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COMITATO NAZIONALE ITALIANO
For sustainable energy.

CORE-JetFuel

Johannes Michel, FNR

First Annual Workshop of ISAFF
Rome, 4 November 2014

Project Partners

Bauhaus Luftfahrt
Neue Wege.

FNR
Fachagentur Nachwachsende Rohstoffe e.V.

PROJECT COORDINATOR

WIP

ifp Energies nouvelles

SENASA

AIRBUS GROUP

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Background

- CORE-JetFuel: "***Co****ordinating* ***re****search and innovation in the field of sustainable alternative fuels for Aviation*"
  - → *Coordinate initiatives, projects and results/data, helping in building relationships and public-private cooperation*
  - → *Identify needs in research, standardisation, innovation and policy measures at European level*
  - → *Independent mapping and assessment of R&D activities in this field with collection of the lessons learned*

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Background - ACARE

- 75% reduction of CO_2 emissions (relative to 2000)
- 90% reduction of NO_x emissions
- *Technology goals*

ACARE

Advisory Council for Aviation Research and Innovation in Europe

Flightpath 2050
Europe's Vision for Aviation

Strategic Research & Innovation Agenda

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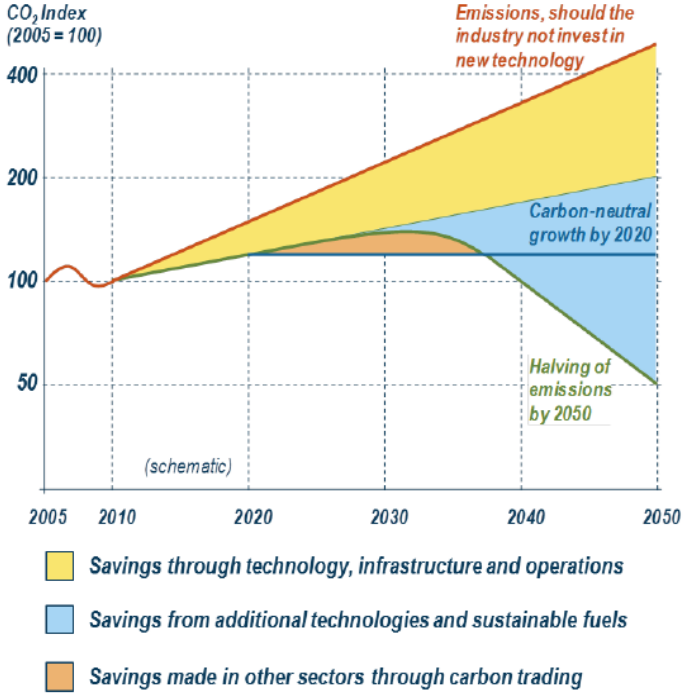
Background - ATAG

- Improve fleet fuel efficiency by 1.5% per year from now until 2020
- Cap net emissions from 2020 through carbon neutral growth
- Halving net aviation carbon emissions by 2050 (relative to 2005)



