

# Workshop

Parallel Coördinates Graphs

Energyplus

19-juni-2015

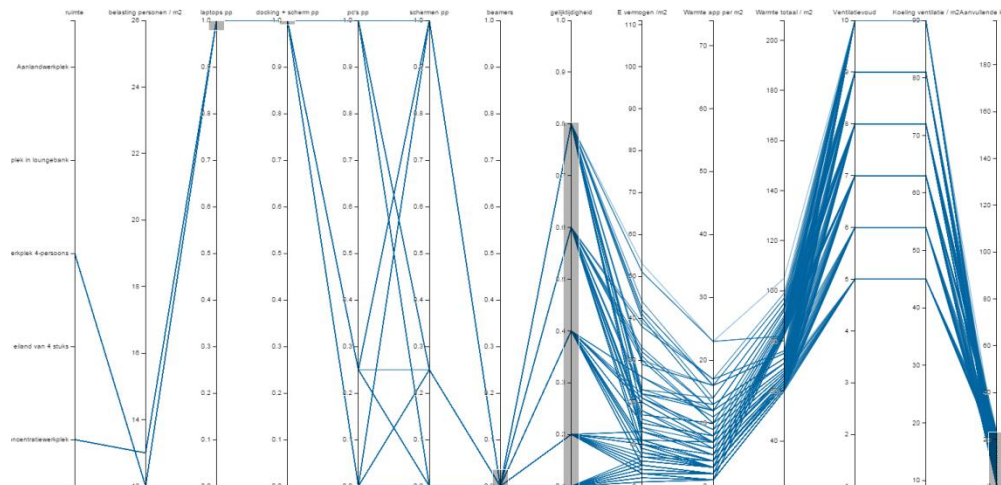
# Workshop PCG – E+

## Doel:

De resultaten van een variantenstudie in een PCG zetten.

## Inhoud:

- 1. Even opfrissen!
- 2. Parametrisch simuleren met E+
  - Uitleg
  - Oefeningen
- 3. Parallel Coördinates graphs
  - Uitleg
  - Oefening



**Even opfrissen!**

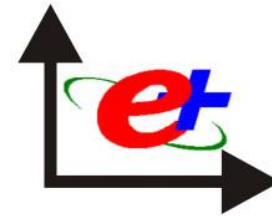
# Even oprissen!



SketchUp



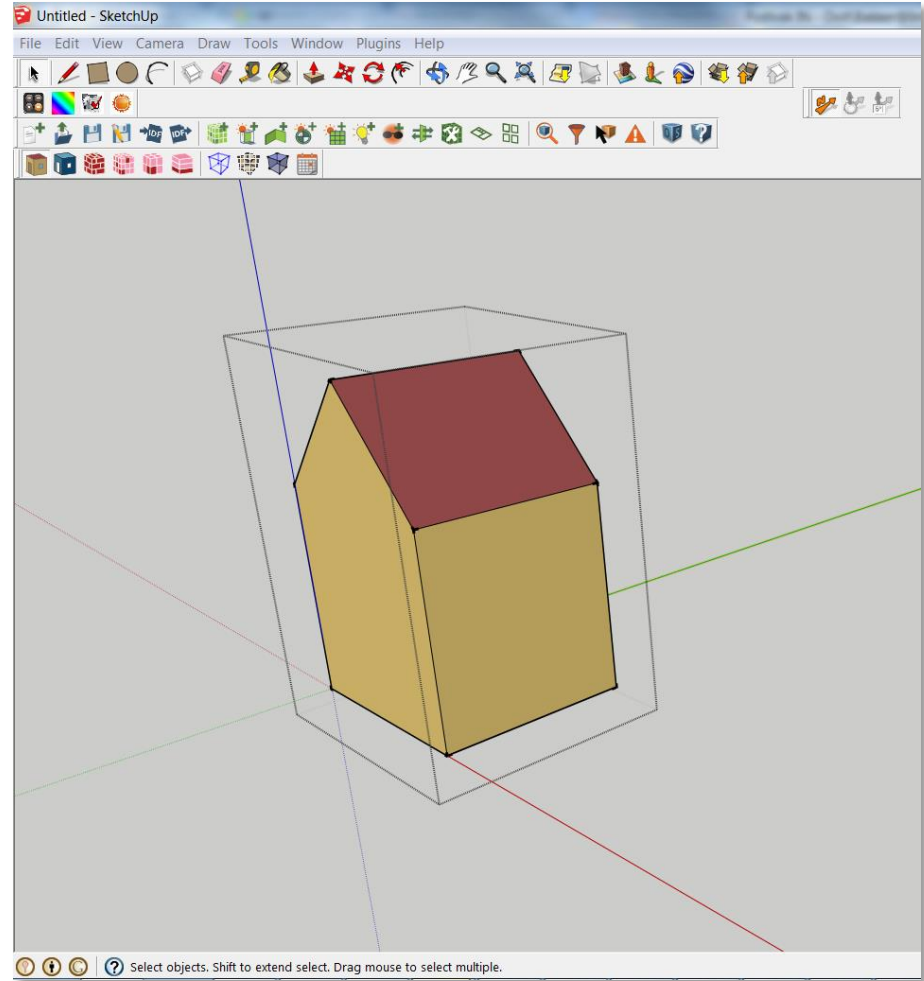
OpenStudio



# Even oprfrissen!



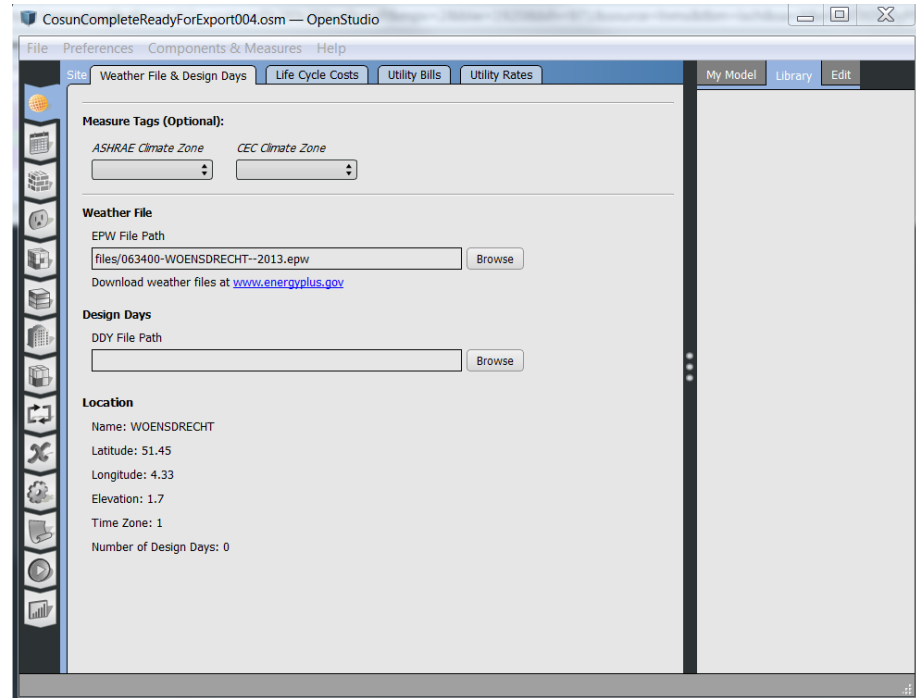
OpenStudio



# Even oprfrissen!



## OpenStudio



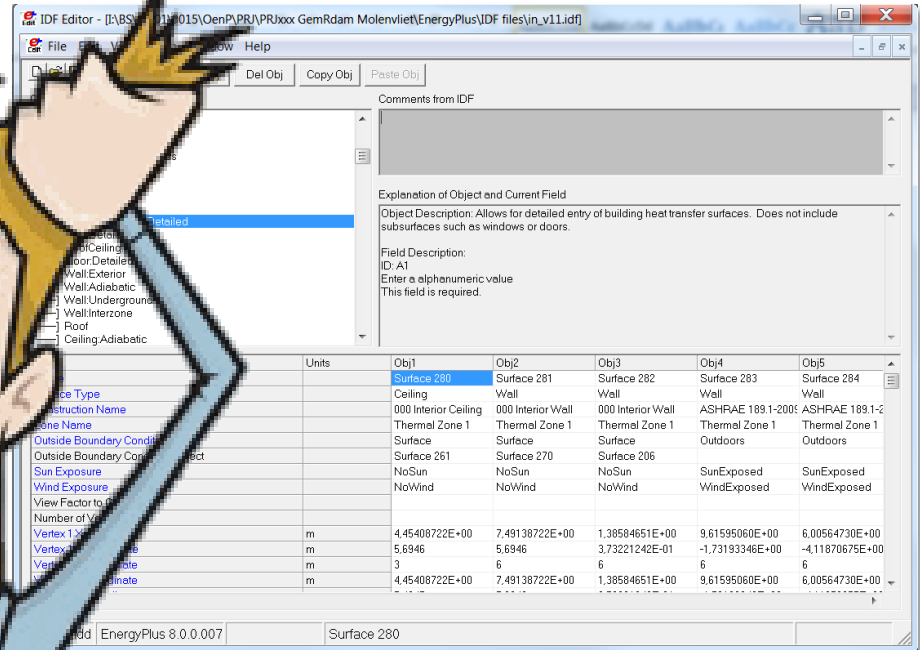
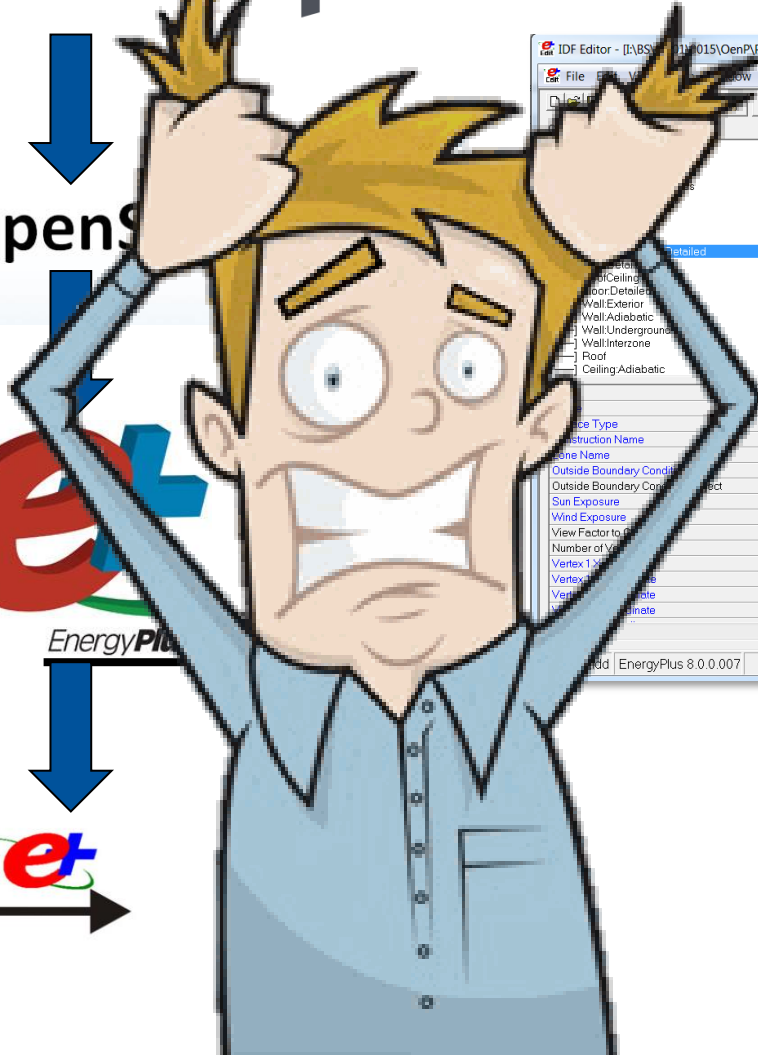
# Even oprissen!



OpenS



EnergyPlus



# Even oprissen!

IDF Editor - [D:\dbakker1\Documents\Energyplus\Workshop\Workshop1\RoyalPaprika\IDF\COMPLETE\out.idf]

File Edit View Jump Window Help

New Obj Dup Obj Del Obj Copy Obj Paste Obj

Class List

- [0025] Schedule:Week:Daily
- [---] Schedule:Week:Compact
- [0025] Schedule:Year
- [0013] Schedule:Compact
- [0009] Schedule:Constant
- [---] Schedule:File

Surface Construction Elements

- [0025] Material
- [0001] Material:NoMass
- [---] Material:InfraredTransparent
- [0002] Material:AirGap
- [---] Material:RoofVegetation
- [0002] **WindowMaterial:SimpleGlazingSystem**
- [0007] WindowMaterial:Glazing
- [---] WindowMaterial:GlazingGroup:Thermochromic
- [---] WindowMaterial:Glazing:RefractionExtinctionMethod
- [---] WindowMaterial:Gas
- [---] WindowGap:SupportPillar
- [---] WindowGap:DeflectionState
- [---] WindowMaterial:GasMixture
- [---] WindowMaterial:Gap
- [---] WindowMaterial:Shade
- [---] WindowMaterial:ComplexShade
- [---] WindowMaterial:Blind
- [---] WindowMaterial:Screen
- [---] WindowMaterial:Shade:EquivalentLayer
- [---] WindowMaterial:Drape:EquivalentLayer
- [---] WindowMaterial:Blind:EquivalentLayer

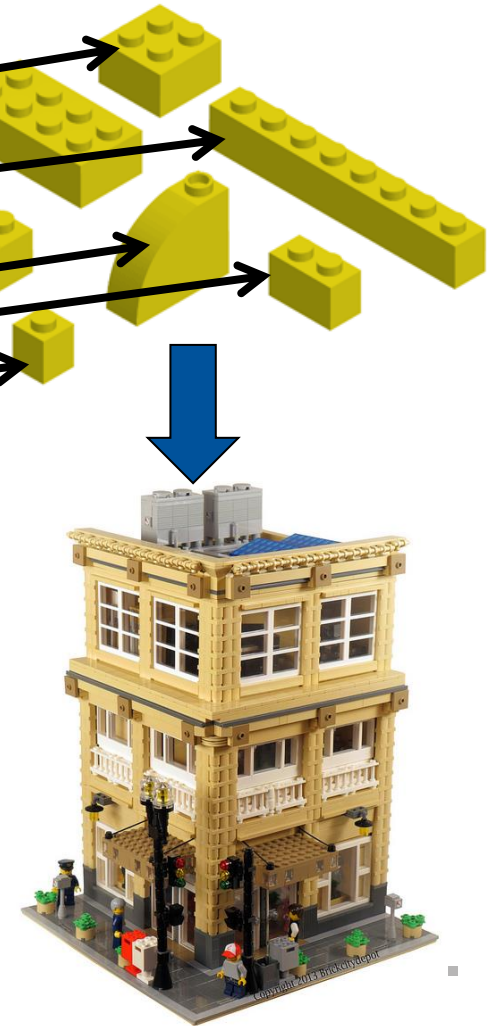
Comments from IDF

Explanation of Object and Current Field

Object Description: Alternate method of describing windows  
This window material object is used to define an entire glazing system using simple performance parameters.

