

OSeMOSYS (Open Source energy MOdelling SYStem)



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2nd open energy modelling initiative workshop April 2015



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**:

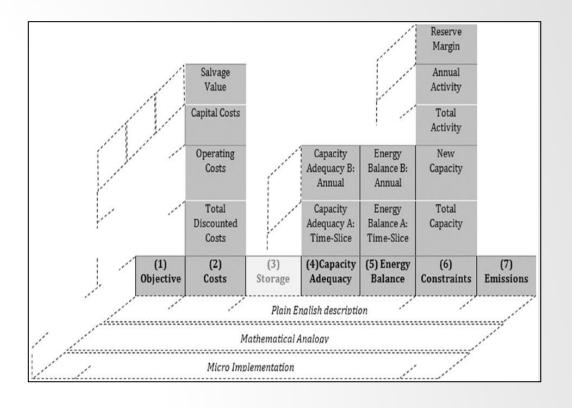
- A plain English description
- An algebraic formulation of the plain English description
- The model's implementation in a programming language

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, 1 in TIMESLICE, f in FUEL, y in YEAR}: SpecifiedAnnualDemand[r,f,y]*SpecifiedDemandProfile[r,f,l,y] / Yea
########
                   Capacity Adequacy A
                                               **********
s.t. CAal 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,yx]*NumberOfNewTechnologyUnits[r,t,yx];
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, 1 in TIMESLICE, t in TECHNOLOGY, y in YEAR: TechWithCapacityNeededToMeetPeakTS[r,t]<>0}: RateOfTotal
# 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
                                               **********
```

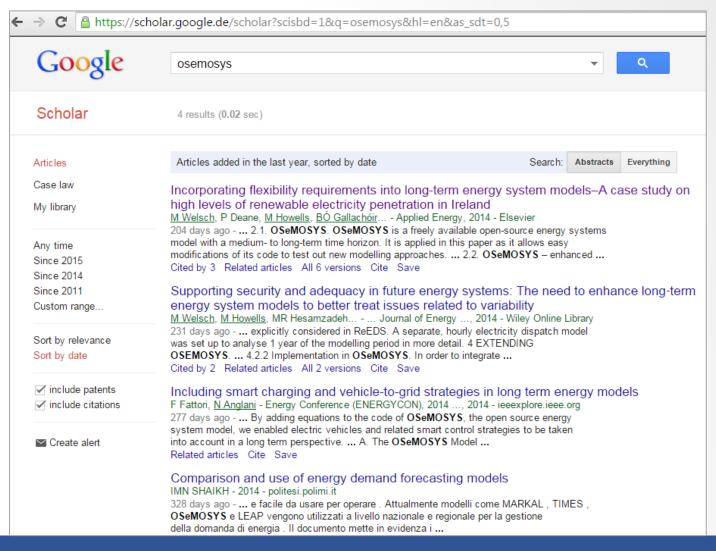


INTERFACES

- 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)

OSeMOSYS the Open Source Energy Modelling System

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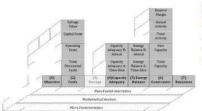
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Contact us

Looking for a

- . Simple, powerful and transparent toolkit with
- Open, well documented code to produce a
 Free optimization energy model that is
- · Transportable to other platforms?

Then OSeMOSYS may be the energy modelling SOFTware toolkif for you. It is build by a community of leading institutions and ideal for academic investigations, powerful energy systems analysis and protoyping new energy model formulations. (This type of software is typically used for the analysis of energy systems looking over the medium (10-15yrs) and long (60-100yrs) term.)



New version of OSeMOSYS released I

The latest version includes improvements in the processing time, reduced memory usage, and a reordered index for compatibility with an interface currently in development.

Click here to register and download OSeMOSYS:



We also have a (brand new) discussion forum kindly hosted by COMMEND here:



OSeMOSYS is designed with several 'blocks' of abstraction to aid easy maintenance, development and transport to other platforms