



GCAM 5.4 Walkthrough

May 31, 2022



PNNL is operated by Battelle for the U.S. Department of Energy



Contents

- Links & Pre-requisites
- Installation
- Folder structure
- Inputs
- Model run
- Outputs

Links & Pre-requisites

Links

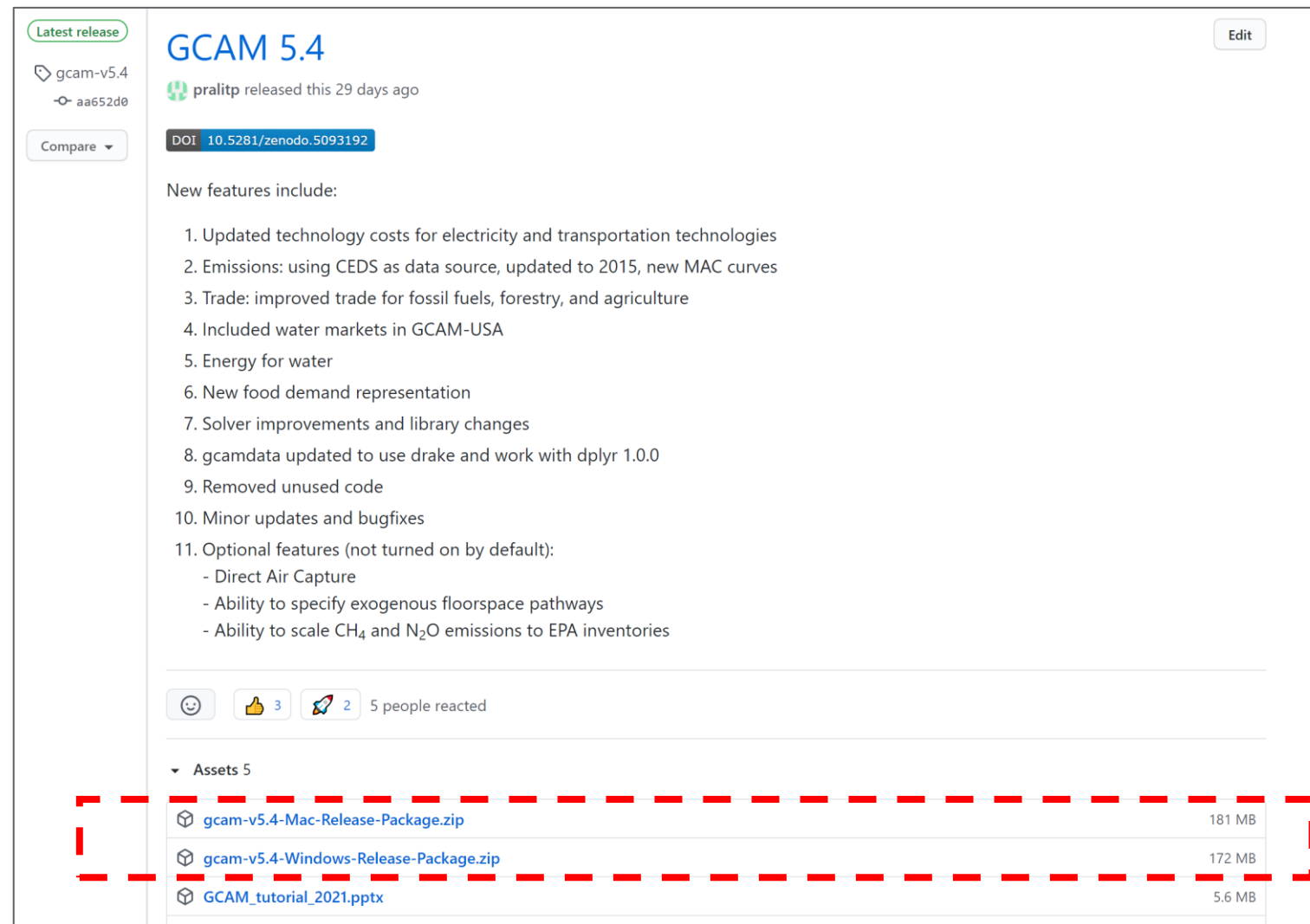
- GCAM Official Documentation: <http://jgcri.github.io/gcam-doc/>
- GCAM User Guide: <http://jgcri.github.io/gcam-doc/user-guide.html>
- GCAM github page: <https://github.com/JGCRI/gcam-core>
- GCAM datasystem R package: <https://github.com/JGCRI/gcamdata>
- ModelInterface: <https://github.com/JGCRI/modelinterface>
- Webinar 1 Link: <https://register.gotowebinar.com/recording/2893695101765080835>

Pre-requisites

- 8 GB RAM
- Install Java 64 <https://www.java.com/en/download/windows-64bit.jsp>
- Install R <https://cran.r-project.org/> and R Studio <https://www.rstudio.com>
- Install Windows XML Maker http://symbolclick.com/xmlmarker_1_1_setup.exe

Installation

- Unzip compiled version provided OR
- Download release version: <https://github.com/JGCRI/gcam-core/releases>



The screenshot shows the GitHub release page for GCAM 5.4. The page title is "GCAM 5.4" and it was released by "praltp" 29 days ago. The DOI is 10.5281/zenodo.5093192. The page lists 11 new features, including updated technology costs, emissions data, trade improvements, water markets, energy for water, food demand, solver improvements, and optional features like Direct Air Capture. The "Assets" section is expanded, showing three downloadable files: "gcam-v5.4-Mac-Release-Package.zip" (181 MB), "gcam-v5.4-Windows-Release-Package.zip" (172 MB), and "GCAM_tutorial_2021.pptx" (5.6 MB). A red dashed box highlights the first two zip files.

Latest release

gcam-v5.4
aa652d0

Compare

GCAM 5.4

praltp released this 29 days ago

DOI 10.5281/zenodo.5093192

New features include:

1. Updated technology costs for electricity and transportation technologies
2. Emissions: using CEDS as data source, updated to 2015, new MAC curves
3. Trade: improved trade for fossil fuels, forestry, and agriculture
4. Included water markets in GCAM-USA
5. Energy for water
6. New food demand representation
7. Solver improvements and library changes
8. gcamdata updated to use drake and work with dplyr 1.0.0
9. Removed unused code
10. Minor updates and bugfixes
11. Optional features (not turned on by default):
 - Direct Air Capture
 - Ability to specify exogenous floorspace pathways
 - Ability to scale CH₄ and N₂O emissions to EPA inventories

5 people reacted

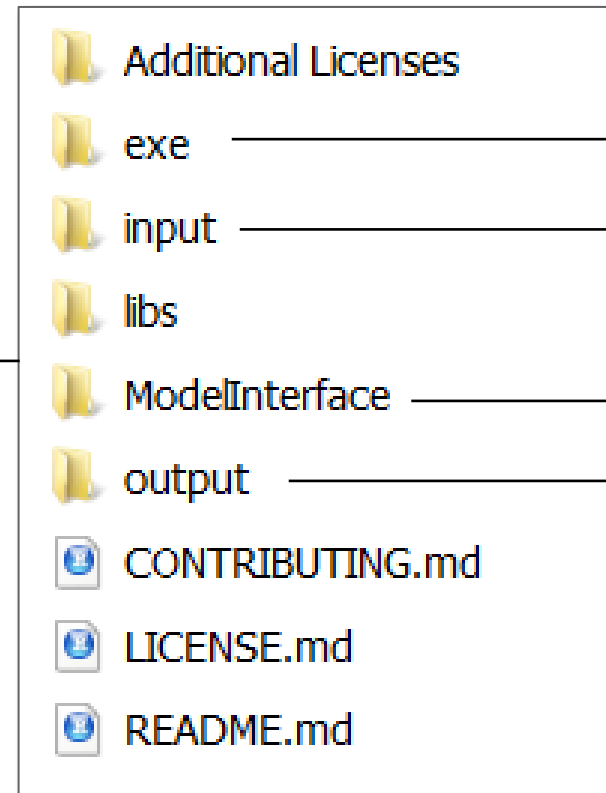
Assets 5

| | |
|---------------------------------------|--------|
| gcam-v5.4-Mac-Release-Package.zip | 181 MB |
| gcam-v5.4-Windows-Release-Package.zip | 172 MB |
| GCAM_tutorial_2021.pptx | 5.6 MB |

