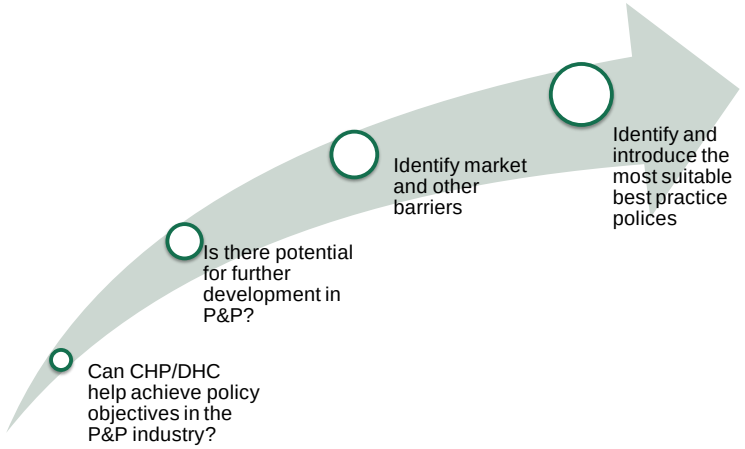
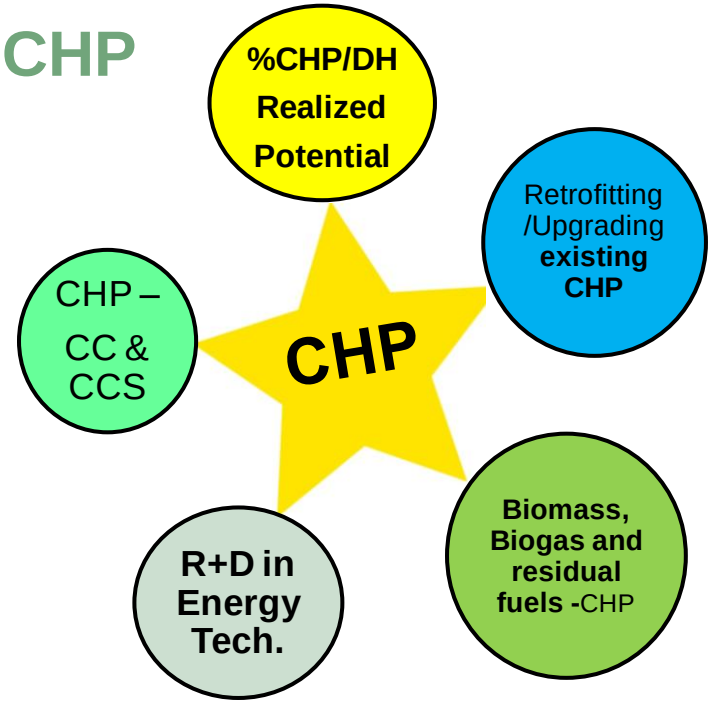
14 april 2011

THE USE OF COGENERATION IN EUROPEAN KEY INDUSTRY SECTORS

CEPI P&P Strategy and Best Practice - CHP

4 Steps + 11 Recommendations





Javier Rodríguez Morales – ASPAPEL
(Spanish Association of P&P Manufacturers)

Choosing and implementing effective CHP policies in the P&P SECTOR

4 STEP CHP APPROACH (IEA)

CHP

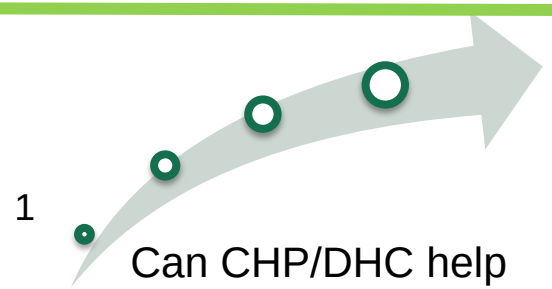
Can CHP/DHC help achieve policy objectives in the P&P industry?

Is there potential for further development in P&P?

Identify market and other barriers

Identify and introduce the most suitable best practice polices

CHP is a KEY partner for P&P Industry Objectives in UE –MS policies.