Field Description:  
ID: A1  
Enter an alphanumeric value  
This field is required.

Field	Units	Obj1	Obj2
Name		RaamSGG	RaamPV
U-Factor	W/m2-K	1	1,25
Solar Heat Gain Coefficient		0,37	0,4
Visible Transmittance		0,71	0,49





**Even oprissen!**



**Imtech**

# Even opfrissen!

The screenshot shows the IDF Editor interface. The Class List on the left includes various material and glazing system entries. The 'WindowMaterial:SimpleGlazingSystem' entry is highlighted. Below the class list is a table with the following data:

Field	Units	Obj1	Obj2
Name		RaamSGG	RaamPV
U-Factor	W/m2-K	1	1.25
Solar Heat Gain Coefficient		0.37	0.4
Visible Transmittance		0.71	0.49

```
!- ===== ALL OBJECTS IN CLASS: WINDOWMATERIAL:SIMPL  
=====
```

```
WindowMaterial:SimpleGlazingSystem,  
RaamSGG,           !- Name  
1,                !- U-Factor {W/m2-K}  
0.37,            !- Solar Heat Gain Coefficient  
0.71;            !- Visible Transmittance
```

```
WindowMaterial:SimpleGlazingSystem,  
RaamPV,           !- Name  
1.25,            !- U-Factor {W/m2-K}  
0.4,             !- Solar Heat Gain Coefficient  
0.49;           !- Visible Transmittance
```

```
!- ===== ALL OBJECTS IN CLASS: WINDOWMATERIAL:GLAZI
```

```
WindowMaterial:Glazing,  
Clear 3mm,        !- Name  
SpectralAverage,  !- Optical Data Type  
,                !- Window Glass Spectral Data S  
0.0029999999999999999, !- Thickness {m}  
0.837,           !- Solar Transmittance at Norma  
0.075,           !- Front Side Solar Reflectance  
Incidence  
0,                !- Back Side Solar Reflectance  
Incidence  
0.898,           !- Visible Transmittance at Norm  
0.081,           !- Front Side Visible Reflectan  
Incidence  
0,                !- Back Side Visible Reflectanc  
Incidence  
0,                !- Infrared Transmittance at No  
0.84,            !- Front Side Infrared Hemispher  
0.84,            !- Back Side Infrared Hemispher  
0.9,              !- Conductivity {W/m-K}
```



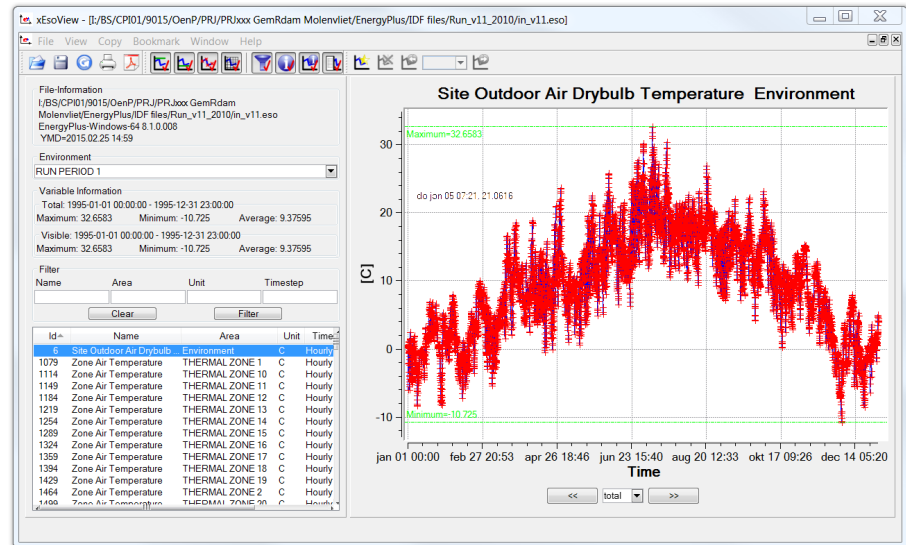
# Even oprissen!



## OpenStudio



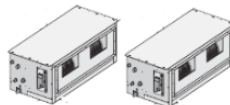
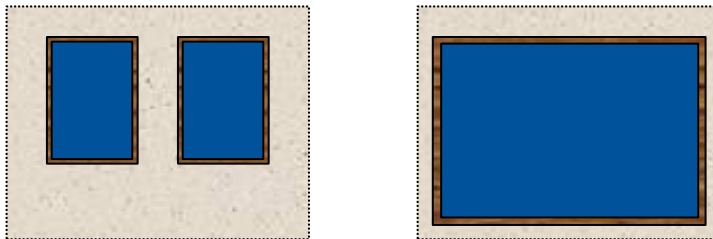
## xEsoView



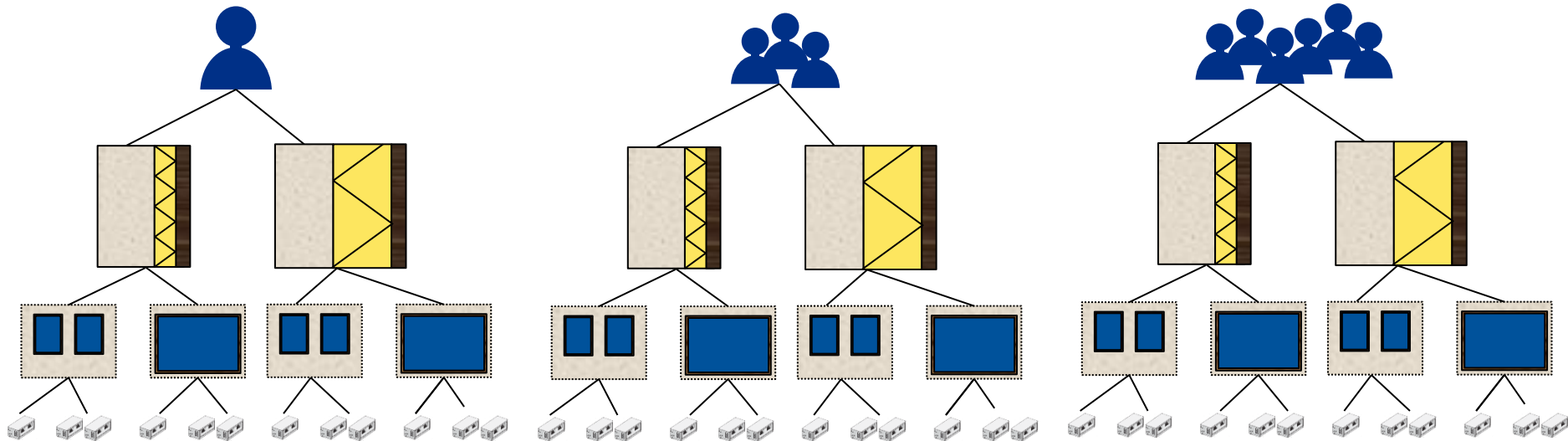
# Even oprissen!

## Parametrisch Simuleren

- Personen in de ruimte
- Thermische isolatie 3cm of 30 cm
- %glas in de gevel
- Koel / verwarmvermogen in de ruimte



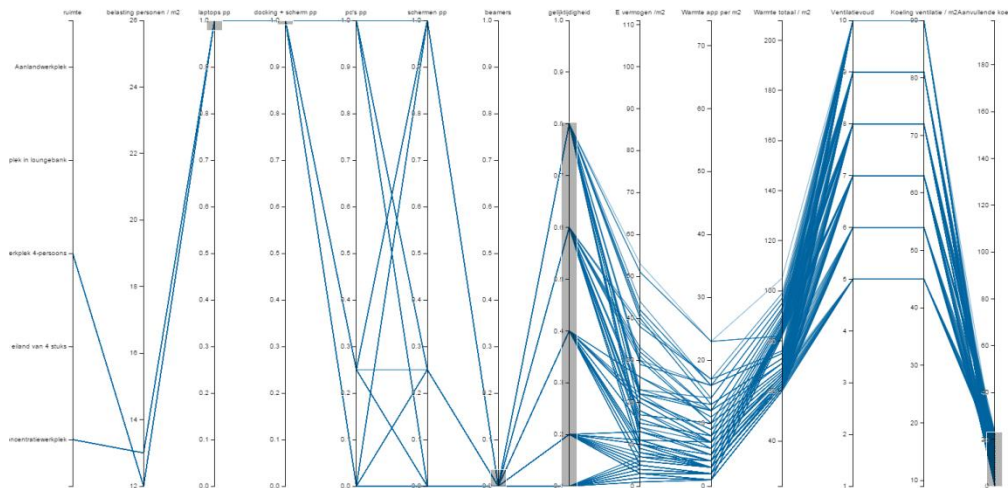
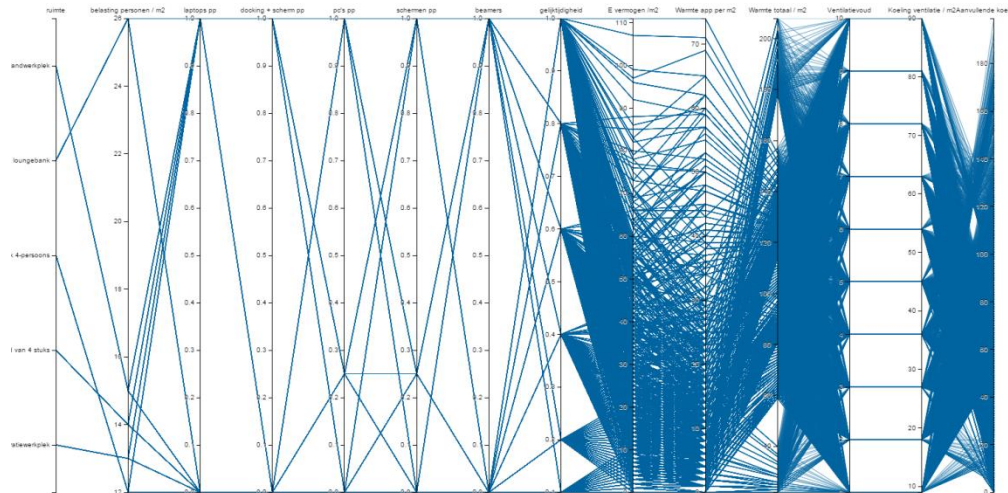
# Even oprissen!



$3 \times 2 \times 2 \times 2 = 24$  varianten



# Even opfrissen!



# Parametrisch simulieren

jEplus

<http://www.jeplus.org/>



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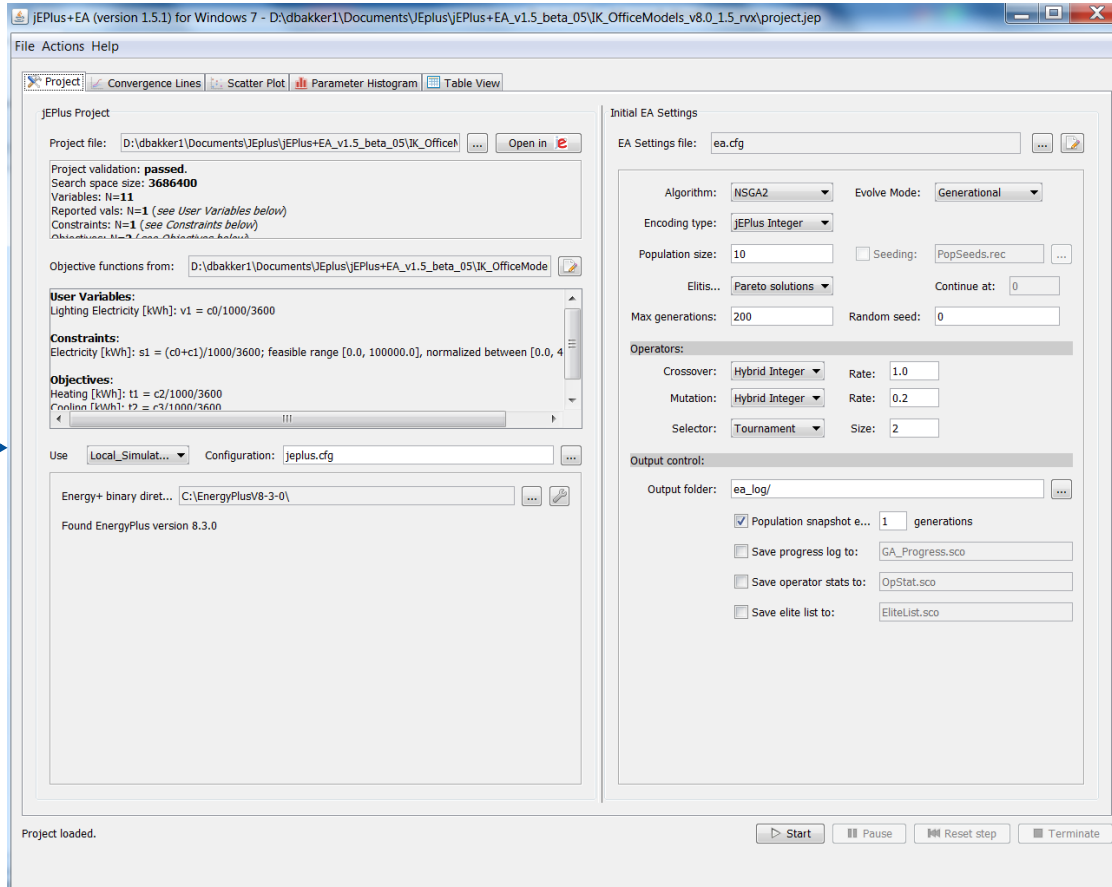
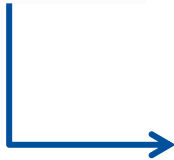
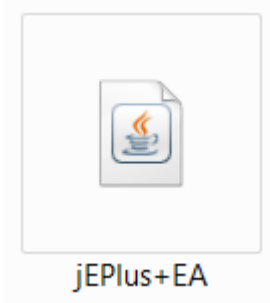
Website: [http://www.iesd.dmu.ac.uk/staff/ivan\\_korolija.php/](http://www.iesd.dmu.ac.uk/staff/ivan_korolija.php/)





