

RDF/SRF utilisation plants

Legislative status and economic balance



Studies commissioned by:



Conducted with the collaboration of



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Our mission :

RDC Environment supports decision making towards a sustainable world

Our core business :

Life Cycle Assessment



- **250 LCA studies** in various sectors
- **Innovative LCA software "RangeLCA"** allowing strong sensitivity analysis
- Involved in **standards development**

Waste management



- **Technical, environmental and economic expertise** on waste management projects
- **Evaluation of public policies**
- Support of **take-back schemes**
- **Data collection, analysis and control**

LCA tools



- **Environmental labelling and eco-design tools** (InstantLCA)
- **User-friendly** and accessible by non-experts
- Detailed and audited models and data

Sustainability evaluation



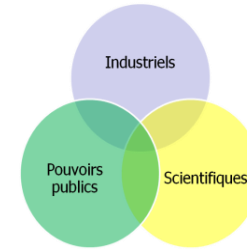
- **Integration of environmental, social and economic** impacts throughout the life cycle
- **Innovative methods** based on monetarization
- **Identification and evaluation of externalities**

RECORD: Cooperative network of research on waste and the environment

Develop applied knowledge and share experience around used products, waste, polluted sites, efficient use of resources in view of contributing to the circular economy



RECORD association is a network open to all organisations, public or private. RECORD enables studies and researches to be conducted as part of a peculiar three-party cooperation between **the industry, public institutions and researchers**. This cooperative environment makes of RECORD a privileged framework to **exchange** as well as a tool for **technological and scientific intelligence**.



Financing projects (alone or as part of wider partnerships)

(Bibliography, Field studies (metrology, trials, etc.), Technical state of the art, benchmarking studies EU / regulation, ...)

Programmes receiving financial support from ADEME

From state of the art---> to PhD work



RECORD subjects for studies and research

- ❖ Knowledge and characterization – methods and tools (metrology, understand waste streams, etc.)
- ❖ Development of value chains to recover and treat waste (processes, effluent treatment, etc.)
- ❖ Assess sanitary and environmental impacts and risks (improve methodologies for sanitary and environmental risk assessment, population health, occupational health, upcoming: ecology engineering)
- ❖ Assess social and economic dimensions (economy, law – regulation, externalities, etc.)

➤ To know more: www.record-net.org

Members of RECORD :



Context and methodology

- **Context: accelerate landfill reduction in France → developing the SRF market is one of the solutions**
- **2 studies in parallel commissioned by RECORD and DGE**
 - Common work: study the public policies, market and regulation in 10 countries (bibliography)
 - DGE: study the SRF value chain in Hessen
 - RECORD: visit 13 plants (excluding cement kilns) using RDF/SRF in Europe– study technical, economic and administrative conditions
- **→ Objective: capitalise on key success factors in terms of public policies and industrial strategies**



RDF: a variety of different fuels for dedicated plants...



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... among which a minority is standardised

Waste

Hazardous solid waste

Biofuels

Unprepared waste

Specific fuels: used tyres, animal meal, STEP sludge

Liquid waste

RDF (Refuse-Derived Fuels): solid, non-hazardous, prepared for energy recovery

Unspecified RDF/ outside quality system

RDF covered by quality agreements between producers and users

Standardised RDF

SRF (Solid Recovered Fuels) according to standard EN 15359

End-of-Waste -
EoW (Italy, Austria)

SRF acceptable in ICPE
2971 (France)

RAL- GZ 724
(Germany)

- EN 15 359 : not used by dedicated plants unless required by regulation (Italy) or permits
- RAL-GZ 724 (Germany): power plants, cement and lime kilns, not used by dedicated plants

Regulatory status

Regulations for RDF

- Quality covered by private agreements, based on technical criteria and emissions limits
- French regulation is unique: other countries rely on permitting and existing frameworks.
- Italy has a regulation but based on EN 15359 : no quality threshold

	France	Other EU countries
RDF quality thresholds	LHV (12 MJ/kg), Halogens, Hg	No regulatory thresholds
Quality control	Requirements (sampling, list of parameters to be analysed, frequency...)	No requirements
Mixing with other waste	Not allowed in ICPE 2971	Allowed in principle Seen in practice (DE, AT, SW)
End of waste	Not allowed	Framework in AT, IT, PB Not used in practice for RDF!
Status of facilities	ICPE 2971 (specific)	Incineration or co-incineration (IED) – not specific

Sometimes required in the permits
 Number of parameters to be followed < French regulation

