OSeMOSYS (Open Source energy MOdelling SYStem)

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BASICS

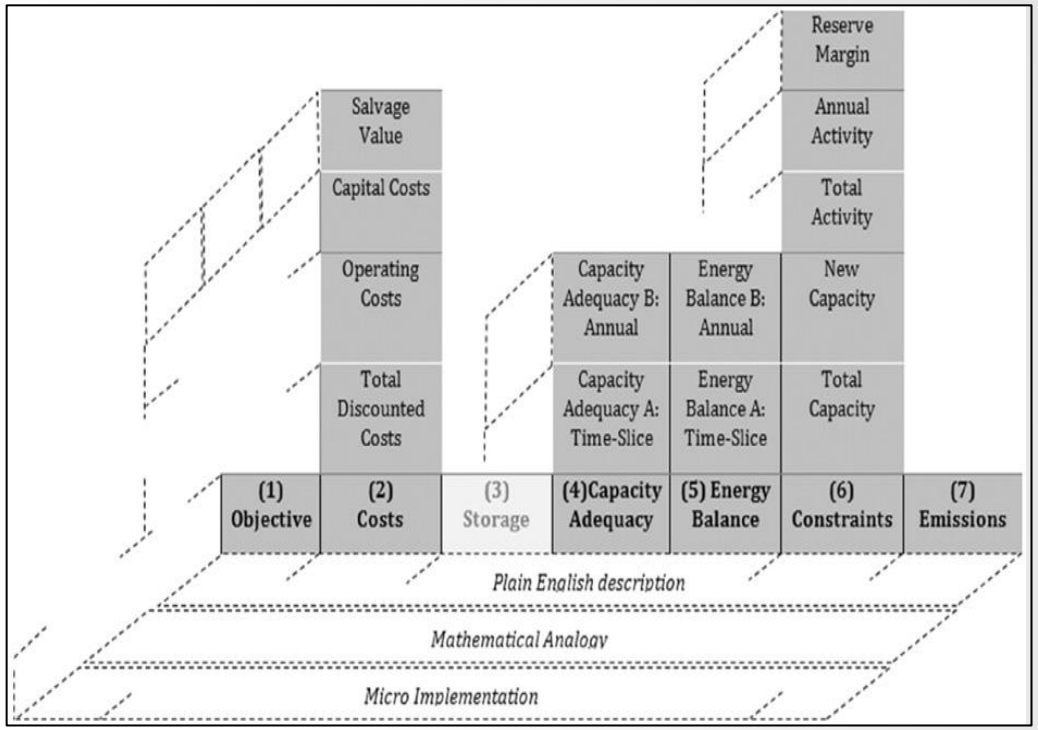
- Developed in 2011
- OSeMOSYS is a least cost linear optimisation tool
- Primarily used for long-term energy system investment planning

"OSeMOSYS: The Open Source Energy Modeling System: An introduction to its ethos, structure and development", Howells, M. et al, Energy Policy, 2011

DESIGN FEATURES

Three **levels of abstraction**:

- A plain English description
- An algebraic formulation of the plain English description
- The model's implementation in a programming language



Mathematical language:

GNU MathProg (similar to GAMS)

Solver:

glpsol (option to use CPLEX)