# jEplusEA

- Optimalisatie
- Op basis van jEplus

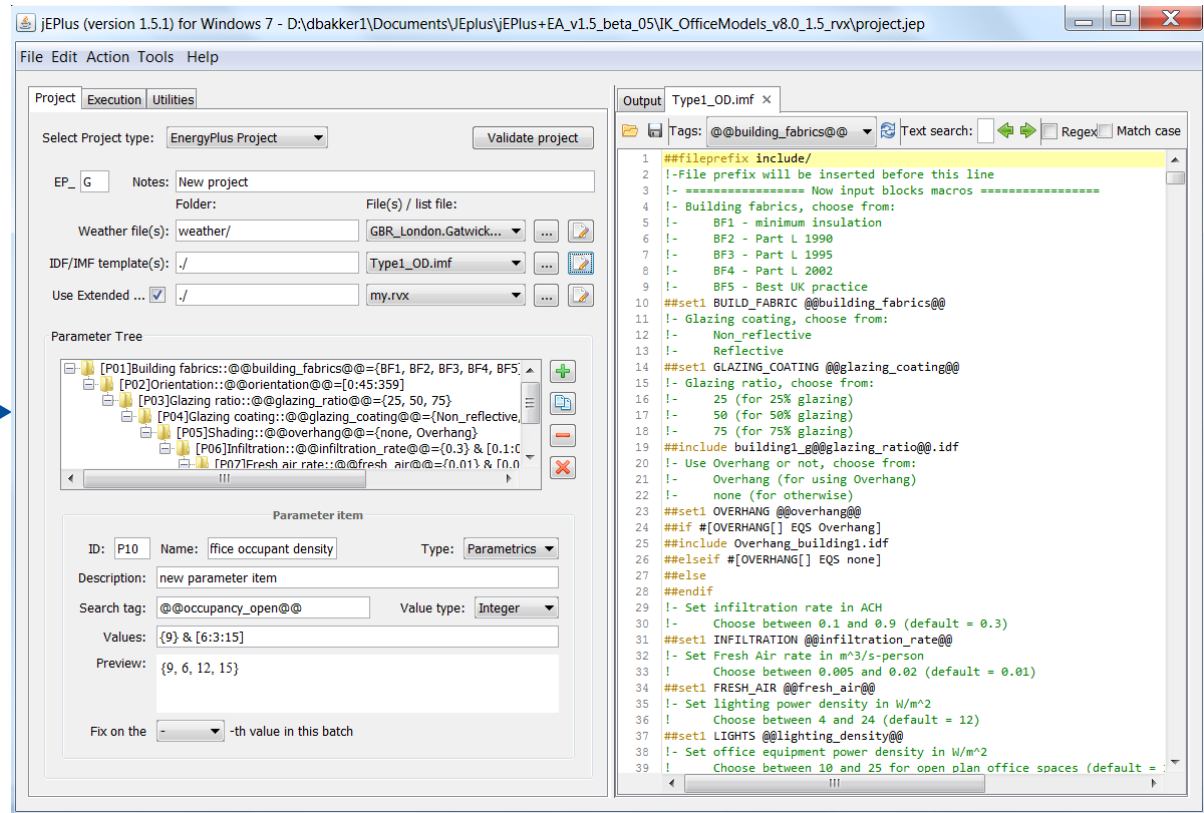
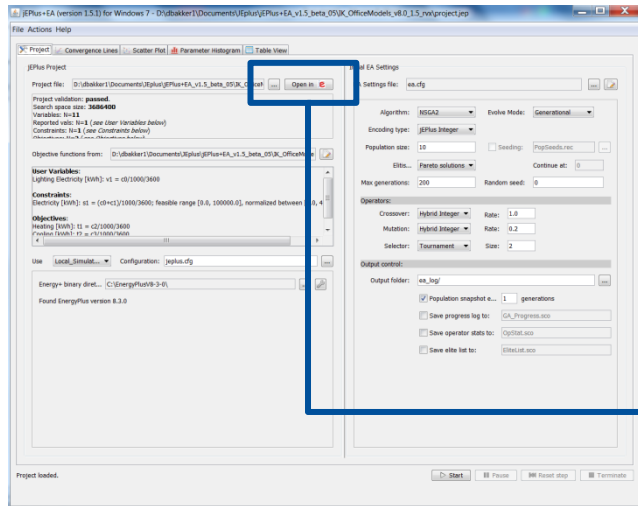


jEplusEA

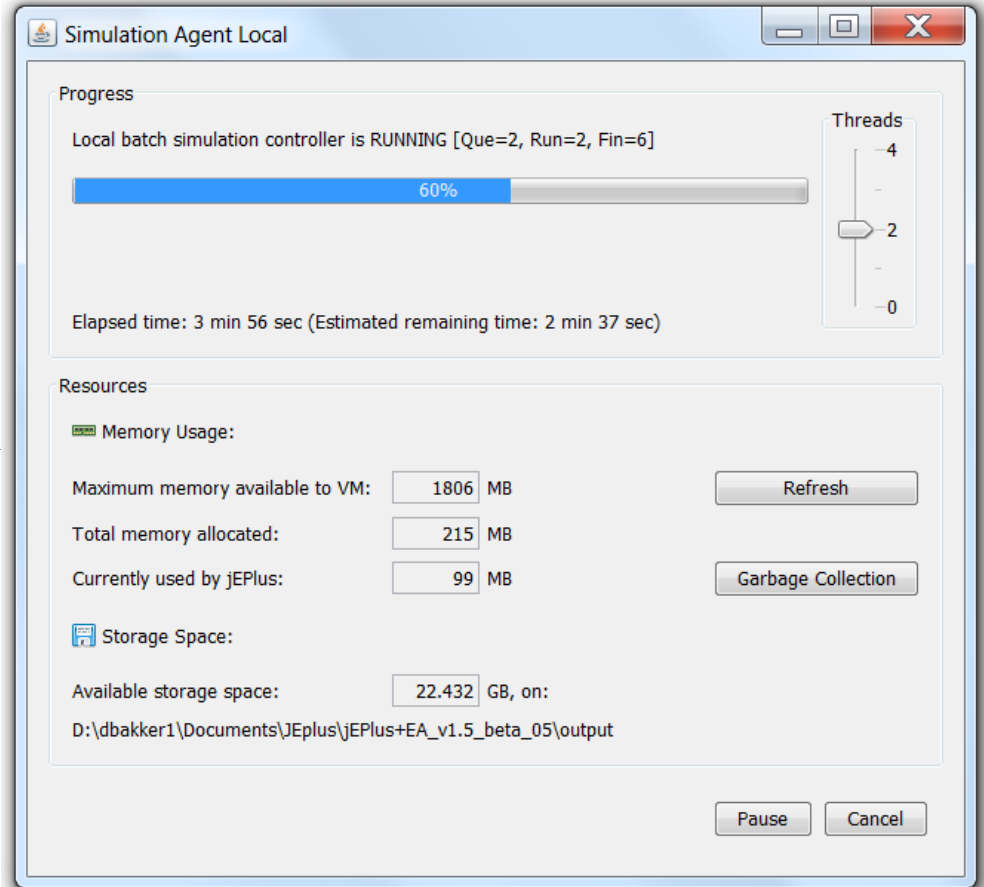
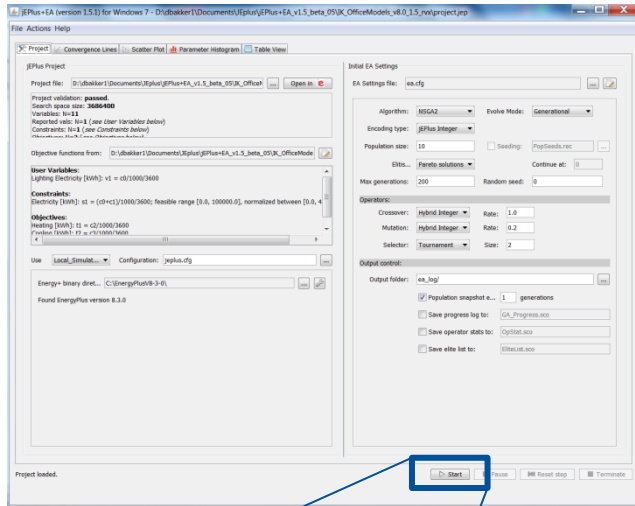


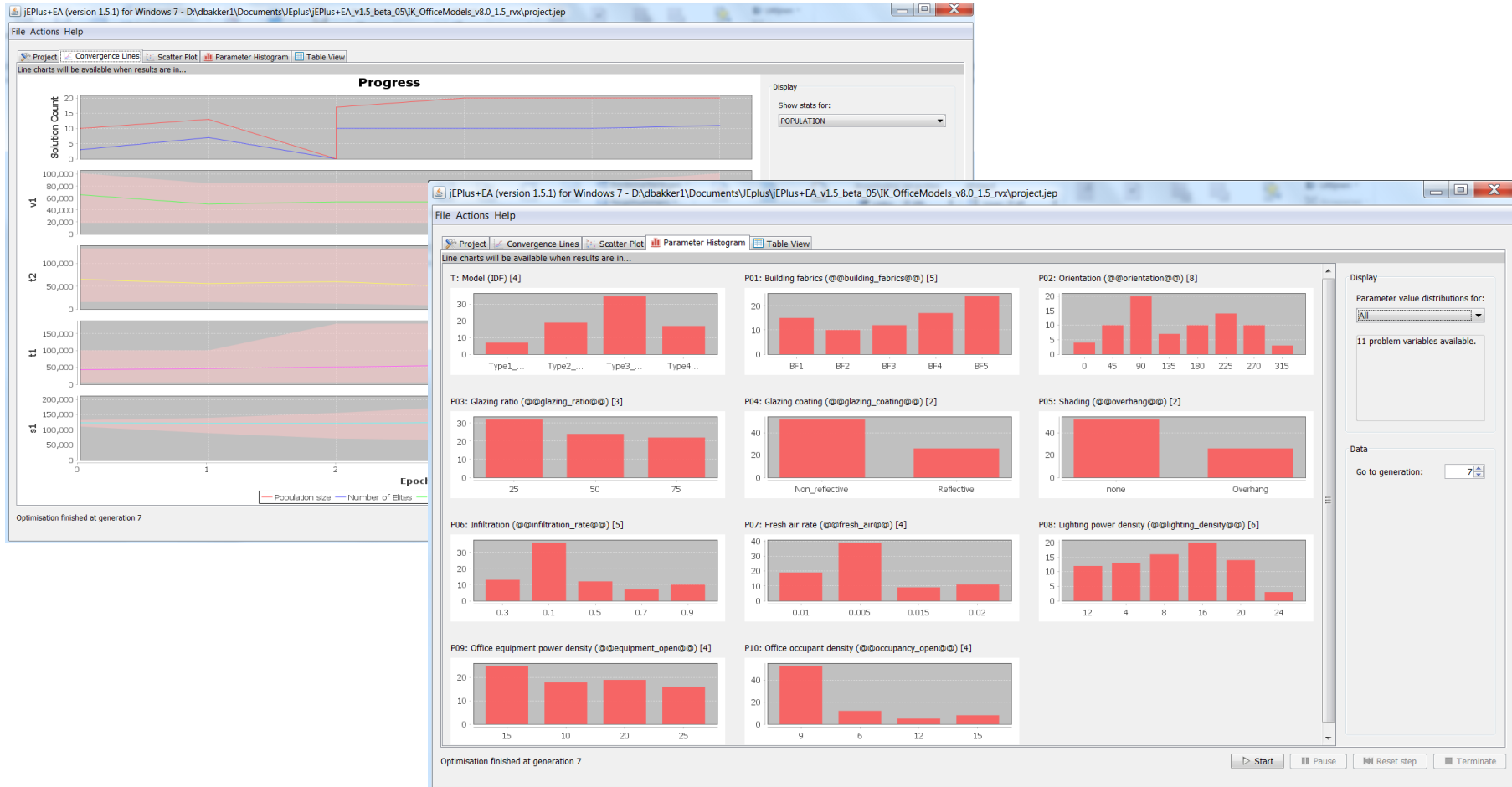
# jEplusEA

- jEplus voor het instellen en uitvoeren van parametrische simulaties



# jEPlusEA





The screenshot displays the jEplus software interface. The main window is titled "jEplus (version 1.5.1) for Windows 7 - D:\dbakker1\Documents\jEplus\jEplus+EA\_v1.5\_beta\_05\JK\_OfficeModels\_v8.0\_1.5\_rvx\project.jep".