Folder Structure

Download and unzip

gcam-v5.4-Windows-Release-Package
gcam-v5.4-Windows-Release-Package.zip



Model executable and code

Model input files

Result viewing software

Output Folder

Input Files

- gcam-v5.4-Windows-Release-Package
- gcam-v5.4-Windows-Release-Package.zip

- Additional Licenses
- exe
- input
- libs
- ModelInterface
- output
- CONTRIBUTING.md
- LICENSE.md
- README.md

Raw Input Data

- climate
- extra
- gcamdata
- magicc
- policy
- solution

GCAM data building
R package



- chunk-generator
 - data-raw
 - exec
 - figures
 - inst
 - man
 - R
 - tests
 - xml
 - .gitattributes
 - .gitignore
 - .Rbuildignore
 - .travis.yml
 - appveyor.yml
 - coverage.R
 - DESCRIPTION
 - gcamdata.Rproj
 - LICENSE
 - NAMESPACE
 - README.md
- Raw Input Files
- Processing Code
- xmls

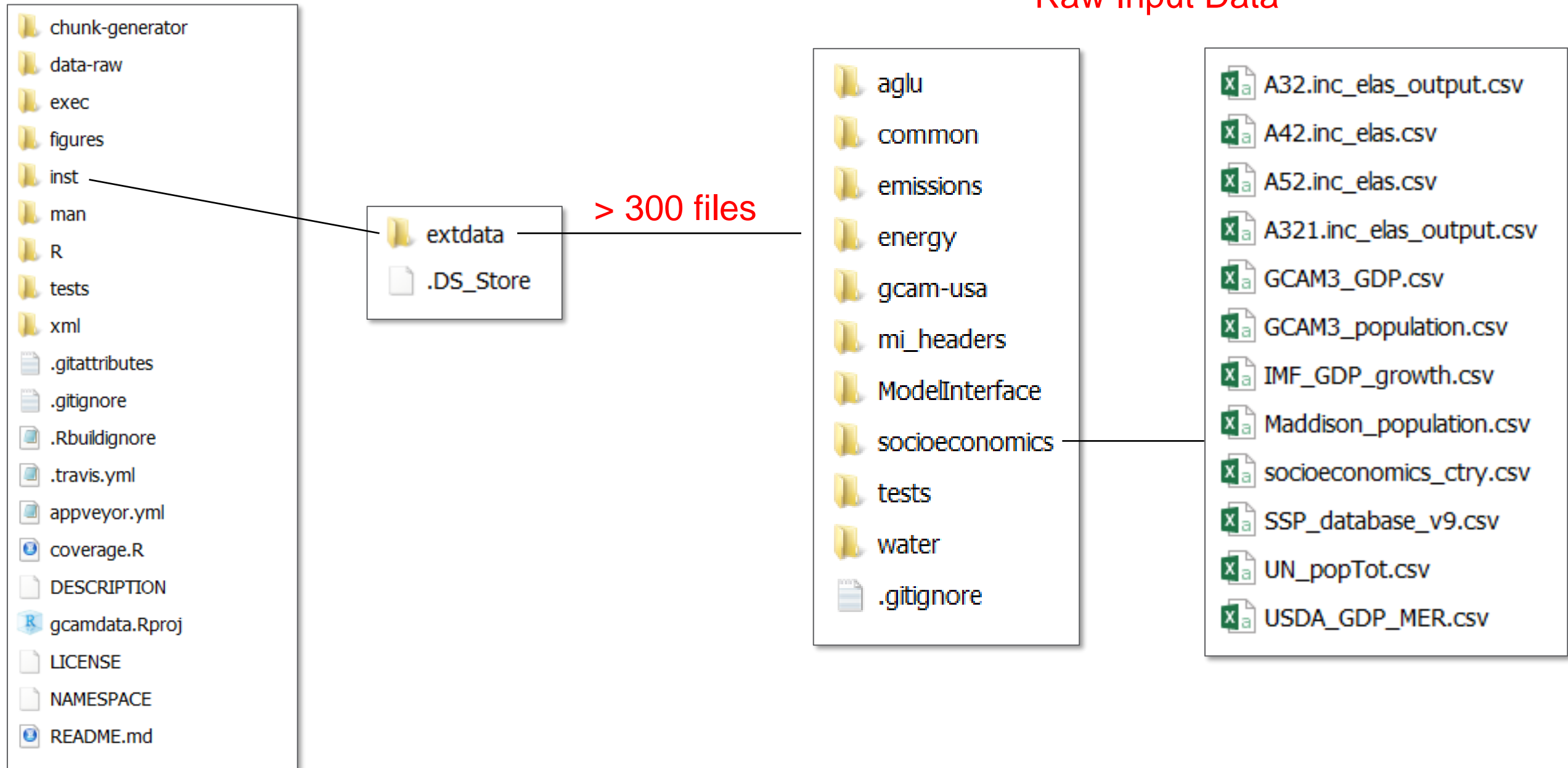
Input Files

R data system (Raw Input Data)

<https://github.com/JGCRI/gcamdata>

`./gcamFolder/input/gcamdata`

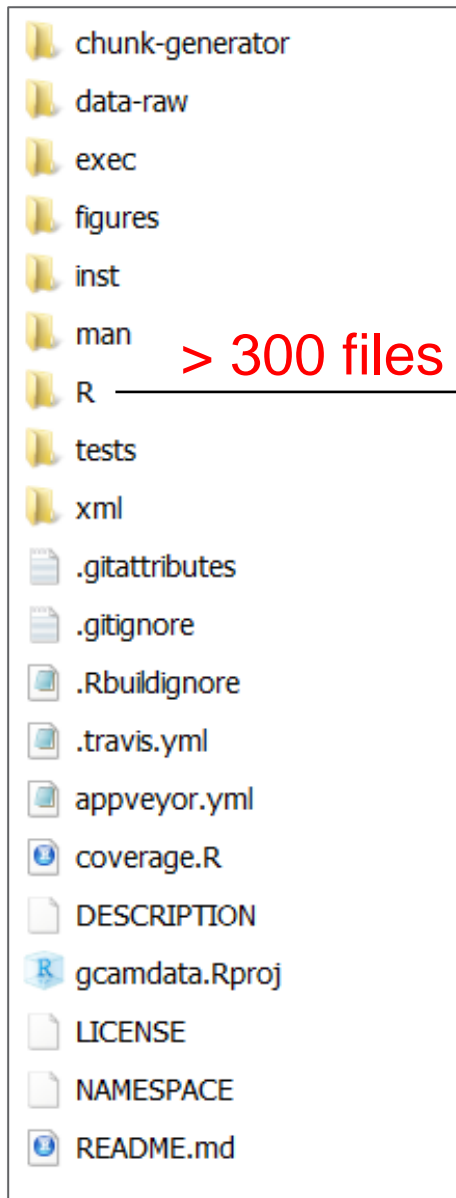
Raw Input Data



Input Files

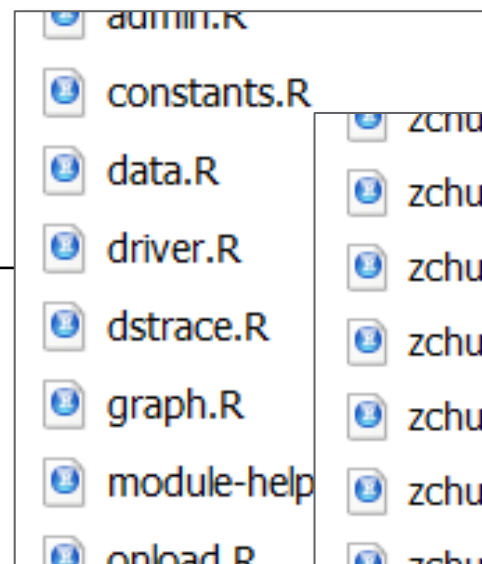
R data system (Data processing functions)

