(*ITABIA*)

* No response received



Summary results (1)

Country	Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
	Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
Australia	x	√	√	√	x	√	√	√	x	x
Austria	(√)	x	x	√	x	x	√	x	√	x
Belgium	x	√	√	x	√	√	x	x	x	√
Brazil	x	√	x	x	√	x	√	√	x	x
Canada	x	√	√	√	x	√	√	x	√	x
Croatia	x	x	x	x	x	x	√	x	√	x
Denmark	(√)	√	x	√	x	√	x	√	x	x
Finland	√	x	x	x	√	√	√	x	√	x
France	(√)	x	x	x	√	√	x	x	√	x
Germany	√	√	√	√		√	x	x	√	x
Italy	x	√	x	x	x	√	√	√	x	x
Japan	(√)	√	√	√	x	√	√	√	x	x
Netherlands	√	x	x	√	x	√	x	x	√	x
New Zealand	x	√	x	√	x	x	√	x	√	x
Norway	(√)	x	x	√	√	x	√	x	√	x
South Africa	√	x	x	x	√	x	√	x	√	x
Sweden	√	√	√	x		√	x	x	√	x
Switzerland	(√)	x	x	x	√	x	x	x	√	x
UK	(√)	√	x	√	x	√	√	x	√	x
United States	(√)	x	x	√	√	x	x	√	x	x
Ireland, Korea	no response received by country representatives									
√	applicable									
x	not applicable									
(√)	No governmental bioeconomy strategy, but high governmental attention (e.g. national blueprint, green economy strategy...)									

Summary results (2)

Country	Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
	Agriculture +forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
Australia	√	x	√	√	x	x	√	x	x	√	x	x
Austria	√	√	√	√	√	√	√	√	x	√	x	x
Belgium	√	√	√	√	√	√	√	x	x	√	x	x
Brazil	√	√	√	√	√	√	√	x	x	√	√	√
Canada	√	x	√	√	√	√	x	√	√	√	√	x
Croatia	√	x	√	√	√	x	√	x	x	√	x	x
Denmark	√	√	√	x	x	√	x	x	x	√	√	x
Finland	√	√	√	√	√	√	√	√	√	√	√	x
France	√	√	√	√	√	√	√	x	x	√	√	x
Germany	√	√	√	√	√	√	√	√	x	√	√	√
Italy	√	x	√	x	x	√	x	x	x	√	√	√
Japan	√	x	√	√	√	√	√	√	x	√	x	x
Netherlands	√	x	√	x	x	√	√	√	√	√	√	x
New Zealand	√	√	√	√	√	x	x	x	x	√	x	x
Norway	√	√	√	√	√	√	x	√	x	√	√	√
South Africa	√	√	√	x	x	√	√	√	x	√	√	x
Sweden	√	√	√	√	√	√	x	√	x	√	√	x
Switzerland	√	√	√	√	√	x	x	√	(√)	√	√	x
UK	√	√	√	x	√	√	√	x	x	√	√	√
United States	√	x	√	x	x	√	√	√	√	√	√	x
Ireland, Korea	no response received by country representatives											
√	applicable											
x	not applicable											

Governmental BioEconomy strategies in...

- Germany (Task 42)
 - National policy strategy bioeconomy (2014)
 - National research strategy bioeconomy 2030 (2010)
- The Netherlands (Task 42)
 - Framework memorandum on the Biobased Economy (2012)
 - De Overheidsvisie op de bio-based economy in de energietransitie (2007)
- Finland
 - The Finnish Bioeconomy Strategy (2014)
- South Africa
 - The Bio-Economy Strategy (2013)
- Sweden
 - Swedish Research and Innovation Strategy for a Bio-based Economy (2012)

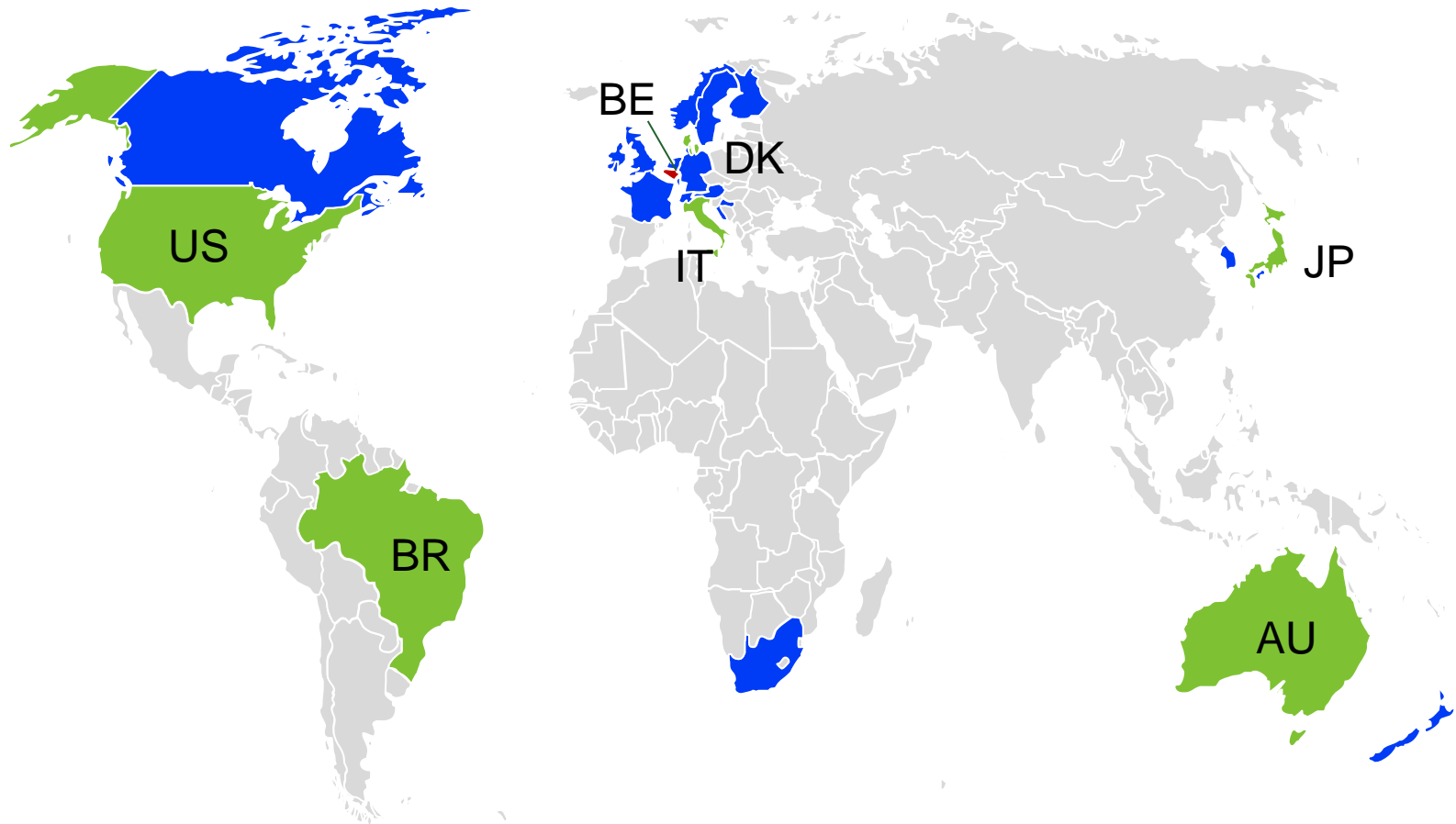
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Governmental attention to BioEconomy (ongoing strategy development) in...

- Austria (Task 42)
„Research, Technology and Innovation Strategy for Biobased Industries (2014)
- Denmark (Task 42)
Growth plan for water, bio and environmental solutions (2014)
- Japan (Task 42)
Biomass Industrialization Strategy (2012)
- United States (Task 42)
National Blueprint Bioeconomy (2012)
- Norway
Research Programme on Sustainable Innovation in Food and Bio-based Industries
"BIONÆR" (2012 -2022) (2012)
- France
Les usages non alimentaires de la biomasse (2012)
- Switzerland
Green Economy: Report and Action Plan (2013)
- UK
Waste or resource? Stimulating a bioeconomy (2014)

Position of Bioenergy in a future BioEconomy

(priority / equally important to other sectors / less important)



Measurable targets for BioEconomy (market) development

- “Monitoring biobased economy in Nederland” (2014)

“Knowledge position” (indicating the investments and funding into R&D of BiobasedEconomy), “**number of projects** related to BiobasedEconomy”, “**amount of biomass** into BiobasedEconomy”, “**market development** in NL and worldwide”, “value added from BiobasedEconomy”

- Biobased Economy Indicators U.S. (2011)

16 measurable targets, include 4 input-, 4 investment-, 8 output-related indicators

input indicators: e.g. **amount of cropland** in energy-dedicated crops, quantity of **chemical and other inputs** used in biobased production.

investment indicators: e.g. **government spending** on bioeconomy research and development (R&D), **private capital investment** in plant and equipment,.

output indicators: e.g. **production levels** of chemical-based products, **emissions** from biobased production, **direct value added** from biobased production, production levels of biofuels, and quantity of by-products from biofuel production.