**Project Settings:**

- Project type: EnergyPlus Project
- EP\_G: G
- Notes: New project
- Folder: GBR\_London.Gatwick...
- Weather file(s): weather/
- IDF/IMF template(s): ./ Type1\_OD.imf
- Use Extended ...: ./ my.rvx

**Parameter Tree:**

- [P01] Building fabrics::@@building\_fabrics@@={BF1, BF2, BF3, BF4, BF5}
- [P02] Orientation::@@orientation@@={0:45:359}
- [P03] Glazing ratio::@@glazing\_ratio@@={25, 50, 75}
- [P04] Glazing coating::@@glazing\_coating@@={Non\_reflective, Reflective}
- [P05] Shading::@@overhang@@={none, Overhang}
- [P06] Infiltration::@@infiltration\_rate@@={0.3} & [0.1:0.3]
- [P07] Fresh air rate::@@fresh\_air@@={0.01} & [0.01:0.1]

**Parameter item details:**

- ID: P10
- Name: office occupant density
- Type: Parametrics
- Description: new parameter item
- Search tag: @@occupancy\_open@@
- Value type: Integer
- Values: {9} & [6:3:15]
- Preview: {9, 6, 12, 15}
- Fix on the: -th value in this batch

**Code Editor (Type1\_OD.imf):**

```
1 ##fileprefix include/
2 !-File prefix will be inserted before this line
3 !- ===== Now input blocks macros =====
4 !- Building fabrics, choose from:
5 !- BF1 - minimum insulation
6 !- BF2 - Part L 1990
7 !- BF3 - Part L 1995
8 !- BF4 - Part L 2002
9 !- BF5 - Best UK practice
10 ##set1 BUILD_FABRIC @@building_fabrics@@
11 !- Glazing coating, choose from:
12 !- Non_reflective
13 !- Reflective
14 ##set1 GLAZING_COATING @@glazing_coating@@
15 !- Glazing ratio, choose from:
16 !- 25 (for 25% glazing)
17 !- 50 (for 50% glazing)
18 !- 75 (for 75% glazing)
19 ##include building1_g@@glazing_ratio@@.idf
20 !- Use Overhang or not, choose from:
21 !- Overhang (for using Overhang)
22 !- none (for otherwise)
23 ##set1 OVERHANG @@overhang@@
24 ##if #[OVERHANG[] EQS Overhang]
25 ##include Overhang_building1.idf
26 ##elseif #[OVERHANG[] EQS none]
27 ##else
28 ##endif
29 !- Set infiltration rate in ACH
30 !- Choose between 0.1 and 0.9 (default = 0.3)
31 ##set1 INFILTRATION @@infiltration_rate@@
32 !- Set Fresh Air rate in m^3/s-person
33 !- Choose between 0.005 and 0.02 (default = 0.01)
34 ##set1 FRESH_AIR @@fresh_air@@
35 !- Set lighting power density in W/m^2
36 !- Choose between 4 and 24 (default = 12)
37 ##set1 LIGHTS @@lighting_density@@
38 !- Set office equipment power density in W/m^2
39 !- Choose between 10 and 25 for open plan office spaces (default =
```

The screenshot displays the jEplus (version 1.5.1) for Windows 7 interface. The window title is "jEplus (version 1.5.1) for Windows 7 - D:\dbakker1\Documents\GGA\jEplusTests\jE\KG\_metZonw\2Zones.jep".

**Project Configuration Panel:**

- Project: EnergyPlus Project
- EP\_G Notes: 2Zones\_klimaatgevels
- Weather file(s): LD\_Amsterdam.062400\_IWEC\ NLD\_Amsterdam.062...
- IDF/IMF template(s): \jEplusTests\jE\KG\_metZonw\ Basis2Zones.imf
- Use Extended ...:  \jEplusTests\jE\KG\_metZonw\ my.rvx

**Parameter Tree:**

- [P1]Ventilatievoud::@@VV@@={2,4,8}
- [P2]Orientatie::@@N@@={0,90,180,-90}

**Parameter item details (P2):**

- ID: P2
- Name: Orientatie
- Type: Parameters
- Description: new parameter item
- Search tag: @@N@@
- Value type: Integer
- Values: {0,90,180,-90}
- Preview: {0, 90, 180, -90}
- Fix on the: - -th value in this batch

**Output Panel (Basis2Zones.imf):**

```

157 No,                !- Do System Sizing Calculation
158 No,                !- Do Plant Sizing Calculation
159 Yes,               !- Run Simulation for Sizing Periods
160 Yes;              !- Run Simulation for Weather File Run Per:
161
162
163 !- ===== ALL OBJECTS IN CLASS: BUILDING =====
164
165 Building,
166   Building 1,      !- Name
167   @@N@@,          !- North Axis {deg}
168   ,               !- Terrain
169   ,               !- Loads Convergence Tolerance Value
170   ,               !- Temperature Convergence Tolerance Value
171   FullInteriorAndExteriorWithReflections, !- S
172   ,               !- Maximum Number of Warmup Days
173   ;               !- Minimum Number of Warmup Days
174
175
176 !- ===== ALL OBJECTS IN CLASS: SHADOWCALCULATION =====
177
178 ShadowCalculation,
179   AverageOverDaysInFrequency, !- Calculation Method
180   7,               !- Calculation Frequency
181   15000;          !- Maximum Figures in Shadow Overlap Calcula
182
183
184 !- ===== ALL OBJECTS IN CLASS: SURFACECONVECTIONALGORITHM:INSI
185
186 SurfaceConvectionAlgorithm:Inside,
187   TARP;           !- Algorithm
188
189
190 !- ===== ALL OBJECTS IN CLASS: SURFACECONVECTIONALGORITHM:OUTS
191
192 SurfaceConvectionAlgorithm:Outside,
193   DOE-2;         !- Algorithm
194
  
```

# jEplus

The screenshot displays the jEplus (version 1.5.1) for Windows 7 interface. The main window is titled "jEplus (version 1.5.1) for Windows 7 - D:\dbakker1\Documents\GGA\jEplusTests\jE\KG\_metZonw\2Zones jep". The interface is divided into several panes:

- Project Configuration:** Includes a "Select Project type" dropdown set to "EnergyPlus Project" and a "Validate project" button. Below this, there are fields for "EP\_ G" and "Notes: 2Zones\_klimaatgevels".
- File Selection:** A table with columns "Folder:", "File(s) / list file:", and "Use Extended ...". It lists:
  - Weather file(s): LD\_Amsterdam.062400\_IWEC\ NLD\_Amsterdam.062... (with a dropdown menu open showing "NLD\_Amsterdam.062400\_1" and "ZAF\_Cape.Town.688160\_I")
  - IDF/IMF template(s): \jEplusTests\jE\KG\_metZonw\ ZAF\_Cape.Town.688160\_I
  - Use Extended ...:  \jEplusTests\jE\KG\_metZonw\ my.rvx
- Parameter Tree:** Shows a tree structure with items like "[P1]Ventilatievoud:::@VV@@={2,4,8}" and "[P2]Orientatie:::@N@@={0,90,180,-90}".
- Parameter Item Editor:** A form for editing a parameter item with fields for ID (P2), Name (Orientatie), Type (Parameterics), Description (new parameter item), Search tag (@@N@@), Value type (Integer), Values ({0,90,180,-90}), and Preview ({0, 90, 180, -90}).
- Output Window:** Displays simulation output for "Basis2Zones.imf x". The output includes comments and simulation results, such as:

```
157 No, !- Do System Sizing Calculation
158 No, !- Do Plant Sizing Calculation
159 Yes, !- Run Simulation for Sizing Periods
160 Yes; !- Run Simulation for Weather File Run Per:
161
162
163 !- ===== ALL OBJECTS IN CLASS: BUILDING =====
164
165 Building,
166 Building 1, !- Name
167 @@N@@, !- North Axis {deg}
168 , !- Terrain
169 , !- Loads Convergence Tolerance Value
170 , !- Temperature Convergence Tolerance Value
171 FullInteriorAndExteriorWithReflections, !- S
172 , !- Maximum Number of Warmup Days
173 ; !- Minimum Number of Warmup Days
174
175
176 !- ===== ALL OBJECTS IN CLASS: SHADOWCALCULATION =====
177
178 ShadowCalculation,
179 AverageOverDaysInFrequency, !- Calculation Method
180 7, !- Calculation Frequency
181 15000; !- Maximum Figures in Shadow Overlap Calcula
182
183
184 !- ===== ALL OBJECTS IN CLASS: SURFACECONVECTIONALGORITHM:INSI
185
186 SurfaceConvectionAlgorithm:Inside,
187 TARP; !- Algorithm
188
189
190 !- ===== ALL OBJECTS IN CLASS: SURFACECONVECTIONALGORITHM:OUTS
191
192 SurfaceConvectionAlgorithm:Outside,
193 DOE-2; !- Algorithm
194
```

Klimaatfile(s)  
E+ model  
Output

# jEplus

The screenshot displays the jEplus (version 1.5.1) for Windows 7 interface. The main window is titled "jEplus (version 1.5.1) for Windows 7 - D:\dbakker1\Documents\GGA\jEplusTests\jE\KG\_metZonw\2Zones.jep". The interface includes a menu bar (File, Edit, Action, Tools, Help) and a toolbar. The "Project" tab is active, showing fields for "Select Project type" (EnergyPlus Project), "EP\_G" (Notes: 2Zones\_klimaatgevels), "Folder", "Weather file(s)", "IDF/IMF template(s)", and "Use Extended ...".

The "Parameter Tree" window is highlighted with a blue border. It shows a tree structure with two items: "[P1]Ventilatievoud::@@VV@@={2,4,8}" and "[P2]Orientatie::@@N@@={0,90,180,-90}". The "Parameter item" window below it shows details for the selected item: ID: P2, Name: Orientatie, Type: Parametrics, Description: new parameter item, Search tag: @@N@@, Value type: Integer, Values: {0,90,180,-90}, and Preview: {0, 90, 180, -90}. A blue box highlights the "Search tag" field.

The "Output" window shows the output file "Basis2Zones.imf". The output text includes comments and parameter definitions, such as "Building, Building 1, @N@@, ..." and "SurfaceConvectionAlgorithm:Inside, TARP;". A blue arrow points from the "Search tag" field in the "Parameter item" window to the "@N@" tag in the output file.

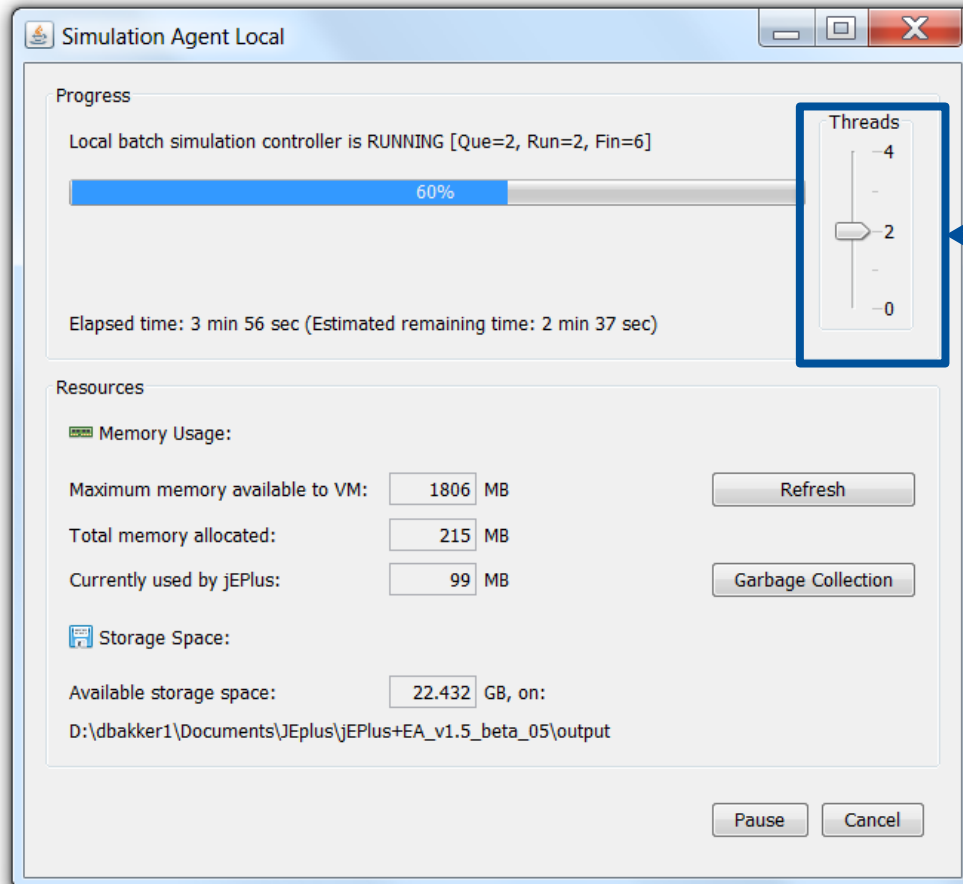
Instellen parameters

Tag  
Waarden



# jEplus

The screenshot shows the jEplus (version 1.5.1) for Windows 7 interface. The main window is titled "jEPlus (version 1.5.1) for Windows 7 - D:\dbakker1\Documents\GGA\jEplusTests\jE\KG\_metZonw\2Zones.jep". The interface includes a menu bar (File, Edit, Action, Tools, Help) and several tabs: Project, Execution, and Utilities. The "Execution" tab is active, showing the "Local batch simulation controller" selected. The "Executables" section is highlighted with a blue box and an arrow pointing to it from the text "Eerste keer even instellen". Below this, the "Options" section is also highlighted with a blue box and an arrow pointing to it from the text "Rekenkracht". The "Working dir:" field is highlighted with a blue box and an arrow pointing to it from the text "Locatie output instellen". The "Actions" section is highlighted with a blue box and an arrow pointing to it from the text "Wat wil je allemaal berekenen??". The "Start simulation" button is highlighted with a blue box and an arrow pointing to it from the text "GO!!!". The "Output" window on the right shows a text file named "Basis2Zones.imf" with a search filter "@@DEPTH@@" and a search for "Regex". The output text includes details for "BuildingSurface:Detailed", "Surface 6", "Roof", "ASHRAE 189.1-2009 ExtRoof IEAD ClimateZone 2-5", "Thermal Zone 1", "Adiabatic", "NoSun", "NoWind", and "BuildingSurface:Detailed", "Surface 10", "Wall", "ASHRAE 189.1-2009 ExtWall Mass ClimateZone 5".