Description of Work

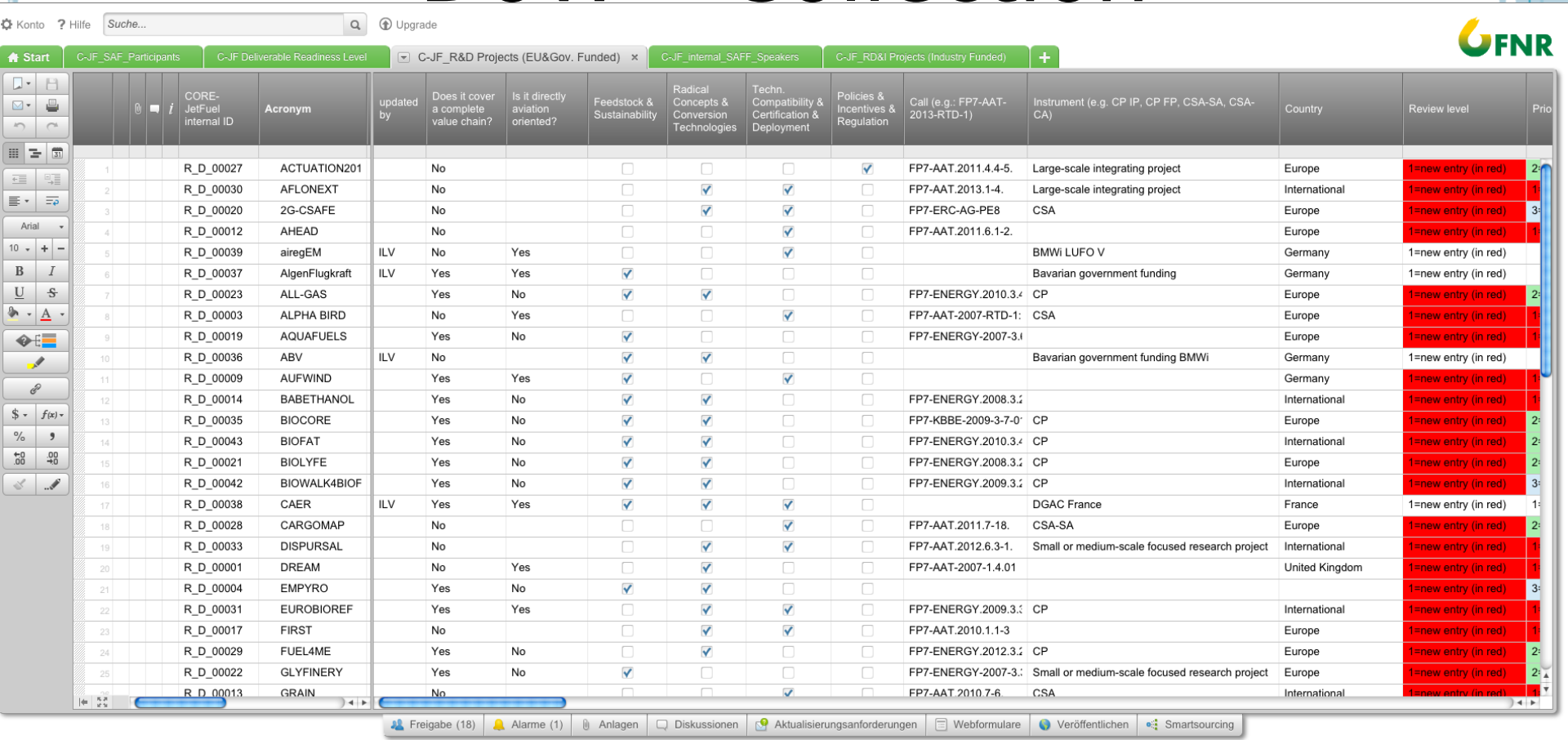
- The project covers the entire fuel production chain of alternative aviation fuels, divided into four thematic domains

1. Feedstock and Sustainability
2. Conversion Technologies and Radical Concepts
3. Technical Compatibility, Certification and Deployment
4. Policies, Incentives and Regulation

