POLSKI CEMENT

Stowarzyszenie Producentów Cementu
Polish Cement Association

Energy Recovery from Alternative Fuels (AF)

The Swiss Experience

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The Swiss Experience

jura cement

Content

- The situation in Switzerland
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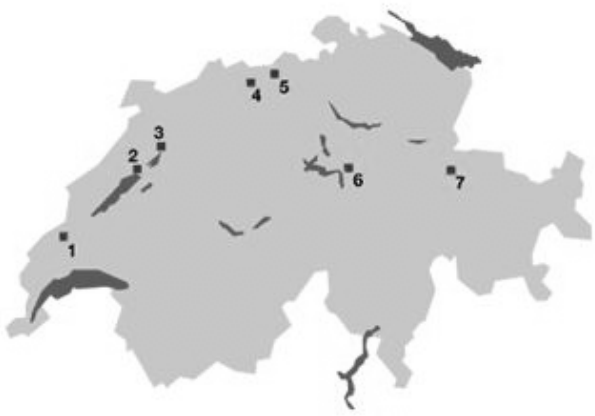
Swiss cement plants



1 Holcim
2 jura cement
3 Vigier
4 jura cement
5 Holcim
6 Holcim
7 Holcim

Production 2005

3.44 Mio t clinker

4.14 Mio t cement

The AF use in Swiss cement plants in 2005

- **244'765 tons burnt**
- **Energy substitution of 5'433 TJ**
  = 46.6 % substitution
- **Decrease from 2004 (51.2 %), due to:**
  - **Higher clinker production (+ 5.4 %)**
  - **Less waste oil**
  - **Less animal meal + fat**

Approval by the authorities

- Close cooperation with authorities → permit for relevant trials with AF
- Lobbying at highest level of administration (by company and/or cement association)
- Cement industry can solve a waste problem
  → win – win – win solution !
- Establish new regulations for use of AF in cement plants (example CH)
- Develop high level of confidence towards authorities (monitoring, reporting, ISO 14000 can help)

Agreement with the Swiss authorities (1)

- Guideline of the Swiss Federal Office for the Environment:
  Disposal of Wastes in Cement Plants (April 1988)
- http://www.umwelt-schweiz.ch/buwal/eng/
- Result of long negociations → advantages of cement kiln have been recognized
- Defines which types of wastes can be used in cement plants

Agreement with the Swiss authorities (2)

The guideline contains:

- **Requirements for permitted wastes**
- **Quality requirements for clinker, cement and flue gases (no dilution !)**
- **Further requirements (operation, monitoring, transport, etc.)**
- **Positive list of AFR**

➔ Periodical revision of positive list

The AF supply chain

- **Availability of products, now and in future (quantity, quality / variability)**
  → high flexibility required from the plant
- **Price, competition on the market (other cement plants, incineration plants, landfills, export)**
- **Make it / buy it / joint venture ?**
- **Quality control at plant is indispensable**
- **How to overcome long kiln stops ? → storage capacity, coordination with other plants**
- **AF business has own rules ≠ from cement → don't trust too much too quickly !**

Acceptance from neighbours

- **Respect exisiting environmental regulations !**
- **Involve local authorities from beginning of the AF project (incl. environmental delegates)**
- **Invite population to visit the cement plant (open doors day) → contact, transparency, confidence**
- **Inform population about the project, show good examples of others AF projects → no risks !**
- **Participate actively to the local life (support, sponsoring, presence at village fêtes): all employes are company ambassadors !**

Acceptance from personnel

- **More work for fuel preparation**
- **Kiln control more difficult**
- **Kiln operation disturbed (build-ups, blockages) → hard, dirty, dangerous cleaning work**
- **Safety & Health: strict, heavy protection measures to be observed**

Kiln operation (1)

- **Reduction of kiln capacity (5 to 10 %) due to low grade fuels, variability, more excess air**
- **Variability of AF calorific value → kiln more difficult to control → kiln control system is a big advantage, even a must for high AF level**
- **Increased S, Cl, alkalies input → additional blockages and cleaning work in preheater / precalciner / kiln → more kiln stops**
- **Increased wear of refractories / corrosion of metal parts → more kiln stops**

Kiln operation (2)

- **Basically high grade AF in kiln, low grade in PC**
- **AF with lowest variability in kiln**
- **O_2 level in rotary kiln must be always sufficient (CO → EP trip, local reducing conditions)**
- **Improve design of fuel/meal distribution in precalciner (long residence time, no local overheating)**
- **Multi-fuel burners of last generation for better operation**

Product quality

- **Customers should not remark any change in concrete properties !**
- **AF supply / quality not constant → changes of burning conditions → variability of clinker quality may increase (mineralogy)**
- **Increased input of S, Cl, alkalies → will be incorporated in clinker or cement → may influence workability, setting time, etc.**

Environmental effects

- **Basically no increase of conventional emissions (CO peaks → bag filter an advantage)**
- **Overall CO_2 balance improved**
- **Input of heavy metals increased → meet regulations, prevent accumulation in the system (e.g. Thallium)**
- **More reporting and transparency required by authorities for all emissions**

Costs / Savings (1)

Costs

- Capex
- Production loss
- Operation (AF preparation, kiln cleaning work, increased heat/power consumption)
- Maintenance (refractories, corrosion)
- Laboratory (quality, environment)
- Reporting to authorities

Costs / Savings (2)

Savings

- Conventional fuels costs
- Coal grinding costs
- Earnings from elimination tax for various AF
- CO_2 tax

The Swiss CO_2 agreement

- Signed in 2003 with Swiss government
- On level of cemsuisse (not companies)
- Reduction from 1990 to 2010:
  - 44.2 % on fuel CO_2
  - 30.3 % on geogenic CO_2
- All AF count (not only biomass !)
- CO_2 emission allowances are indexed on the clinker/cement production

Conclusion

- AF in cement kiln: win – win – win !
  → AF use becomes a must
- High flexibility is required
- Process to be well managed and controlled: no detrimental effect will be accepted by any stakeholder