- **A significant proportion of RDF: 7 - 35% → Regulation and outlets are key**
- **Bottom ash and unburned: non-hazardous waste**
 - NHW landfill or road construction
- **Fly ash and air pollution control residues**
 - usually hazardous waste
 - Salt mines
 - HW landfills
 - except :
 - Coincineration of RDF in coal power plants: construction materials (Fusina, Italy)
 - Fly ash recovered in hot cyclones (2 facilities): road construction, NHW landfills Witzenhausen (Allemagne), Linz (Autriche)
 - Specific permits when coincinerated with biomass (Anjala, Finland)

Coincineration/incineration status more or less favorable

- Interpretation of dedicated RDF plants (designed to produce energy)

Country	Incineration	Coincineration
Germany	X	
England	No dedicated facilities	
Austria	X	
Belgium		X
Finland		X
France		X
Italy	X	
Norways	No dedicated facilities	
Netherlands	No dedicated facilities	
Sweden		X

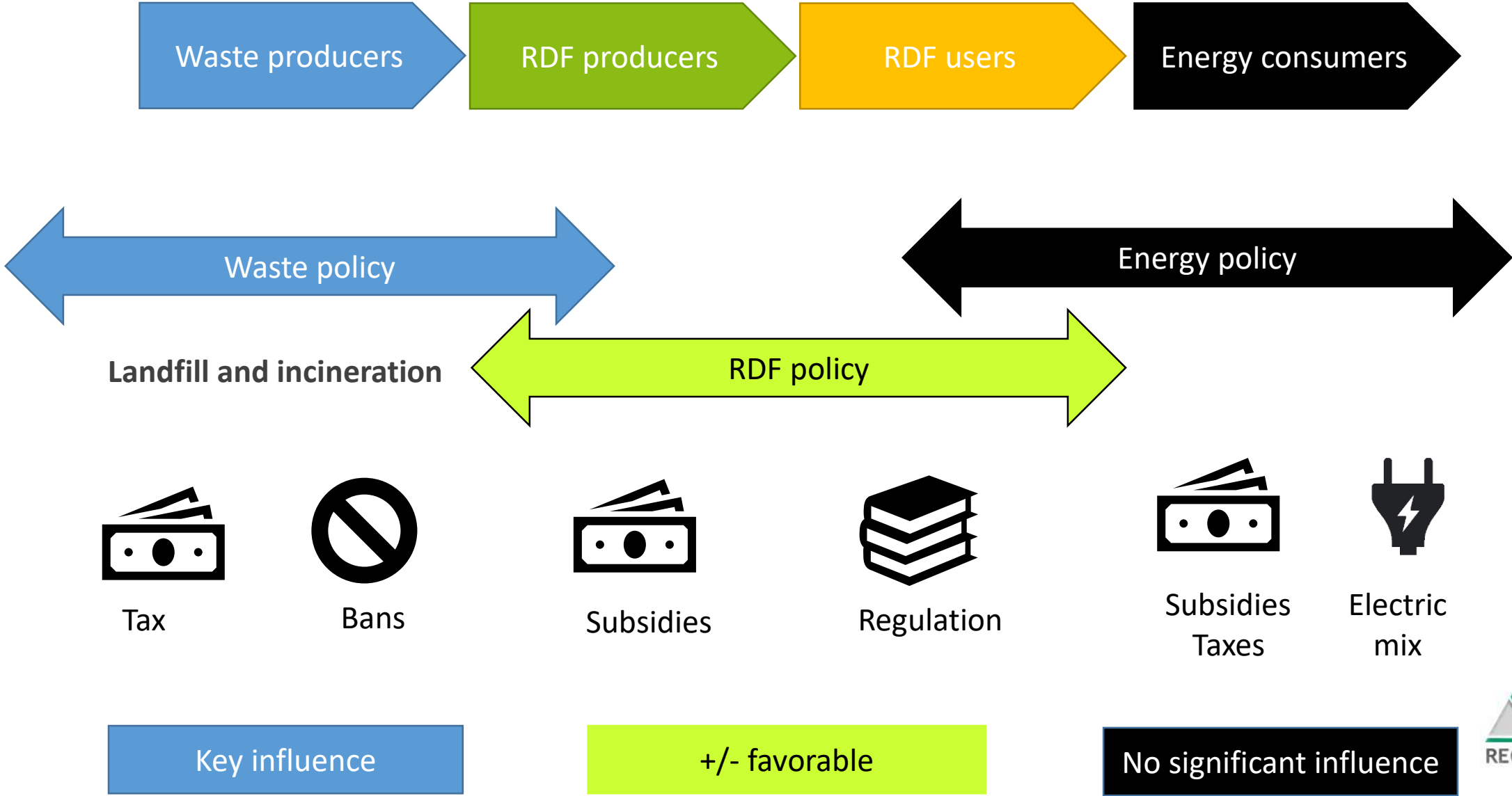
Coincineration/incineration status more or less favorable

- Incineration plants are not covered by CO₂ quotas → distorsion of competition
- Impact of the distorsion is currently low for France (<1€/MWh) but would increase if CO₂ prices increase (10 - 12€/MWh if 50€/tCO₂).
- In favor of
 - Industrials using energy where there is incineration interpretation (DE, AT, IT)
 - Export of RDF towards these countries rather than local recovery

How was the RDF market created?

