

Optimal Location and Management of a Biomass Inventory Facility

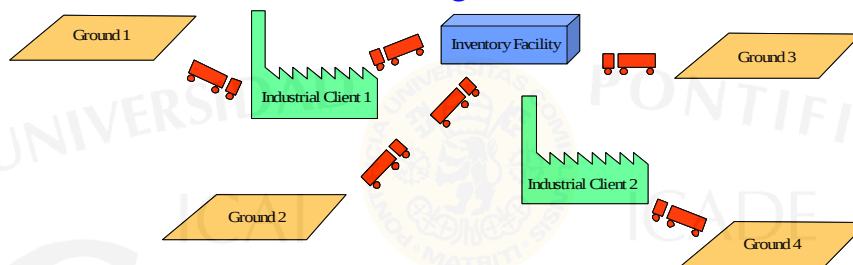
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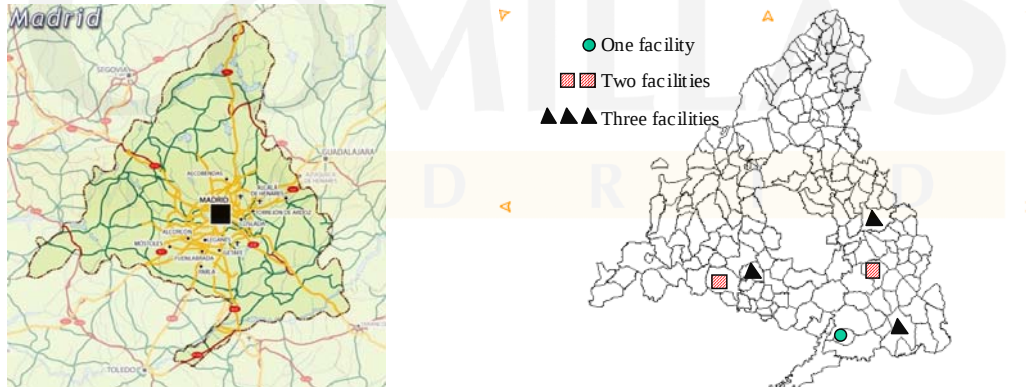
Key aspects of this research

- **Research context:**
 - Recycling agricultural wastes as fuel for industrial plants
 - Difficulty of dealing with widespread and seasonal agricultural collection processes
 - Very detailed road topology to obtain realistic solutions
- **Objectives:**
 - Optimize logistic costs and delayed biomass collection impacts
 - Minimization of unsupplied biomass to industrial clients
- **Combined problem:**
 - Facility location problem modelled using binary variables
 - Biomass transportation problem using flow variables

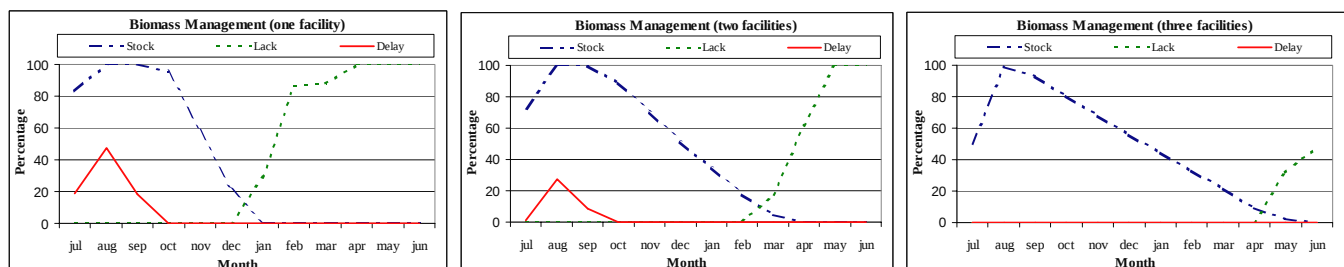
Biomass Logistic Scheme



Real case study at the Community of Madrid (road network and facilities location)



Biomass management with one, two and three inventory facilities



Implementation

- GAMS programming language and CPLEX 10.0 solver
- Each case has 140.000 constraints, 200.000 continuous & 200 binary variables and 1.500.000 non zero elements
- Each execution takes 30 minutes to get an integer solution with a 5 % integrality gap in a Pentium IV 2.34 GHz

Future research

- Formulation of the stochastic nature of each collection and consumption biomass scenario
- Addition of investment cost of each facility to the objective function to determine the optimal number of facilities