./gcamFolder/input/gcamdata

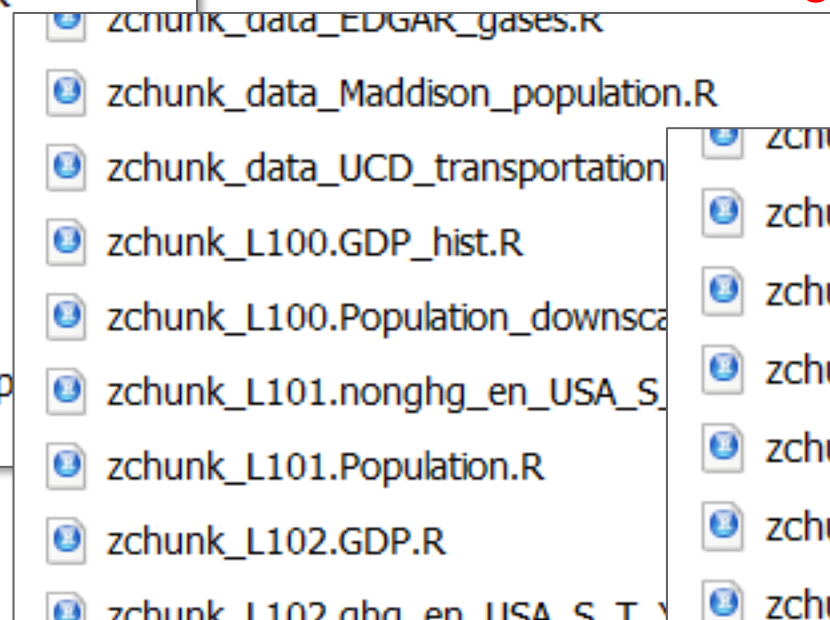


> 300 files

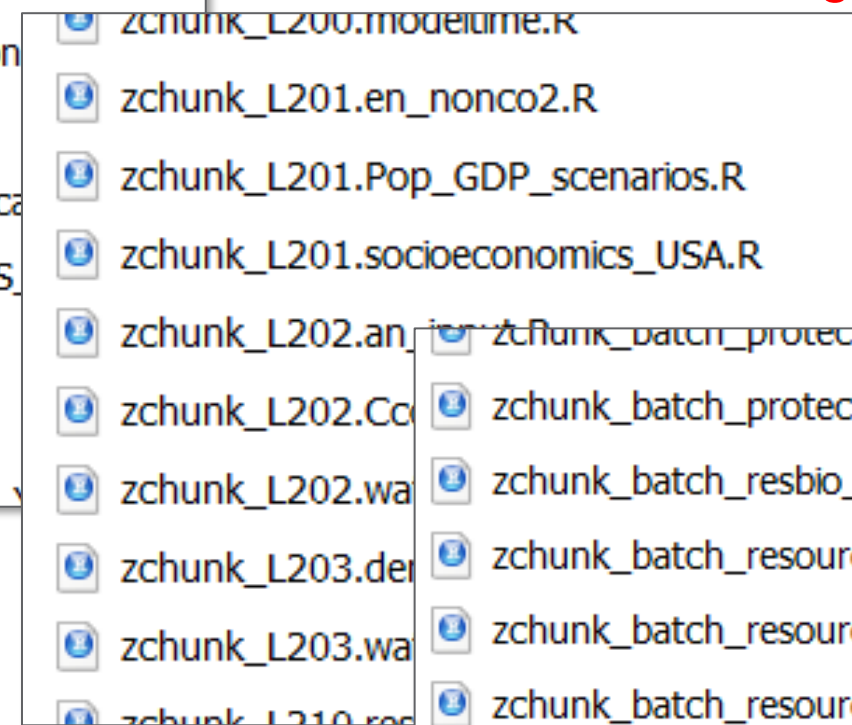
Constants
Assumptions



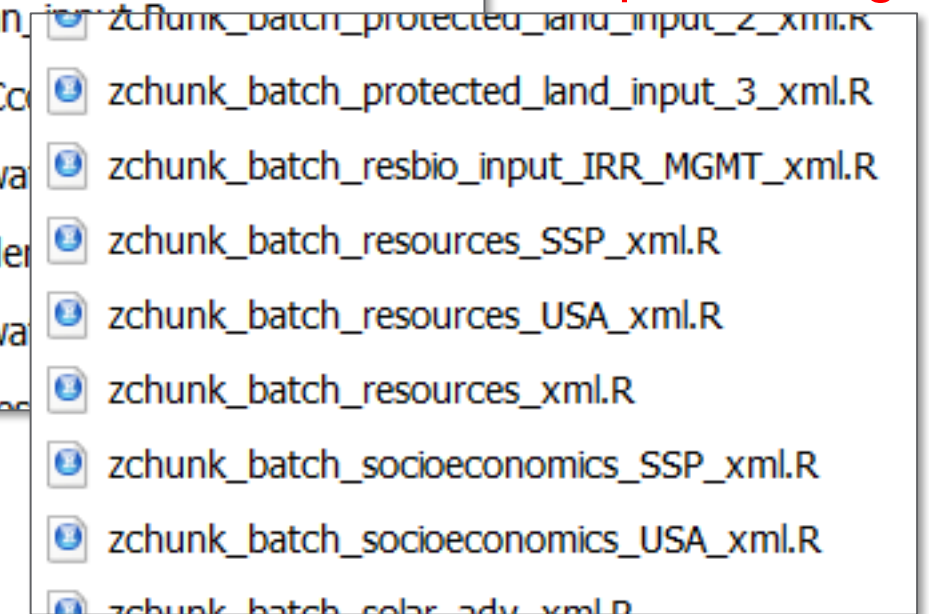
Level 1
Initial Processing



Level 2
Initial Processing



xml
processing



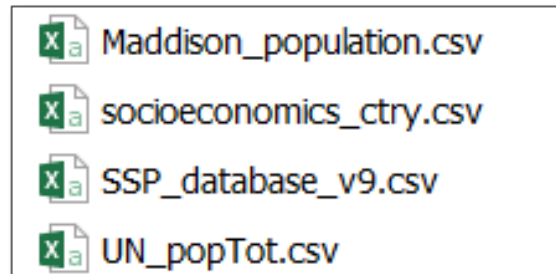
XML nested structure



Year
Value

Input Files - Example Raw Data to XML

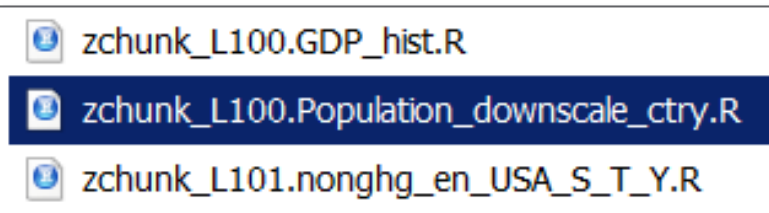
Raw Input Data



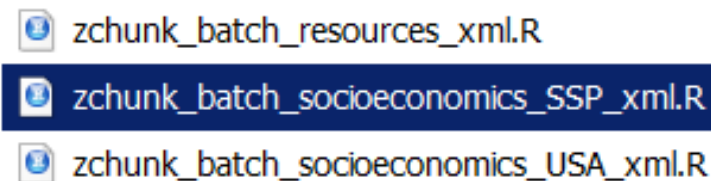
File: UN_popTot.csv
Title: UN population 1950-2010 and projected 2010-2100
Units: thousands
Description: UN population data by countryâ€™historical and projected through 2100
Source: <http://esa.un.org/unpd/wpp/Excel-Data/population.htm>
â€”
Column types: ccccin

| Country | Region | Sex | Scenario | Year | Value |
|---------|--------|-----|----------|------|----------|
| AFG | sas | M+F | EST | 1950 | 8151.455 |
| AFG | sas | M+F | EST | 1951 | 8276.82 |
| AFG | sas | M+F | EST | 1952 | 8407.148 |
| AFG | sas | M+F | EST | 1953 | 8542.906 |
| AFG | sas | M+F | EST | 1954 | 8684.494 |
| AFG | sas | M+F | EST | 1955 | 8832.253 |
| AFG | sas | M+F | EST | 1956 | 8986.449 |
| AFG | sas | M+F | EST | 1957 | 9147.286 |
| AFG | sas | M+F | EST | 1958 | 9214.915 |