Generic conclusion

Identification and assessment of major Bio(based) Economy Strategies in 20 member countries of the IEA Bioenergy Implementing Agreement has shown that:

- Bioeconomy is an important part of national transition strategies in 60% of the countries (AT, FI, FR, DE, JP, NL, NO, ZA, SE, CH, UK, US)
- the energy sector is almost always important in national transition strategies, and in most (65%) cases bioenergy has an equal position to other sectors in the BioEconomy, and is a priority in AU, BR, DK, IT, JP, US
- bio(based) development is almost always a top-down (policy driven) approach
- most countries have a BioEconomy vision and general targets instead of measurable policy targets (measurable targets in CA, FI, NL, US)
- for market deployment all countries focus on R&D, 70% on transition aspects and 25% on additional policy development
- in all countries the agriculture+forestry and energy sector are priority areas for the transition to a BioEconomy, and in 80% of the countries also the chemical sector is identified as a priority area
- in half of the countries Biorefining is identified as key technology for successful BioEconomy deployment

Knowledge on current biomass use (1)

- Essential for BioEconomy strategies is the knowledge on current energetic and material use of biomass in each country, based on indicators like:
 - Biomass flows imported, exported and processed for energetic and material use (e.g. energy, food, feed, forest products, new biobased products)
 - Economic indicators of biomass production and biobased industries (e.g. share of GDP, value-added, trade volumes)
 - Potential additional domestic sources of biomass (e.g. unused biomass, expected yield increases)
 - Economic indicators of potential biobased industry sectors (e.g. chemical industry with substitution potential of fossil by biomass resources)

Knowledge on current biomass use (2)

- Challenge: consolidation and comparability of different statistical data sources within a country and even more between countries - no uniform compilation available for this survey, only a few consolidated country profiles
- Recent examples of biomass country profile compilations
 - Country reports in Task 42 and other IEA Bioenergy IA Tasks
<http://www.iea-bioenergy.task42-biorefineries.com/en/ieabiorefinery/Country-Reports.htm>
 - Sustainable biomass country monitors by Netherlands Enterprise Agency RVO (6 EU and 10 non-EU countries)
<http://english.rvo.nl/topics/international/sustainable-biomass/publications-results/countries/country-monitors>
 - Report: Biobased Economy in the EU-27: A first quantitative assessment of biomass use in the EU industry (Nova-institute, 2013)
 - Bioeconomy Observatory project – ongoing development (EU-28 countries)
<http://web.jrc.ec.europa.eu/biso-prototype/pages/>

Detailed country reports

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Each country report has 3 slides:

(1) Results summary

(2) Summary comments

(3) List of references

Assessed strategies		Scope of Strategies			Position of bioenergy in a bioeconomy				
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice / research / consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
x	v	v	v	x	v	v	v	x	x

Economic sectors in the focus of strategies				Vision and targets		Current focus of implementation	
Agriculture / forestry	Food	Energy	Pulp + paper	Wood processing	Chemical industry	Medical industry	Policies
v	x	v	v	x	x	v	x

IEA Bioenergy	BioEconomy Survey 2014	Country (1)	12
Task 42 Biorefining		Country (2)	

1. Governmental national BioEconomy strategy
2. Position of Bioenergy
3. Priority economic sectors & focus of implementation
4. Measurable targets
5. National balance of biomass use and flows

IEA Bioenergy	BioEconomy Survey 2014	Country (3)	15
Task 42 Biorefining		Country (3)	

Biorefining (RF)	Identification of scope considered (national, regional, name of industry sectors)
Biobased economy (BBE)	Biorefineries
Biobased industries (BBI)	Industry sector: Pulp+Paper; Regional: South Australia
Bioenergy (BE)	National: Biomass feedstocks and supply
National strategies	Opportunities for Primary Industries in the Bioenergy Sector / National Research, Development and Extensal Strategy (2010)
Document name	Primary Industries: Sustainability, biomass feedstocks supply logistics, policy analysis, capacity building
Priority	
Other documents	
Document name	Pulp and Paper Industry Strategy Group - Final Report (2010)
Priority	Investment in a portfolio of bioenergy/biofuel production integrated with RF processes, support of establishing a BioEnergy Research Institute, investment in a expansion of timber plantations, sustainability (i.e. sustainable biomass growth) and productivity
Document name	Australian Government response to the 'Pulp and Paper Industry Strategy Group Report' (2012)
Priority	Establishment of Manufacturing Industry Council, measures taken to support P&P industry strategy (i.e. incentives for private sector investment in new biomass plantations), no statement concerning the establishment of a BioEnergy Research Institute
Document name	Bioeconomy Leading Study: Tropical Biomass (2010)
Priority	Advice to government for development of Biobased Economy Strategy, focusing on the use of sugarcane
Document name	Leading Bioeconomy: Temperate Biomass Chains (2010)
Priority	Advice to government for development of Biobased Economy Strategy, focusing on the use of temperate biomass
Document name	Advice to government for development of a Strategy for agricultural biotechnology: optimising the contribution of the next generations of biotechnologies to Australian agriculture and downstream markets as part of an emerging bioeconomy
Document name	Building a Bioeconomy in South Australia 2011-2020 (2011)
Priority	Strategy to foster the bioeconomy industry in South Australia, focusing on medical devices, environmental solutions, water management and research
Document name	Research Impact of a Future Tropical Bioenergy Industry in Queensland (2011)
Priority	Report examined a potential future bioenergy industry in Queensland, involving the manufacture of both fine and commodity compounds, and polymers for the global chemical and pharmaceutical sectors, derived from grain or biobased feedstocks
WebResources	
Title	The Bioeconomy
Owner	CSIRO
Link	http://www.csiro.au/Organisation/Structure/Phylo/Bioeconomy/56.aspx?The_Bioeconomy.aspx
Title	Bioeconomy and Industrial Biorefinery
Owner	Australian Government, Department of Industry
Link	http://www.industry.gov.au/industry/technology/industry/biorefinery/Pages/Bioeconomy-and-industrial-biorefinery.aspx
Title	BEA
Owner	South Australian Government
Link	http://www.beaonline.com.au/

Task 42 Biorefining

Australia (1)

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
X	√	√	√	X	√	√	√	X	X

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture + forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
√	X	√	√	X	X	√	X	X	√	X	X

Australia (2)

1. No national BioEconomy strategy, but regional strategy (South Australia) and pulp-paper industry strategy
2. Bioenergy, especially fibre-based biofuel has a priority in a BioEconomy (Australia has domestic coal and gas, but less oil)
3. Strategy-focus on R&D for agriculture + forestry (green biotechnology), bioenergy and biofuels / fuel-driven biorefineries, pharma industry (red biotechnology)
4. No measurable targets for BioEconomy development
5. Share of bioenergy (~4% of total energy consumed in 2011), mainly firewood and bagasse (sugar cane residues), biofuels <1% of total fuels consumed;
Most biomass currently used in the food and feed industry (cereals) and in the wood processing and pulp and paper industry, total balance of material and energy use of biomass currently not available

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Australia (3)

Scope of strategies	√	Description of scope considered (national, regional, name of industry sectors)
Bioeconomy (BE)	x	
Biobased economy (BBE)	√	Biorefineries
Biobased industries (BBI)	√	Industry sector: Pulp + Paper; Regional: South Australia
Bioenergy (BEN)	√	National: Biomass feedstocks and supply
National strategies	√	Description of documents
Document name		Opportunities for Primary Industries in the Bioenergy Sector / National Research, Development and Extension Strategy (2014)
Priorities		Primary Industries: Sustainability, biomass feedstocks, supply logistics, policy analysis, capacity building
Other documents	√	
Document name		Pulp and Paper Industry Strategy Group - Final Report (2010)
Priorities		Innovation (i.a. potential of bioenergy/biofuel production integrated in P&P processes, support of establishing a Biorefinery Research Institute), investment (i.a. expansion of timber plantations), sustainability (i.a. sustainable biomass growth) and productivity
Document name		Australian Government response to the "Pulp and Paper Industry Strategy Group Report" (2012)
Priorities		Establishment of Manufacturing Industry Council, measures taken to support P&P industry strategy (i.a. incentives for private sector investment in new biomass plantations), no statement concerning the establishment of a Biorefinery Research Institute
Document name		Biorefinery Scoping Study: Tropical Biomass (2010)
Priorities		Advice to government for development of Biobased Economy Strategy, focusing on the use of sugarcane
Document name		Scoping Biorefineries: Temperate Biomass Value Chains (2010)
Priorities		Advice to government for development of Biobased Economy Strategy, focusing on the use of temperate biomass
Document name		Biotechnology and Australian Agriculture (2008)
Priorities		Advice to government for development of a Strategy for agricultural biotechnology: optimising the contribution of the next generations of biotechnologies to Australian agriculture and downstream markets as part of an emerging bioeconomy
Document name		Building a bioeconomy in South Australia 2011-2015 (2011)
Priorities		Strategy to foster the bioscience industry in South Australia, focusing on medical devices, environmental solutions, water management and cleantech
Document name		Economic impact of a future tropical biorefinery industry in Queensland (2014)
Priorities		Report examines a potential future biorefinery industry in Queensland, involving the manufacture of both fine and commodity compounds, and polymers for the global chemical and pharmaceutical sectors, derived from green or bio-based feedstocks
Websites	√	
Title		The bioeconomy
Owner		CSIRO
Link		http://www.csiro.au/Organisation-Structure/Divisions/Ecosystem-Sciences/The-Bioeconomy.aspx
Title		Bioeconomy and Industrial Biotechnology
Owner		Australian Government, Department of Industry
Link		http://www.industry.gov.au/industry/biotechnology/IndustrialBiotechnology/Pages/BioeconomyandIndustrialBiotechnology.aspx
Title		BioSA
Owner		South Australian Government
Link		http://www.bioinnovationsa.com.au/

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Austria (1)

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
(v)	x	x	v	x	x	v	x	v	x

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture + forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
v	v	v	v	v	v	v	v	x	v	x	x

Task 42 Biorefining

Austria (2)