Public policies influencing the market

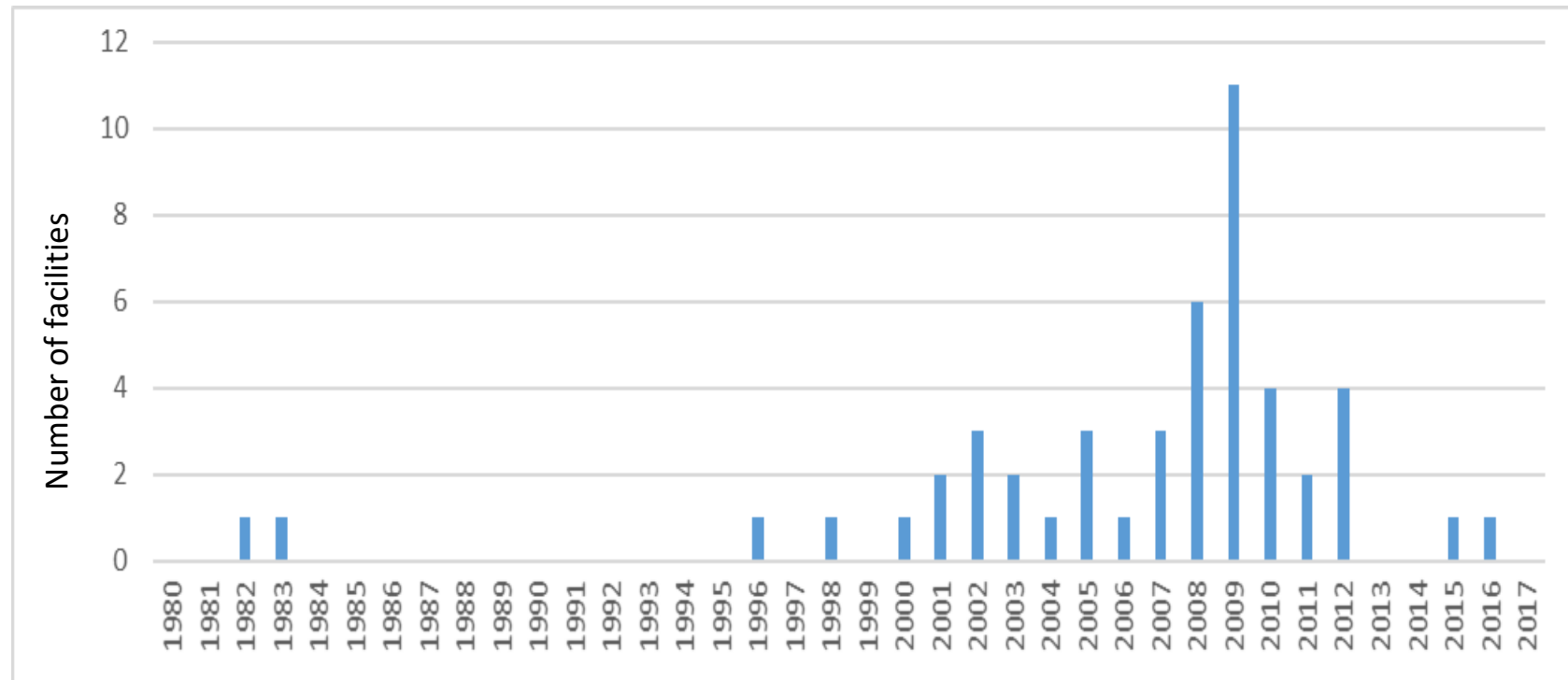
Public policies in favor of the RDF market



A favorable energy market...

