INTCON

a process control system for biomass fired plants

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BIO-ENERGY
ENLARGED PERSPECTIVES

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Process control in Combustion of Biofuels must handle:

- Varying moisture content
- Varying ash content and properties
- Fuel flow properties
- Load variation
- Burn out of ash
- Burn out of gases
- Co-combustion plants – waste combustion directive

Objective of the INTCON project

To develop and demonstrate an optimising general control system for biofuel fired boilers that

- minimise the emissions
- optimise the burn out of ashes
- minimising problems such as slagging/fouling
- optimise the heat output

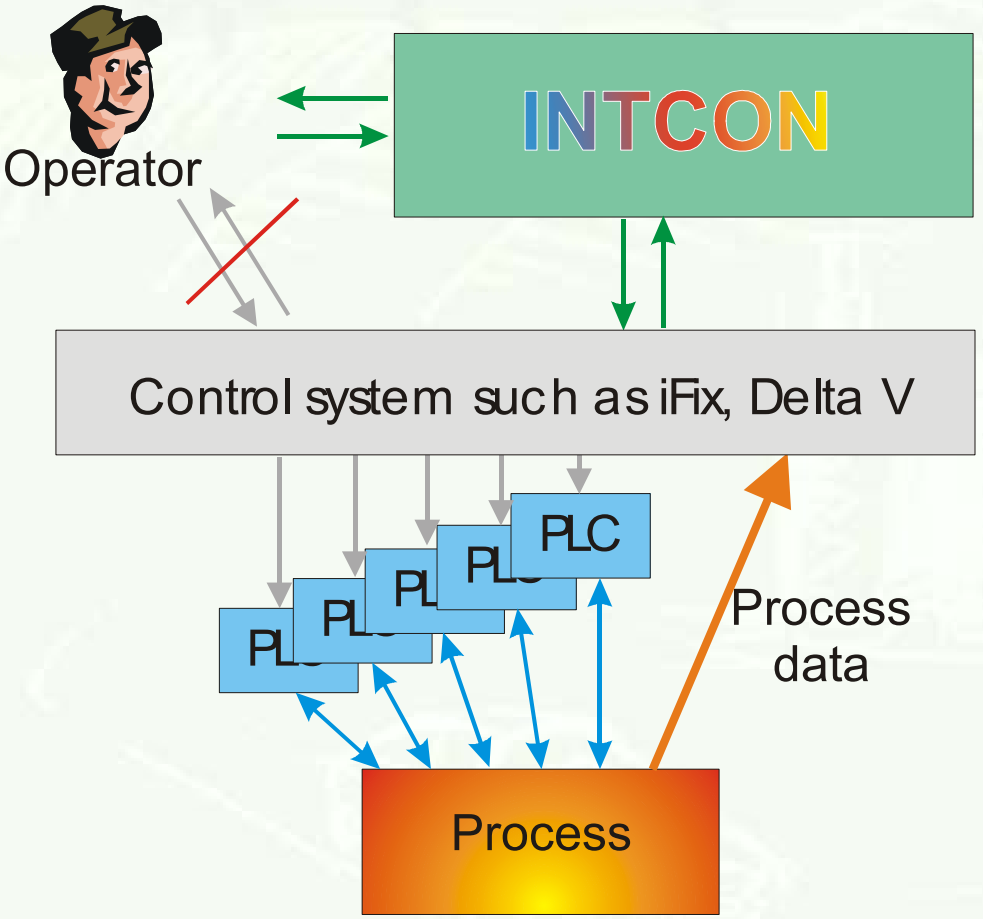
Participants

- TPS Termiska Processer AB, Sweden, Coordinator
- CINAR, UK
- CIRCE, Spain
- TECHNATOM, Spain