1. National strategy on biobased industries (2014), with focus on food, pharma, chemical and wood processing industries; national research agenda “biobased industries” (2012) with focus on pulp and paper industry;
2. Position of bioenergy: strategy on biobased industries sees biofuels as an important biobased product, focus on concepts of integrated energy and material use of biomass
3. Strategy-focus on R&D for biomass conversion technologies, integrated concepts for cascading use of biomass, biorefineries
4. No measurable targets for BioEconomy development
5. National balance of overall biomass use and flows available (2014)
Share of bioenergy ~19% of total energy consumed, mainly for decentral heat production, biofuels ~7% of total fuels consumed;
Bioenergy dominates inland total (agro+forest) biomass consumption, together with animal feed industry (each about 39-40%), share of food industry 7%, and wood products, pulp and paper industry 14%
Energetic biomass use is already part of cascaded biomass use today - use of saw-mill by-products, black liquor, household + forest residues, only small share of energy production as direct biomass use (biofuels, biogas)

Austria (3)

Scope of strategies	√	Description of scope considered (national, regional, name of industry sectors)
Bioeconomy (BE)	x	
Biobased economy (BBE)	x	
Biobased industries (BBI)	√	National; food, chemical, pharmaceutical, wood-working industries
Bioenergy (BEN)	x	
National strategies	√	Description of documents
Document name		National strategy for the biobased industry in Austria (draft) (2014)
Priorities		Resources, technologies and products of biobased industries, with focus on chemical, pharmaceutical and wood-processing industries
Other documents	√	
Document name		Research agenda biobased industries (2012)
Priorities		Technology roadmap for biobased industries with a focus on forest biomass, pulp and paper industry
Document name		Bioeconomy position paper and background paper (2013)
Priorities		Identification of research areas and stakeholders (companies, institutions) in Austria relevant for the development of bioeconomy
Websites	x	

Belgium (1)

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
X	√	√	X	√	√	X	X	X	√

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture + forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
√	√	√	√	√	√	√	X	X	√	X	X

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Belgium (2)

1. No national Bioeconomy strategies, but regional strategy (Flanders). Although in the Walloon Region there is no specific dedicated strategy, there are several ongoing activities pointing to promote the BioEconomy.
2. The importance of Bioenergy is decreasing compared to other sectors.
3. Most biomass currently used in bioenergy production. It also appears that in Flanders, biobased products (e.g. paper, wood, bioplastics and biochemicals) already create five times as much added value and ten times more employment than bioenergy.
4. No measurable targets.
5. Share of bioenergy in gross final consumption in 2012: 5.1% in electricity, 6.4% in heating, 4.1% in transport
Strategy-focus on R&D across the entire value chain (valorization of secondary streams from biomass-related industries, such as food, animal fodder, wood, and paper before transforming them to energy at the end of the life-cycle).

Task 42 Biorefining

Belgium (3)

Scope of strategies	✓	Description of scope considered
Bioeconomy (BE)	✓	Regional - Flanders
Biobased economy (BBE)	✓	National, Regional (Flanders)
Biobased industries (BBI)	x	
Bioenergy (BEN)	x	
National strategies	x	Description of documents
Other documents	✓	
Document name		Bioeconomy in Flanders - The vision and strategy of the Government of Flanders for a sustainable and competitive bioeconomy in 2030 (2013)
Priorities		The development of a coherent Flemish policy that supports and facilitates a sustainable bioeconomy. To put Flanders at the top for education and training and research and innovation in future-oriented bioeconomy clusters. Biomass is optimally and sustainably produced and used across the entire value chain. Strengthening of markets and competitiveness of bioeconomic sectors. Flanders is a key partner within European and international joint ventures.
Document name		Sustainable use of and creation of value from renewable raw materials for biobased industrial production such as biomaterials and green chemicals in Flanders (2013)
Priorities		Advise to the Government of Flanders in developing its own strategy for a biobased economy (BBE): need for an integrated approach, in which research and innovation, economy, agriculture, energy, environment and education and all stakeholders are involved; need for research and innovation, across the entire value chain (from feedstock to application); To promote the optimal utilisation of biomass (valorisation of secondary streams from biomass-related industries such as food, animal fodder, wood, and paper before transforming them to energy at the end of the life cycle); need for a regulatory framework to promote the use of renewable feedstocks in materials.
Document name		Towards a Belgian and Regional Strategy for the Biobased Economy (2013)
Priorities		Need for an integrated and holistic approach. Feedstock supply and availability. Research and innovation. Stimulating production and consumption. Visibility and awareness
Websources	✓	
Title		Bio-based economy: Trends in Wallonia (PPT presentation)
Source		ValBiom - Valorisation de la biomasse asbl
Link		http://www.valbiom.be/files/library/Docs/Biomasse/bioeconomyinwallonia_julieroiz_finalversion1323437908.pdf
Title		“Coq Vert” : Towards a bio-based economy in Wallonia “ (PPT presentation)
Source		“Coq Vert” Project

Task 42 Biorefining

Brazil (1)

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
X	√	X	X	√	X	√	√	X	X

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture + forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
√	√	√	√	√	√	√	X	X	√	√	√

Task 42 Biorefining

Brazil (2)

1. No national BioEconomy strategies. However, the level of attention to this area is very high ("BioEconomy, an Agenda for Brazil" by the Brazilian National Confederation of Industry (CNI)).
2. Bioenergy has a primary role for the BioEconomy, in particular for new generation biofuels production.
3. Strategy-focus on industrial biotechnology, agriculture and forestry, human health. Investments on R&D will allow the development of biomedicine, biochemicals, biotechnology applied for food and energy production (biorefinery, second generationo biofuels).
An important role assigned to the BioEconomy is the ability to limit the use of raw materials, improving production cycles and upgrading by-products and residues. For this purpose biorefineries are considered a good opportunity and biotechnology the optimal tool (production of food, biomedicine, next-generation biofuels, etc.).
4. No measurable targets.
5. The main use of biomass for energy purposes is the production of biofuels, in particular of first generation bioethanol obtained from sugar cane.

Task 42 Biorefining

Brazil (3)

Scope of strategies	√	Description of scope considered
Bioeconomy (BE)	√	Industry
Biobased economy (BBE)	x	
Biobased industries (BBI)	√	Pulpe and Paper Industry, green chemistry
Bioenergy (BEN)	√	second generation biofuels
National strategies	x	Description of documents
Other documents	√	
Document name		Bioeconomy: an Agenda for Brazil (2013)
Priorities		Investment in research and development to stimulate innovation in high value added sectors such as biomedicine, energy and alternative fuels, biotechnology applied to food production, among others, appears as a priority the agribusiness (bioreactors, forestry biotechnology, assisted plant reproduction, etc.).
Document name		The Brazilian Pulp Industry (2010)
Priorities		Analysis of the state of the art and possible future developments of the sectors: forests, pulp and paper industry, chemicals from biomass, birefineries, bioenergy, biofuels
Document name		Bioenergy and food production for local development in Brazil: inputs for policy making (2010)
Priorities		The industry is expected to shift to using lignocellulose-based raw materials (e.g., forest wood, sugarcane bagasse, agricultural waste, herbaceous and woody plants) for the production of socalled second generation biofuels. Is presented a model for future sugarcane ethanol development, its key feature is that it integrates sugarcane ethanol production with cattle production.
Websources	√	
Title		Bioenergy Research Program
Source		FAPESP
Link		http://www.fapesp.br/en/472

Canada (1)

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
X	√	√	√	X	√	√	X	√	X

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture + forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
√	X	√	√	√	√	X	√	√	√	√	X

Canada (2)

Task 42 Biorefining

1. No national BioEconomy strategy (since 2004), however numerous industrial and provincial strategies and initiatives indicate a strong interest by forest products and biofuel industries, and a moderate interest by manufacturing and agriculture sectors in furthering the development of the bioeconomy.
2. Bioenergy and 1st gen. biofuels are seen as an integral part of a future hybrid (renewable and petroleum) economy, a way to transform wastes into value, and a platform for higher value bioproducts.
3. Canadian natural resource and clean technology industries see their global leading position at stake; a national bioeconomy strategy should secure a favourable research and commercialization environment for green innovation, and expand the use of biomass for energy and new bioproducts.
4. Examples for measurable targets: number of bio-based firms and change over time, people employed in the bioeconomy and types of jobs, amount of biomass feedstock destined for bioproduct manufacture, amount of recoverable biomass being landfilled, bioenergy and biofuel consumption, meeting renewable fuel mandates, bio-based economy as a percentage of GDP, export of Canadian technology.
5. Canada is rich in diverse domestic biomass resources (e.g. ~10 % of world's forests). Share of wood bioenergy is 3.35% of total energy consumed; share of ethanol is 6.5% of total gasoline sales, share of biodiesel is 2.1% of total diesel sales in fuel used in transport sector in 2012

Task 42 Biorefining

Canada (3)