1 Can CHP/DHC help achieve policy objectives in the P&P industry?

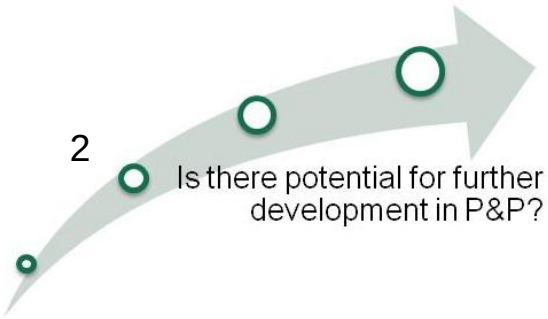
- **YES**. The Pulp and Paper industry in Europe has over 7.000 MWe of CHP capacity, approximately 10% of all CHP in Europe and is the third largest industrial sector after oil refining and chemicals

POLICY- OBJECTIVES

- **INDUSTRIAL POLICY:** COMPETITIVENESS + EMPLOYMENT
- **ENERGY POLICY:**
  - EFFICIENCY.
  - SECURITY SUPPLY + SUSTAINABILITY+COMPETITIVENESS
  - ESCO s
- **ENVIROMENTAL POLICY**
  - **CC POLICY:** HEAT DECARBONISATION.and Power footprints.
  - EMISSION REDUCTION
  - WASTE Valorization.
  - IPPC-BAT
- **R+D** New promising technologies EE and E Production**.**

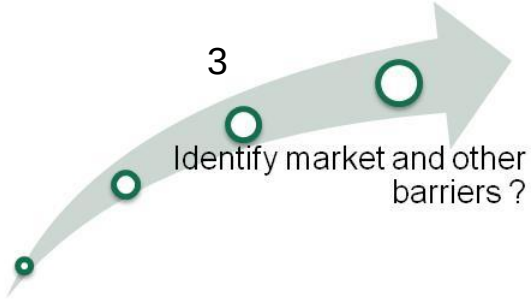
CHP IS A KEY PARTNER FOR P&P INDUSTRY

60% P&P CHP EU POTENTIAL AVAILABLE



- **YES**. COGEN Europe + CEPI estimates that only 40% of CHP potential capacity has been installed in the P&P industry, varying from MS.

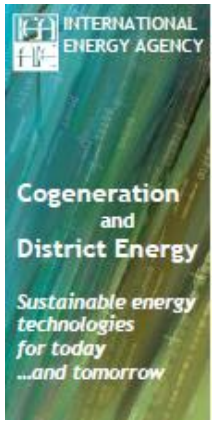
BARRIER IDENTIFICATION AT EU – MS LEVEL



- Main BARRIES in P&P CHP does not differ from barriers already identified for CHP/DH at Global, UE and MS.
- More efforts have to be made at EU and MS regulation level to coordinate identified barriers removal and integrate policies.

BARRIER IDENTIFICATION EU+MS: TARGETING POLICIES

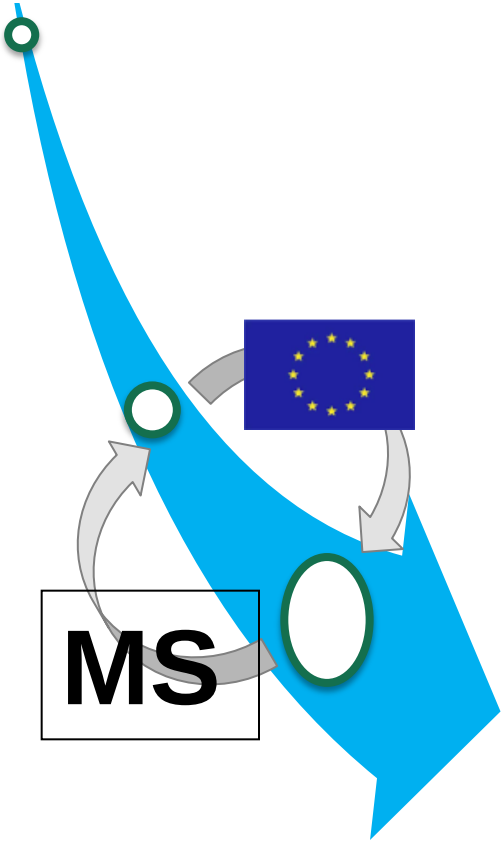
International Energy Agency



Well-chosen policy can overcome barriers to CHP

The evidence from many of the countries highlighted in the previous section is clear: CHP does not need substantial financial incentives to make it happen. Rather, it requires the effective use of often modest, targeted policies to systematically address barriers and allow for full realisation of the potential for CHP and DHC. Common barriers include:

- Economic and market issues, relating to the difficulty in securing fair value prices for CHP electricity that is exported to the grid.
- Regulatory issues, relating to non-transparent, inconsistent interconnection procedures and backup charges.
- Social/political issues, particularly in relation to a lack of knowledge in society about CHP benefits and savings.
- Difficulties in integrating the GHG emissions benefits into emissions trading or other regulations, due to CHP/DHC's status as combined technologies that include heat and power.



