Bioenergy in the European Context
BioBoost and SECTOR Policy Workshop
Brussels 16-17 June 2015

Paul Verhoef
European Commission
Directorate-General for Research and Innovation
Renewable Energy Sources
Outline

• Bioenergy potential and facts
• EU Energy Policy
• Energy Union
• EU R&I Policy
• Challenges and opportunities for Bioenergy
New realities in the global Energy market

Competitiveness → Energy cost

Impact of the financial crisis
Fall in private investment, tight financing conditions

Shale gas
US oil and gas production

Rising demand → rising prices
By 2030, world economy set to double and energy demand to rise by 1/3

Fukushima
Some countries phase out nuclear power production

NOT LEGALLY BINDING
Bio-energy - an integral part of the low carbon economy...

"We need [...] a resilient energy union with a forward-looking climate change policy"

".. mobilise EUR 300 billion in public and above all private investments over the next three years [...] through the targeted use of the existing structural funds and of the EIB instruments .."

".. we need coordinated investment in infrastructure projects [...] in energy networks .."

"We need a reindustrialisation of Europe"

"Renewable energies and their development is a sine qua non if tomorrow's Europe really is going to create lasting, consistent and sustainable locational advantages which are directly comparable with those of other world players."

"I want the European Union to become the world number one in renewables."

Jean-Claude Juncker,
President-elect of the European Commission
Bioenergy Potential

• Only renewable source that can replace fossil fuels in all energy markets – heat, electricity and fuels for transport

• Could sustainably contribute between 25% and 33% to the future global primary energy supply (up to 250 EJ) in 2050

• Development and deployment interconnected with growing demand for food, feed and fiber in addition to, the emerging bio-based economy

• Competition for land and for raw material with other biomass uses must be carefully managed

• Logistics and infrastructure must be managed

• Further technological innovation needed for more efficient and cleaner conversion of a more diverse range of feedstocks

• Expansion of bioenergy must be sustainable

• Bioenergy must compete with other energy sources and options!!
Role of bioenergy in global energy mix

Source: IEA – 2014
Share of renewables and biomass

Final energy consumption

Supply of biomass

Source: IEA – 2014
Significance of bio – heat!

End use of energy
- Heat: 50%
- Transport: 30%
- Electricity: 20%

End use of bioenergy
- Heat: 92%
- Transport: 5%
- Electricity: 3%

Source: IEA – 2014
Continental distribution of bioenergy

Source: IEA – 2014
Bioenergy in electricity and transport

- **Electricity**
  - Europe: 37%
  - Americas: 33%
  - Asia: 29%
  - Oceania: 1%
  - Africa: 0.2%

- **Transport**
  - Europe: 24%
  - Americas: 70%
  - Asia: 5%
  - Oceania: 1%
  - Africa: 0%

Source: IEA – 2014
Biomass for heating

Derived heat
- Europe: 86%
- Americas: 6%
- Asia: 8%
- Oceania: 0%
- Africa: 0%

Direct heat
- Asia: 51%
- Americas: 13%
- Africa: 28%
- Europe: 7%
- Oceania: 1%

Source: IEA – 2014
EU Energy policy priorities

- Energy security strategy
- Energy efficiency goals
- Renewable energy targets
- Infrastructure renewal and interconnection
- Smart/intelligent networks
- New players with new roles/services/technology
- Focus on needs of users
Competitiveness

Smart infrastructure

Diversified supply

Renewable sources

Competitive markets

Energy efficiency

Security of supply

Sustainability

NOT LEGALLY BINDING
2020 targets and 2030 climate and energy Framework

2020
- 20% GHG
- 20% RES
- 20% EE

10% RES in transport

2030
- 40% GHG
- 27% RES
- 27% EE

No target in transport

New Key Indicators

New governance system

NOT LEGALLY BINDING
"Our commitment to becoming a low-carbon economy also means that we have to step up our efforts in the field of renewables, so that we can honour the promise made by President Juncker when he became Commission President: that the Energy Union should be the world number one in renewables … We now have a unique opportunity to look beyond energy and climate policy and link it up with other areas such as industrial policy, transport, competition, agriculture, foreign, trade and development policy, or research. This is the only way to transcend the so-called contradiction between 'competitiveness' and 'decarbonisation'. There is no such contradiction, we need both at the same time"
ENERGY UNION – VISION
COM(2015) 80 final