- Rising energy prices as the main driver

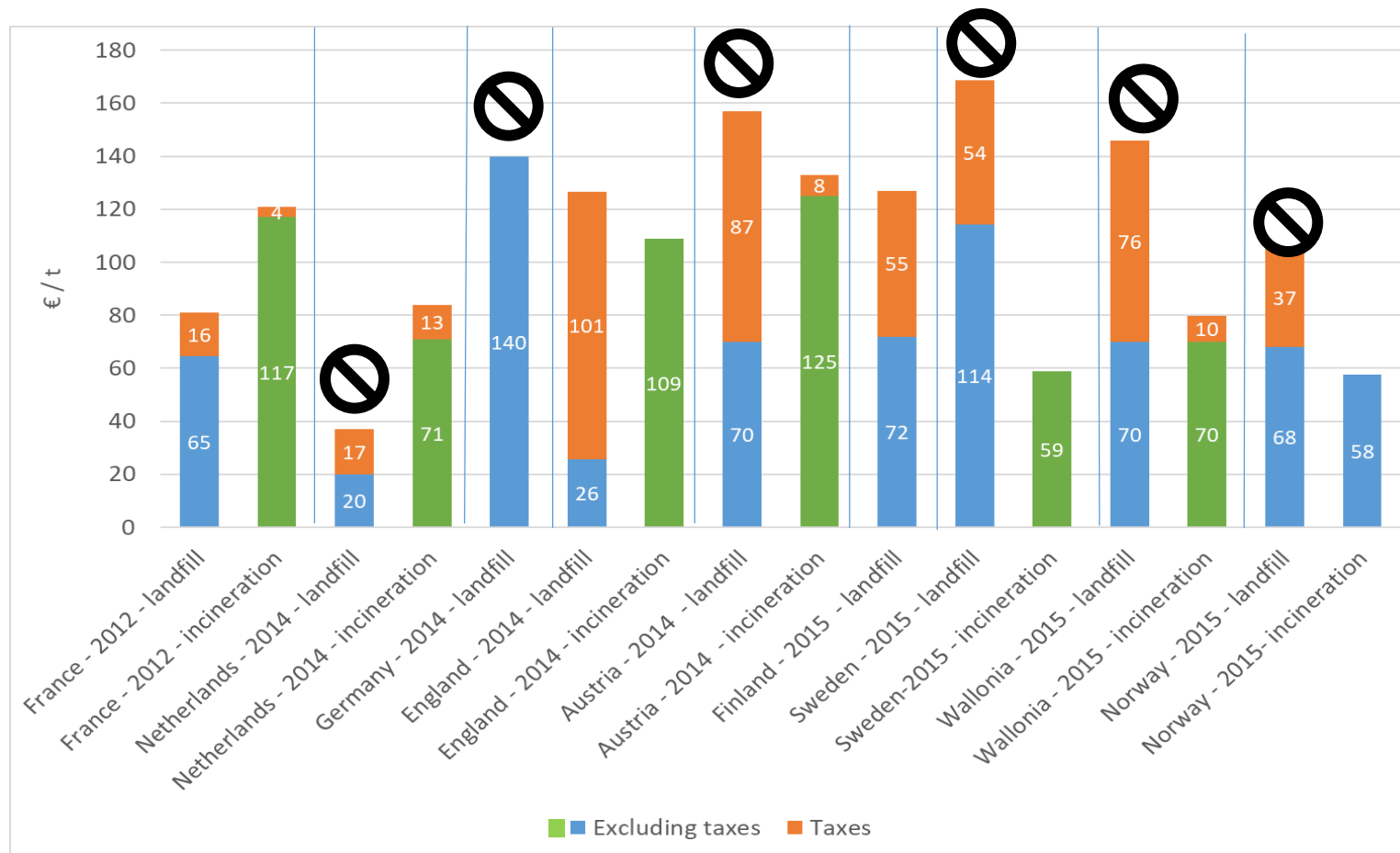
Start-up dates for identified RDF plants (RECORD, 2018)