R processing

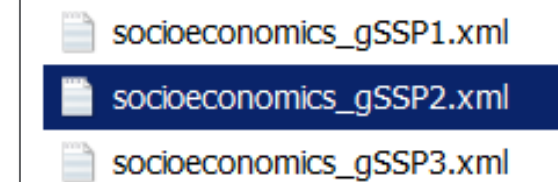


```
module_socioeconomics_L100.Population_downscale_ctry <- funct
if(command == driver.DECLARE_INPUTS) {
  return(c(FILE = "socioeconomics/socioeconomics_ctry",
            FILE = "socioeconomics/SSP_database_v9",
            FILE = "socioeconomics/UN_popTot"))
} else if(command == driver.DECLARE_OUTPUTS) {
  return(c("L100.Pop_thous_ctry_Yh",
            "L100.Pop_thous_SSP_ctry_Yfut"))
} else if(command == driver.MAKE) {
```



```
"L201.PPPConvert",
"L201.BaseGDP_GCAM3",|
"L201.LaborProductivity_GCAM3",
"L201.Pop_GCAM3"))
} else if(command == driver.DECLARE_OUTPUTS) {
  return(c(XML = "socioeconomics_gSSP1.xml",
            XML = "socioeconomics_gSSP2.xml",
            XML = "socioeconomics_gSSP3.xml",
```

XML Generation



```
<?xml version="1.0" encoding="UTF-8"?>
<scenario>
  <world>
    <region name="USA">
      <demographics>
        <populationMiniCAM year="1975">
          <totalPop>222133</totalPop>
        </populationMiniCAM>
        <populationMiniCAM year="1990">
          <totalPop>256971</totalPop>
```



To GCAM
configuration.xml

Model Run – exe folder

- gcam-v5.4-Windows-Release-Package
- gcam-v5.4-Windows-Release-Package.zip

- Additional Licenses
- exe
- input
- libs
- ModelInterface
- output
- CONTRIBUTING.md
- LICENSE.md
- README.md

- logs
- restart
- .basexhome
- batch_SSP_REF.xml
- batch_SSP_SPA1.xml
- batch_SSP_SPA4.xml
- batch_SSP_SPA5.xml
- batch_SSP_SPA23.xml
- configuration.xml
- configuration_ref.xml
- configuration_ssps.xml
- configuration_usa.xml
- log_conf.xml
- Objects-Main.exe
- run-gcam.bat
- xerces-c_3_1.dll
- XMLDBDriver.jar
- XMLDBDriver.properties

```
<?xml version="1.0" encoding="UTF-8"?>
<Configuration>
  <Files>
    <Value name="xmlInputFileName">../input/gcamdata/xml/modeltime.xml</Value>
    <Value name="BatchFileName">batch_ag.xml</Value>
    <Value name="policy-target-file">../input/policy/forcing_target_4p5.xml</Value>
    <Value name="GHGInputFileName">../input/magicc/inputs/input_gases.emk</Value>
    <Value write-output="1" append-scenario-name="0" name="xml-db-location">../output/database_basexdb</Value>
    <Value write-output="1" append-scenario-name="0" name="restart">../restart/restart</Value>
    <Value write-output="1" append-scenario-name="1" name="xmlDebugFileName">debug.xml</Value>
    <Value write-output="1" append-scenario-name="0" name="climatFileName">gas.emk</Value>
    <Value write-output="1" append-scenario-name="1" name="costCurvesOutputFileName">cost_curves.xml</Value>
    <Value write-output="1" append-scenario-name="0" name="batchCSVOutputFile">batch-csv-out.csv</Value>
    <Value write-output="0" append-scenario-name="0" name="supplyDemandOutputFileName">SDCurves.csv</Value>
    <Value write-output="0" append-scenario-name="0" name="flow-graph">gcam-flow-graph.dot</Value>
    <Value write-output="0" append-scenario-name="0" name="dependencyGraphName">DependencyGraph.dot</Value>
    <Value write-output="0" append-scenario-name="0" name="landAllocatorGraphName">LandAllocatorGraph.dot</Value>
  </Files>
  <ScenarioComponents>
    <Value name="climate">../input/gcamdata/xml/hector.xml</Value>
    <Value name="interest_rate">../input/gcamdata/xml/interest_rate.xml</Value>
    <Value name="socioeconomics">../input/gcamdata/xml/socioeconomics_gSSP2.xml</Value>
  </ScenarioComponents>
</Configuration>
```

Configuration file

Run GCAM file

```
REM OR IT IS NOT 64-bit. In this case an error mess
IF DEFINED JAVA_HOME (

REM Update the PATH to be able to find the Java dlls
SET PATH=%JAVA_HOME%\bin;%JAVA_HOME%\bin\server

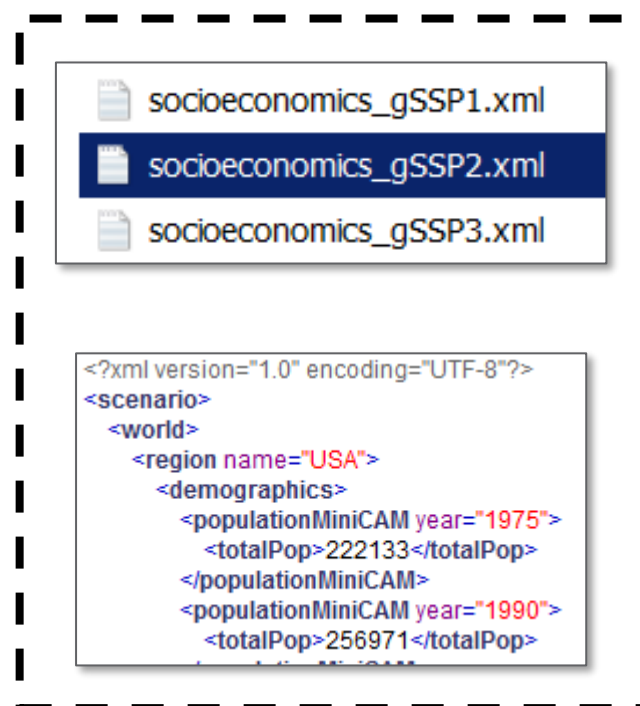
REM Run GCAM
Objects-Main.exe -C configuration.xml

)

pause
```


Model Run – configuration.xml

XML Generation



configuration.xml

```
<?xml version="1.0" encoding="UTF-8"?>
<Configuration>
  <Files>
    <Value name="xmlInputFileName">../input/gcamdata/xml/modeltime.xml</Value>
    <Value name="BatchFileName">batch_ag.xml</Value>
    <Value name="policy-target-file">../input/policy/forcing_target_4p5.xml</Value>
    <Value name="GHGInputFileName">../input/magicc/inputs/input_gases.emk</Value>
    <Value write-output="1" append-scenario-name="0" name="xmldb-location">../output/database_basexdb</Value>
    <Value write-output="1" append-scenario-name="0" name="restart">../restart/restart</Value>
    <Value write-output="1" append-scenario-name="1" name="xmlDebugFileName">debug.xml</Value>
    <Value write-output="1" append-scenario-name="0" name="climatFileName">gas.emk</Value>
    <Value write-output="1" append-scenario-name="1" name="costCurvesOutputFileName">cost_curves.xml</Value>
    <Value write-output="1" append-scenario-name="0" name="batchCSVOutputFile">batch-csv-out.csv</Value>
    <Value write-output="0" append-scenario-name="0" name="supplyDemandOutputFileName">SDCurves.csv</Value>
    <Value write-output="0" append-scenario-name="0" name="flow-graph">gcam-flow-graph.dot</Value>
    <Value write-output="0" append-scenario-name="0" name="dependencyGraphName">DependencyGraph.dot</Value>
    <Value write-output="0" append-scenario-name="0" name="landAllocatorGraphName">LandAllocatorGraph.dot</Value>
  </Files>
  <ScenarioComponents>
    <Value name="climate">../input/gcamdata/xml/hector.xml</Value>
    <Value name="interest_rate">../input/gcamdata/xml/interest_rate.xml</Value>
    <Value name="socioeconomics">../input/gcamdata/xml/socioeconomics_gSSP2.xml</Value>
    <Value name="resources">../input/gcamdata/xml/resources.xml</Value>
    <Value name="energy_supply">../input/gcamdata/xml/en_supply.xml</Value>
    <Value name="energy_transformation">../input/gcamdata/xml/en_transformation.xml</Value>
    <!--Value name="electricity">../input/gcamdata/xml/electricity.xml</Value-->
    <Value name="elec_water_base">../input/gcamdata/xml/electricity_water.xml</Value>
    <Value name="heat">../input/gcamdata/xml/heat.xml</Value>
    <Value name="hydrogen">../input/gcamdata/xml/hydrogen.xml</Value>
    <Value name="energy_distribution">../input/gcamdata/xml/en_distribution.xml</Value>
    <Value name="industry">../input/gcamdata/xml/industry.xml</Value>
    <Value name="industry_income_elas">../input/gcamdata/xml/industry_incelas_gssp2.xml</Value>
    <Value name="cement">../input/gcamdata/xml/cement.xml</Value>
    <Value name="cement_income_elas">../input/gcamdata/xml/cement_incelas_gssp2.xml</Value>
    <Value name="fertilizer_energy">../input/gcamdata/xml/en_Fert.xml</Value>
    <Value name="hddcdd">../input/gcamdata/xml/HDDCDD_constdd_no_GCM.xml</Value>
    <Value name="building">../input/gcamdata/xml/building_det.xml</Value>
    <Value name="transportation">../input/gcamdata/xml/transportation_UCD_CORE.xml</Value>
    <Value name="carbon_content">../input/gcamdata/xml/Ccoef.xml</Value>
  </ScenarioComponents>
</Configuration>
```