- True **solidarity and trust**; speaking with **one voice** in global affairs
- An **integrated** continent-wide energy system
- Sustainable, low-carbon and climate-friendly **economy**
- Strong, innovative and **competitive** European economy
- **Citizens** taking ownership of the energy transition
TOWARDS A EUROPEAN ENERGY UNION
COM(2015) 80 final

- Energy security, solidarity and trust;
- A fully integrated European energy market;
- Energy efficiency contributing to moderation of demand;
- Decarbonising the economy

**Research, Innovation and Competitiveness - Priorities**

- World leader in developing the next generation of renewable energy technologies,
- Participation of consumers
- Efficient energy systems
- Energy systems integration
- A forward-looking approach to carbon capture and storage (CCS) and carbon capture and use (CCU)
- Nuclear energy

*NOT LEGALLY BINDING*
ENERGY UNION PACKAGE – Action points

11. Speed up energy efficiency and decarbonisation in transport
✓ Action to create the right market conditions for alternative fuels deployment

12. Implement a climate and energy framework for 2030
✓ Legislation to achieve the 40% GHG reduction target in ETS and non-ETS sectors

13. Implement EU target of ≥27% for renewable energy by 2030
✓ New Renewable Energy Package including new policy for sustainable biomass and biofuels and legislation to meet cost-effectively the 2030 EU target

14. Develop forward-looking, energy and climate-related R&I strategy
✓ European energy R&I approach: upgraded SET Plan and strategic Transport R&I agenda
✓ Initiative on global technology and innovation leadership on energy and climate to boost jobs and growth

NOT LEGALLY BINDING
Bioenergy - Current situation in Europe

Investments include risks:

- The revision of the Renewable Energy Directive:
  - Capping of 1st generation biofuels due to ILUC (7%)
  - Optional sub-target for advanced biofuels (0,5%)
  - But measures for technology-neutral approach for promotion and expansion of advanced biofuels after 2020

- Post-2020 policy framework under development
  - Currently no sustainability for biomass to heat and power
  - Bioenergy sustainability under the new RES package
  - No specific RES target for the transport sector

- Most technologies still need to overcome "valley of death" including innovative heat and power from biomass

NOT LEGALLY BINDING
Current situation – RTD perspective

- Bioenergy and advanced biofuel investments are progressing
- European production technology is showing to be a critical component of new plants outside Europe
- EU technology providers are very present in these investments
- EU technology base continues to be very strong
- European production capacity planning and investments remain weak
- Regulatory uncertainties are being resolved
- Continued high level of bio-energy proposals under H2020 calls
The SET-Plan: coordinating research and innovation across Europe

The Strategic Energy Technology (SET) Plan is the technology pillar of the EU's energy and climate change policy

  + European Biofuels Technology Platform (EBTP)

- **Towards an Integrated Roadmap**
  updates SET Plan and puts forward key research and innovation actions

- **The Action Plan will** lay down coordinated and/or joint investments by individual Member States, between Member States and with the EU for the implementation of the Integrated Roadmap.

These investments should go beyond grant programmes

*NOT LEGALLY BINDING*
EC support to bioenergy

SET Plan/EIBI Implementation Plan/IR Bioenergy & Biofuels

Financing

H2020 WPs alignment
ERA-NET Plus and Cofund
NER 300/NER 400

New instruments Under discussion e.g., InnovFin

NOT LEGALLY BINDING
Horizon 2020: The new European Union Programme for Research and Innovation in 2014-2020

- An integrated programme coupling research to innovation
- Challenge based
- Strong focus on SMEs
- Major simplification
- EURATOM: same key priorities
Budget: 79 billion € from 2014 to 2020 (in current prices)

- **Industrial Leadership:** EUR 17.0 billion
- **Excellent Science:** EUR 24.4 billion
- **Euratom (2014-2018):** EUR 1.6 billion
- **Societal Challenges:** EUR 29.7 billion
- **European Institute of Innovation and Technology:** EUR 2.7 billion
- **Other:** EUR 3.2 billion