- Final energy consumer has a key role in the project and is often a shareholder

... and affordable waste-based fuels

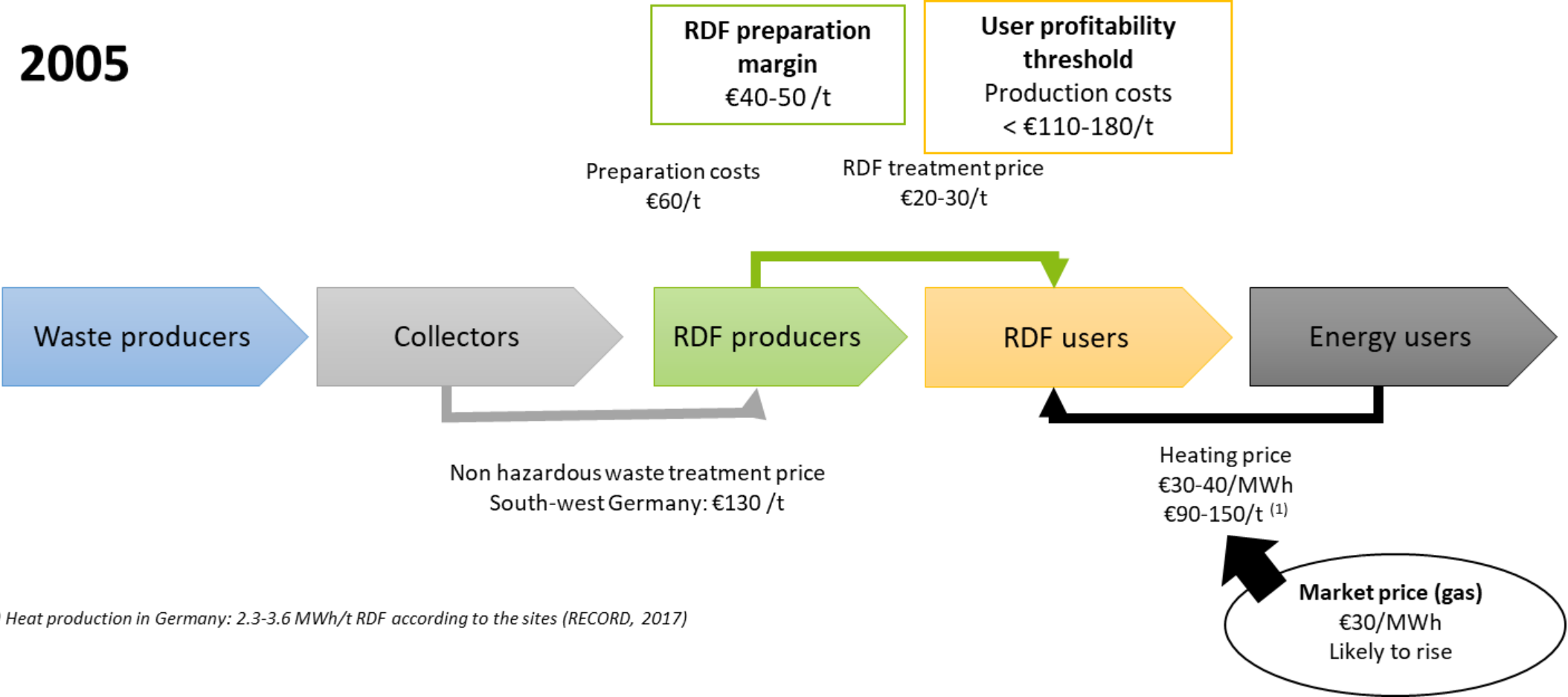
- **EU objectives for landfill reduction but different national implementation**
 - Landfill tax & ban → cost landfill > cost incineration → waste producers look for alternatives
 - High incineration prices or missing capacities → RDF preparation and use rather than direct incineration