IEA: ECONOMIC+MARKET – REGULATORY – SOCIAL – ETS

- EU IDENTIFICATION – INTEGRATED & COORDINATED POLICIES.
  - UE ETS
  - New EEP 2011 -
  - ETD
  - Revision CHP Directive + Energy Service Directive
  - Industrial Competitiveness:sector approach
  - UE ENERGY MARKET & POLICY
- MS IDENTIFICATION+MODELLING
  - Economic
  - Financing
  - Administrative
  - Uncertainty regulatory framework & ETS

Example: SPAIN – BCG Study - Assessment of Benefits Associated with CHP Development in Spain

There are barriers hindering CHP's development in Spain

Efficient Energy
acogen
Spanish CHP Association

Economic barriers

1 CHP specifically has high risks which are reflected in the rate of return and in payback requirements which are not seen in compensation

- CHP adds the client company's risk to other risks associated with different generation technologies (market risks, operational, regulatory, etc.)
- 6-9 year typical project payback are excessive for higher risk sectors
  - With these rates of return the industry tends to opt for projects closer to its core business
  - An external developer's participation does not reduce the sectorial risk and generally worsens returns and payback
- An adjustment of rates of return and/or speed at which the investment is recovered to open the way to developing new CHP and replacing the ones already in existence seems necessary
  - E.g. possible faster recovery in high risk sectors (e.g. chemicals, textiles, food & beverages)

2 Much of new CHP (marginal CHP) is less attractive to an investor (return vs. risk) than what the law's feed-in tariffs imply

- Worse profitability connected to inefficient scales, lower operational levels, specific risks, etc.
- New CHP with capacity between 1-25 MW seem to be more affected by this limited profitability

3 Lack of incentives for >50 MW CHP makes realizing the significant potential to improve energy efficiency difficult

- Going against the spirit of the European Directive regarding CHP (2004/8/EC) which stipulates that it will be ensured "that support of cogeneration [...] is based on useful heat demand and primary energy savings"

Financing barrier

4 Current context of the economic downturn has made access more difficult and financing more expensive, for industrial companies as well as for developers, which further lowers new projects' profitability

Administrative barrier

5 Important administrative difficulties when developing CHP

- Registry of capacity pre-allocation adds red tape and is not justified as speculative control since CHP's potential delimited by the requirement of the existence of useful heat demand
- Certain ambiguity, and uneven application by autonomous regions, in the criteria for applying incentives to replacement
- Access to connection point is difficult in particular for the cogenerator which is aggravated by some distributor's stumbling blocks to acceptance of solutions that would enable operation in island mode
- CHP management is more and more complex – ESCO development needs to be facilitated for CHPs to grow

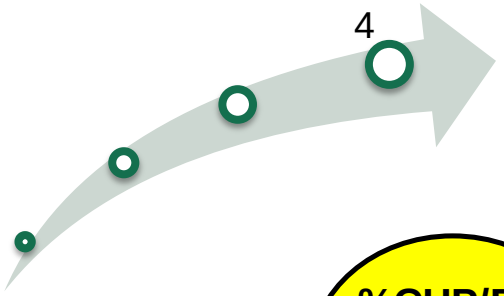
Uncertainty

6 Uncertainty about the regulatory framework is an important impediment to CHP's development

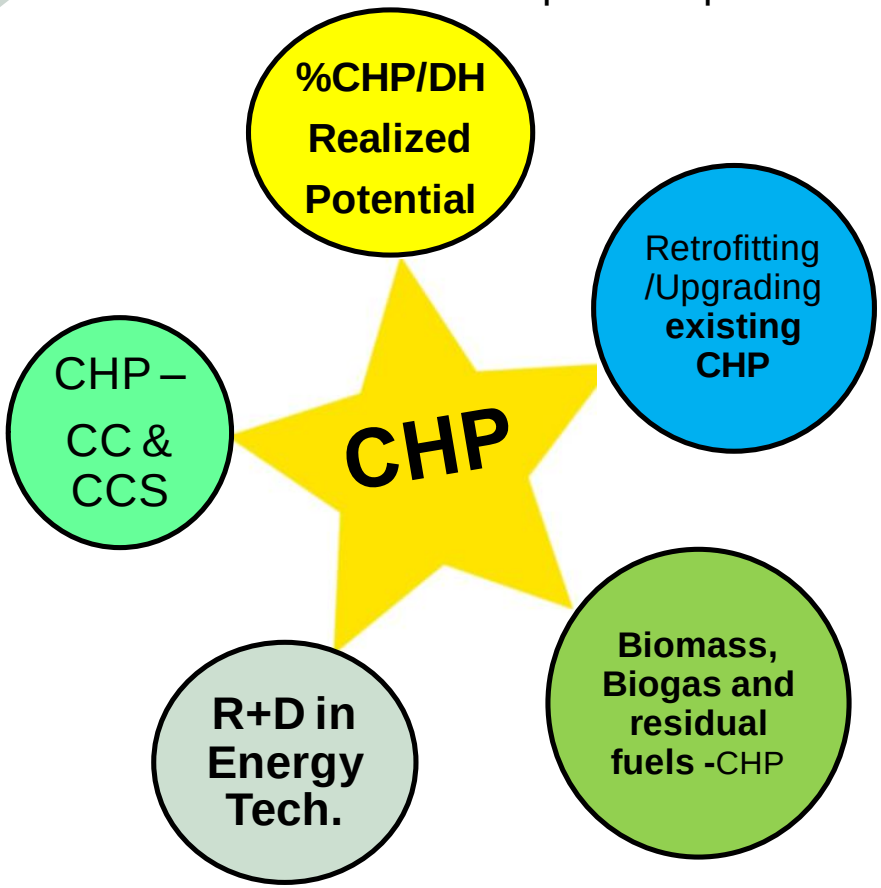
- Doubts about future CO_2 allowances and the compensatory framework