Setup Key Model Inputs & Options

- Output database location
- Output database name
- Input xml list
- Scenario Name
- BatchMode
- Number of Periods

<http://jgcri.github.io/gcam-doc/user-guide.html>

Model Run - Configuration

Output Database Name and Location

```
<?xml version="1.0" encoding="UTF-8"?>
<Configuration>
  <Files>
    <Value name="xmlInputFileName">../input/gcamdata/xml/modeltime.xml</Value>
    <Value name="BatchFileName">batch_ag.xml</Value>
    <Value name="policy-target-file">../input/policy/forcing_target_4p5.xml</Value>
    <Value name="GHGInputFileName">../input/magicc/inputs/input_gases.emk</Value>
    <Value write-output="1" append-scenario-name="0" name="xmlDb-location">../output/database_basexdb</Value>
    <Value write-output="1" append-scenario-name="0" name="restart">../restart/restart</Value>
    <Value write-output="1" append-scenario-name="1" name="xmlDebugFileName">debug.xml</Value>
    <Value write-output="1" append-scenario-name="0" name="climatFileName">gas.emk</Value>
    <Value write-output="1" append-scenario-name="1" name="costCurvesOutputFileName">cost_curves.xml</Value>
    <Value write-output="1" append-scenario-name="0" name="batchCSVOutputFile">batch-csv-out.csv</Value>
    <Value write-output="0" append-scenario-name="0" name="supplyDemandOutputFileName">SDCurves.csv</Value>
    <Value write-output="0" append-scenario-name="0" name="flow-graph">gcam-flow-graph.dot</Value>
    <Value write-output="0" append-scenario-name="0" name="dependencyGraphName">DependencyGraph.dot</Value>
    <Value write-output="0" append-scenario-name="0" name="landAllocatorGraphName">LandAllocatorGraph.dot</Value>
  </Files>
</Configuration>
```

Reference case .xml input files

```
<Value name="resources">../input/gcamdata/xml/resources.xml</Value>
<Value name="energy_supply">../input/gcamdata/xml/en_supply.xml</Value>
<Value name="energy_transformation">../input/gcamdata/xml/en_transformation.xml</Value>
<!--Value name="electricity">../input/gcamdata/xml/electricity.xml</Value-->
<Value name="elec_water_base">../input/gcamdata/xml/electricity_water.xml</Value>
<Value name="heat">../input/gcamdata/xml/heat.xml</Value>
<Value name="hydrogen">../input/gcamdata/xml/hydrogen.xml</Value>
<Value name="energy_distribution">../input/gcamdata/xml/en_distribution.xml</Value>
<Value name="industry">../input/gcamdata/xml/industry.xml</Value>
```

Scenario Options

```
</ScenarioComponents>
<Strings>
  <Value name="scenarioName">Reference</Value>
  <Value name="debug-region">USA</Value>
  <Value name="MAGICC-input-dir">../input/magicc/inputs</Value>
  <Value name="MAGICC-output-dir">../output</Value>
</Strings>
<Bools>
  <Value name="CalibrationActive">1</Value>
  <Value name="BatchMode">0</Value>
  <Value name="find-path">0</Value>
  <Value name="createCostCurve">0</Value>
  <Value name="debugChecking">0</Value>
  <Value name="simulActive">1</Value>
  <Value name="PrintValuesOnGraphs">1</Value>
  <Value name="ShowNullPaths">0</Value>
  <Value name="PrintPrices">1</Value>
</Bools>
<Ints>
  <Value name="numMarketsToFindSD">10</Value>
  <Value name="numPointsForSD">21</Value>
  <Value name="numPointsForCO2CostCurve">5</Value>
  <Value name="carbon-output-start-year">1705</Value>
  <Value name="climateOutputInterval">5</Value>
  <Value name="parallel-grain-size">50</Value>
  <Value name="stop-period">-1</Value>
  <Value name="restart-period">-1</Value>
</Ints>
```

Scenario Name

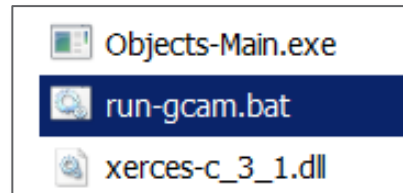
Batch Mode

Periods

| | |
|----|------|
| -1 | All |
| 1 | 1975 |
| 2 | 1990 |
| 3 | 2005 |
| 4 | 2010 |
| 5 | 2015 |
| 6 | 2020 |