Economic conditions: waste treatment price is key

RDF value chain in Hesse, 2005

2005

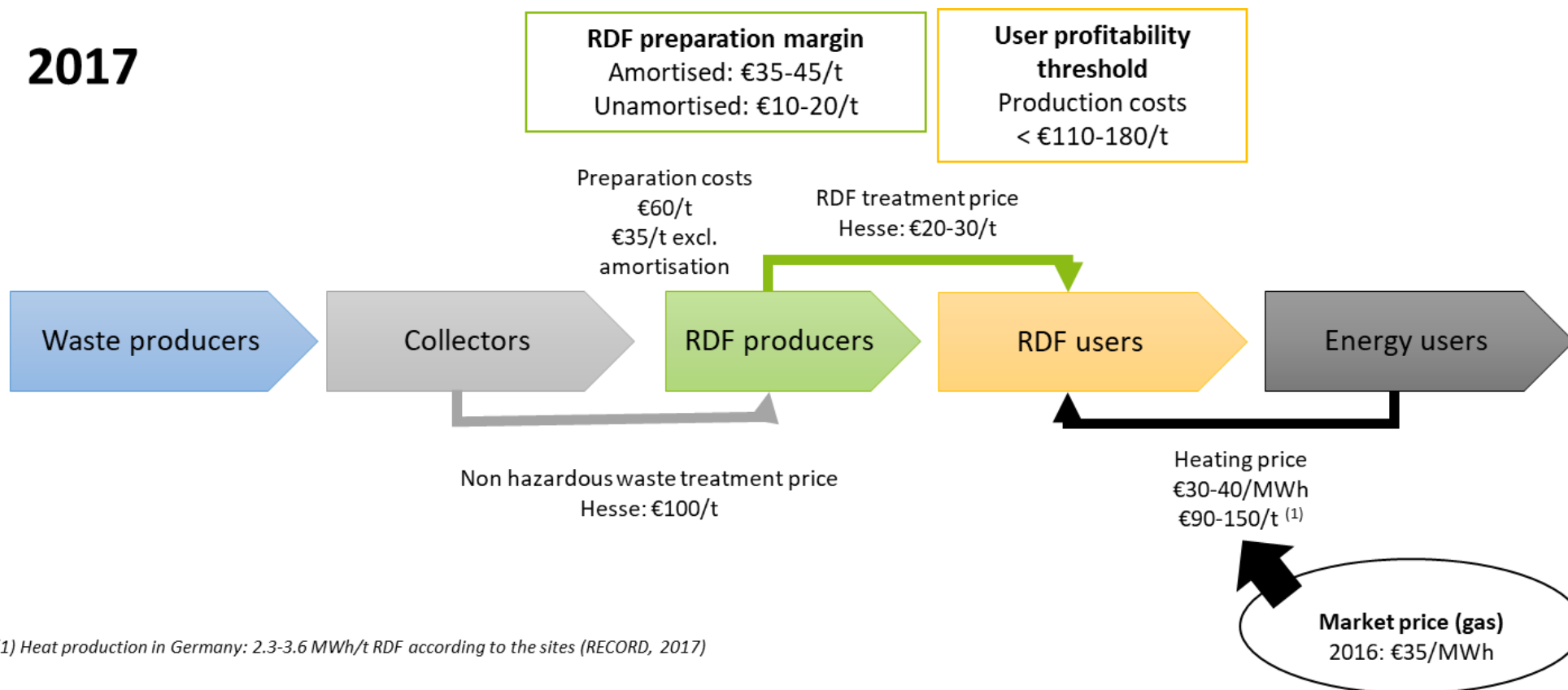


(1) Heat production in Germany: 2.3-3.6 MWh/t RDF according to the sites (RECORD, 2017)

Economic conditions: waste treatment price is key

RDF value chain in Hesse, 2017

2017



Economic conditions

- **No subsidies or subsidies are not significant (except Italy)**
- **Visited facilities are profitable**
- **As many business models as visited sites**
 - Price for RDF: -60 €/t to 30€/t
- **Long term partnership with energy consumer is key**
- **Mitigate risk over RDF supply: MT contracts, integration of preparation and use**

Recommandations to drive the RDF market

- **Create the conditions for a viable RDF market on the LT**
 - Landfill tax or ban
 - Energy tax
 - Plan capacities
- **Subsidise RDF use only on the short-term**
- **Avoid unnecessary or redundant regulations**
- **Homogeneous interpretation of incineration/co-incineration in the EU**
- **Discuss exemption of CO₂ quotas for coincineration plants burning 100% waste**

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RDC Environment SA

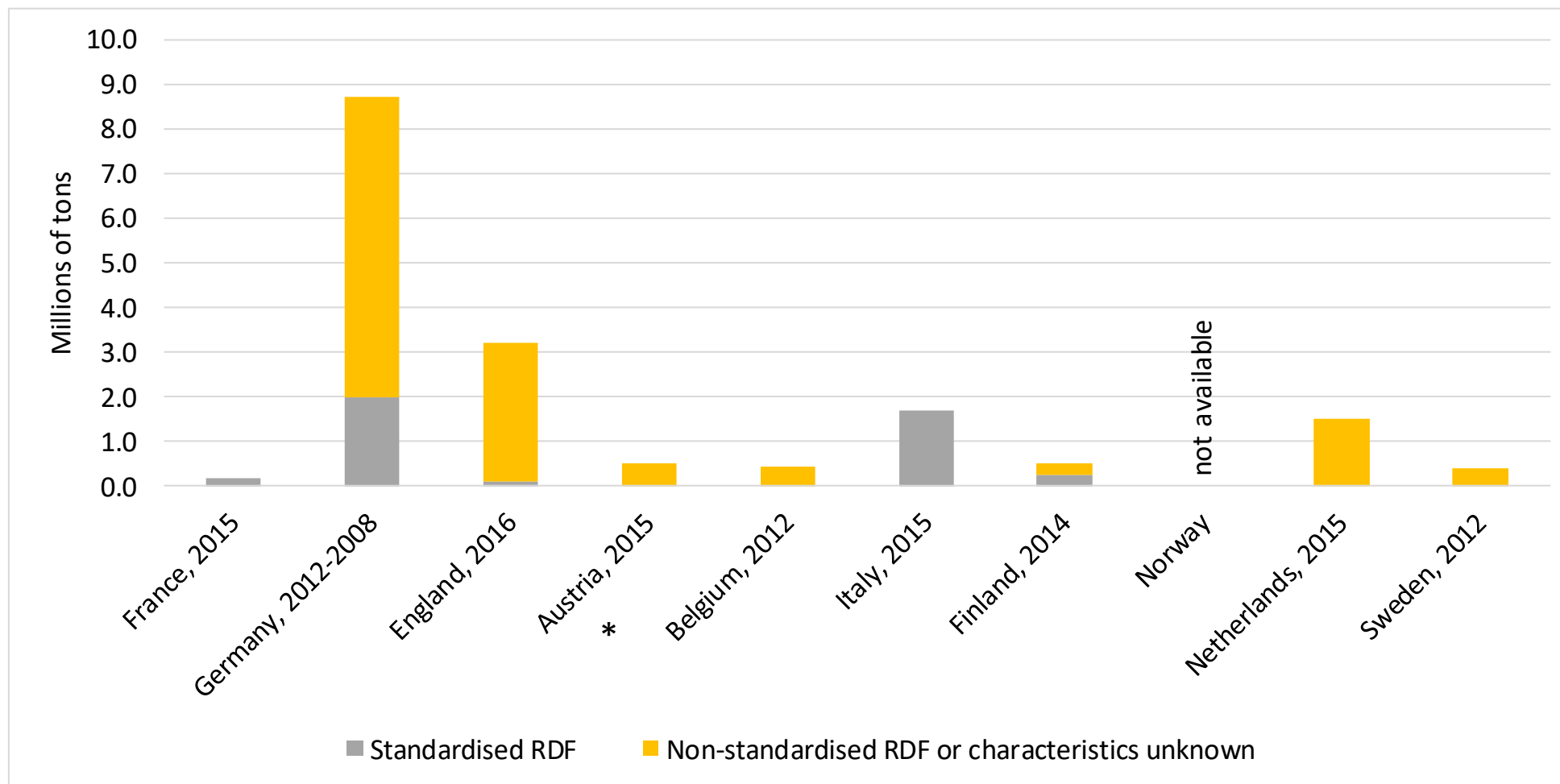
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Life Cycle Assessment,
Waste Management,
Impact Assessment