Scope of strategies	√	Description of scope considered (national, regional, name of industry sectors)
Bioeconomy (BE)	√	Regional
Biobased economy (BBE)	√	National
Biobased industries (BBI)	√	Forest industries
Bioenergy (BEN)	√	National, regional
National strategies	√	Description of documents
Document name		Innovation Roadmap on Bio-based Feedstocks, Fuels and Industrial Products (2004)
Priorities		Chemical and bioconversion technologies, immediate and future markets for the bio-based economy
Other documents	√	
Document name		The Canadian Blueprint: Beyond Moose and Mountains – How We Can Build the World's Leading Bio-based Economy (2010)
Priorities		proposes a transformational approach in three interdependent areas: people, capital and the operating environment.
Document name		Canadian Renewable Fuels Strategy (2006)
Priorities		5% biofuel strategy for 2010 (biodiesel, bioethanol)
Document name		The New Face of the Canadian Forest Industry - The Emerging Bio-Revolution (2011)
Priorities		Opportunities of forest industries to produce a wide range of bio-products from wood fibre: bioenergy, biochemicals, biomaterials
Document name		Evaluation of the Sustainable Bioenergy Strategic Priority (2012)
Priorities		Sustainable Feedstock, biomass conversion
Document name		The Manitoba Bioproducts Strategy (2011)
Priorities		Sustainable Biomass Production and Supply, Biofuels and Bioenergy, Biofibres and Biomaterials, Biochemicals
Document name		British Columbia Bioeconomy (2012)
Priorities		Definition of key areas for action: definition of vision, access to feedstock, technology development strategy, market development
Document name		Getting Value from Every Fibre - Making the Most of Alberta's Lignocellulose Resource (2007)
Priorities		Strategies for biorefineries, transforming wood-processing industries, bioaterials, bioproducts
Document name		Evolution & Growth: From Biofuels to Bioeconomy Canadian Renewable Fuels Association (2014)
Priorities		Industry action plan for advancing renewable energy ands fuels in Canada
Document name		Renewable natural gas technology roadmap for Canada (2014)
Priorities		Recommendations for a fully-developed renewable natural gas marketplace by 2020
Websites	√	
Title		Alberta forest products roadmap
Owner		Government and industry
Link		http://www.albertaforestroadmap.ca/
Title		How genomics can address sector challenges: Forest, Agri-food, fisheries
Owner		Genome Canada
Link		http://www.genomecanada.ca/en/sectorstrategies/
Title		Natural Resources Canada - Forest statistics
Owner		Government of Canada
Link		http://www.nrcan.gc.ca/publications/statistics-facts/1241
Title		Natural Resources Canada - Forest innovation program
Owner		Government of Canada
Link		http://www.nrcan.gc.ca/forests/federal-programs/13137

Croatia (1)

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
X	X	X	X	X	X	√	X	√	X

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture + forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
√	X	√	√	√	X	√	X	X	√	X	X

Task 42 Biorefining

Croatia (2)

1. There is not a specific national strategy for the BioEconomy, but some government action plans provide guidance for the development of this sector in agriculture, forestry, timber and paper industry.
2. Bioenergy (especially solid biomass thermal plants and biogas from anaerobic digestion) is an important sector, but not a priority for the BioEconomy.
3. Strategy-focus on R&D in the field of biotechnology and biomedicine. Market transition - in the agricultural and forestry sectors - through modernization of production systems.
A primary role in the production of biomass is allocated to food and feed industry, this approach will be optimized - according to the strategy of the Ministry of Agriculture - encouraging sustainable production systems related to the BioEconomy (bioenergy, wood processing industry).
4. No measurable targets.
5. The largest share of bioenergy on overall consumption (2012) regards heating and cooling from solid biomass (about 12%), for the transport sector the use of biodiesel is about 1.6% of total fuels consumed, and only 0.3% of electricity is obtained from biomass (mainly biogas).

Task 42 Biorefining

Croatia (3)

Scope of strategies	√	Description of scope considered
Bioeconomy (BE)	x	
Biobased economy (BBE)	x	
Biobased industries (BBI)	√	wood processing and paper industries
Bioenergy (BEN)	√	energy from biomass (heat and power)
National strategies	√	Description of documents
Document name		Strategic Plan 2015-2017 (2014)
Priorities		Modernization of production systems in the agricultural sector, EU standards related to hygiene, public health, welfare animals, occupational safety, environmental requirements and restructuring, manufacture of wood and energy from biomass
Document name		Strategy for industrial wood processing and paper (2004)
Priorities		Stimulate the production of manufactures of high quality obtained from the forests to the national and international market, through a system of tools relating to forestry, energy prices, environmental measures, operation of investment funds, legislation
Document name		Action Plan 2007 -2010 - Science & Technology Policy of the croatian Republic (n.a.)
Priorities		Basic research and knowledge, food; agriculture; biotechnology; health systems, energy and materials (renewable energy; bio-nanomaterials)
Other documents	√	
Document name		Action Plan to Encourage Investment into Science and Research (2008)
Priorities		It is necessary to restructure and financially strengthen NFS (National Foundation for Science) in order for it to take over the central place in financing quality and internationally reviewed scientific projects, with the emphasis on the fields of natural, technical, biotechnical and biomedicine sciences
Websources	√	
Title		Cluster Development Strategy 2011-2020
Source		Ministry of Economy, Labour and Entrepreneurship
Link		http://eobrazovanje.mingorp.hr/default.aspx?id=7
Title		Business Innovation Croatian Agency - BICRO
Source		BRICO
Link		http://www.bicro.hr/en/o-nama

Task 42 Biorefining

Denmark (1)

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
(√)	√	x	√	x	√	x	√	x	x

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture + forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
√	√	√	x	x	√	x	x	x	√	√	x

Task 42 Biorefining

Denmark (2)

1. National BioEconomy strategy under development by BioEconomy panel involving industry, research and government.
2. Bioenergy and in particular biofuels are seen crucial in achieving profitability within Danish industrial-scale production of biobased products.
3. Focus of current strategies on increased environmental protection and sustainability in the agricultural and food sector (“Green Growth”). Strategy-focus on R&D, demonstration and market maturation of (largely energy/fuel-oriented) biorefineries
Agricultural production + food and feed sector significantly contribute to Danish economy, chemical industry rather small sector.
4. No measurable targets defined
5. Share of bioenergy ~18% of total energy consumed, mainly for decentral heat production, biofuels ~4.2% of total fuels consumed.
Total balance of material and energy use of biomass currently not available.

Denmark (3)

Task 42 Biorefining

Scope of strategies	√	Description of scope considered (national, regional, name of industry sectors)
Bioeconomy (BE)	x	National plans on BE, BBE (no strategy so far)
Biobased economy (BBE)	√	Biorefineries
Biobased industries (BBI)	x	
Bioenergy (BEN)	x	
National strategies	x	Description of documents
Other documents	√	
Document name		Agreement on Green Growth (2009)
Priorities		2 parts: The Environment and Nature Plan Denmark up to 2020; and The Strategy for Green Agriculture and Food Production Industry undergoing Growth; high level of environmental, nature and climate protection going hand in hand with modern and competitive agriculture and food industries, promotion of manure-based biogas for energy
Document name		Denmark in a global biobased society (2012)
Priorities		Policy recommendations by BioRefining Alliance in the areas of markets, bioresources, demonstration and R&D.
Document name		Biobased economy: Danish strengths and potentials (Den biobaserede økonomi: Danske styrkepositioner og potentialer) (2013)
Priorities		Danish strengths and potentials for a biobased economy: biorefineries, synthetic fuels based on gasification, residues as resource
Document name		A Bioeconomy for the Baltic Sea Region (2014)
Priorities		Mapping of stakeholders, practices and opportunities in the Baltic Sea Region
Document name		Growth plan for water, bio and environmental solutions (2014)
Priorities		Initiatives for strengthening the potential for future market pull for biobased resource-efficient solutions within water, bio and environmental solutions
Websources	√	
Title		The alliance in new national bioeconomy panel (22.11.2013)
Owner		Biorefining alliance Denmark
Link		http://biorefiningalliance.com/news/108/163/The-alliance-in-new-national-bioeconomy-panel.html

Finland (2)

1. There is a national strategy for the BioEconomy and also a program for the development of the forestry sector. Strategy-focus: new business opportunities generated by crossing of sectoral boundaries, education, training and research, proper management and use of biomass.
2. Bioenergy has a role of equal interest compared to other sectors of the BioEconomy. The development of bioenergy aims in particular to the biomass supply chain for the thermal energy production.
3. The development of the BioEconomy involves a strong synergy between agriculture, forestry and industry. In these sectors are springing opportunities for innovative markets related to biomaterials (natural fibers, wood materials, biochemicals, etc.) and their technological systems (biorefinery, bioenergy plants, etc.).
4. The BioEconomy output will grow to € 100 billion from its current level of € 60 billion, and 100,000 new jobs will have been created in this sector by 2025.
5. The largest share of bioenergy (2012) is for heating and cooling from solid biomass (about 46%), for electricity obtained from biomass power plants (12.5%), share of biofuels (biodiesel and bioethanol) is ~ 7.2% of total consumption.

Task 42 Biorefining

Finland (3)

Scope of strategies	√	Description of scope considered
Bioeconomy (BE)	√	National
Biobased economy (BBE)	√	Biochemical, biomaterial, pulp and paper, biorefineries
Biobased industries (BBI)	√	Wood industry
Bioenergy (BEN)	√	wood energy
National strategies	√	Description of documents
Document name		The Finnish Bioeconomy Strategy (2014)
Priorities		Creation of a competitive operating environment for bioeconomy growth, new business opportunities (generated by means of risk financing, bold experiments and the crossing of sectoral boundaries), strong bioeconomy competence base (upgraded by: developing education, training and research), Accessibility and sustainability of biomass (secured by: well-functioning raw material markets, proper management and use of biomass). Sectors: food industry, wood products industry, pulp and paper industry, chemical industry, pharmaceutical industry, bioenergy.
Document name		Strategic Programme for the Forest Sector 2011 - 2015 (2011)
Priorities		The priorities of the Programme are wood construction, wood industry growth and competitiveness and new business in forest bioeconomy (new fibre materials, manufactured wood products, composites, chemically processed wood products and energy from wood biomass). In addition, efforts are made to promote the operational conditions and exports in the sector by lobbying on the EU level and internationally.
Other documents	x	
Websources	√	
Title		Innovation
Source		Ministry of Employment and the Economy
Link		http://www.tem.fi/en/innovations

France (1)

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
(√)	x	x	x	√	√	x	x	√	x

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture + forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
√	√	√	√	√	√	√	x	x	√	√	x

Task 42 Biorefining

France (2)

1. No BioEconomy strategies, but the Government, Industry and Research Institutes are pointing towards the BioEconomy as a strategy to address Climate Change.
2. Bioenergy (in particular second generation biofuels) has an equal position to other sectors.
3. R&D and knowledge transfer will boost technological and economic development of an economy based on renewable resources. The main topics are agriculture and forests, green chemistry, transitioning to second-generation biofuels.
4. No measurable targets.
5. Share of bioenergy in gross final consumption in 2012 (14.6% in electricity, 1.1% in heating, 6.6% in transport).
Most biomass currently used in bioenergy production.