Do not allow barriers to become classical

IDENTIFY and INTRODUCE BEST P&P PRACTICE POLICIES AND P&P INDUSTRY CASES



Identify and introduce the most suitable best practice polices



COMMUNICATING BENEFITS & BARRIERS STRENGTHENING INDUSTRY APPROACH

- **BEST PRACTICE POLICIES AND P&P NDUSTRY CASES**

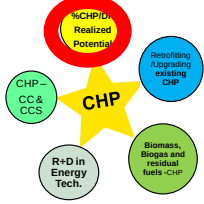
1. % CHP/DH realized potencial in P&P.
2. Retrofitting/Upgrading existing CHP/DH
3. Biomass, Biogas and Residual Fuels. (RDF-SRF) to CHP.
4. R+D in P&P Energy Tech
5. CC & CCS

SPAIN P&P CHP Potential near 70% implemented

Assessment of Benefits Associated with CHP Development in Spain

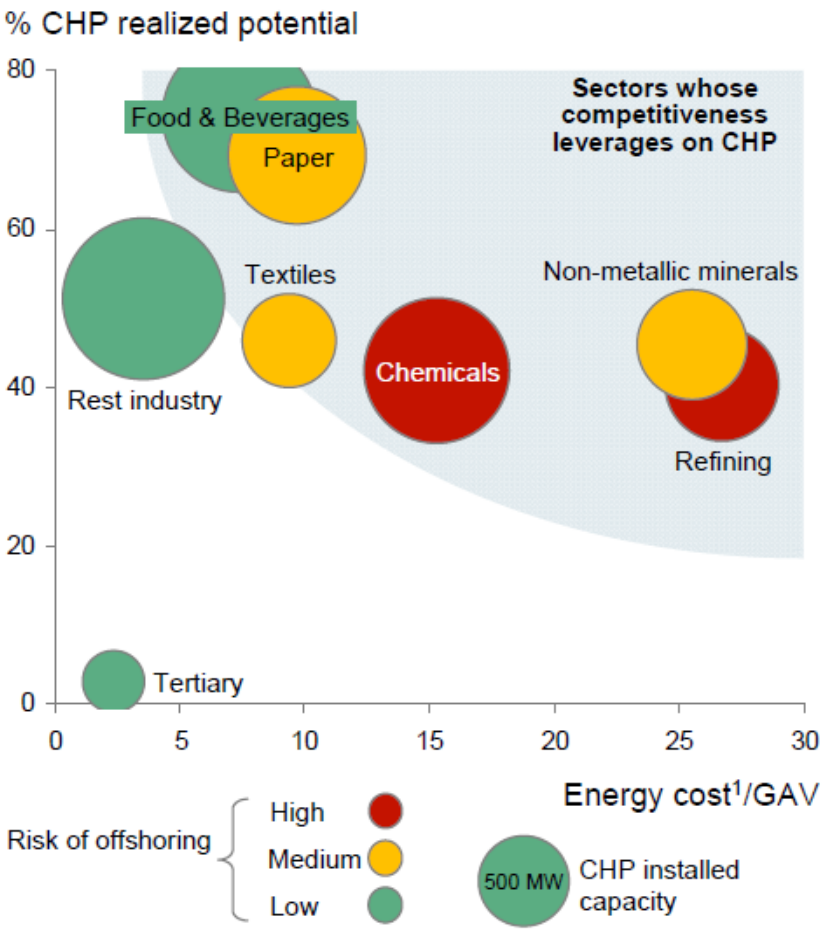
Efficient Energy acogen
Spanish CHP Association