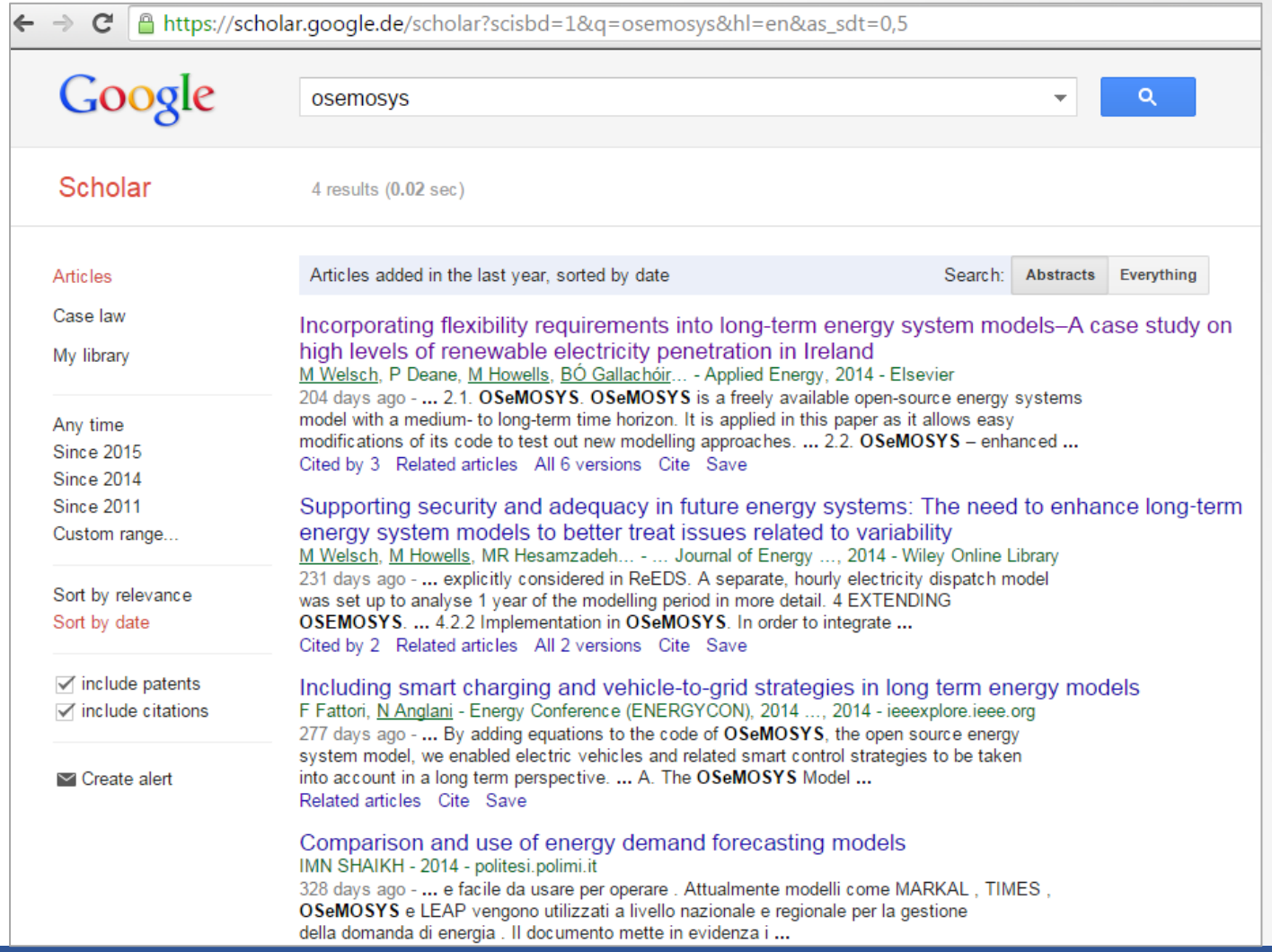
EXAMPLE OF CODE

```
######################
# Objective Function #
######################
#
minimize cost: sum{r in REGION, y in YEAR} TotalDiscountedCost[r,y];
#
####################
# Constraints      #
####################
#
s.t. EQ_SpecifiedDemand{r in REGION, l in TIMESLICE, f in FUEL, y in YEAR}: SpecifiedAnnualDemand[r,f,y]*SpecifiedDemandProfile[r,f,l,y] / Yea
#
#########          Capacity Adequacy A         #############
#
s.t. CAa1_TotalNewCapacity{r in REGION, t in TECHNOLOGY, y in YEAR}:AccumulatedNewCapacity[r,t,y] = sum{yy in YEAR: y-yy < OperationalLife[r,t
                                  if CapacityOfOneTechnologyUnit[r,t,y]=0 then NewCapacity[r,t,yy]
                                  else CapacityOfOneTechnologyUnit[r,t,yy]*NumberOfNewTechnologyUnits[r,t,yy];
s.t. CAa2_TotalAnnualCapacity{r in REGION, t in TECHNOLOGY, y in YEAR}: AccumulatedNewCapacity[r,t,y]+ ResidualCapacity[r,t,y] = TotalCapacity
s.t. CAa3_TotalActivityOfEachTechnology{r in REGION, t in TECHNOLOGY, l in TIMESLICE, y in YEAR}: sum{m in MODE_OF_OPERATION} RateOfActivity[r
s.t. CAa4_Constraint_Capacity{r in REGION, l in TIMESLICE, t in TECHNOLOGY, y in YEAR: TechWithCapacityNeededToMeetPeakTS[r,t]<>0}: RateOfTota
#
# Note that the PlannedMaintenance equation below ensures that all other technologies have a capacity great enough to at least meet the annual
#
#########          Capacity Adequacy B         #############
```

INTERFACES

- ANSWER-OSeMOSYS
- OSeMOSYS Excel interface
- LEAP interface
- Run an input file
  - Directly on the command line, e.g, using Notepad++ to write input file
  - GUSEK
  - Matlab

ONGOING WORK



www.osemosys.org

For further information and downloads, visit www.osemosys.org

Or write to osemosys@gmail.com

(Or email me at ashi@kth.se)