France (3)

Task 42 Biorefining

Scope of strategies *	✓	Description of scope considered
Bioeconomy (BE)	✓	National
Biobased economy (BBE)	✓	National
Biobased industries (BBI)	x	
Bioenergy (BEN)	x	
National strategies **	x	Description of documents
Other documents ***	✓	
Document name		Les usages non alimentaires de la biomasse (2012)
Priorities		sustainable production of food, biomass (agriculture and forests), green chemistry, biofuels (transitioning to second-generation)
Document name		La bioéconomie. Dossiers du CRDD (2012)
Priorities		List of reference documents on the bioeconomy
Websources	✓	
Title		Seminar on bioeconomy
Source		National Research Institute in Agriculture (INRA)
Link		http://www.inra.fr/Entreprises-Monde-agricole/Resultats-innovation-transfert/Tous-les-dossiers/Rendez-vous-professionnels-du-SIA-2013/SIA-2013-Rencontre-bioeconomie/%28key%29/12
Title		Symposium - L'économie verte au service de la croissance: des enjeux, des solutions
Source		Ministry of Agriculture - General Council of Agriculture, Food and Rural Areas (CGAAER)
Link		http://agriculture.gouv.fr/L-economie-verte-au-service-de-la

Germany (1)

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
√	√	√	√	√	X	X	X	√	X

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture + forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
√	√	√	√	√	√	√	√	X	√	√	√

Task 42 Biorefining

Germany (2)

1. Germany has two national BioEconomy strategies – a research strategy focusing on research funding, research infrastructure and international cooperation, and a policy strategy focusing on policy advice, markets, industrial implementation, and the dialogue with society.
2. The position of bioenergy is generally seen as energy storage medium in the concert of renewable energy.
3. Strategies consider sustainability aspects on a global scale due to high share of biomass imports.
Several Federal States have established BioEconomy Clusters to improve regional collaboration among research and industrial sectors.
4. No measurable targets defined yet
5. Share of bioenergy ~8.2% of total energy consumed, mainly for decentral heat production, biofuels ~5.7% of total fuels consumed.
Animal feed production dominates inland total (agro + forest) biomass consumption with about 58%, followed by food production with 15%, material use with 14%, and bioenergy with 13% (nova 2012).

Germany (3)

Task 42 Biorefining

Scope of strategies	√	Description of scope considered (national, regional, name of industry sectors)
Bioeconomy (BE)	√	National
Biobased economy (BBE)		
Biobased industries (BBI)	x	
Bioenergy (BEN)	√	
National strategies	√	Description of documents
Document name		National Research strategy Bioeconomy 2030 (2010)
Priorities		Focus on research funding, research infrastructure and international cooperation
Document name		National policy strategy bioeconomy (2014)
Priorities		Focus on research, policy advice, markets, industrial implementation and the dialogue with society
Document name		Positions and Strategies of the German Bioeconomy Council (2014)
Priorities		10 recommendations to foster the development of the bioeconomy
Document name		Nationaler Biomasseaktionsplan für Deutschland (2010)
Priorities		Measures to increase bioenergy production
Document name		Aktionsplan der Bundesregierung zur stofflichen Nutzung nachwachsender Rohstoffe (2009)
Priorities		Overall concept for a significant and constantly increasing share and efficiency of biomass use in the supply with primary resources in DE
Other documents	x	
Websources	√	
Title		Bioeconomy Council Germany
Owner		Bioeconomy Council
Link		http://www.biooekonomierat.de
Title		Bioeconomy Cluster
Owner		BioEconomy e.V.
Link		http://www.bioeconomy.de/
Title		Fachagentur Nachwachsende Rohstoffe
Owner		FNR-central coordinating institution for research, development and demonstration projects in the field of renewable resources
Link		www.fnr.de/en

Ireland

No response received within the survey

Italy (1)

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
X	√	X	X	X	√	√	√	X	X

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture + forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
√	X	√	X	X	√	X	X	X	√	√	√

Task 42 Biorefining

Italy (2)

1. No national BioEconomy strategy, but the BioEconomy is considered important in other national and industry strategies, with focus on bioenergy and chemical industry.
2. Bioenergy is a priority, in particular biogas/biomethane, heat from woody biomass and liquid biofuels of second and third generation.
3. Chemical industry is a dominant sector of Italian economy. R&D, policy measures and industrial activities concentrate on bioproduct (mainly bioplastics) and biofuel-driven biorefineries (2nd generation cellulosic ethanol); Italian Green Chemistry Cluster with focus on agroenergy, biofuel, green biotech.
4. No measurable targets.
5. Share of bioenergy for heat and electricity is ~7,5% of total energy consumed; biofuels ~6 % of total fuels consumption, high share of overall energy imports (~80%).
Consumption of solid biomass (wood, chips, pellets) for energy (mainly heat) ~20 MTons / year. Despite the extensive forest area (about 10,5 million hectares), Italy is one of the world's largest biomass importers.

Task 42 Biorefining

Italy (3)

Scope of strategies	✓	Description of scope considered (national, regional, name of industry sectors)
Bioeconomy (BE)	✗	BE only as part of larger green economy strategy (no detailed integrated BE strategy so far)
Biobased economy (BBE)	✓	Biorefineries (chemical industry)
Biobased industries (BBI)	✓	Biotechnology industry, Chemical industries
Bioenergy (BEN)	✓	National
National strategies	✗	Description of documents
Document name		La Roadmap per la green economy in Italia - A Green new deal for Italy (2013)
Priorities		10 point program with a general view of a green economy, no specific biomass related strategy
Document name		Piano di Settore per le Bioenergie - The Bioenergy sector Plan (2014)
Priorities		Measures to enhance sustainable bioenergy and green chemicals in the more general framework of the multifunctionality of agriculture
Document name		The Decree on Biorefineries (2013)
Priorities		Simplifying procedures for the authorization of biorefineries in order to promote their implementation in Italy. The standard biorefineries want to steer towards the production of next-generation biofuels - but not giving prominence to other bioproducts such as bioplastics and bio-lubricants.
Document name		Italian National Renewable Energy Action Plan + document with additional information (2010)
Priorities		Plan has specific measures for the promotion of the use of energy from biomass, biogas, biliquid and biofuels, also considering potential conflicts with food products and wood products for industrial use
Other documents	✓	
Document name		Il manifesto della chimica verde - The green chemistry manifest (2014)
Priorities		5 point statement of the chemical industry calling for biorefineries, biobased sustainable products and a green chemistry roadmap
Document name		Italian Biotechnology report (2014)
Priorities		The report covers red (health sector), green (agricultural sector) and white (industry sector) biotechnology.
Document name		Goals of Bioenergy in Italy - Key elements for 2020 objectives (2009)
Priorities		The leitmotiv of the Report is to assess, using original research instruments, whether national objectives are congruent with European directives and with the sector's potential in Italy, and to examine the gap between current situation and the objectives for the next decade, suggesting which political and technical tools may be adopted to fill the gap.
Websources	✓	see report
Title		Italian Green Chemistry Cluster
Owner		Italbiotec (association of industry and research)
Link		http://www.italbiotec.it/index.php/en/component/k2/item/135-cluster-lombardo-della-chimica-verde
Title		Il Progetto Biomasse (The Biomass Project) - Italian
Owner		ENAMA (Ente Nazionale per la Meccanizzazione Agricola) - Ministry Agriculture
Link		http://www.progettobiomasse.it/it/progetto.php
Title		Goals of Bioenergy in Italy - English
Owner		Itabia - Italian Biomass Association
Link		http://www.itabia.it/pdf/rapporto2008eng.pdf
Title		Le bioraffinerie per l'agricoltura e l'agroindustria (Biorefineries for the agriculture and agro-industry) - Italian
Owner		CRA-RPS
Link		http://rps.entecra.it/page_56
Title		Bioplastics: an italian case study of bioeconomy in italy - English
Owner		Kyoto Club
Link		http://www.kyotoclub.org/docs/Bruxelles_060313_Bioplastics_Bastioli.pdf
Title		Integrated Biorefineries
Owner		National Technology Cluster of "Green Chemistry (SPRING) - English
Link		http://www.clusterspring.it/strategia-en/bioraffinerie-en/
Title		Italy's National Energy Strategy: For a more competitive and sustainable energy
Owner		Ministry of Economic Development
Link		http://www.sviluppoeconomico.gov.it/images/stories/documenti/SEN_EN_marzo2013.pdf

Japan (1)

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
√	√	√	√	x	√	√	√	x	x

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture + forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
√	x	√	√	√	√	√	√	x	√	x	x

Japan (2)