Model Run - Execution

`./gcamFolder/exe/`



```
C:\Windows\system32\cmd.exe
This computer software was prepared by Battelle Memorial Institute,
hereinafter the Contractor, under Contract No. DE-AC05-76RL0 1830 with
the Department of Energy (DOE). NEITHER THE GOVERNMENT NOR THE
CONTRACTOR MAKES ANY WARRANTY, EXPRESS OR IMPLIED, OR ASSUMES ANY
LIABILITY FOR THE USE OF THIS SOFTWARE. This notice including this
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exported into any country or used in any manner prohibited by the United
States Export Administration Act or any other applicable export laws,
restrictions or regulations (collectively the 'Export Laws'). Export of
the Software may require some form of license or other authority from
the U.S. Government, and failure to obtain such export control license
may result in criminal liability under U.S. laws. In addition, if the
Software is identified as export controlled items under the Export Laws,
User represents and warrants that User is not a citizen, or otherwise
located within, an embargoed nation (including without limitation Iran,
Syria, Sudan, Cuba, and North Korea) and that User is not otherwise
prohibited under the Export Laws from receiving the Software.

Copyright 2011 Battelle Memorial Institute. All Rights Reserved.
Distributed as open-source under the terms of the Educational Community
License version 2.0 (ECL 2.0). http://www.opensource.org/licenses/ec12.php

For further details, see: http://www.globalchange.umd.edu/models/gcam/

Running GCAM model code base version 5.1 revision gcam-v5.1.3

Configuration file: configuration.xml
Parsing input files...
Parsing ../input/gcamdata/xml/hector.xml scenario component.
Parsing ../input/gcamdata/xml/interest_rate.xml scenario component.
Parsing ../input/gcamdata/xml/socioeconomics_gssp2.xml scenario component.
Parsing ../input/gcamdata/xml/resources.xml scenario component.
Parsing ../input/gcamdata/xml/en_supply.xml scenario component.
Parsing ../input/gcamdata/xml/en_transformation.xml scenario component.
Parsing ../input/gcamdata/xml/electricity_water.xml scenario component.
Parsing ../input/gcamdata/xml/heat.xml scenario component.
Parsing ../input/gcamdata/xml/hydrogen.xml scenario component.
Parsing ../input/gcamdata/xml/en_distribution.xml scenario component.
```

```
C:\Windows\system32\cmd.exe
Starting new scenario: Reference
Tue Aug 6 10:13:36 2019:WARNING:Hector::Logger::printLogHeader: hector version
2.0
Tue Aug 6 10:13:36 2019:WARNING:Hector::Logger::printLogHeader: hector version
2.0
Tue Aug 6 10:13:37 2019:WARNING:Hector::Logger::printLogHeader: hector version
2.0
Caloutput read in but no land read in for technology Middle East Corn_ArabianSea
_RFD_hi
Caloutput read in but no land read in for technology Middle East Corn_ArabianSea
_RFD_lo
Starting a model run. Running all periods.
Model run beginning.
Period 0: 1975
Model solved with last period's prices.

Period 1: 1990
Model solved normally. Iterations period 1: 202. Total iterations: 203

Period 2: 2005
Model solved normally. Iterations period 2: 228. Total iterations: 430

Period 3: 2010
Model solved normally. Iterations period 3: 131. Total iterations: 561

Period 4: 2015
Model solved normally. Iterations period 4: 826. Total iterations: 1387

Period 5: 2020
Model solved normally. Iterations period 5: 100. Total iterations: 1487

Period 6: 2025
Model solved normally. Iterations period 6: 100. Total iterations: 1587

Period 7: 2030
Model solved normally. Iterations period 7: 100. Total iterations: 1687

Period 8: 2035
Model solved normally. Iterations period 8: 100. Total iterations: 1787

Period 9: 2040
Model solved normally. Iterations period 9: 100. Total iterations: 1887

Period 10: 2045
Model solved normally. Iterations period 10: 100. Total iterations: 1987

Period 11: 2050
Model solved normally. Iterations period 11: 100. Total iterations: 2087

Period 12: 2055
Model solved normally. Iterations period 12: 100. Total iterations: 2187

Period 13: 2060
Model solved normally. Iterations period 13: 100. Total iterations: 2287

Period 14: 2065
Model solved normally. Iterations period 14: 100. Total iterations: 2387

Period 15: 2070
Model solved normally. Iterations period 15: 100. Total iterations: 2487

Period 16: 2075
Model solved normally. Iterations period 16: 100. Total iterations: 2587

Period 17: 2080
Model solved normally. Iterations period 17: 100. Total iterations: 2687

Period 18: 2085
Model solved normally. Iterations period 18: 100. Total iterations: 2787

Period 19: 2090
Model solved normally. Iterations period 19: 100. Total iterations: 2887

Period 20: 2095
Model solved normally. Iterations period 20: 28. Total iterations: 2502

Period 21: 2100
Model solved normally. Iterations period 21: 32. Total iterations: 2534

All model periods solved correctly.
Model run completed.
Printing output
Starting output to XML Database.
C:/Z/GCAMWebinar2/gcam-v5.1.3-Windows-Release-Package/exe/.basex: writing new co
nfiguration file.
Model run completed.
Model exiting successfully.
Press any key to continue . . .
```

Similar for
mac/linux/unix
OS systems

Model Run – Logs

gcam-v5.4-Windows-Release-Package
gcam-v5.4-Windows-Release-Package.zip

Additional Licenses
exe
input
libs
ModelInterface
output
CONTRIBUTING.md
LICENSE.md
README.md

logs
restart
.basexhome
batch_SSP_REF.xml
batch_SSP_SPA1.xml
batch_SSP_SPA4.xml
batch_SSP_SPA5.xml
batch_SSP_SPA23.xml
configuration.xml
configuration_ref.xml
configuration_ssps.xml
configuration_usa.xml
log_conf.xml
Objects-Main.exe
run-gcam.bat
xerces-c_3_1.dll
XMLDBDriver.jar
XMLDBDriver.properties

HFC227ea_halocarbon.log
HFC245fa_halocarbon.log
HFC4310_halocarbon.log
main_log.txt
N2O.log

main_log.txt - Notepad

File Edit Format View Help

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For further details, see: <http://www.globalchange.umd.edu/models/gcam/>

Running GCAM model code base version 5.1 revision gcam-v5.1.3

Configuration file: configuration.xml
Parsing input files...
Parsing ../input/gcamdata/xml/hector.xml scenario component.
Parsing ../input/gcamdata/xml/interest_rate.xml scenario component.
Parsing ../input/gcamdata/xml/socioeconomics_gssp2.xml scenario component.
Parsing ../input/gcamdata/xml/resources.xml scenario component.
Parsing ../input/gcamdata/xml/en_supply.xml scenario component.
Parsing ../input/gcamdata/xml/en_transformation.xml scenario component.
Parsing ../input/gcamdata/xml/electricity_water.xml scenario component.
Parsing ../input/gcamdata/xml/heat.xml scenario component.

Outputs – Database/Queries

gcam-v5.4-Windows-Release-Package
gcam-v5.4-Windows-Release-Package.zip

Additional Licenses
exe
input
libs
ModelInterface
output
CONTRIBUTING.md
LICENSE.md
README.md

database_basexdb
gcam_diagnostics
modelinterface
queries
.gitignore

| | | | |
|------------|-------------------|------------|--------------|
| atv.basex | 8/6/2019 10:36 AM | BASEX File | 191,797 KB |
| inf.basex | 8/6/2019 10:36 AM | BASEX File | 5 KB |
| tbl.basex | 8/6/2019 10:36 AM | BASEX File | 1,491,848 KB |
| tbli.basex | 8/6/2019 10:36 AM | BASEX File | 2,928 KB |
| txt.basex | 8/6/2019 10:36 AM | BASEX File | 145,493 KB |
| txtl.basex | 8/6/2019 10:32 AM | BASEX File | 1 KB |
| txtr.basex | 8/6/2019 10:32 AM | BASEX File | 0 KB |

filters
Main_queries.xml

```
<queryGroup>
  <queryGroup name="socioeconomics">
    <demographicsQuery title="population by region">
      <axis1 name="region">region</axis1>
      <axis2 name="Year">populationMiniCAM</axis2>
      <xPath buildList="true" dataName="total-population" group="false" sumAll="false">demographics/populationMiniCAM/total-population/node()</XPath>
      <comments/>
    </demographicsQuery>
    <gdpQueryBuilder title="GDP MER by region">
      <axis1 name="region">region</axis1>
      <axis2 name="Year">gdp-mer</axis2>
      <xPath buildList="true" dataName="gdp-mer" group="false" sumAll="false">GDP/gdp-mer/text()</XPath>
      <comments/>
    </gdpQueryBuilder>
    <gdpQueryBuilder title="GDP per capita MER by region">
```