BCG The Boston Consulting Group

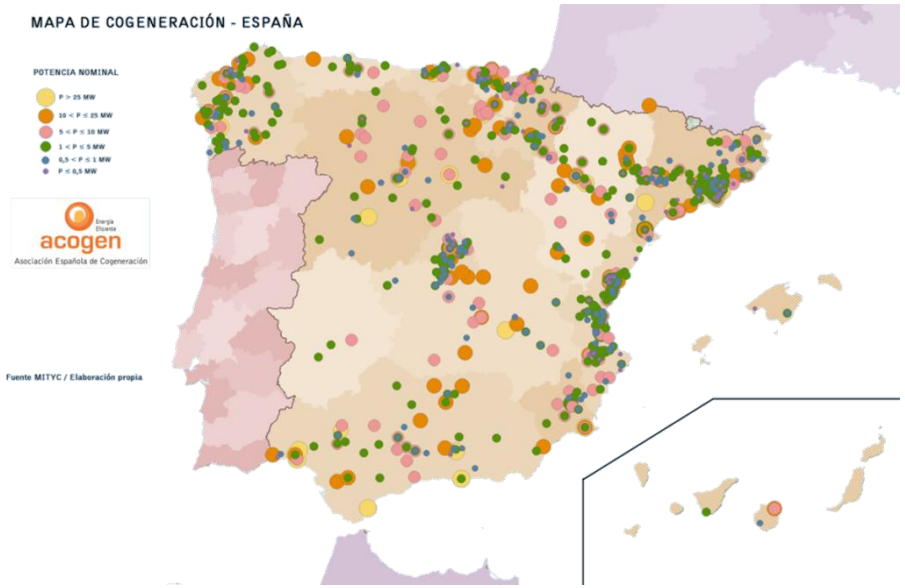


Modeling + Assessment Economic Electricity System Benefit: > 1000 M€ (E savings+ CO2 + Grid Savings)

CHP-intensive sectors as competitiveness lever



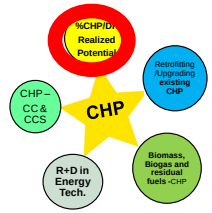
COMMUNICATING BENEFITS & BARRIERS ENHANCING INDUSTRY SECTOR APPROACH



CHP industrial sectors counts 40% of industrial GDP – 1,4 Million Jobs

FINLAND – Integration CHP/DH in forestry and paper industries

Finland's Rating: ★★★★★



CHP/DHC Country Scorecard: Finland

Finland is a world leader in combined heat and power (CHP)with high levels of development in district heating (DH), industrial CHP and use of biofuels

Administrative frame + Energy Tax Scheme

CHP Status Industrial Applications

The forestry and paper industry is by far the largest consumer of energy in the industrial sector, accounting for 58% of industrial energy consumption (Figure 4). The integration of forestry and paper sectors means it has become highly cost-effective to have onsite CHP units that utilise forest wastes and provide the heat necessary for paper production and often for heating nearby communities.

Alholmens Kraft Power Plant, Pietarsaari

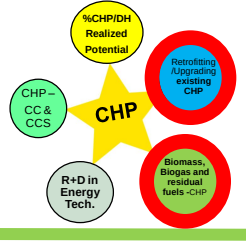
This is the world's largest biomass CHP plant, and has been in commercial operation since 2002. The plant is situated near the UPM Kymmene pulp and paper mill, serving both the local paper industry and the residents of Pietarsaari. The plant obtains some fuel from the mill in the form of residue bundles of wood. The plant is composed of a CHP unit and a boiler. Other details include:

- Power capacity – 240 MW_e
- Process steam capacity – 100 MW_{th}
- DH capacity – 60 MW_{th}

The boiler has a capacity of 550 MW_{th} and an estimated efficiency of 92%. The annual fuel consumption of the plant is 3 500 GWh, broken down as shown in Table 1.

Source: TEKES, 2002.

RETROFFITING/UPGRADING existing CHP + BIOGAS CHP



SAICA-2, El Burgo de Ebro (Zaragoza-Spain), the world's first flange-to-flange replacement for a GE 6B gas turbine. CHP 46, 9 MW – PES 21,6%

2010 SPAIN Implementing legal provisions RD 1565/10 to achive RENEWAL of existing CHP (>50% over 15 year age in 2015), increasing CHP Efficiency and reducing emissions.