1. Biomass Industrialization strategy (2012) and Biomass Utilization Promotion Plan (2010) stipulate basic policy outline on biomass ‘utilization’; Strategy Energy Plan (Apr. 2014) stipulates basic policy outline on ‘energy’ as a whole, including bioenergy together with other renewable bases.
2. Position of bioenergy: energetic use of biomass will be a priority, mainly as woody biomass in distributed energy systems for heat and power as well as for next-generation liquid and gaseous biofuels, with R&D focus in the light of avoidance of food conflicts.
3. Japan has a strong focus on red and white biotechnology in the pharmaceutical and chemical industries. Japan Bioindustry association and regional biotech clusters have been founded to support these developments.
4. Some overall targets, e.g. number of “biomass towns” where biomass is efficiently used in recycling systems (goal 600)
5. Share of bioenergy 2.1% of total energy consumed (apx.2/3 for decentral power generation), biofuels 0.6% of total fuels consumed, high share of overall energy imports (~94%)
Total balance of material and energy use of biomass currently not available

Task 42 Biorefining

Japan (3)

Scope of strategies	√	Description of scope considered (national, regional, name of industry sectors)
Bioeconomy (BE)	x	
Biobased economy (BBE)	√	
Biobased industries (BBI)	√	
Bioenergy (BEN)	√	National
National strategies	√	Description of documents
Document name		The Biomass Industrialization Strategy (2012)
Priorities		Specifying the targeted conversion technologies and biomass for realizing biomass industrialization; setting principles and policies for realizing biomass industrialization
Document name		The National Plan for the Promotion of Biomass Utilization (2010)
Priorities		Setting targets for 2020; setting basic policies on the development of technologies for biomass utilization
Document name		4th Strategic Energy plan (2014)
Priorities		In relation to biomass for energy, the focus is on woody biomass in distributed energy systems and next generation biofuels (fermentation, gasification of biomass and residues/urban biomass)
Other documents	√	
Document name		Biomass Policies and Assistance Measures in Japan (within The Guidebook for Promoting Biomass Town Concept) (2013)
Priorities		Summary of biomass policies within the "Biomass Town" initiative (planning document for comprehensive biomass utilization system)
Document name		Strategic development of next-generation bioenergy utilization technologies (2013)
Priorities		R&D plan for Next-generation Technology Development (BTL, Biofuels from algae) and Commercialization Technology Development (biomethane by fermentation and gasification)
Document name		Development of an Innovative and Comprehensive Production System for Cellulosic Bioethanol (2012)
Priorities		R&D plan for Integrated System for Low-cost Cellulosic Bioethanol Production from Energy Crop Cultivation
Document name		Country Report Biomass Gasification –2010-2012 in Japan (2012)
Priorities		Biomass potentials and perspectives of biomass gasification technology in Japan
Websources	√	
		Biomass Town (planning document for comprehensive biomass utilization system)
		MAFF - Ministry of Agriculture, Forestry and Fisheries http://www.maff.go.jp/e/biomass.html
Title		NEDO - New Energy and Industrial Technology Development Organization
Owner		NEDO
Link		http://www.nedo.go.jp/english/
Title		The Society of Biotechnology Japan
Owner		The Society of Biotechnology Japan
Link		http://www.sbj.or.jp/e/
Title		Japan Bioindustry association
Owner		Non-profit organization dedicated to the promotion of bioscience, biotechnology and bioindustry.
Link		http://www.iba.or.jp/pc/en/
Title		BioBridge Kansai
Owner		Kansai Bio Cluster by pharmaceutical and biotechnology-related companies and research institutes across the region Kansai
Link		http://www.biobridge-kansai.com/about/kansai.php

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
√	x	x	√	x	√	x	x	√	x

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture + forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
√	x	√	x	x	√	√	√	√	√	√	x

Task 42 Biorefining

The Netherlands (2)

1. NL has a strategy on BioBased Economy, key aim is sustainable biomass valorization (“value pyramid”) - prioritize on biomaterials and use residues for biofuels, electricity and heat - concept of ‘co-production’ with biorefineries as key technology.
2. Bioenergy has an equal position to other sectors and will remain important for the European 2020 objectives.
3. Strategy aims to further develop NL’s strong knowledge position in biotechnology, food-chemistry, agrofood and chemistry by a number of public-private joint ventures: TKI-BBE and funded research.
4. Measurable targets defined: “Knowledge position” (indicating the investments and funding into R&D of BBE), “number of projects related to BBE”, “amount of biomass into BBE”, “BBE market development in NL and worldwide”, “value added from BBE”.
5. Share of bioenergy ~3.7% of total energy consumed, biofuels ~4.5% of total fuels consumed.
NL is world’s second largest exporter of agricultural and food products, however, it also imports large quantities of biobased resources (feed/biomass etc.); within the Biobased Economy (excl. food+feed) bioenergy dominates (46% of biomass consumption), followed by the P&P and the chemical industry (each 21%), and timber industry (12%).

Task 42 Biorefining

Scope of strategies	√	Description of scope considered (national, regional, name of industry sectors)
Bioeconomy (BE)	x	
Biobased economy (BBE)	√	National
Biobased industries (BBI)	x	
Bioenergy (BEN)	x	
National strategies	√	Description of documents
Document name		Framework memorandum on the Biobased Economy (2012)
Priorities		Sustainable biomass supply, chemical industry, energy supply, agro-food sector, logistics, horticulture, life sciences
Document name		De Overheidsvisie op de bio-based economy in de energietransitie (2007)
Priorities		
Other documents	√	
Document name		Strategy for a green society - Biomaterials as a driver for the biobased economy (2013)
Priorities		Long-term expertise required for the transition to a sustainable biobased economy
Document name		Getting to the core of the bio-economy: A perspective on the sustainable promise of biomass (2011)
Priorities		Policy advice on the development of the biobased economy in the Netherlands
Document name		Protocol for Monitoring of Material Streams in the Biobased Economy (2013)
Priorities		Development of a monitoring method in relation to the raw material (biomass) streams into BBE and their development over time
Document name		Market Developments of and Opportunities for bio-based products and chemicals (2013)
Priorities		Market analysis and trends for biobased products
Document name		Study on investment climate in biobased industries in the Netherlands (2014)
Priorities		Strengths and weaknesses of the Netherlands as a location for bio-based economy, analysis of investment barriers
Document name		Monitoring biobased economy in Nederland 2013 (2014)
Priorities		Monitoring results 2013 for biomass streams into BBE, project and investments in BBE R&D projects, BBE market development in NL and international, value added tax by BBE
Websites	√	
Title		Biobased Economy
Link		www.biobasedeconomy.nl
Title		TKI-BBE
Link		http://www.tki-bbe.nl/downloads/tki-bbe.html

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
X	√	X	√	X	X	√	X	√	X

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture + forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
√	√	√	√	√	X	X	X	X	√	X	X

1. No national BioEconomy strategy, but the government sees the BioEconomy as a key driver for future economic growth; strategies in relation to biomass use exist for the energy sector.
2. Bioenergy has an equal position to other sectors
3. R&D focused on biotechnology for increasing primary production, nutrition science and niche areas of health and industry, and on biochemical and thermochemical biomass conversion for “drop-in” biofuel production; low industrial activity in developing biorefineries.
4. No measurable targets defined.
5. Share of bioenergy ~9.8% of total energy consumed, biofuels ~0.1% of total fuels consumed.

Total balance of material and energy use of biomass currently not available, important economic sectors are agriculture+forestry, food, wood processing, P&P with high share of exported bioproducts (70% of total exports).

Task 42 Biorefining

Scope of strategies	√	Description of scope considered (national, regional, name of industry sectors)
Bioeconomy (BE)	x	
Biobased economy (BBE)	x	
Biobased industries (BBI)	√	National (currently at the stage of blueprint / proposal, not yet strategy)
Bioenergy (BEN)	√	National
National strategies	x	Description of documents
Other documents	√	
Document name		New Zealand Bioenergy Strategy (2010)
Priorities		Focus on wood fuel, biodiesel, bioethanol, biogas and bio-oil; research on wood-to-energy conversion technologies
Document name		Driving economic growth through biobased industries - summit report (2009)
Priorities		Recommendations to build a bioeconomy in NZ
Document name		Bioenergy Options for New Zealand (2007)
Priorities		Forest biomass for heat, power and biofuels
Websites	√	
Title		NZBIO
Owner		NZBIO - member-based organisation focused on growing New Zealand's bioeconomy
Link		http://www.nzbio.org.nz/page/home.aspx
Title		Bioenergy Association of New Zealand
Owner		Bioenergy Association of New Zealand
Link		www.bioenergy.org.nz/

Norway (1)

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
(v)	x	x	v	v	x	v	x	v	x

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture + forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
v	v	v	v	v	v	x	v	x	v	v	v

Task 42 Biorefining

Norway (2)

1. No national BioEconomy strategy, however, there is a research program which identifies priority thematic areas, such as: land use, agriculture and forestry, food, biomass, new bio-based products.
2. Bioenergy is not a priority, but there is considerable interest in the development of biomass district heating plants, pellet stoves in private households; development of efficient logistics and supply chains for forest and wood waste based fuel.
3. R&D will generate knowledge on wood-based industries and bioenergy (based on raw materials from forestry and agriculture as well as on waste from other industries and households).
4. No measurable targets.
5. Bioenergy constitutes 6% of the domestic consumption, electricity 49%, and fossil fuels 45% (year 2011).
The current use of biomass is for the wood processing industry, pulp and paper, bioenergy.