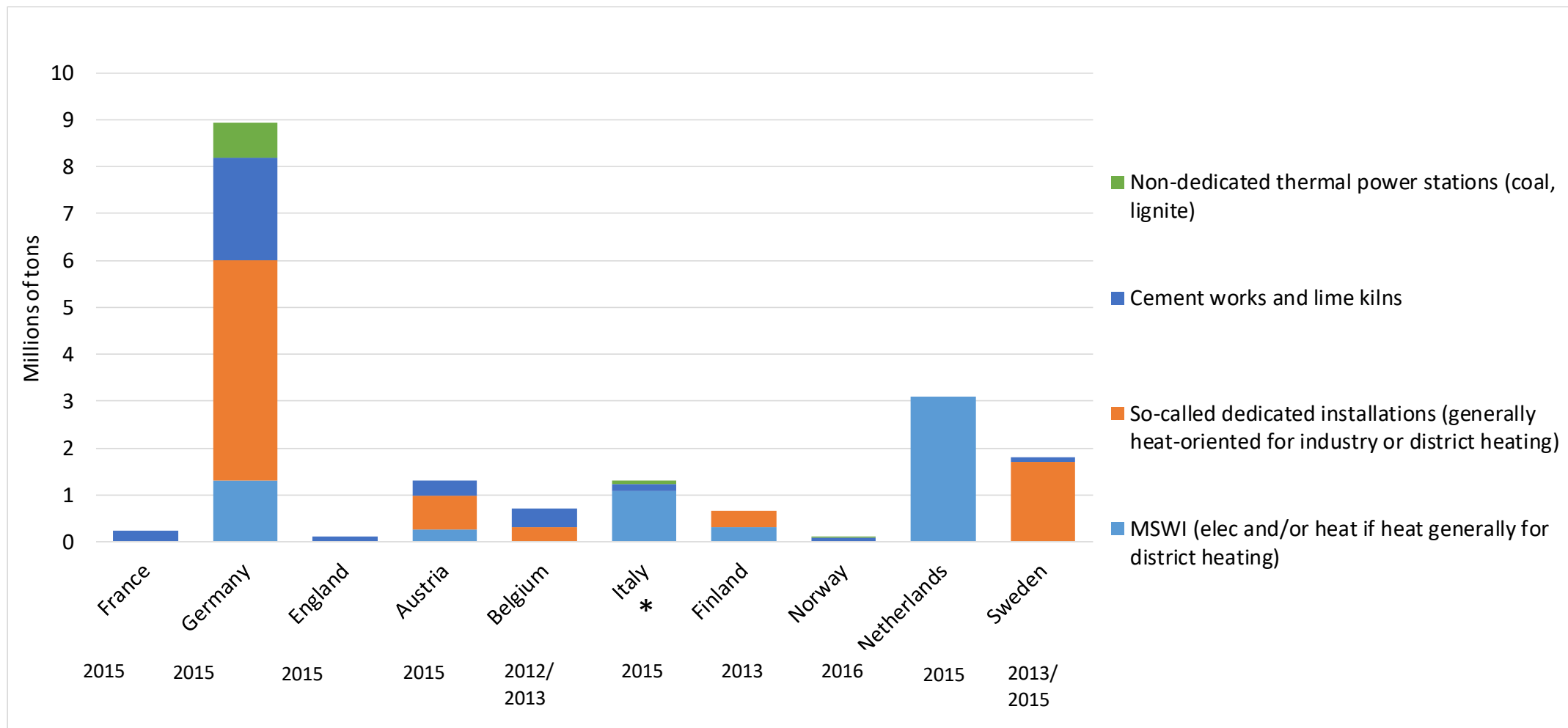
Production of non-standardised RDF and standardised RDF