- Same HEAT DEMAND,- **Increasing 8% Electricity production.-Specific consumprion Reduction on 8%**.- NOx 90% reduction (<15 ppm) - Increasing runnability
- 330.000 Tons of recycling paper. Thermal usefull heat consumption: 1,32 MWh/Ton
- Mar 8, 2011 - GE has completed a major 'flange-to-flange' upgrade of a Frame 6B gas turbine in just seven weeks. **The project marked the world's first flange-to-flange replacement for a GE 6B gas turbine.**
- New, advanced design parts has resulted in increased operating efficiency, a significant reduction in emissions and a considerable life extension for the plant.

- Also SAICA implemented 2009 largest Spanish Biogas CHP 7.5 MWe from AR STP

RETROFFITING/UPGRADING existing CHP

CARTIERE DEL GARDA (Italy) FROM INDUSTRIAL CHP INTO CHP/DH

- The new district-heating network will heat more than 4,500 houses in the town of Riva del Garda
- The combined cycle power plant comprises a 42 MWe gas turbine, which supplies a Heat Recovery Steam Generator for the production of steam and hot water, and a steam turbine of approximately 7 Mwe.
- Phase 4: The steamdriven Turbomach steam turbo started at the beginning of 2009. This completes a project being already internationally considered as a landmark case study for its excellent environmental performance.

http://www.altogardapower.eu/

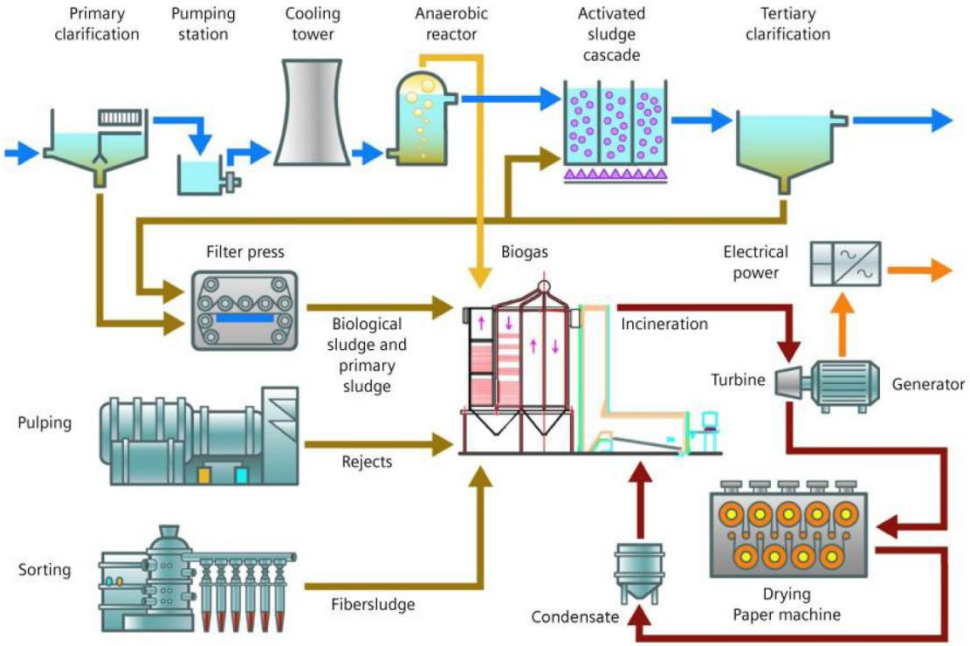
UE P&P Mills AGING IS AN OPORTUNIY TO ENHACE EE+COMPETITIVENESS BY BEST TECHNOLOGY IMPLEMENTATION AND RETROFITTING
TAYLORING CUSTOMER NEW CHP POSSIBILITIES

RESIDUAL FUELS – CHP: HIGH BIOMASS % - w2e

Reject Power for SIPAPER^{CIS} Reference MM Karton in Austria (3,5 Mwe CHP, 1.17 w2e)

SIEMENS

Industrial Solutions and Services



- 75.000 Tons of paper.
- 40 and 50 tonnes of waste (80% BIOMASS) are incinerated per day,
- 30% REDUCTION COST
- 25% NET REDUCTION DIRECT CO2 emissions

The result

Environment-friendly, efficient energy extraction combined with lower costs and less expenditure