Aanpassen  
rekenkracht

# jEplus

The screenshot displays the jEplus (version 1.5.1) for Windows 7 interface. The main window is titled "jEplus (version 1.5.1) for Windows 7 - D:\dbakker1\Documents\GGA\jEplusTests\jE\KG\_metZonw\2Zones jep". The interface is divided into several panes:

- Project Configuration:** Includes a "Project" tab with "Select Project type" set to "EnergyPlus Project" and a "Validate project" button. Below this, there are fields for "EP\_ G" and "Notes: 2Zones\_klimaatgevels".
- File Selection:** A section for selecting files, including "Weather file(s)", "IDF/IMF template(s)", and "Use Extended ...". The "Weather file(s)" field is set to "LD\_Amsterdam.062400\_IWEC\" and "NLD\_Amsterdam.062...". The "IDF/IMF template(s)" field is set to "\jEplusTests\jE\KG\_metZonw\" and "ZAF\_Cape.Town.688160\_I".
- Parameter Tree:** A tree view showing parameters. The selected parameter is "[P2]Orientatie::@@N@@={0,90,180,-90}".
- Parameter Item Editor:** A form for editing the selected parameter. It shows "ID: P2", "Name: Orientatie", "Type: Parametrics", "Description: new parameter item", "Search tag: @@N@@", "Value type: Integer", "Values: {0,90,180,-90}", and "Preview: {0, 90, 180, -90}".
- Output Window:** Displays the simulation output for "Basis2Zones.imf". The output includes comments and simulation results, such as "Building, Building 1, @@N@@, !- North Axis {deg}" and "ShadowCalculation, AverageOverDaysInFrequency, !- Calculation Method".

E+ model  
Output

Instellen  
parameters

# jEplus - input

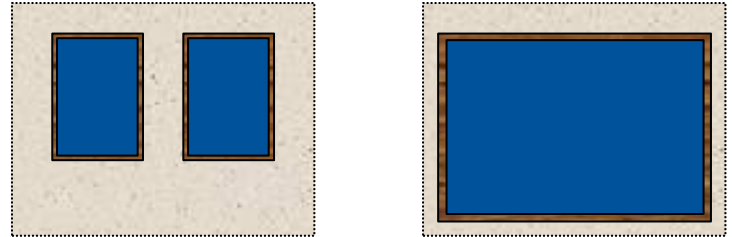
- Parameters invoegen



## Methode 1:

- In de \*.idf de invoerwaarde veranderen voor @@TAG@@
- Parameter (@@TAG@@) aanmaken in jEplus en mogelijke waarden opgeven.

- E+ modellen / bouwblokken invoegen



## Methode 2:

- bestandstype \*.idf veranderen in een \*.imf
- Toevoegen invoegscript bovenin \*.imf bestand

```
##fileprefix include/
```

```
!-File prefix will be inserted before this line!
```

```
===== Now input blocks macros =====
```

```
##set1 variant @@variant@@
```

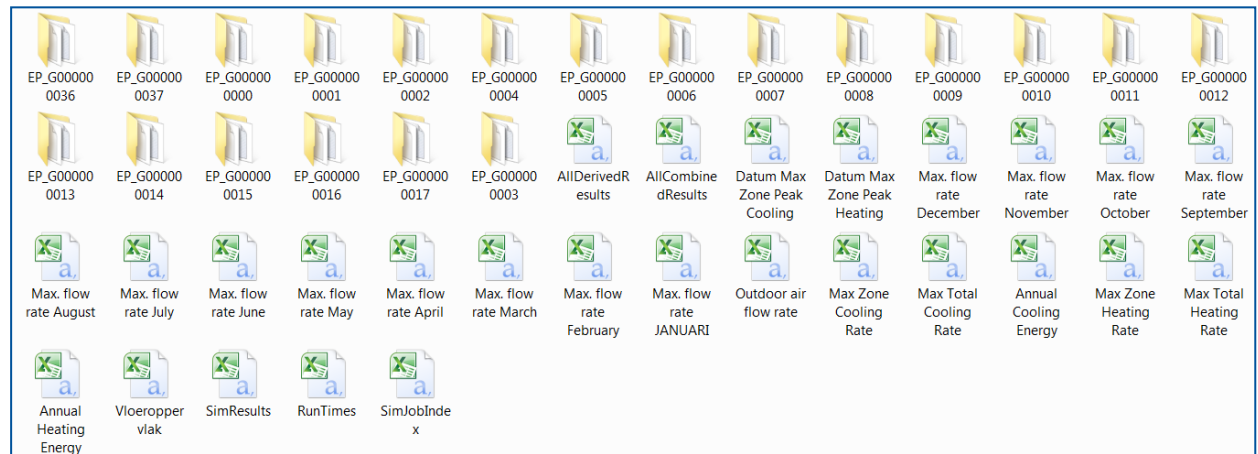
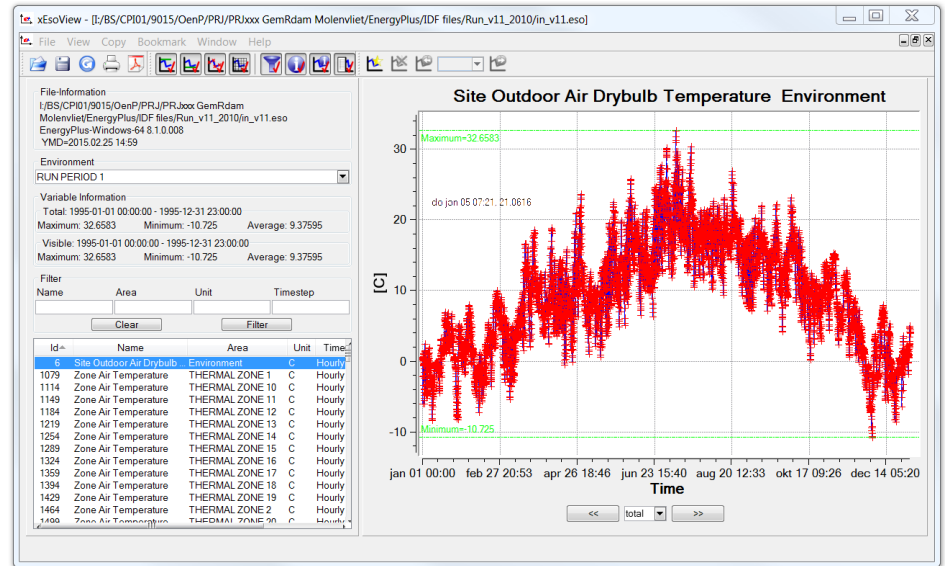
```
##include @@variant@@.idf!
```

```
===== End of input blocks macros =====
```

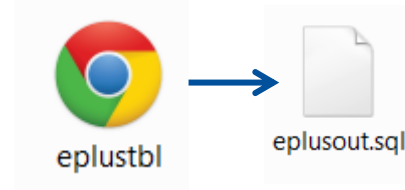
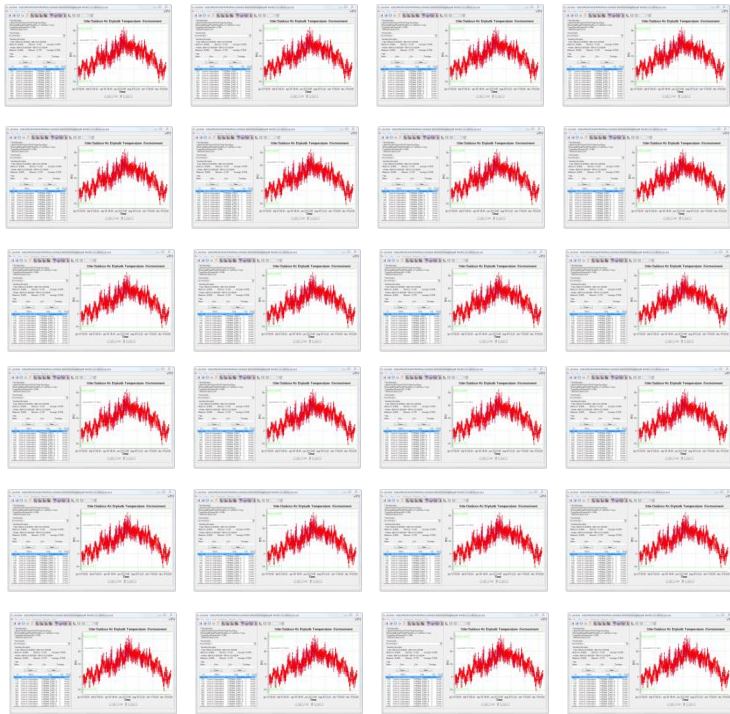
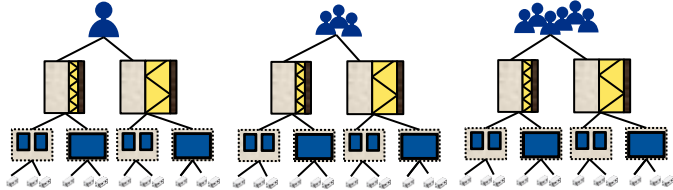
- @@variant@@ aanmaken in jEplus.

De parameters zijn de bestandsnamen.

# jEplus - output



# jEplus - output



Report: WindowZoneSummaryMonthly

For: THERMAL ZONE 2

Timestamp: 2015-06-14 12:40:13

Custom Monthly Report

	ZONE WINDOWS TOTAL HEAT GAIN RATE [W]	ZONE WINDOWS TOTAL HEAT LOSS RATE [W]	ZONE WINDOWS TOTAL TRANSMITTED SOLAR RADIATION RATE [W]
January	32.42	94.32	68.17
February	88.42	86.66	139.20
March	174.81	72.39	229.05
April	233.99	49.96	276.46
May	374.39	41.34	359.00
June	361.47	30.54	329.29
July	329.38	24.87	298.11
August	288.39	27.21	280.12
September	212.10	39.46	241.64
October	107.36	51.39	139.43
November	44.48	79.17	78.40
December	16.79	96.22	45.23
Annual Sum or Average	189.22	57.64	207.30
Minimum of Months	16.79	24.87	45.23
Maximum of Months	374.39	96.22	359.00

# jEplus - output

- \*.rvi

## Haal data uit \*.eso

eplusout.eso ←

eplusout.csv ←

Heating:DistrictHeating

Cooling:DistrictCooling

Fans:Electricity

Pumps:Electricity

0 ←

!-objectives

! Name of the objective; unit; formula (c0, c1, c2... are columns in the result table generated from the statements above)

Electricity; kWh; (c0+c1+c4+c5)/1000/3600

Heating; kWh; c2/1000/3600

Cooling; kWh; c3/1000/3600

!-end objectives

- \*.rvx

Voegt de mogelijkheid toe om data uit SQLite database te halen.