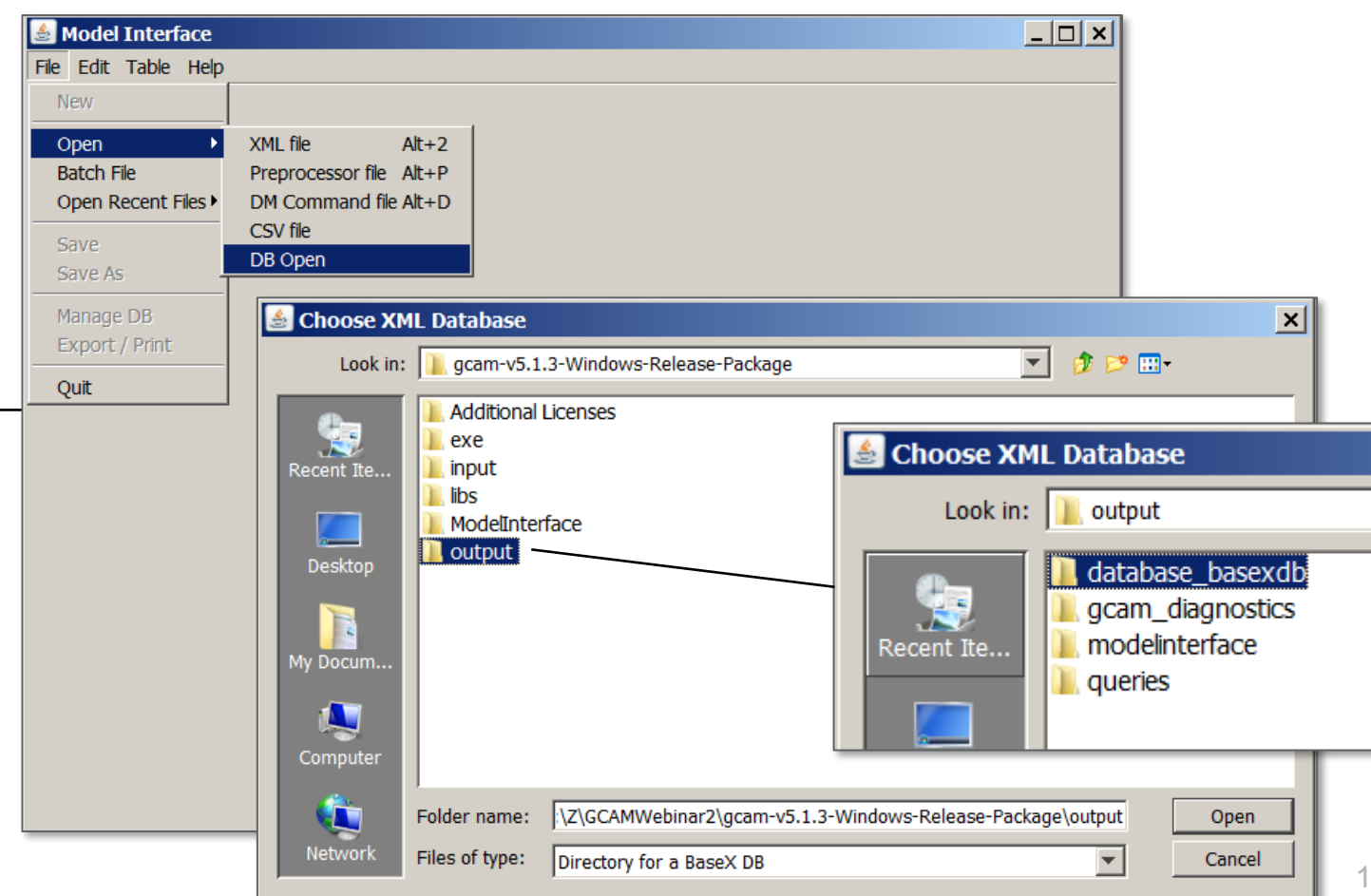
Outputs – Model Interface (View Results)

gcam-v5.4-Windows-Release-Package
gcam-v5.4-Windows-Release-Package.zip

Additional Licenses
exe
input
libs
ModelInterface
output
CONTRIBUTING.md
LICENSE.md
README.md