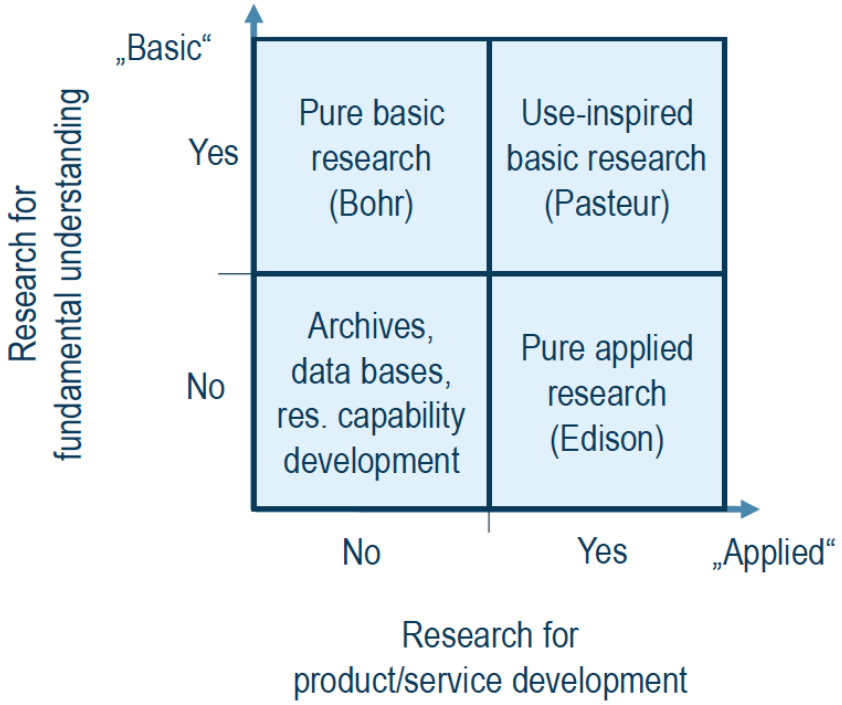
Description of Work

- For each one of the four topics the working methodology consists of:
  - **Collection**: information gathering
  - **Mapping** of data and results from identified projects: organization, classification of information
  - **Analysis/evaluation** of gathered information and mapped projects / technology pathways