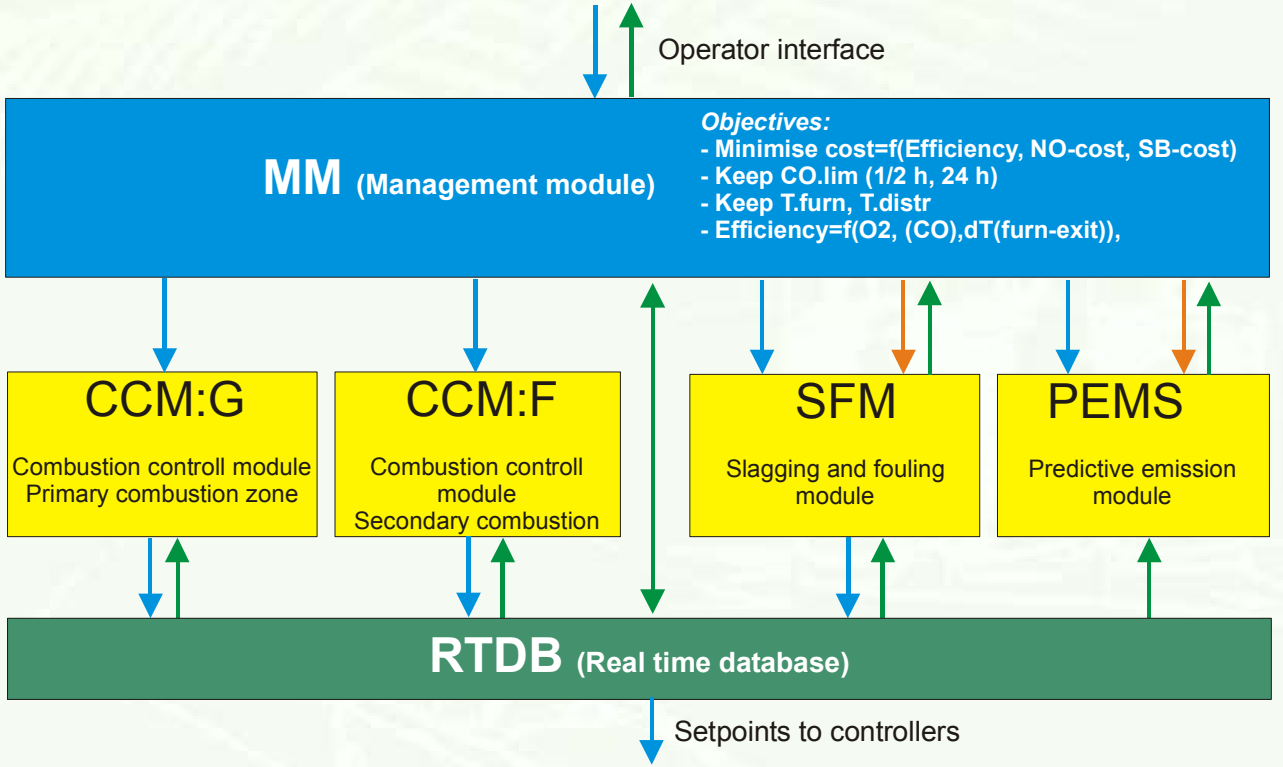
Strategy

- INTCON is an open and modular system
- The work is based on a system for grate fired boiler
- Create a set of specialized as well as general modules
- Methods for alterations for other combustion methods will be evaluated

Structure of a control system



INTCON structure



Further modules:
- SNCR
- Additives
- Steam turbine
- .....

Combustion Control Module: Grate

Objective is to maintain boiler load at set point while reducing fluctuations and keeping burn out within limits