- Eenvoudig dataverwerking
- Scripts
- Constrains
- Objectives

```
{      "notes" : "Some notes ",
      "rvis" : [      ],
      "sqls" : [      ],
      "scripts" : [      ],
      "userVars" : [      ],
      "objectives" : [      ] }
```

[http://www.jeplus.org/wiki/doku.php?id=docs:manual\\_1\\_5\\_rvx](http://www.jeplus.org/wiki/doku.php?id=docs:manual_1_5_rvx)



{

"notes" : "Some notes about this RVX",

"rvis" : [

{

"fileName" : "5ZoneCostEst.rvi",

"tableName" : "SimResults"

}

],

"sqls" : [

{

"tableName" : "ChillerCap",

"columnHeaders" : "Chiller Nominal Capacity [W]",

"sqlcommand" : "select Value from ComponentSizes WHERE (CompType='Chiller:Electric' AND CompName='CHILLER PLANT CHILLER' AND Description='Nominal Capacity')"

},

{

"tableName" : "ConsCost",

"columnHeaders" : "Construction Cost [\$/m2]",

"sqlcommand" : "select Value from TabularDataWithStrings WHERE (ReportName='Construction Cost Estimate Summary' AND ReportForString='Entire Facility' AND

TableName='Construction Cost Estimate Summary' AND RowName='Cost Per Conditioned Building Area (~~\$~/m2)' AND ColumnName='Current Bldg. Model' AND Units=' AND

RowId=10)"

}

],

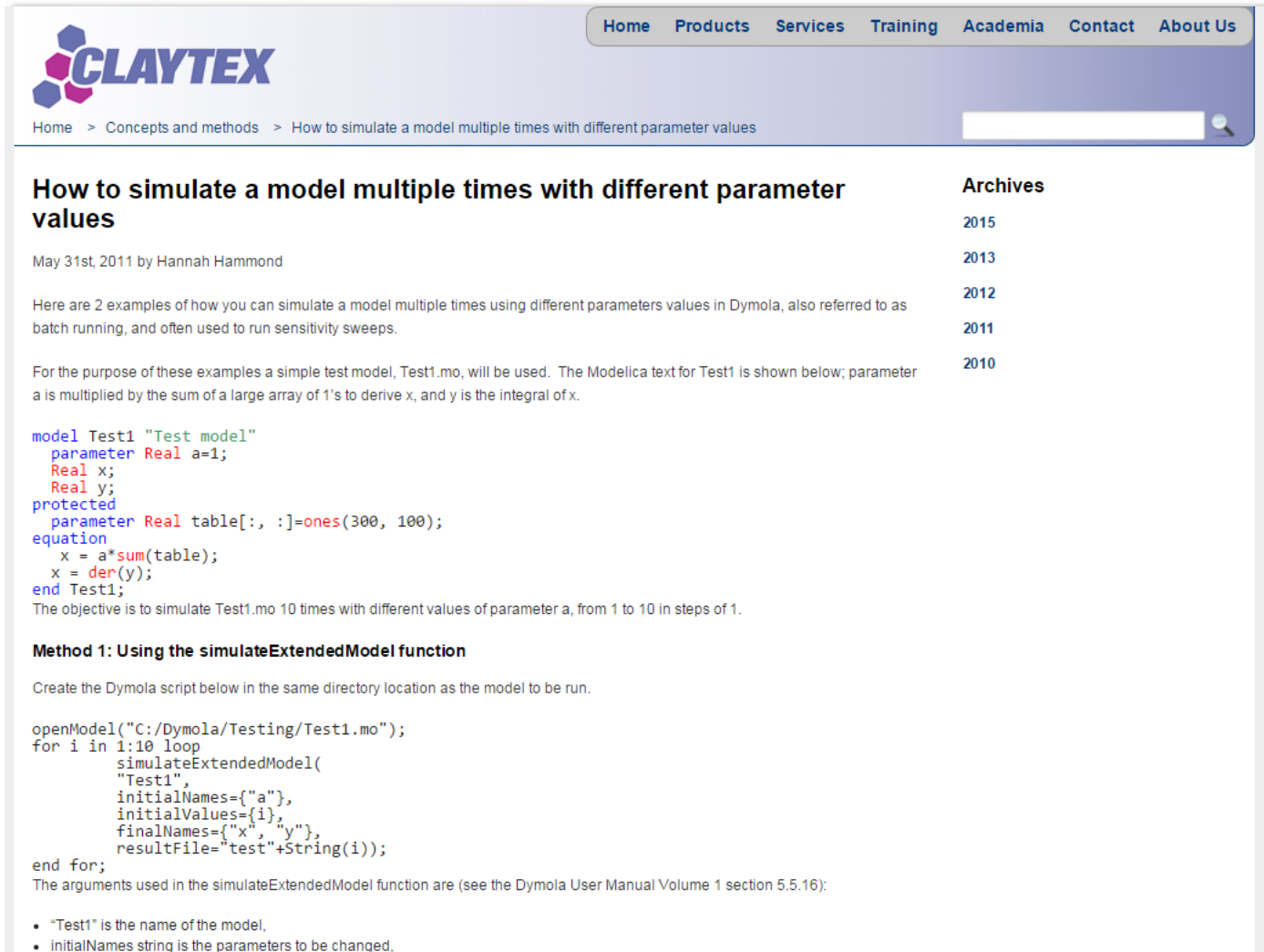




# Dymola...

Niet in deze workshop maar...

<http://www.claytex.com/how-to-simulate-a-model-multiple-times-with-different-parameter-values/>



The screenshot shows the Claytex website with a navigation menu (Home, Products, Services, Training, Academia, Contact, About Us) and a search bar. The article title is "How to simulate a model multiple times with different parameter values" by Hannah Hammond, dated May 31st, 2011. The article content includes a Dymola model snippet for "Test1.mo" and a Dymola script for "Method 1: Using the simulateExtendedModel function".

**CLAYTEX**

Home > Concepts and methods > How to simulate a model multiple times with different parameter values

## How to simulate a model multiple times with different parameter values

May 31st, 2011 by Hannah Hammond

Here are 2 examples of how you can simulate a model multiple times using different parameters values in Dymola, also referred to as batch running, and often used to run sensitivity sweeps.

For the purpose of these examples a simple test model, Test1.mo, will be used. The Modelica text for Test1 is shown below; parameter a is multiplied by the sum of a large array of 1's to derive x, and y is the integral of x.

```
model Test1 "Test model"
  parameter Real a=1;
  Real x;
  Real y;
protected
  parameter Real table[:, :] = ones(300, 100);
equation
  x = a*sum(table);
  x = der(y);
end Test1;
```

The objective is to simulate Test1.mo 10 times with different values of parameter a, from 1 to 10 in steps of 1.

### Method 1: Using the simulateExtendedModel function

Create the Dymola script below in the same directory location as the model to be run.

```
openModel("C:/Dymola/Testing/Test1.mo");
for i in 1:10 loop
  simulateExtendedModel(
    "Test1",
    initialNames={"a"},
    initialValues={i},
    finalNames={"x", "y"},
    resultFile="test"+String(i));
end for;
```

The arguments used in the simulateExtendedModel function are (see the Dymola User Manual Volume 1 section 5.5.16):

- "Test1" is the name of the model.
- initialNames string is the parameters to be changed.

**Archives**

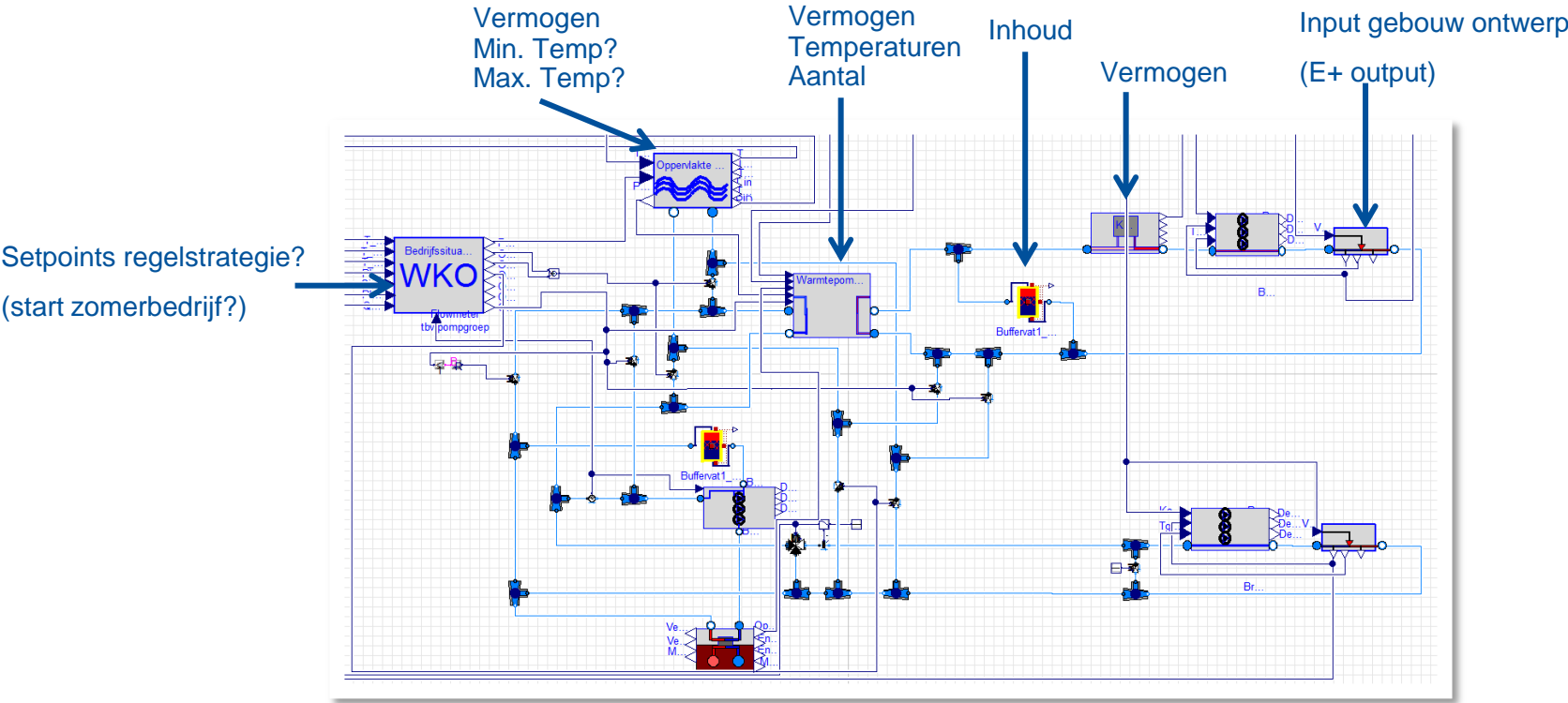
- 2015
- 2013
- 2012
- 2011
- 2010

**Imtech**

# Dymola...

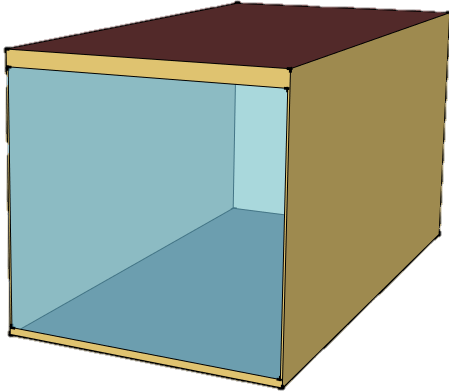
Niet in deze workshop maar...

<http://www.claytex.com/how-to-simulate-a-model-multiple-times-with-different-parameter-values/>



**Aan de slag met jEplus!**

# Oefening 1.



- Oriëntatie
  - E+ Bouwblok: Building
  - {180,0} (= {Noord, Zuid})
- Bezetting
  - E+ Bouwblok: People
  - 10m<sup>2</sup>/p, 20m<sup>2</sup>/p
- Ventilatievoud
  - DesignSpecification:OutdoorAir
  - Maximum
  - 0,01111 m<sup>3</sup>/s /persoon
  - 2voudig, 4 voudig

Ruimte voor een gevelstudie.  
Een tussenruimte op en tussenverdieping.

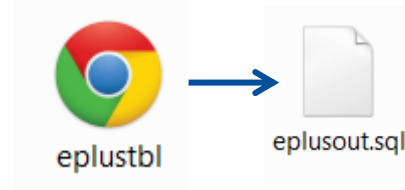
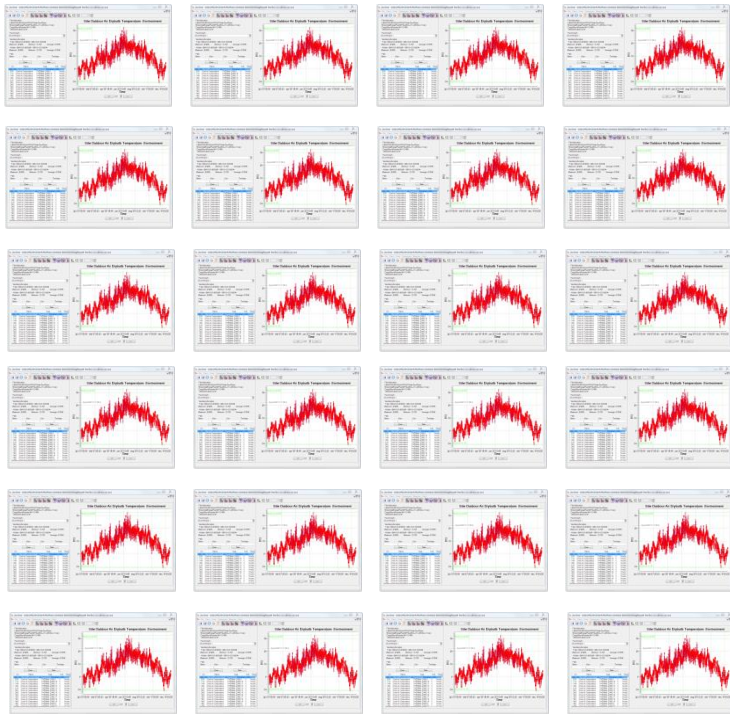
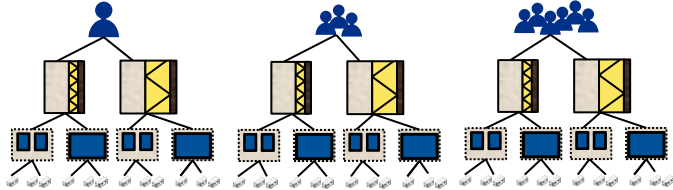
Gebruik de parameters in jEplus om de volgende eigenschappen te variëren:

- Oriëntatie (Noord = 180, Zuid = 0)
- Bezetting, m<sup>2</sup>/p
- Ventilatievoud

Output:

- DistrictHeating:Facility
- DistrictCooling:Facility
- Zone Ideal Loads Zone Total Heating Rate
- Zone Ideal Loads Zone Total Cooling Rate

# jEplus - output



Report: WindowZoneSummaryMonthly  
 For: THERMAL ZONE 2  
 Timestamp: 2015-06-14 12:40:13  
 Custom Monthly Report

	ZONE WINDOWS TOTAL HEAT GAIN RATE [W]	ZONE WINDOWS TOTAL HEAT LOSS RATE [W]	ZONE WINDOWS TOTAL TRANSMITTED SOLAR RADIATION RATE [W]
January	32.42	94.32	68.17
February	88.42	86.66	139.20
March	174.81	72.39	229.05
April	233.99	49.96	276.46
May	374.39	41.34	359.00
June	361.47	30.54	329.29
July	329.38	24.87	298.11
August	288.39	27.21	280.12
September	212.10	39.46	241.64
October	107.36	51.39	139.43
November	44.48	79.17	78.40
December	16.79	96.22	45.23
Annual Sum or Average	189.22	57.64	207.30
Minimum of Months	16.79	24.87	45.23
Maximum of Months	374.39	96.22	359.00

# SQLite

```
"sqls" : [
{


```



Report: WindowZoneSummaryMonthly  
 For: THERMAL ZONE 2  
 Timestamp: 2015-06-14 12:40:13  
 Custom Monthly Report

	ZONE WINDOWS TOTAL HEAT GAIN RATE [W]	ZONE WINDOWS TOTAL HEAT LOSS RATE [W]	ZONE WINDOWS TOTAL TRANSMITTED SOLAR RADIATION RATE [W]
January	32.42	94.32	68.17
February	88.42	86.66	139.20
March	174.81	72.39	229.05
April	233.99	49.96	276.46
May	374.39	41.34	359.00
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September	212.10	39.46	241.64
October	107.36	51.39	139.43
November	44.48	79.17	78.40
December	16.79	96.22	45.23
Annual Sum or Average	189.22	57.64	207.30
Minimum of Months	16.79	24.87	45.23
Maximum of Months	374.39	96.22	359.00



DB Browser for SQLite - D:/dbakker1/Documents/GG/vEplusTests/JE/KG\_metZonw/Output/EP\_G000000964/eplussout...