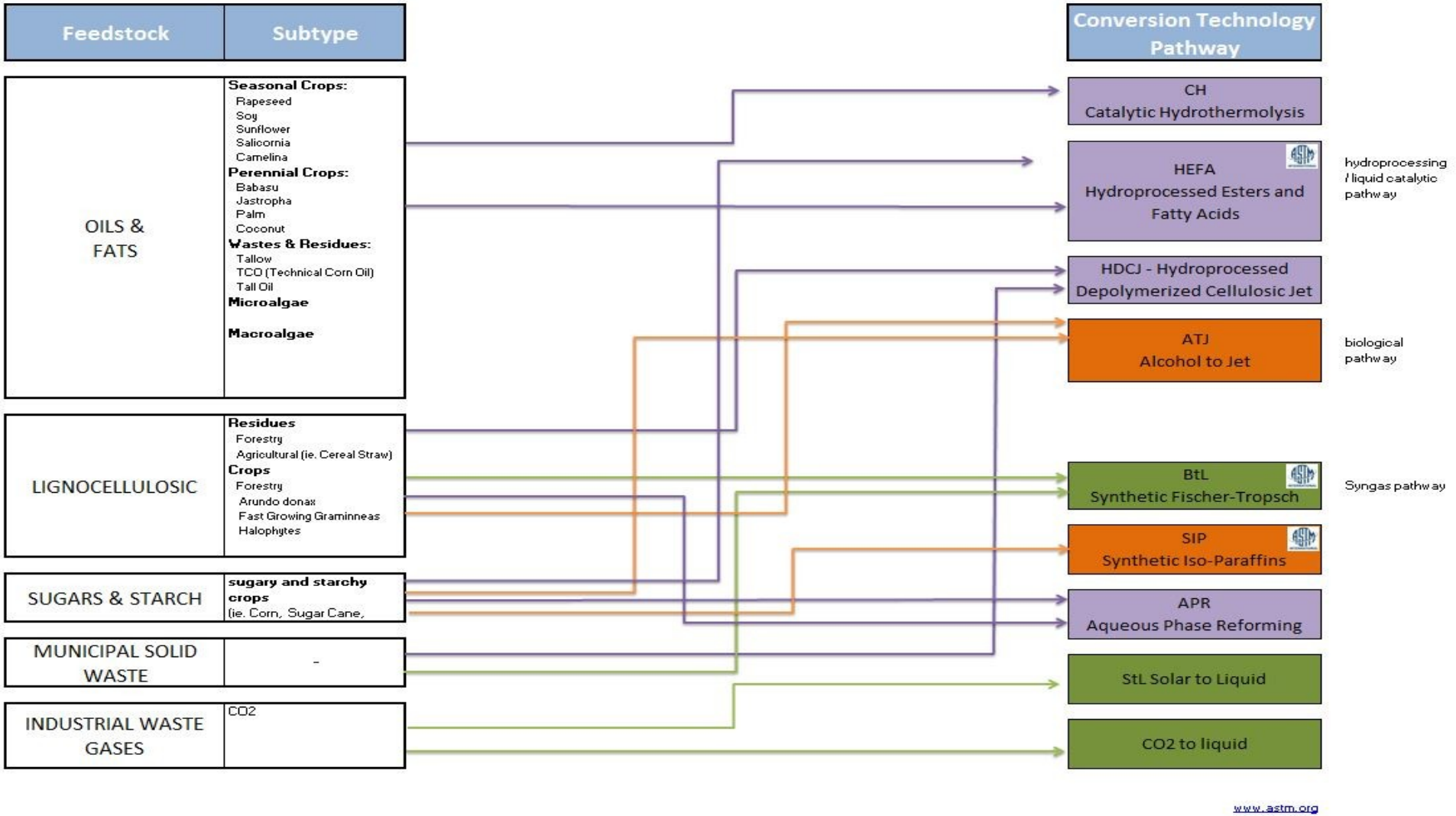
DoW - Collection



DoW - Mapping



- Balance of basic („curiosity-driven“) and applied (product-orientated) research
- Allocation in quadrants
- Assessment of targeted outcomes instead of possible future application perspectives


Feedstock
Subtype
Conversion Technology Pathway
OILS & FATS
Seasonal Crops:
Rapeseed
Soy
Sunflower
Salicornia
Camelina
Perennial Crops:
Babasu
Jastropha
Palm
Coconut
Wastes & Residues:
Tallow
TCO (Technical Corn Oil)
Tall Oil
Microalgae
Macroalgae
LIGNOCELLULOSIC
Residues
Forestry
Agricultural (ie. Cereal Straw)
Crops
Forestry
Arundo donax
Fast Growing Graminneas
Halophytes
SUGARS & STARCH
sugary and starchy crops
(ie. Corn, Sugar Cane,
MUNICIPAL SOLID WASTE
-
INDUSTRIAL WASTE GASES
CO2
CH
Catalytic Hydrothermolysis
HEFA
Hydroprocessed Esters and Fatty Acids
HDCJ - Hydroprocessed Depolymerized Cellulosic Jet
ATJ
Alcohol to Jet
BtL
Synthetic Fischer-Tropsch
SIP
Synthetic Iso-Paraffins
APR
Aqueous Phase Reforming
StL Solar to Liquid
CO2 to liquid
hydroprocessing / liquid catalytic pathway
biological pathway
Syngas pathway
www.astm.org

DoW - Analysis

- Three key (“high-level”) criteria for alternative jet fuels:
  - Suitability
    - *“Drop-in” capability*
  - Scalability
    - *Production potential*
  - Sustainability
    - *GHG emission reduction potential*

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DoW - Analysis

Key Criterion	Criteria	Metric
Suitability	Technical compatibility	[%] Max. blending ratio („drop-in capability”)
Scalability	Production costs	[%] relative to conventional reference
	Technical caturity	Feedstock Readiness Level (*FSRL*) Conversion Technology Readiness Level (*CTRL*)
	Substitution potential	[%] max. share of total demand
Sustainability	Specific land use	ha t_{fuel}^{-1}
	Energy efficiency	[%]
	GHG reduction potential	[%];relative to conventional reference

International Stakeholder Exchange

- In order to reach the aspired goals of the project and also to receive external expert knowledge, a variety of stakeholders are involved
- Therefore, stakeholder **Working Groups** according to their respective fields have been established:
  - ***Feedstock and Sustainability*** (FNR)
  - ***Radical Concepts and Conversion Technologies*** (BHL)
  - ***Technical Compatibility, Certification and Deployment*** (IFPEN)
  - ***Policies, Incentives and Regulation*** (SENASA)

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SAFF – Selected Statements

- Sustainability of biofuels is a regional issue → regional interpretation of certification and standards
- No good or bad feedstocks → management issue
- Feed-in tariffs as a measure to overcome investment barrier
- Issue of demand prioritization between transport sectors
- 1st economics, 2nd sustainability
- Investment today, cost-effectiveness tomorrow

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Thank you very much for your attention!

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Your cooperation is much welcomed!

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