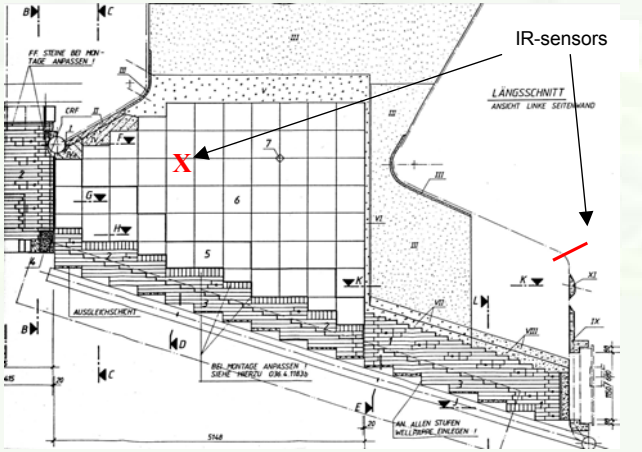
Control variables

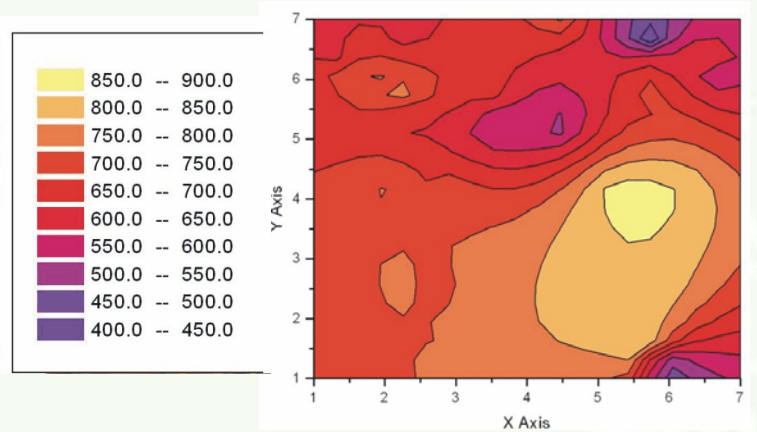
- Fuel feeder
- Speed for 3x4 grate zones
- 3x4 primary air supplies