Norway (3)

Task 42 Biorefining

Scope of strategies	✓	Description of scope considered
Bioeconomy (BE)	(✓)	National Research programme (no strategy)
Biobased economy (BBE)	✗	
Biobased industries (BBI)	✓	knowledge-building in management of land use, primary production and processing (wood-based industrial development)
Bioenergy (BEN)	✓	Logistics and supply chains for forestry biomass, district heating, wood-based fuels
National strategies	✓	Description of documents
Document name		Research Programme on Sustainable Innovation in Food and Bio-based Industries "BIONÆR" (2012 -2022) (2012)
Priorities		Thematic priority areas: land use, agriculture and forestry, food, wood, new bio-based product, biomass, services.
Document name		Research Programme on Nature-based Industry 2008 – 2013 (2008)
Priorities		Knowledge in: industrial policy (trade policy, coastal and land-use policy, and associated public policy instruments, etc.); forestry, wood-based industries and bioenergy (based on raw materials from forestry and agriculture as well as on waste from other industries and households); new land, coastal and <i>nature-based</i> industrial development (innovation, diversity and competitiveness in the value chains).
Document name		Strategi for økt utbygging av bioenergi (Strategy for Increased Expansion of Bioenergy) (2008)
Priorities		Development of efficient logistics and supply chains for forest and wood waste based fuel. Bioenergy production must be performed in accordance with sustainability requirements, naming for example the Norwegian "Living Forests" standard.
Other documents	✓	
Document name		Bioenergi i Norge - Rapport (Bioenergy in Norway - Report) (2014)
Priorities		Analysis of costs and theoretical and realistic resource potential of forest resources, industrial waste, biomass, biogas, biomass and other raw materials.
Websources	✓	
Title		Bioeconomy
Source		Industrial Biotech Network - Norway
Link		http://www.indbiotech.no/search/node/bioeconomy
Title		Nordic Bioeconomy Initiative
Source		The Nordic Joint Committee for Agriculture and Food Research
Link		http://nki.nordforsk.org/copy2_of_NBIstrategydocENG.pdf
Title		The new National Strategy for Bioenergy
Source		The research Council of Norway
Link		http://www.forskningsradet.no/en/Newsarticle/New_national_strategy_for_bioenergy/1236685401743

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
√	x	x	x	√	x	√	x	√	x

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture +forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
√	√	√	x	x	√	√	√	x	√	√	x

1. There is a national BioEconomy strategy.
2. Position of bioenergy equal to other sectors. An integrated biorefinery concept for the co-production of food and non-food (feed, chemicals, materials and energy) to facilitate the transition from fossil resources to renewable bioresources.
3. Strategy-focus: agriculture (food security, job creation); health (phytomedicines and biopharmaceuticals); industry (biorefinery, biobased chemicals, biomaterials and bioenergy).
4. No measurable targets.
5. Comprehensive data on bioenergy not available, however, the Biofuels Industrial Strategy (2007) established that the blending ratio for South Africa is 2% biodiesel (B2) and 8% Bioethanol (E8) blend.
Most of the biomass is produced for the food and feed industry, alternative uses of this resource can be considered only if they can strengthen the food sector.

Task 42 Biorefining

Scope of strategies	√	Description of scope considered
Bioeconomy (BE)	√	National
Biobased economy (BBE)	x	
Biobased industries (BBI)	√	National - Pulp + Paper, pharmaceuticals, food, fuels, textiles, plastics and other materials
Bioenergy (BEN)	√	National - Biomass feedstocks and supply (biodiesel, bio-ethanol, biobutanol, biogas)
National strategies	√	Description of documents
Document name		The Bio-Economy Strategy (2013)
Priorities		Sustainability, Health, Trade, Agriculture and Forestry, Industry, Policy, Research
Document name		A National Biotechnology Strategy for South Africa (2001)
Priorities		health, nutrition, jobs, environment.
Document name		Biofuels Industrial Strategy of the Republic of South Africa (2007)
Priorities		Biofuels industry development through government policy regulations and incentives, feedstock production in under utilised rural area, job creation and rural development by creating sustainable income-earning opportunities
Other documents	x	
Websources	√	
Title		The bioeconomy strategy
Source		South Africa Government
Link		http://www.gov.za/speeches/view.php?sid=42968
Title		Biochemistry
Source		University of Johannesburg
Link		http://www.uj.ac.za/EN/Faculties/science/departments/biochemistry/Pages/default.aspx
Title		Forestry and Wood
Source		http://thewoodfoundation.co.za/
Link		The wood Foundation
Title		Pulp and Paper manufacturers
Source		Forestry South Africa
Link		http://www.forestry.co.za/forestry-business-directory-pulp-and-paper-manufacturers/

Sweden (1)

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
√	√	√	x	√	x	x	x	√	x

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture + forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
√	√	√	√	√	√	x	√	x	√	√	x

Task 42 Biorefining

Sweden (2)

1. The Proposal for a National BioEconomy strategy has the aim to replace fossil-based raw materials with bio-based raw materials (accelerating development, verification and commercialisation of new bio-based products other than fuels and energy). Forest Industry strategy (research, development and demonstration on new materials and products: wood products, paper and pulp, bioenergy).
2. Bioenergy (relevant is heating from solid biomass) has equal position to other sectors. The strategy fosters a sustainable production of biomass to enable increased use within an increased number of different competitive users.
3. Strategy-focus on R&D (for smarter products and smarter use of raw materials) and market transition (support to small and medium-sized enterprises for the commercialization of new technologies; change in consumption habits and attitudes).
4. No measurable targets.
5. Share of bioenergy in gross final consumption in 2012 (7% in electricity, 57% in heating, 9% in transport).
Increasing use of biomass within a number of different sectors beside the bioenergy sector.

Sweden (3)

Task 42 Biorefining

Scope of strategies		Description of scope considered
Bioeconomy (BE)	√	National
Biobased economy (BBE)	√	National - biorefineries
Biobased industries (BBI)	√	Forest Industry
Bioenergy (BEN)	x	
National strategies		Description of documents
Document name	√	Swedish Research and Innovation Strategy for a Bio-based Economy (2012)
Priorities		Change in consumption habits and attitudes; Prioritisation and choice of measures; Stimulating cross-industry collaboration in research and development; Stimulating the growth of strong research and innovation environments; Accelerating development, verification and commercialisation of new bio-based solutions other than fuels and energy technology solutions; Offering support to small and medium-sized enterprises for the commercialisation of new technologies
Other documents		
Document name	√	Swedish Forest Industries Federation Sustainability Report 2012. The forest industry - The driver for a sustainable bioeconomy (2012)
Priorities		Increased growth in the forests (the increasing of the standing stock of timber is vital to safeguard biodiversity). Increased resources for research, development and demonstration (new materials and product need to be developed). Maximized value creation (By using the wood raw material where it generates the greatest added value at every stage, i.e. cascading use of wood: wood products, paper and pulp, bioenergy)

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
(√)	X	X	X	√	X	X	X	√	X

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture + forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
√	√	√	√	√	X	X	√	(√)	√	√	X

Switzerland (2)

1. There is a national Action Plan for the Green Economy. The Plan intends to conserve natural resources, make consumption more environmentally friendly, and strengthen the circular economy.
2. Bioenergy is not a priority. The Strategy for energy use of biomass in Switzerland (2010) states that the exploitation of biomass for energy should be planned to avoid conflicts with other uses (food, building materials, etc.).
3. The transition to a sustainable and resource-efficient economy is an on-going, long-term, process that should take shape through dialogue with economic actors, the scientific community and civil society.
4. No measurable targets.
5. In 2010, bioenergy accounted for about 25% of the final consumption of renewable energy and >4% of total energy consumption.
Current biomass use is for food and feed industry, building materials, energy.

Task 42 Biorefining

Scope of strategies	√	Description of scope considered (national, regional, name of industry sectors)
Bioeconomy (BE)	(√)	National (green economy, no explicit bioeconomy strategy)
Biobased economy (BBE)	x	
Biobased industries (BBI)	x	
Bioenergy (BEN)	√	Biomass feedstocks and supply
National strategies	√	Description of documents
Document name		Green Economy: Report and Action Plan (2013)
Priorities		Consumption and production, Wastes and raw materials, Cross-cutting instruments, Targets, monitoring, information, reporting
Document name		Strategy for energy uses of biomass in Switzerland (2010)
Priorities		Max substitution of non-renewable energy sources; sustainable implementation of the energy produced by indigenous biomass; Cascading use of biomass for saving resources ensuring optimal value resulting primarily for food products, building materials, etc.
Other documents	x	
Websources	√	
Title		Green economy
Source		FOEN - Federal Office for the Environment
Link		http://www.bafu.admin.ch/wirtschaft/11350/index.html?lang=en
Title		Revision of the Environmental Protection Act (EPA)
Source		FOEN - Federal Office for the Environment
Link		http://www.bafu.admin.ch/dokumentation/medieninformation/00962/index.html?lang=en&msg-id=47945
Vision	√	The transition to a sustainable and resource-efficient economy is an on-going, long-term process that should take shape through dialogue with economic actors, the scientific community and civil society.
Targets	√	
General target	√	Improving resource efficiency and reducing resource consumption to naturally sustainable levels is a long term target and specific milestones should be set at regular intervals (e.g. every eight years). The milestones will be accompanied by appropriate measures so that they can be achieved. The goals should be scientifically sound and harmonised with international goals (e.g. the sustainable development goals and the UN's Post-2015 Development Agenda).
Measurable targets / indicators	x	The achievement of the goal and thus the progress made in transitioning to a green economy will need to be regularly monitored. If monitoring of results indicates that additional action is required, new measures will be proposed and their environmental and economic impacts will be specified.
		At the end of each legislature (2015, 2019, etc.), a report will be submitted to the Federal Council to inform it of progress in the Green Economy Action Plan and on the path toward the green economy.