Sources: ADEME, ISPRA, UBA, BLFUW, Environmental Agency, RECOMBIO

* Except IW

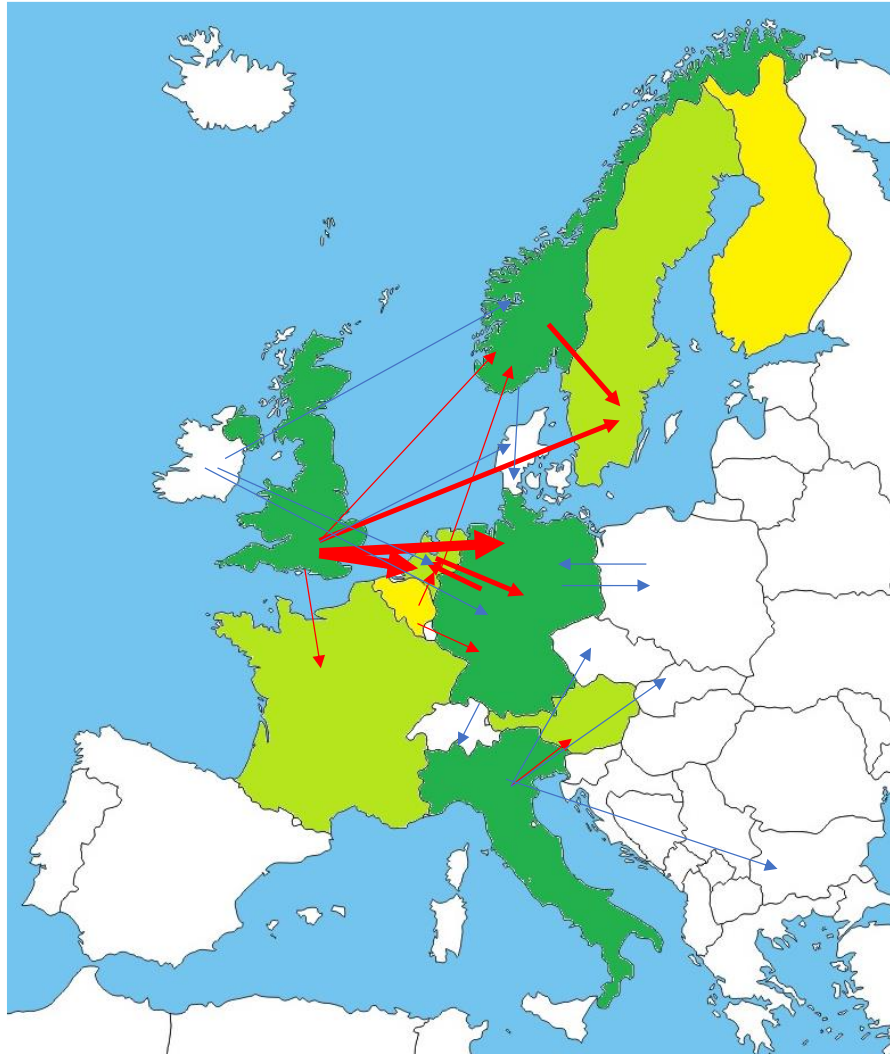
Use of non-standardised RDF and standardised RDF







Sources: ADEME, ISPRA, UBA, BLFUW, Environmental Agency, RECOMBIO


* Except use of RDF produced from I&CW

RDF flow



-  < 300 kt/year
-  300-600 kt/year
-  > 600 kt/year

 Exchanges between countries included in the study's scope

 Exchanges between countries included in the study's scope and one country excluded from the study's scope

- Main determining factors:**
- Taxes / landfill ban
 - HWIU capacity
 - Incinerator energy efficiency (heat need)

NB: The colours have no significance in this graph, they simply serve to distinguish one country from another