Table: TabularDataWithStrings

id	Value	ReportName	ReportForStrin	TableName	RowName	ColumnName	Units
1	17.11	AnnualBuild...	Entire Facility	Site and So...	Total Site E...	Total Energy	GJ
2	17.11	AnnualBuild...	Entire Facility	Site and So...	Net Site Ene...	Total Energy	GJ
3	58.89	AnnualBuild...	Entire Facility	Site and So...	Total Sourc...	Total Energy	GJ
4	58.89	AnnualBuild...	Entire Facility	Site and So...	Net Sourc...	Total Energy	GJ
5	819.36	AnnualBuild...	Entire Facility	Site and So...	Total Site E...	Energy Per ...	MJ/m2
6	819.36	AnnualBuild...	Entire Facility	Site and So...	Net Site Ene...	Energy Per ...	MJ/m2
7	2820.30	AnnualBuild...	Entire Facility	Site and So...	Total Sourc...	Energy Per ...	MJ/m2
8	2820.30	AnnualBuild...	Entire Facility	Site and So...	Net Sourc...	Energy Per ...	MJ/m2
9	819.36	AnnualBuild...	Entire Facility	Site and So...	Total Site E...	Energy Per ...	MJ/m2
10	819.36	AnnualBuild...	Entire Facility	Site and So...	Net Site Ene...	Energy Per ...	MJ/m2
11	2820.30	AnnualBuild...	Entire Facility	Site and So...	Total Sourc...	Energy Per ...	MJ/m2
12	2820.30	AnnualBuild...	Entire Facility	Site and So...	Net Sourc...	Energy Per ...	MJ/m2
13	3.167	AnnualBuild...	Entire Facility	Site to Sour...	Electricity	Site->Sour...	
14	1.084	AnnualBuild...	Entire Facility	Site to Sour...	Natural Gas	Site->Sour...	
15	1.056	AnnualBuild...	Entire Facility	Site to Sour...	District Coo...	Site->Sour...	
16	3.613	AnnualBuild...	Entire Facility	Site to Sour...	District Hea...	Site->Sour...	
17	0.300	AnnualBuild...	Entire Facility	Site to Sour...	Steam	Site->Sour...	
18	1.050	AnnualBuild...	Entire Facility	Site to Sour...	Gasoline	Site->Sour...	
19	1.050	AnnualBuild...	Entire Facility	Site to Sour...	Diesel	Site->Sour...	
20	1.050	AnnualBuild...	Entire Facility	Site to Sour...	Coal	Site->Sour...	
21	1.050	AnnualBuild...	Entire Facility	Site to Sour...	Fuel Oil #1	Site->Sour...	
22	1.050	AnnualBuild...	Entire Facility	Site to Sour...	Fuel Oil #2	Site->Sour...	
23	1.050	AnnualBuild...	Entire Facility	Site to Sour...	Propane	Site->Sour...	



# SQLite

```
"sqls" : [  
  {  
    "tableName" : "ChillerCap",  
    "columnHeaders" : "Chiller Nominal Capacity [W]",  
  }  
]
```

**Oefening 2:**  
**Voeg de output toe:**  
**Zone Windows Total heat gain rate**  
**Maximum of Months**  
(sql -> TabularDataWithStrings)



Month	Value 1	Value 2	Value 3
September	212.10	39.46	241.64
October	107.36	51.39	139.43
November	44.48	79.17	78.40
December	16.79	96.22	45.23
Annual Sum or Average	189.22	57.64	207.30
Minimum of Months	16.79	24.87	45.23
Maximum of Months	374.39	96.22	359.00

ic' AND CompName='CHILLER PLANT CHILLER' AND Description='Nominal Capacity')

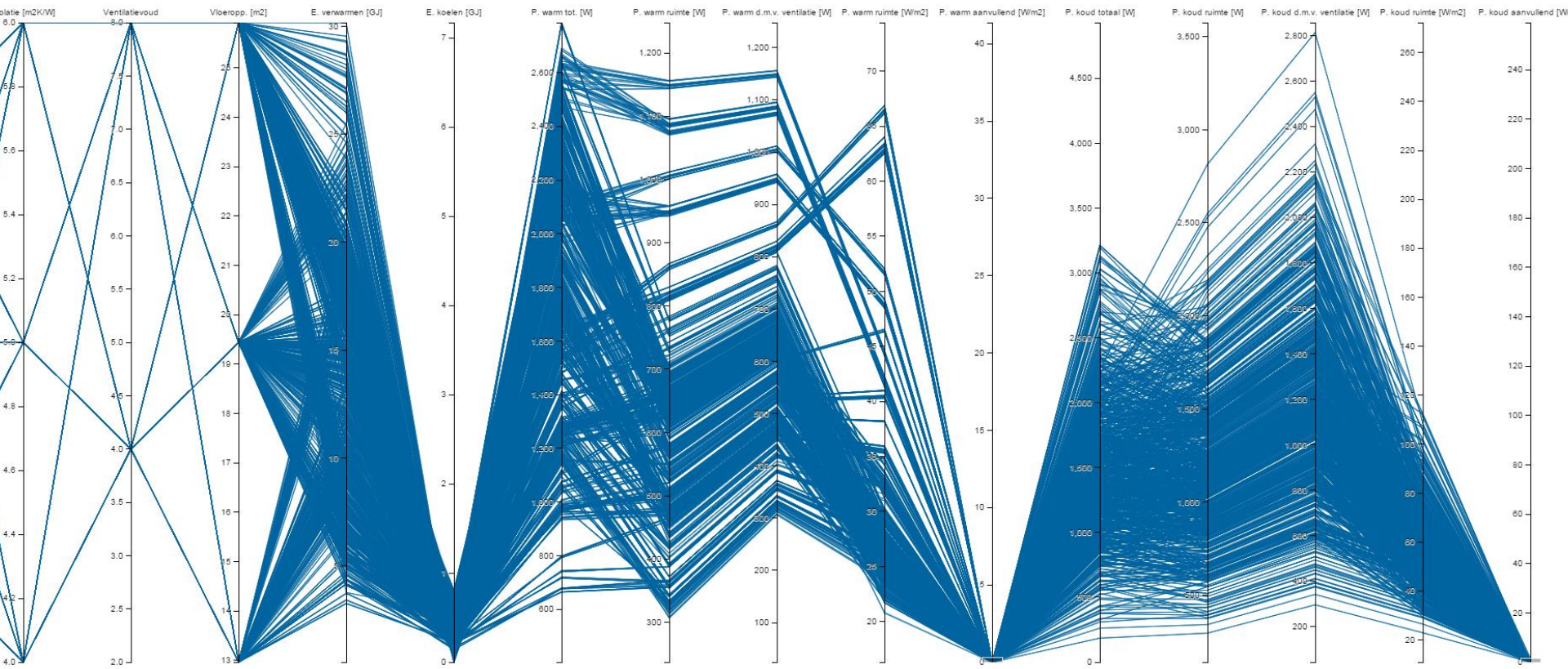
Value	ReportName	ReportForStrin	TableName	RowName	ColumnName	Units
17.11	AnnualBuild...	Entire Facility	Site and So...	Total Site E...	Total Energy	GJ
17.11	AnnualBuild...	Entire Facility	Site and So...	Net Site Ene...	Total Energy	GJ
58.89	AnnualBuild...	Entire Facility	Site and So...	Total Sourc...	Total Energy	GJ
58.89	AnnualBuild...	Entire Facility	Site and So...	Net Source ...	Total Energy	GJ
819.36	AnnualBuild...	Entire Facility	Site and So...	Total Site E...	Energy Per ...	MJ/m2
819.36	AnnualBuild...	Entire Facility	Site and So...	Net Site Ene...	Energy Per ...	MJ/m2
2820.30	AnnualBuild...	Entire Facility	Site and So...	Total Sourc...	Energy Per ...	MJ/m2
2820.30	AnnualBuild...	Entire Facility	Site and So...	Net Source ...	Energy Per ...	MJ/m2
819.36	AnnualBuild...	Entire Facility	Site and So...	Total Site E...	Energy Per ...	MJ/m2
819.36	AnnualBuild...	Entire Facility	Site and So...	Net Site Ene...	Energy Per ...	MJ/m2
2820.30	AnnualBuild...	Entire Facility	Site and So...	Total Sourc...	Energy Per ...	MJ/m2
2820.30	AnnualBuild...	Entire Facility	Site and So...	Net Source ...	Energy Per ...	MJ/m2
3.167	AnnualBuild...	Entire Facility	Site to Sour...	Electricity	Site->Sour...	
1.084	AnnualBuild...	Entire Facility	Site to Sour...	Natural Gas	Site->Sour...	
1.056	AnnualBuild...	Entire Facility	Site to Sour...	District Co...	Site->Sour...	
3.613	AnnualBuild...	Entire Facility	Site to Sour...	District Hea...	Site->Sour...	
0.300	AnnualBuild...	Entire Facility	Site to Sour...	Steam	Site->Sour...	
1.050	AnnualBuild...	Entire Facility	Site to Sour...	Gasoline	Site->Sour...	
1.050	AnnualBuild...	Entire Facility	Site to Sour...	Diesel	Site->Sour...	
1.050	AnnualBuild...	Entire Facility	Site to Sour...	Coal	Site->Sour...	
1.050	AnnualBuild...	Entire Facility	Site to Sour...	Fuel Oil #1	Site->Sour...	
1.050	AnnualBuild...	Entire Facility	Site to Sour...	Fuel Oil #2	Site->Sour...	
1.050	AnnualBuild...	Entire Facility	Site to Sour...	Propane	Site->Sour...	