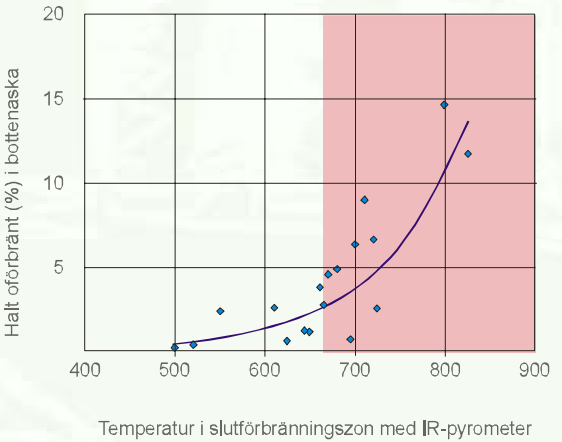
Control inputs

- Boiler load
- IR-temperatures on grate
- Thermocouples in grate elements

IR-measured temperatures



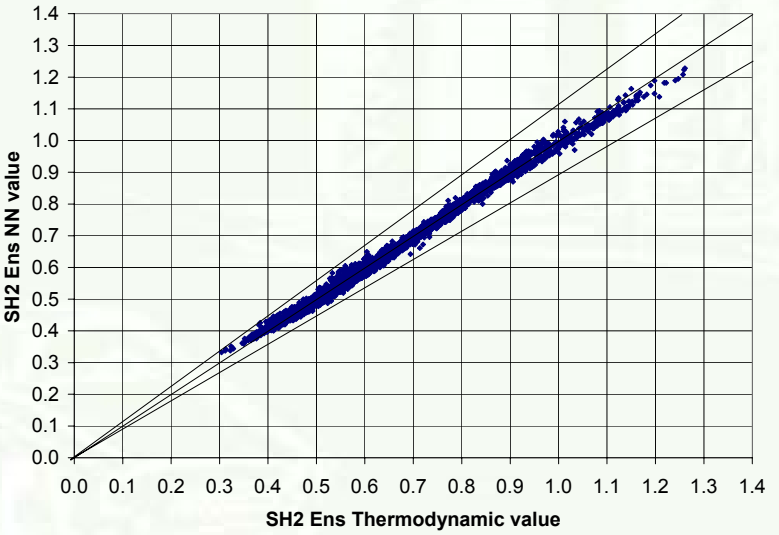




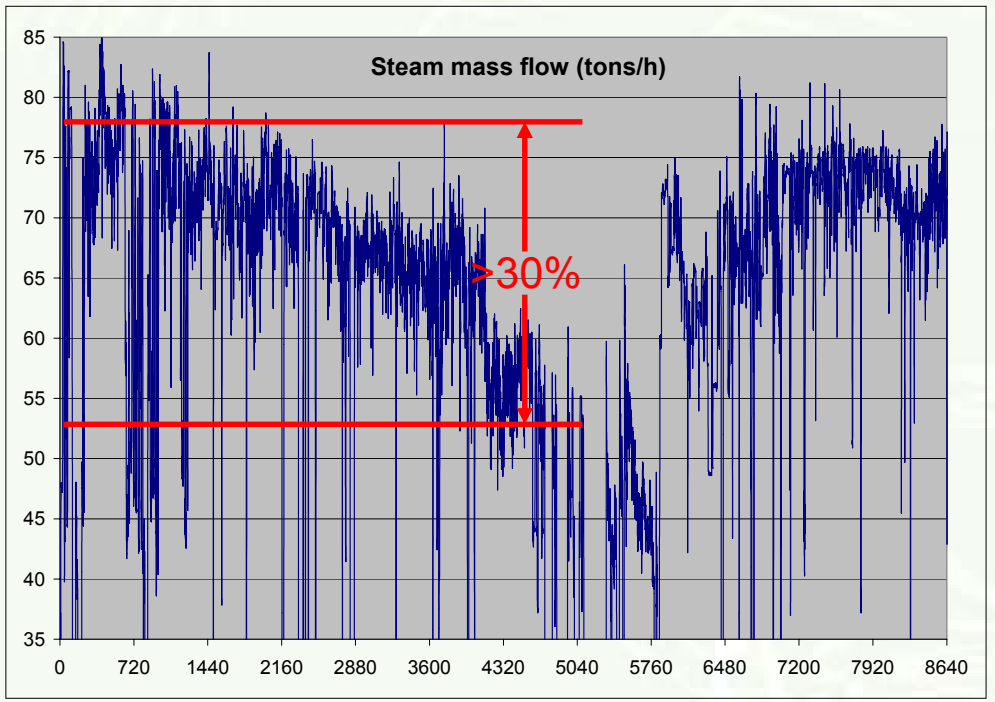
Slagging Fouling Module

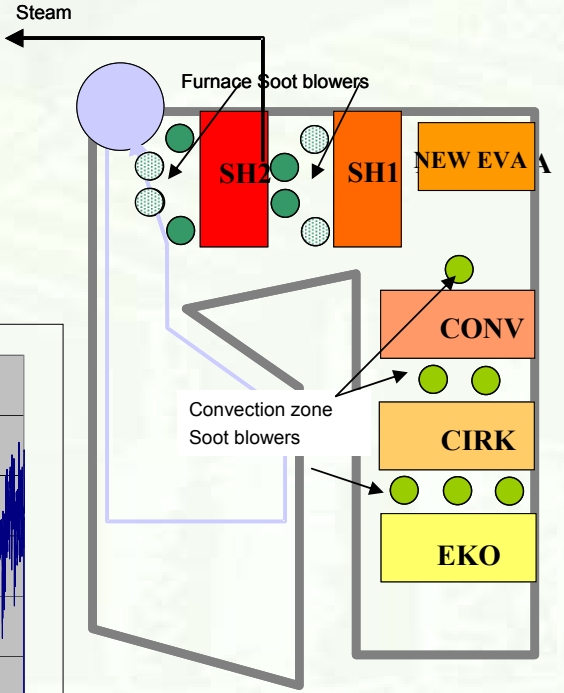
The objective is to optimise output of the boiler

- Monitoring changes in heat transfer
- Individual control of soot blowers to each section
- Prediction of fouling growth and consequence
- NN module reduces the number of input variables needed for boiler control



Slagging and Fouling





Conclusion

- A basic layout of the system and methods for communication within the system and to the process is completed.
- Several of the modules will be tested in the coming season
- This is the first step to a general system for controlling boilers and even more the complete operation of a power/district heating plant


Other Systems
Operated By
Precombustion Area
Combustion Area
Postcombustion Area
Left
Center
Right
Zone 1
Zone 2
Zone 3
Zone 4
VIEW SELECTED
Time Configuration
LOOP OFF
Zone 1 Left
377.93
Zone 2 Left
326.80
Zone 3 Left
Zone 4 Left
Zone 1 Center
388.50
Zone 2 Center
345.07
Zone 1 Right
396.83
Zone 2 Right
326.80
Intellution Dynamics WorkSpace (Run)
File WorkSpace Window Help
10:14:57
05/06/2003
CCM
Grate
SFM
Results
PEMMS
MM
INTCON
SFM
PEMMS
CCM
CONTROL
X Y
Total Air
Total 1ry Air
Total 2ry Air
Nm3/h
10:16:32
05/06/2003
10:18:40
05/06/2003
Switched
On
Off