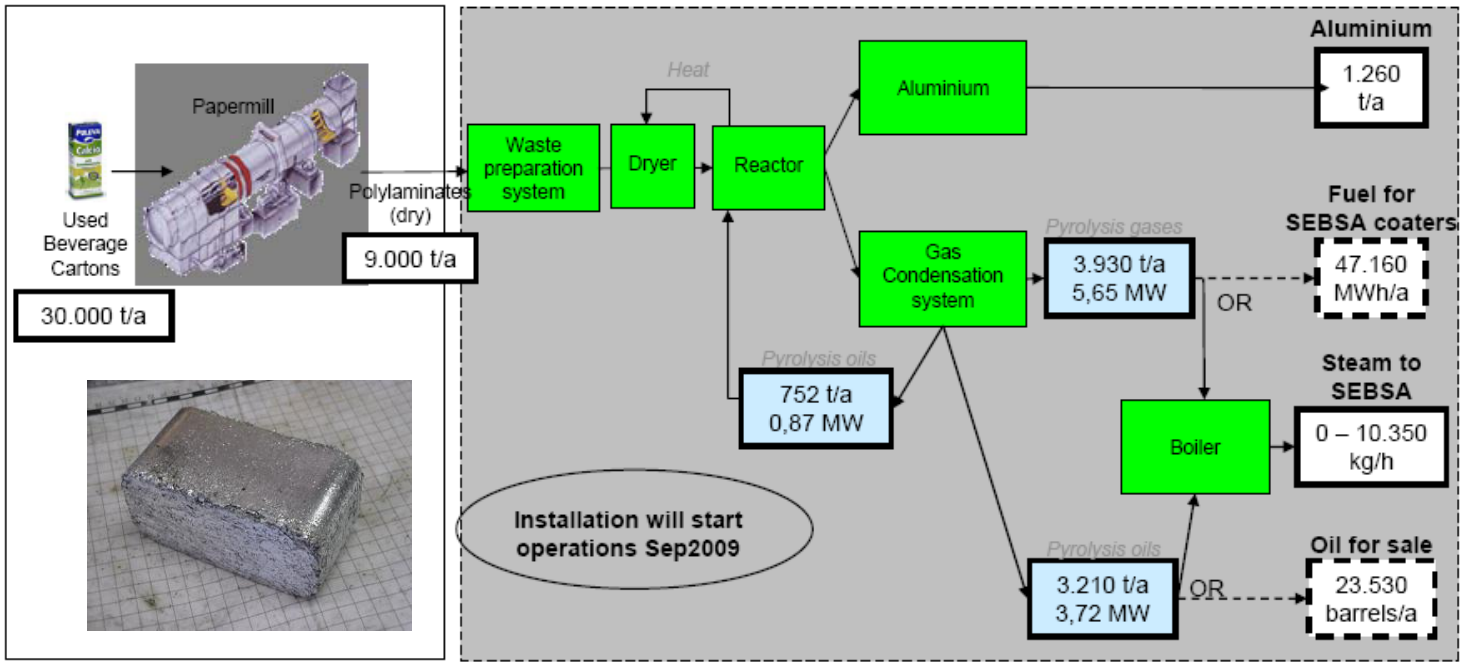
- Substitution of fossil fuel with rejects from production which were largely of biogenic origin
- Environment-friendly combustion in compliance with strict emission regulations, as the plant operates in the local recreational area and protected water catchment zone of the city of Vienna
- Substantial reduction in disposal costs
- Use of the rejects in an energy-optimized combined heat and power system
- Avoidance of "waste tourism" by using rejects directly where the waste occurs

http://www.youtube.com/watch?v=u66DeEBb0EE

RESIDUAL FUELS

"Converting Laminates into Energy and Aluminium for the benefit of Nature"

Project CLEAN: to build Europe's 1st industrial-sized PE/Al recycling plant

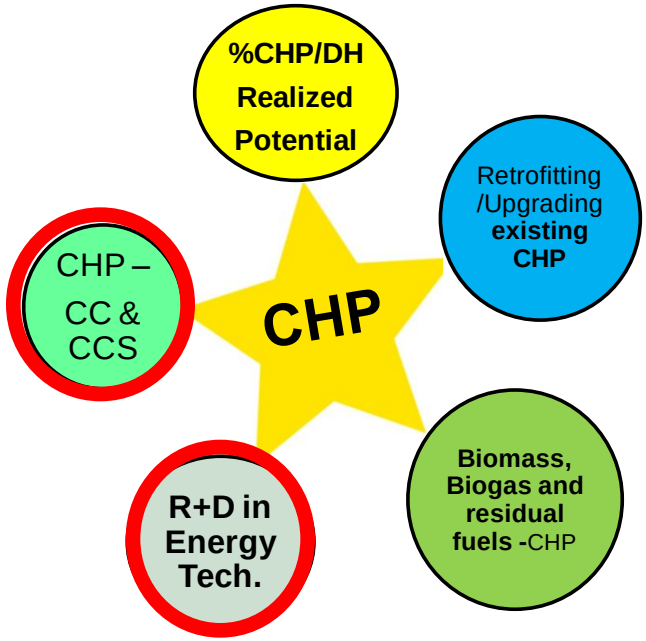


- STORA ENSO BARCELONA S.A. – SPAIN –
- 170.000 ton/yr cartonboard+ converting, 279 persons.
- 46 MW cogeneration plant (CCGT) -1996