*NOT LEGALLY BINDING*
Budget: 79 billion € from 2014 to 2020 (in current prices)

- **Industrial Leadership**
  - EUR 17.0 billion

- **Excellent Science**
  - EUR 24.4 billion

- **Euratom (2014-2018)**
  - EUR 1.6 billion

- **Societal Challenges**
  - EUR 29.7 billion

- **European Institute of Innovation and Technology**
  - EUR 2.7 billion

- **Other**
  - EUR 3.2 billion

*NOT LEGALLY BINDING*
Growth of EU Framework Programme Funding
Energy Budget in FP7 and Horizon 2020

FP7: 2350 M €

H2020: 5931 M €

Bioenergy
60 projects

~ 373 M€
EU support so far for bioenergy R&I

- Grants for R&D and demonstration projects
  - **FP7**: 373 million for around 60 bioenergy project
    185 million for demonstration projects (55%)
  - **ERA-NET Plus** (EC and EU Member States) for EIBI demonstrations: 70 million for 2 projects (BESTF, BESTF2)
  - **NER-300**: EUR 933 million for 14 Bioenergy projects

*NOT LEGALLY BINDING*
NER300/NER400

- **Allowances** reserved in the new entrants reserve (NER) of ETS for financing commercial CCS and innovative RE demonstration projects

- **EIBI strategy was instrumental** in defining eligibility criteria for bioenergy projects

- **Large scale biofuel and bioenergy demonstration** projects were selected for funding
  - **First call**: 8 bioenergy projects (max NER300 funding: **629 M€**)
    - 2 in gasification for grid and 1 in **pyrolysis** of biomass for CHP applications
  - **Second call**: 6 bioenergy projects (max NER300 funding: **304 M€**)
    - 2 in torrefaction and 1 in **pyrolysis** of biomass for CHP applications

- **NER300 continues as NER400**
Bioenergy and advanced biofuels in Horizon 2020

WP 2014/2015

LCE 1: New knowledge and technologies (TRL 2 – TRL 3-4)

LCE 2: Developing next generation technologies of renewable electricity and heating/cooling (TRL 2 – TRL 3-4)

LCE 11: Developing next generation technologies for biofuels and sustainable alternative fuels (TRL 3-4 – TRL 4-5)

LCE 12: Demonstrating advanced biofuel technologies (TRL 5-6 – TRL 6-7)

LCE 14: Market uptake of existing and emerging sustainable bioenergy (TRL-7-9)

LCE 18: Supporting Joint Actions on demonstration and validation of innovative energy solutions - ERA-NET Cofund
WP 2014/2015

- Grants for R&D, demonstration and market-up take projects
  - ~ 400 million euro available for RES including bioenergy/biofuels
  - ~ 35% of received proposals, ~ 35% of successful proposals and ~ 30% of budget allocated are to biofuels and bioenergy (2014)

WP 2016/2017

- Publication expected in fall 2015
- Grants for R&D, demonstration and market up-take projects; ERA-NETs
  - ~ 400 million euro available for RES including bioenergy/biofuels
- Loans for investments for innovation actions (1st Kind), notably through Risk Sharing Finance Facility (RSFF) – InnovFin
WP 2016/2017

- **InnovFin: a pilot facility for first-of-a-kind demonstration projects**
  - H2020 budget to top-up for projects that can repay a loan, either by the promoter/borrower or through project revenues
  - EC funds will up-take the risks of EIB loans for demonstration projects
  - Today, InnovFin products are demand-driven - No earmarking per sector, first come – first served)
Bioenergy Opportunities and challenges

- The overall outlook for bioenergy and advanced biofuels up to 2050 is promising
- European leadership in bioenergy and advanced biofuels
- EU competitiveness will be linked to:
  - Bioenergy Policy (ILUC and post 2020)
  - Innovation-related policies
  - Biomass availability and cost
  - Financing
  - Sustainability certification
  - Demand-side management
- Technology empowerment needed through R&D&D
- Eventual feedstock constraints must be addressed horizontally
- Commercial availability of bioenergy and advanced biofuels should be enabled through achieving competitiveness

NOT LEGALLY BINDING
Thank you for your attention!