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
(√)	√	x	√	x	√	√	x	√	x

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture + forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
√	√	√	x	√	√	√	x	x	√	√	√

United Kingdom (2)

1. No national BioEconomy strategies, however, the Government has activated synergies between industry and research to develop the sector. A bioeconomy road map has been announced for 1st quarter 2015.
2. The position of bioenergy is not a priority in the BioEconomy. The Government believes that food production must remain the primary goal of agriculture and the production of biomass for bioenergy must not undermine food security, in the UK or internationally.
3. Policy-makers with the support of the research bodies are analyzing the market opportunities of bio-based products. Targeted surveys have identified different sectors of interest: fibre-based materials, bioplastics and other biopolymers, biosolvents, biolubricants, chemical building blocks, etc.
4. No measurable targets.
5. The share of bioenergy in overall consumption (2012) is: electricity from solid biomass and biogas (about 4%), biofuels (about 3.4%) heating and cooling from solid biomass and biogas (about 1.8%).
Most of the biomass is used in the food-feed and wood industry. There is also a strong interest in the exploitation of bio-waste as a resource with multiple uses in the BioEconomy.

United Kingdom (3)

Task 42 Biorefining

Scope of strategies	√	Description of scope considered
Bioeconomy (BE)	x	
Biobased economy (BBE)	√	Waste based bioeconomy
Biobased industries (BBI)	√	Green chemistry
Bioenergy (BEN)	√	Biomass feedstocks and supply
National strategies	√	Description of documents
Document name		UK Bioenergy Strategy (2012)
Priorities		Use of biomass resource in process heating, and in the transport sector, either through bioenergy hydrogen production with CCS (Carbon capture and storage) or through biofuels for aviation and shipping if CCS is not available
Other documents	√	
Document name		Waste or resource? Stimulating a bioeconomy (2014)
Priorities		The waste management should be in accordance with a 'waste hierarchy' which prioritises waste prevention, followed by re-use, recycling, recovery and disposal. A waste based bioeconomy could deliver substantial economic returns and support a considerable number of jobs, for example, in the biotechnology or green chemistry sectors in order to obtain high-value products (chemicals, polymers, bio-materials and bio-fuels)
Document name		Maximising UK Opportunities from Industrial Biotechnology in a Low Carbon Economy - A report to Government by the Industrial Biotechnology Innovation and Growth Team (2009)
Priorities		The UK chemical industry and learned institutions are working together to promote sustainable chemistry
Websites	√	
Title		Bio-pharmaceutical
Source		Ministerial Industry Strategy Group (MISG)
Link		https://www.gov.uk/government/groups/ministerial-industry-strategy-group
Title		Stimulating U.K. innovation
Source		Technology Strategy Board
Link		https://www.innovateuk.org/
Title		Integrated Biorefineries
Source		BBSRC
Link		http://www.bbsrc.ac.uk/business/collaborative-research/industry-clubs/ibti/ibti-index.aspx
Title		Industrial biotechnology
Source		BIS- Department for Business Innovation & Skills
Link		http://webarchive.nationalarchives.gov.uk/20090609003228/http://www.berr.gov.uk/whatwedo/sectors/chemicals/ibigt/page44395.html
Title		Biobased product
Source		NNFCC (National Non-Food Crops Center)
Link		http://www.nnfcc.co.uk/bio-based-products

Assessed strategies				Scope of Strategies			Position of bioenergy in a bioeconomy		
Governmental BioEconomy strategies	Industry strategies	Regional strategies	Policy advice by research, consulting	Bio-economy	Biobased economy	Biobased industries	Priority	Equal to other sectors	Less importance
(√)	x	x	√	√	x	x	√	x	x

Economic sectors in the focus of strategies							Vision and targets		Current focus of implementation		
Agriculture + forestry	Food	Energy	Pulp + paper	Wood-processing	Chemical industry	Medical industry	Vision and general target	Measurable targets	R&D	Transition to market	Policies
√	x	√	x	x	√	√	√	√	√	√	x

United States (2)

Task 42 Biorefining

1. No national BioEconomy strategy, however high-level (White House) paper on strategic objectives for BioEconomy, aimed at fostering all biology-based businesses.
2. Bioenergy has a priority (U.S. produce about 46% of world biofuel supply = 60% of bioethanol), technology development of cellulosic ethanol is already advanced, cost reduction / market transition is now one of the priorities
3. Focus of R&D programs on bioenergy and chemical sector – key technology are integrated biorefineries for cellulosic ethanol, drop-in biofuels and biobased-materials.
4. An extensive list of measurable targets available: 16 main indicators (4 input, 4 investment and 8 output-related indicators)
5. Share of bioenergy ~4% of total energy consumed, about 42% of energetic biomass is corn, soybeans for biofuels (~7.1% of total fuels consumed) and 57% is wood+bio-wastes for biopower and heat.
Total balance of material and energy use of biomass currently not available.

Task 42 Biorefining

Scope of strategies	√	Description of scope considered (national, regional, name of industry sectors)
Bioeconomy (BE)	√	National (currently at the stage of blueprint / proposal, not yet strategy)
Biobased economy (BBE)	x	
Biobased industries (BBI)	x	
Bioenergy (BEN)	x	
National strategies	x	Description of documents
Other documents	√	
Document name		National Blueprint Bioeconomy (2012)
Priorities		5 strategic objectives: support R&D investments, transition from research to market, improve regulatory processes, train workforce, develop PPP
Document name		Opportunities for Expanding the Bioeconomy (2014)
Priorities		View of 'bioeconomy' by U.S. biomass research and development board
Document name		Unleashing the power of bioeconomy (2013)
Priorities		Recommendations for policy and financial innovations
Document name		The Bioeconomy and Agricultural Research (2012)
Priorities		Contributions of The Agricultural Research Service to support a growing bioeconomy.
Document name		Biobased Economy Indicators (2011)
Priorities		Types of information that give the best measures of the condition of the biobased economy. This report contains data gathered in 2008 and reflects the most current information available on biobased economy indicators

Summary

- **BioEconomy is important part of national transition strategies**
10 out of 20 is 50% of countries
- **Top-down national Bio(based) Economy development approach**
17 out of 20 is 85% of countries (15% is bottom-up)
- **Measurable national BioEconomy policy targets**
5 out of 20 is 25% of countries (75% only vision and general target)
- **Energy sector within focus national strategies**
19 out of 20 is 95% of countries (AT is exception)
- **Position BioENergy in BioEconomy**
Priority: 30%, equal: 65%, less important: 5%
- **Current deployment focus**
100% R&D + 70% transition2market + 25% policies

Summary

- **Chemical sector as priority in a future BioEconomy**
9 countries: A, CA, DE, GB, I, FR, JP, NL, US
- **R&D focus on biorefineries as key technology**
10 countries: AU, BR, A, CA, DE, FI, I, JP, NL, US

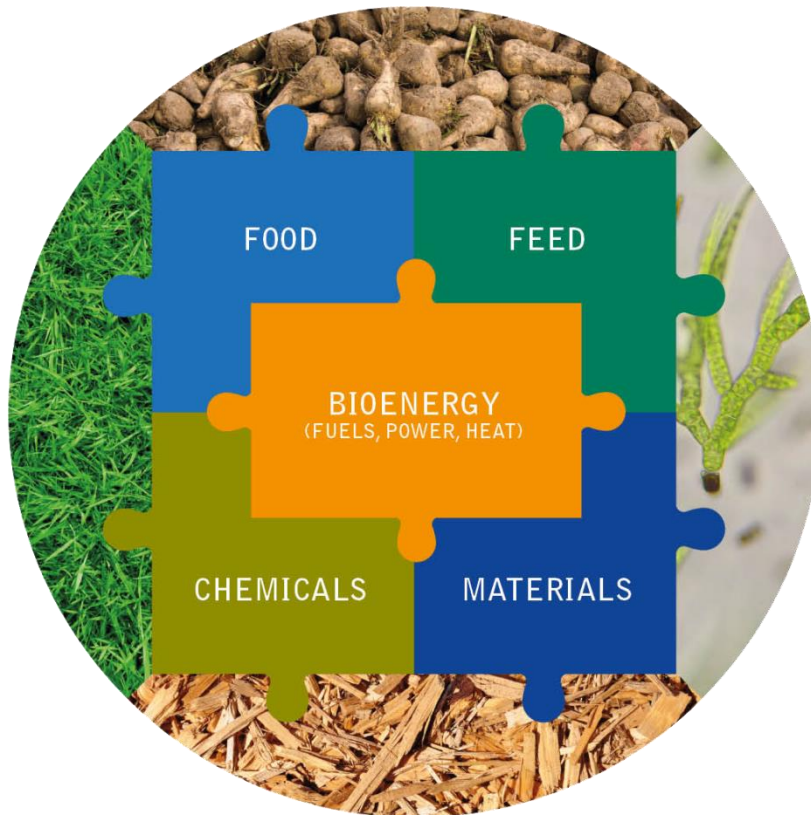
Generic conclusion

Identification and assessment of major Bio(based) Economy Strategies in 20 member countries of the IEA Bioenergy Implementing Agreement has shown that:

- in about half of the countries the Bioeconomy is an important part of national transition strategies
- bio(based) development is almost always a top-down (policy driven) approach
- most countries have a BioEconomy vision and general targets instead of measurable policy targets
- the energy sector is almost always important in national transition strategies, and in most (65%) cases bioenergy has an equal position to other sectors in the BioEconomy
- for market deployment all countries focus on R&D, 70% on transition aspects and 25% on additional policy development
- in about half of the countries the chemical sector is identified as a priority area for the transition to a BioEconomy
- in half of the countries Biorefining is identified as key technology for successful BioEconomy deployment

More info

www.IEA-Bioenergy.Task42-Biorefineries.com



Bioenergy will be the initiator of the transition to and the lubricating oil of the future circular BioEconomy