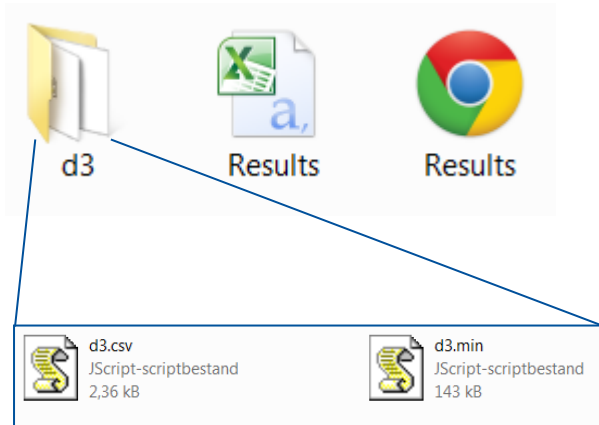
# Parallel Coördinates Graphs



# Parallel Coördinates Graph



# Parallel Coördinates Graph



<http://d3js.org/>

<http://mbostock.github.io/protovis/>

# Parallel Coördinates Graph



Results

CVS bestand

A1	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V													
1	Orientatie	Ruimte die	Bezetting	[ Geveltype	Beglazing	Isolatie	[m	Ventilatie	Vloeroopp.	E. verwarm	E. koelen	[ P.	warm t	P.	warm r	P.	warm d	P.	warm ai	P.	koud to	P.	koud rui	P.	koud d	r	P.	koud rui	P.	koud aanvullend	[W/m2]			
2	Zuid	3.6	5	Klimaatge	SGG_Cool	4	2	12.96	1.09	1.25	549.28	367.49	85.24939	28.35571	21.77782	1253.18	1051.13	258.056	81.10571	61.19399														
3	Zuid	5.4	5	Klimaatge	SGG_Cool	4	2	19.44	1.41	1.08	788.97	516.85	227.5805	26.58693	14.88012	1473.31	1122.83	418.0853	57.75874	36.2523														
4	Zuid	7.2	5	Klimaatge	SGG_Cool	4	2	25.92	1.78	1	1030.58	668.29	433.2638	25.78279	9.06737	1729.07	1467.01	694.4933	56.59761	29.80389														
5	Zuid	3.6	5	Klimaatge	SGG_Cool	5	2	12.96	1.09	1.25	549.1	367.31	85.20764	28.34182	21.76716	1253	1051.31	258.0342	81.1196	61.20956														
6	Zuid	5.4	5	Klimaatge	SGG_Cool	5	2	19.44	1.4	1.08	789.14	517.04	230.2931	26.59671	14.75035	1473.16	1123.3	418.3324	57.78292	36.26376														
7	Zuid	7.2	5	Klimaatge	SGG_Cool	5	2	25.92	1.77	1	1030.65	668.38	433.1758	25.78627	9.074235	1728.7	1467.09	694.6453	56.60069	29.80111														
8	Zuid	3.6	5	Klimaatge	SGG_Cool	6	2	12.96	1.08	1.25	549.35	367.59	85.21768	28.36343	21.78799	1252.91	1051.31	258.0342	81.1196	61.20956														
9	Zuid	5.4	5	Klimaatge	SGG_Cool	6	2	19.44	1.4	1.08	789.21	517.13	229.9538	26.60134	14.77244	1473.07	1123.41	418.4094	57.78858	36.26546														
10	Zuid	7.2	5	Klimaatge	SGG_Cool	6	2	25.92	1.77	1	1030.66	668.4	433.0913	25.78704	9.078267	1728.52	1467.16	694.7356	56.6034	29.80032														
11	Zuid	3.6	5	Klimaatge	HR_glas	4	2	12.96	1	3.9	528.73	352.28	161.9616	27.1821	14.68506	2331.8	2257.37	193.8408	174.1798	159.2229														
12	Zuid	5.4	5	Klimaatge	HR_glas	4	2	19.44	1.16	3.24	638.38	386.12	165.52	19.86214	11.34774	2451.23	2224.96	346.9097	114.4527	96.60753														
13	Zuid	7.2	5	Klimaatge	HR_glas	4	2	25.92	1.41	2.78	903.29	560.43	116.0142	21.62153	17.14567	2530.24	2152.11	499.8589	83.02894	63.74426														
14	Zuid	3.6	5	Klimaatge	HR_glas	5	2	12.96	1	3.9	526.44	350.21	161.2902	27.02238	14.57715	2331.81	2258.53	193.9173	174.2693	159.3065														
15	Zuid	5.4	5	Klimaatge	HR_glas	5	2	19.44	1.16	3.24	616.71	366.31	156.9932	18.84311	10.76733	2451.12	2227.75	347.2946	114.5962	96.73125														
16	Zuid	7.2	5	Klimaatge	HR_glas	5	2	25.92	1.4	2.78	914.36	570.45	117.974	22.0081	17.45664	2530.6	2152.85	499.2053	83.05748	63.79802														
17	Zuid	3.6	5	Klimaatge	HR_glas	6	2	12.96	1	3.9	525.99	349.79	161.0856	26.98997	14.56053	2331.83	2256.9	193.76	174.1435	159.1929														
18	Zuid	5.4	5	Klimaatge	HR_glas	6	2	19.44	1.16	3.24	615.08	364.82	156.4553	18.76646	10.71835	2451.23	2228.16	347.3334	114.6173	96.75034														
19	Zuid	7.2	5	Klimaatge	HR_glas	6	2	25.92	1.4	2.78	899.85	557.32	115.5449	21.50154	17.04379	2530.36	2153.33	500.3441	83.076	63.77261														
20	Zuid	3.6	5	Klimaatge	Drie_vouc	4	2	12.96	0.58	2.16	403.13	236.82	112.8912	18.27315	9.562409	1677.98	1584.47	239.5419	122.2585	103.7753														
21	Zuid	5.4	5	Klimaatge	Drie_vouc	4	2	19.44	0.82	1.72	690.21	431.54	96.24931	22.19856	17.24746	1755.71	1521.37	394.4022	78.25977	57.97159														
22	Zuid	7.2	5	Klimaatge	Drie_vouc	4	2	25.92	1.12	1.5	1013.84	657.86	233.0595	25.3804	16.38891	1886.33	1580.78	591.4574	60.98688	38.16831														
23	Zuid	3.6	5	Klimaatge	Drie_vouc	5	2	12.96	0.58	2.16	414.51	247.23	117.9318	19.07639	9.976714	1677.98	1581.18	238.9944	122.0046	103.5637														
24	Zuid	5.4	5	Klimaatge	Drie_vouc	5	2	19.44	0.81	1.72	687.3	428.95	95.67164	22.06533	17.14395	1755.79	1521.4	394.3627	78.26132	57.97517														
25	Zuid	7.2	5	Klimaatge	Drie_vouc	5	2	25.92	1.12	1.5	1013.21	657.27	232.5358	25.35764	16.38635	1886.09	1580.42	591.5917	60.97299	38.14924														
26	Zuid	3.6	5	Klimaatge	Drie_vouc	6	2	12.96	0.58	2.16	405.24	238.72	113.7942	18.41975	9.639333	1678.06	1585.6	239.6121	122.3457	103.8571														
27	Zuid	5.4	5	Klimaatge	Drie_vouc	6	2	19.44	0.81	1.72	684.86	426.76	95.16354	21.95267	17.05743	1755.95	1521.63	394.4459	78.27315	57.98272														
28	Zuid	7.2	5	Klimaatge	Drie_vouc	6	2	25.92	1.12	1.5	1019.96	663.12	234.4471	25.58333	16.53831	1885.97	1580.57	591.1868	60.97878	38.17065														
29	Zuid	3.6	10	Klimaatge	SGG_Cool	4	2	12.96	1.04	1.06	537.85	372.22	88.11711	28.72068	21.92152	1116.81	975.28	234.2407	75.25309	57.17896														

Let op! Gescheiden door een komma!

Excel in NL wil er “;” van maken. Dit kan je eenvoudig aanpassen met notepad++

# Parallel Coördinates Graph



HTML bestand

```
Results.html [x]
43 <canvas id="foreground"></canvas>
44 <svg></svg>
45 </div>
46 <script src="d3/d3.min.js"></script>
47
48 <script type="text/javascript">
49
50 // shim layer with setTimeout fallback
51 window.requestAnimFrame = (function(){
52   return window.requestAnimationFrame ||
53     window.webkitRequestAnimationFrame ||
54     window.mozRequestAnimationFrame ||
55     window.oRequestAnimationFrame ||
56     window.msRequestAnimationFrame ||
57     function( callback ){
58       window.setTimeout(callback, 1000 / 60);
59     };
60 })();
61
62 var m = [30, 10, 10, 175],
63     w = 2600 - m[0] - m[2],
64     h = 800 - m[0] - m[2];
65
66
67
68
69
70
71
72
73
74
75
76
77
78
79
80
81
82
83
84
85 var svg = d3.select("svg")
86   .attr("width", w + m[1] + m[3])
87   .attr("height", h + m[0] + m[2])
88   .append("svg:g")
89   .attr("transform", "translate(" + m[3] + ", " + m[0] + ")");
90
91
92 // Could value belong to a quantitative ordinal scale
93 var quant_p = function(v){return (parseFloat(v) == v) || (v == "");};
94
95 d3.csv("Results.csv", function(data) {
96   //Reduce the number of unique names... their were > 7K.
97   //data.forEach(function(d) {d["name"] = d["name"].slice(0,2)}); categoriseren van de labels
98
99   // Extract the list of dimensions.
100   dimensions = d3.keys(data[0]).slice(0).concat(d3.keys(data[0]).slice(0,0)); //Put the ordinal dimen
101   x.domain(dimensions);
102
103   // Create a scale for each.
104   dimensions.forEach(function(d) {
105     var vals = data.map(function(p) {return p[d];});
106     if (vals.every(quant_p)){
107       y[d] = d3.scale.linear()
108         .domain(d3.extent(vals.map(function(p){return +p})))
109         .range([h, 0]);
110     }
111   });
112 });
```

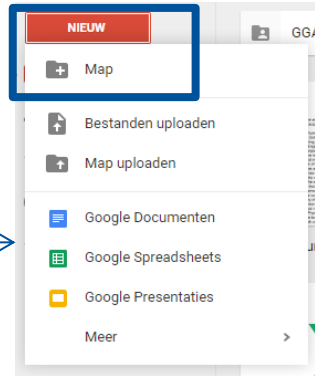
Let op! Op de grafiek te activeren met de HTML vanaf een server geopend worden!

Hiervoor kan je ook WAMP-server gebruiken. <http://www.wampserver.com/en/> (geen onderdeel van deze workshop)

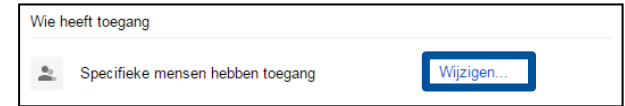
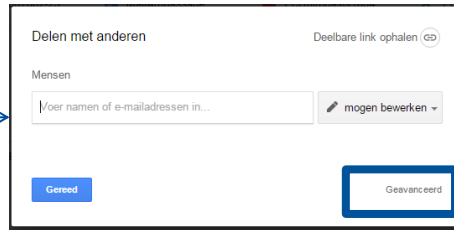
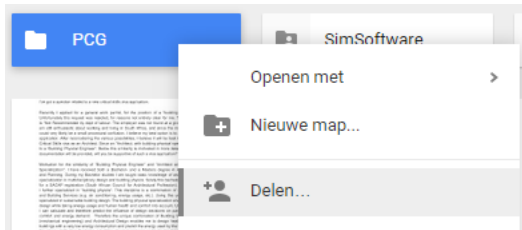


# GDrive

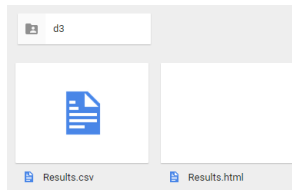
1. Maak een map aan



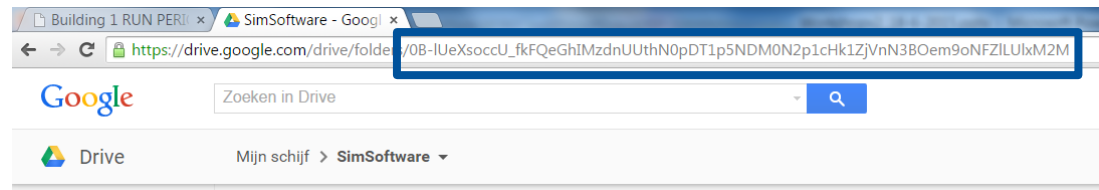
2. Maak de map toegankelijk voor de hele wereld



1. Zet de bestanden in deze map



2. Kopieer de mapnaam uit de balk



3. Type in de balk

[googledrive.com/host/\[plak mapnaam\]/sitenaam.html](https://drive.google.com/host/[plak mapnaam]/sitenaam.html)

[https://drive.google.com/host/0B-lUeXsoccU\\_fkFQeGhIMzdnUUthN0pDT1p5NDM0N2p1cHk1ZjVnN3BOem9oNFZILUlXm2M/results.html](https://drive.google.com/host/0B-lUeXsoccU_fkFQeGhIMzdnUUthN0pDT1p5NDM0N2p1cHk1ZjVnN3BOem9oNFZILUlXm2M/results.html)

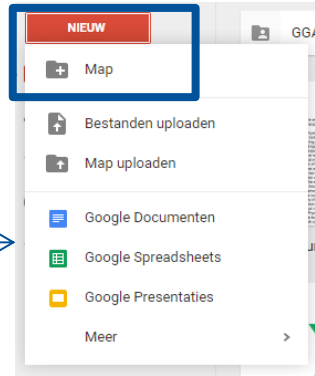


# Aan de slag met PCG!

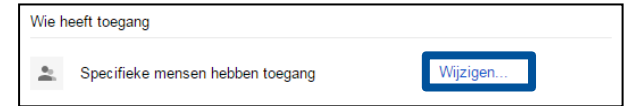
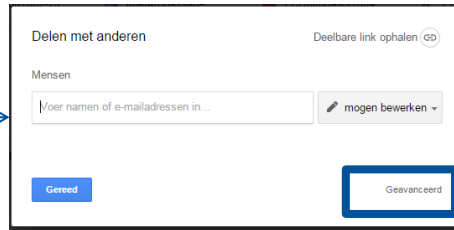
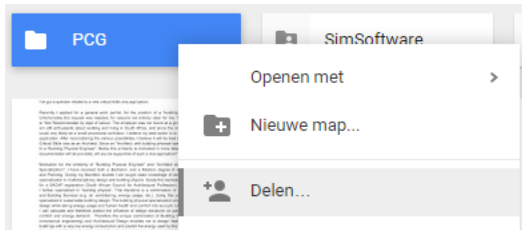
1. Maak een \*.csv  
(Denk aan de ; )  
(Let op dat de verwijzing naar de \*.csv-naam correct is)
2. Maak een Gdrive map
3. Zet de bestanden op de Gdrive
4. Enjoy your PCG!

# GDrive

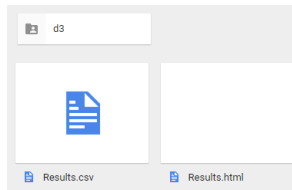
1. Maak een map aan



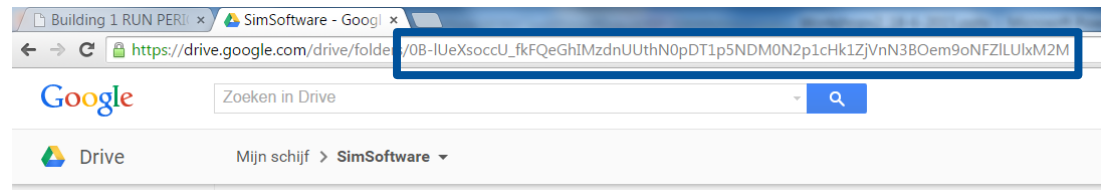
2. Maak de map toegankelijk voor de hele wereld



1. Zet de bestanden in deze map



2. Kopieer de mapnaam uit de balk



3. Type in de balk

[googledrive.com/host/\[plak mapnaam\]/sitenaam.html](https://drive.google.com/host/[plak mapnaam]/sitenaam.html)

[https://drive.google.com/host/0B-lUeXsoccU\\_fkFQeGhIMzdnUUthN0pDT1p5NDM0N2p1cHk1ZjVnN3BOem9oNFZILUlxM2M/results.html](https://drive.google.com/host/0B-lUeXsoccU_fkFQeGhIMzdnUUthN0pDT1p5NDM0N2p1cHk1ZjVnN3BOem9oNFZILUlxM2M/results.html)



# Vragen??



**En nu aan de slag!!!**