Used beverage cartons stored

- ✓**Recover 1,260 t/a** of aluminium
- ✓At the same time, recycle and so **prevent land filling** of the residual laminate waste
- ✓**Generate energy-rich fuels** which can be converted to heat, steam or electricity
- ✓**Reduce CO_2** emissions by 4,968 tonnes per year

P&P R+D in Energy Technologies and CC



- Promising **new technologies in the P&P**
  - BL Gasification: From BL Boilers to BLIGCC (turbines). Increasing over 10% Electricity efficiency.
  - Lignin removal from BL – lignin production
  - Biomass gasification offer synfuels production and additional energy production integration
  - Biorefireny developments..
- **Carbon Capture from CHP** – CC Transport/Storage/Use. – Chemical Absortion – Tegnology ready.

PROMISING P&P NEW TECHNOLOGY ALSO RELATED TO CHP, Energy Efficiency and Electricity Generation. Carbon Capture Technologies "ready"

OVERCOME BARRIERS BY EU+MS TARGETING POLICIES

11 Recommendations

		EU	MS	Policies
Uncertainty-Change ETS	Turning discouraging CHP ETS treatment & doubts in compensatory framework into **POSITIVE discrimination - SE equivalent measure recognition**	✓	✓	✓ ETS
Financing barrier	Scarcity of financial resources. **UE financing instruments to CO s & MS.**	✓	✓	✓ EIB /UE Investing /financing Funds
SOCIAL	Lack of knowledge/perception in society – **Enhanced Benefit Assessment and Communication.**	✓	✓	✓ Stakeholders Voluntary Agr. Media initiatives…
	Voluntary Agreements for Sector National Obligations.	✓	✓	
Economic and Market barriers	**Supporting/ fair benefit recognition** and experienced mechanisms for CHP distributed electricity.		✓	✓ MS Schemes
	Possible **faster investment recovery in CL Sectors** (return vs. risk) . e.g. chemicals, textiles, food & beverages, p&p..		✓	✓ MS Schemes
	Maintaining optional tax exemptions (part/total) for CHP fuel used in CHP, also for CHP electricity production, CO2 tax under MS decision	✓	✓	✓ ETD/ MS Schemes
Administrative /Management barrier	Provide **Priority/guaranteed access** for CHP electricity.	✓	✓	✓ EEP2011 - MS
	Small/Mid/micro CHP 1 month **administrative permitting procedures** and access	✓	✓	✓ CHP /ESD Dir.Rev.
	Effective Monitor and Reporting of CHP progress in sector /categorized potentials. **Suitable Indicators**.	✓	✓	✓ CHP /ESD Dir.Rev.
	CHP management is more and more complex – **ESCO development** needs to be facilitated for CHPs to grow.	✓	✓	✓ ESD Dir.Rev.

EU Sustainable Energy Week

cepi confederation of european paper industries

COGEN europe

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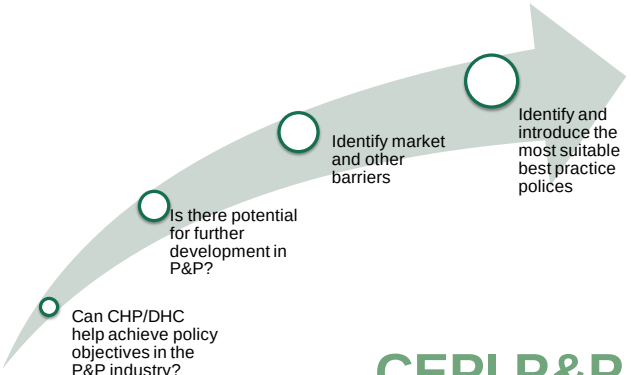

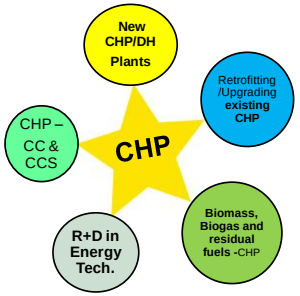

CEPI P&P Strategy and Best Practice - CHP
4 Steps + 11 Recommendations

THANK YOU FOR YOUR ATTENTION

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14 april 2011

ASPAPEL Naturalmente, papel

Efficient Energy acogen Spanish CHP Association