## Basic use test

**1 Create a project**

**2 Upload energy model (ost.zip)**

**3 Set external parameters, for example**

**DHPrice** = 0.00011

**ElectricityPrice** = 0.00012

**SolarThInvCost** = 100

**StorageInvCost** = 150

**4 Create metrics for the project, for example**

**DHCost**

integrate(HOUR\_HEAT.SP\_VALUE, 0, Infinity) / 3600 \* DHPrice

**ElectricityCost**

*integrate(HOUR\_NET\_ELEC.SP\_VALUE, 0, Infinity) / 3600 \* ElectricityPrice*

**SolarThCost**

*SolarThInvCost \* (OSTERSUNDOM\_BIG\_1.A1\_Solarth\_m2 + OSTERSUNDOM\_BIG\_1.A2\_Solarth\_m2 + OSTERSUNDOM\_BIG\_1.A3\_Solarth\_m2 + OSTERSUNDOM\_BIG\_1.A4\_Solarth\_m2 + OSTERSUNDOM\_BIG\_1.A5\_Solarth\_m2 + OSTERSUNDOM\_BIG\_1.A6\_Solarth\_m2 + OSTERSUNDOM\_BIG\_1.A7\_Solarth\_m2 + OSTERSUNDOM\_BIG\_1.A8\_Solarth\_m2 + OSTERSUNDOM\_BIG\_1.A9\_Solarth\_m2 + OSTERSUNDOM\_BIG\_1.A10\_Solarth\_m2 + OSTERSUNDOM\_BIG\_1.A11\_Solarth\_m2 + OSTERSUNDOM\_BIG\_1.A12\_Solarth\_m2 + OSTERSUNDOM\_BIG\_1.A14\_Solarth\_m2)*

**StorageCost**

StorageInvCost \* (OSTERSUNDOM\_BIG\_1.A1\_Storage\_h + OSTERSUNDOM\_BIG\_1.A3\_Storage\_h + OSTERSUNDOM\_BIG\_1.A4\_Storage\_h + OSTERSUNDOM\_BIG\_1.A5\_Storage\_h + OSTERSUNDOM\_BIG\_1.A6\_Storage\_h + OSTERSUNDOM\_BIG\_1.A7\_Storage\_h + OSTERSUNDOM\_BIG\_1.A8\_Storage\_h + OSTERSUNDOM\_BIG\_1.A9\_Storage\_h + OSTERSUNDOM\_BIG\_1.A10\_Storage\_h + OSTERSUNDOM\_BIG\_1.A11\_Storage\_h + OSTERSUNDOM\_BIG\_1.A12\_Storage\_h + OSTERSUNDOM\_BIG\_1.A13\_Storage\_h + OSTERSUNDOM\_BIG\_1.A14\_Storage\_h)

**5 Create scenarios (>2) for the project with different input parameter settings**

**-Alter** *A#\_Solarth\_m2*

*-Alter* A#\_Storage\_h

**6 Simulate scenarios**

**7 Create a database optimization set, for example with expression**

(Minimize) DHCost + SolarThCost + StorageCost

**8 Run database search**

**9 Test visualization**

**-Different chart types**

**-Time series (using different output variables)**

**-Scatter plots (with metrics)**

**10 Test table results**

## Genetic algorithm test

* log in
* create project
* upload ost.zip
* create optimization set, type = genetic algorithm
* create GA objective function: name = max\_heat, sense = maximize, expression = integrate(HOUR\_HEAT.SP\_VALUE, 0, Infinity) / 3600
* create GA objective function: name=min\_elec, sense = minimize, expression = integrate(HOUR\_NET\_ELEC.SP\_VALUE, 0, Infinity) / 3600
* create decision variable: name = a, type = Double, lower bound = 0, upper bound = 10000
* create decision variable: name = b, type = Double, lower bound = 1, upper bound = 2
* create constraint: name = prodconstraint, lower bound = 1000, expression = a\*b, upper bound = 18000
* edit model input parameters: select component OSTERSUNDOM\_BIG\_1, then edit A2\_Solarth\_m2 = a, A2\_Storage\_h = 15.0\*b, A3\_Solarth\_m2 = 10000+a, A3\_Storage\_h = 10.0\*b
* edit algorithm parameters: max runtime = 30, population size = 10, number of parents per generation = 5, number of offspring per generation = 5
* run algorithm
* wait for 30+ minutes (the Opt4J GA backend only checks runtime between GA iterations, so depending on population size, it can take much longer than the maximum runtime)
* select “open scenario” to see the generated scenarios

## User management test

* Log in as an admin user
* Create users for each global user role: admin, expert, standard guest
* Go to edit user page for the expert user
* Check that it shows the expert role
* Add standard role to one of the existing projects
* Check that the role is then listed in the page
* Edit guest user and add guest role to a project
* Check that the role is then listed in the page
* Log in as expert user
* Open the project that the user has access to
* Check that it succeeds
* Try to open any other project, should not be possible
* Try to create a new project, check that it succeeds
* Try to create a new scenario, check that it succeeds
* Log in as standard user
* Try to create a new project, should not be possible
* Log in as guest user
* Try to create a new project, should not be possible
* Open the project that the user has access to
* Try to create a scenario or optimization set, should not be possible
* Log in as an admin user
* Remove project roles of expert and guest users
* Check that they don’t appear in the role lists
* Remove user guest
* Check that it doesn’t appear in the list