logs
model_interface.properties
run-model-interface.bat

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<!DOCTYPE properties SYSTEM "http://java.sun.com/dtd/properties.dtd">
<properties>
<comment>TODO: add comments</comment>
<entry key="queryFile">..\output\queries\Main_queries.xml</entry>
</properties>
```



Outputs – Model Interface (View Results)

Scenario Name

Queries (Main_Queries.xml)

Regions

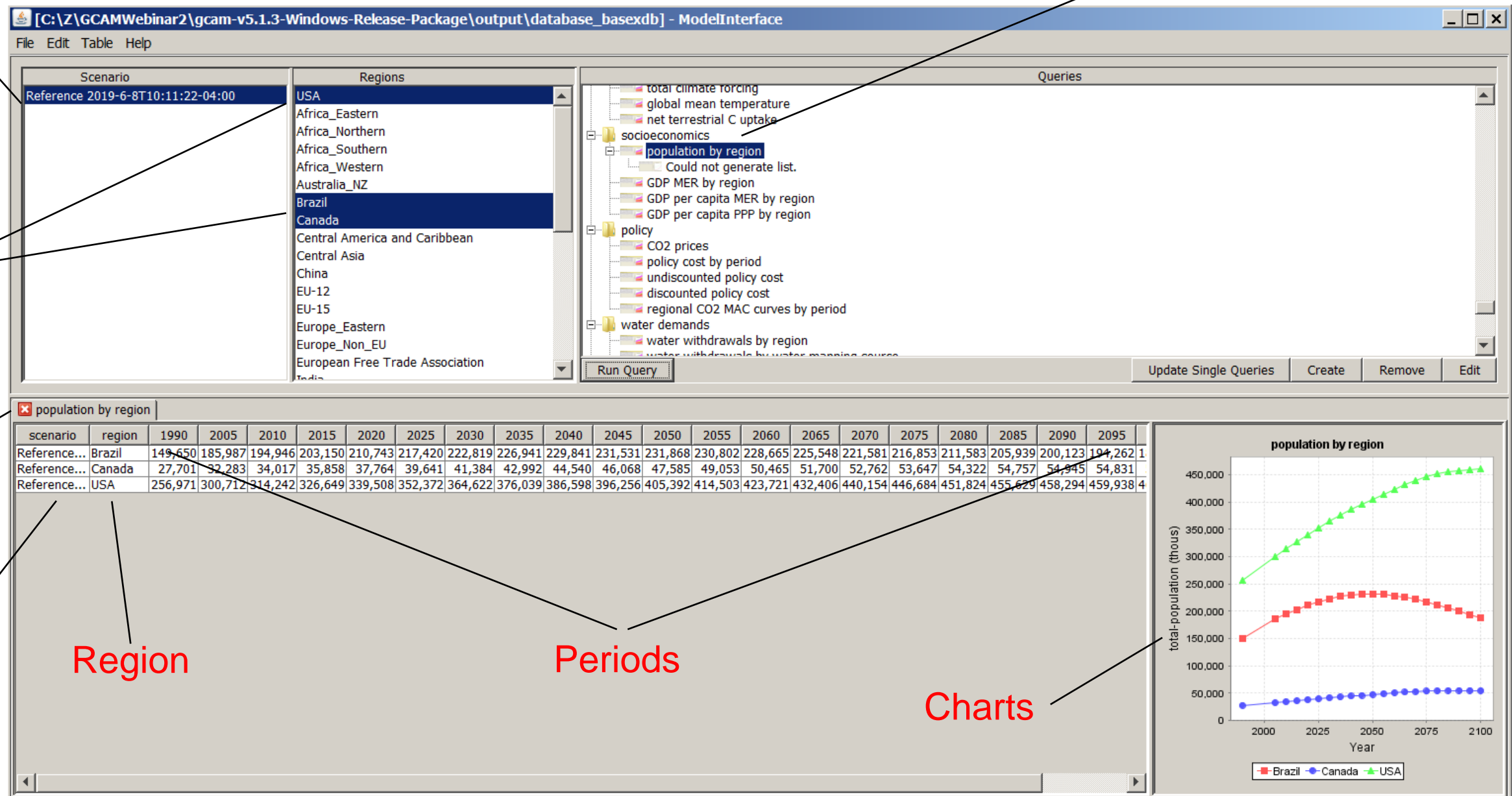
Query

Scenario
name

Region

Periods

Charts



Outputs – Model Interface (View Results)

Scenario Name

Queries (Main_Queries.xml)

Regions

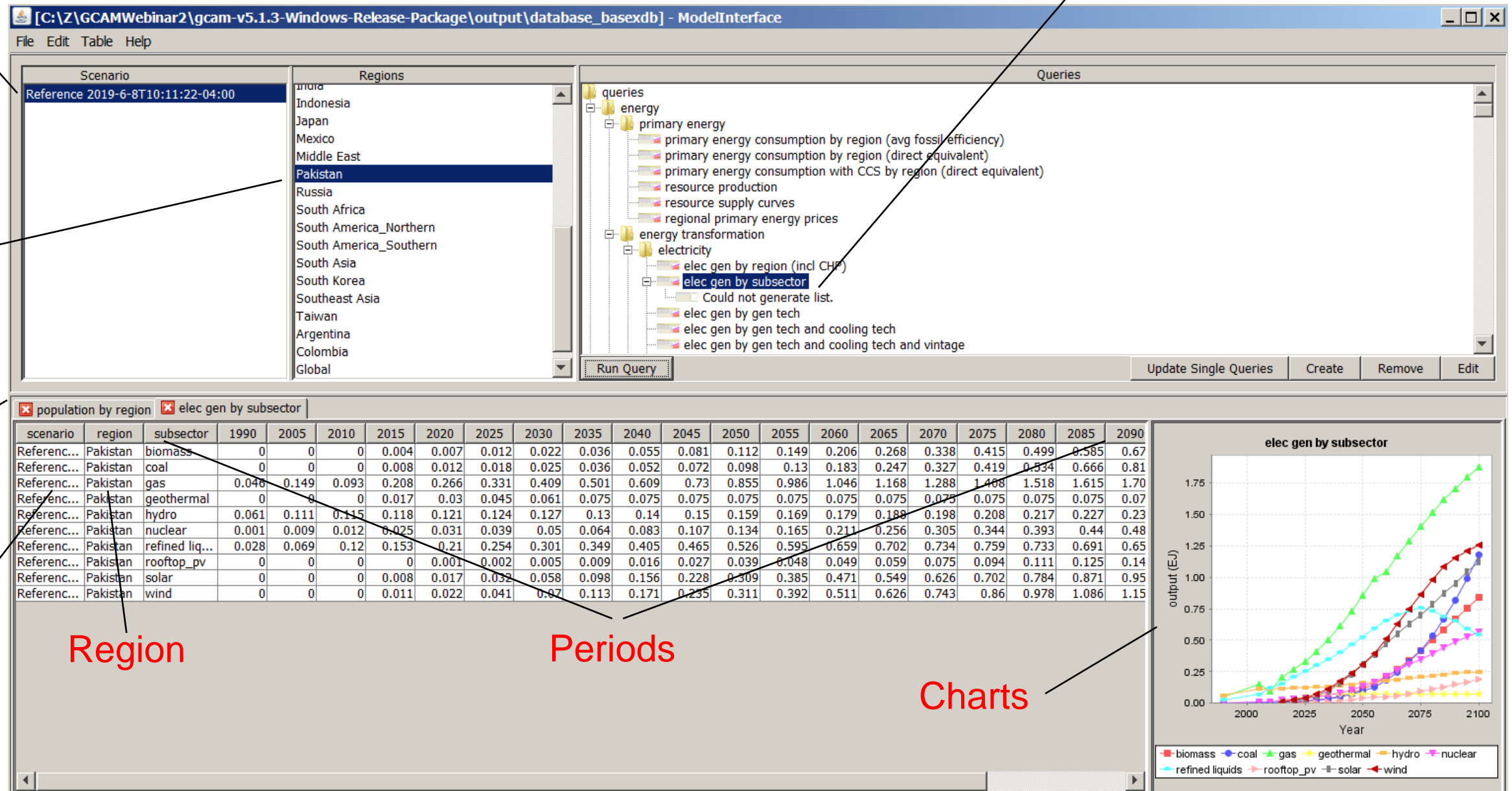
Queries

Scenario name

Region

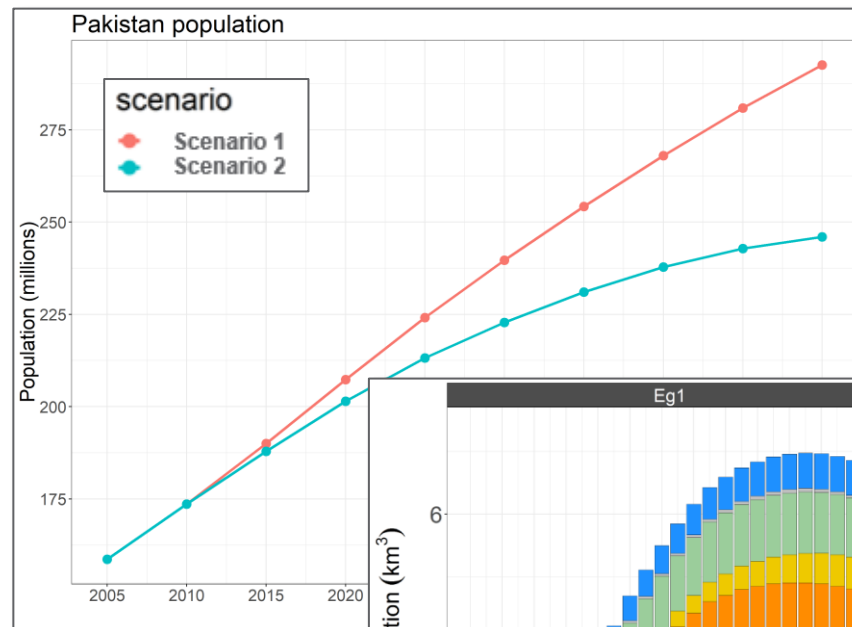
Periods

Charts

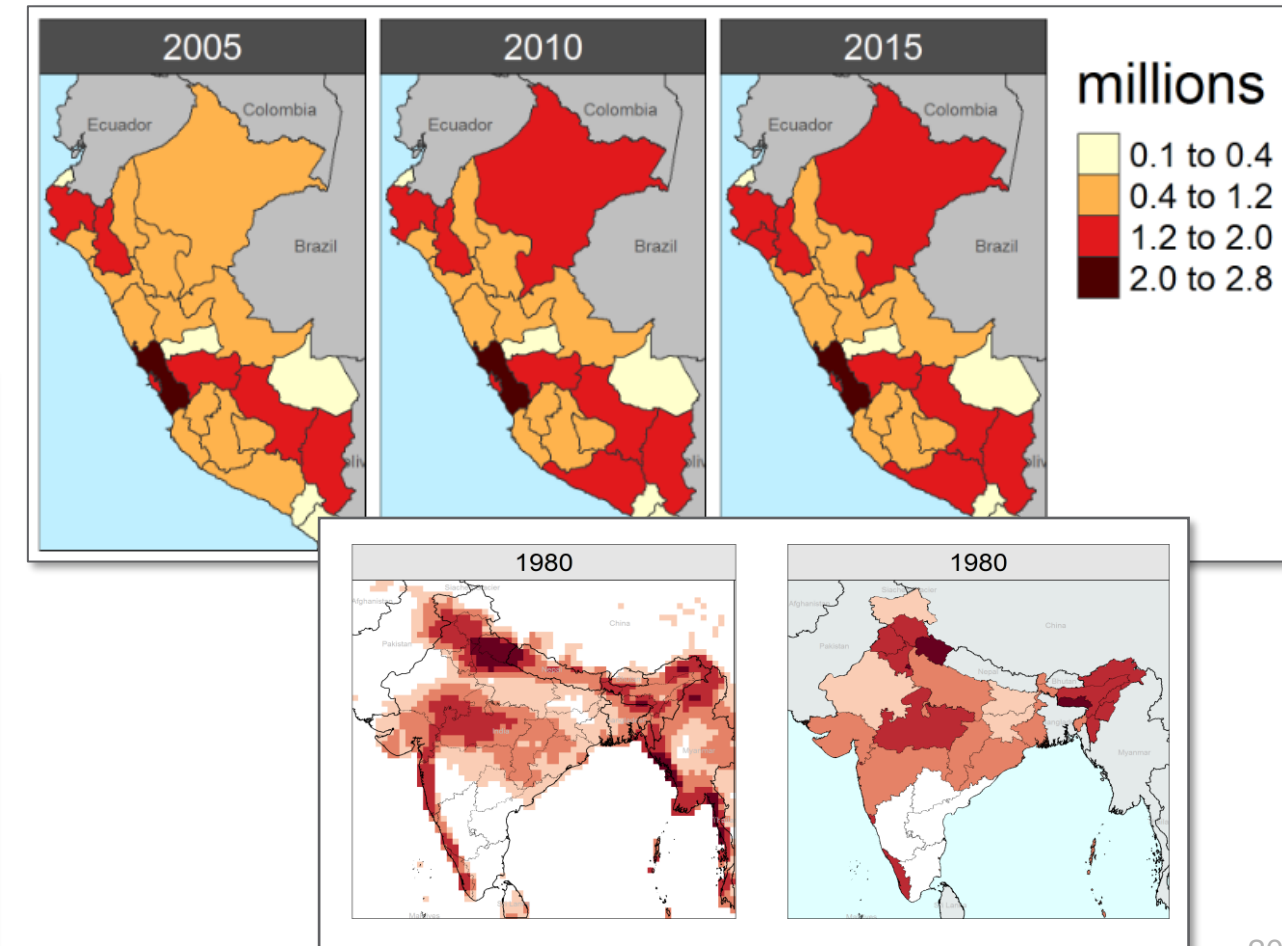
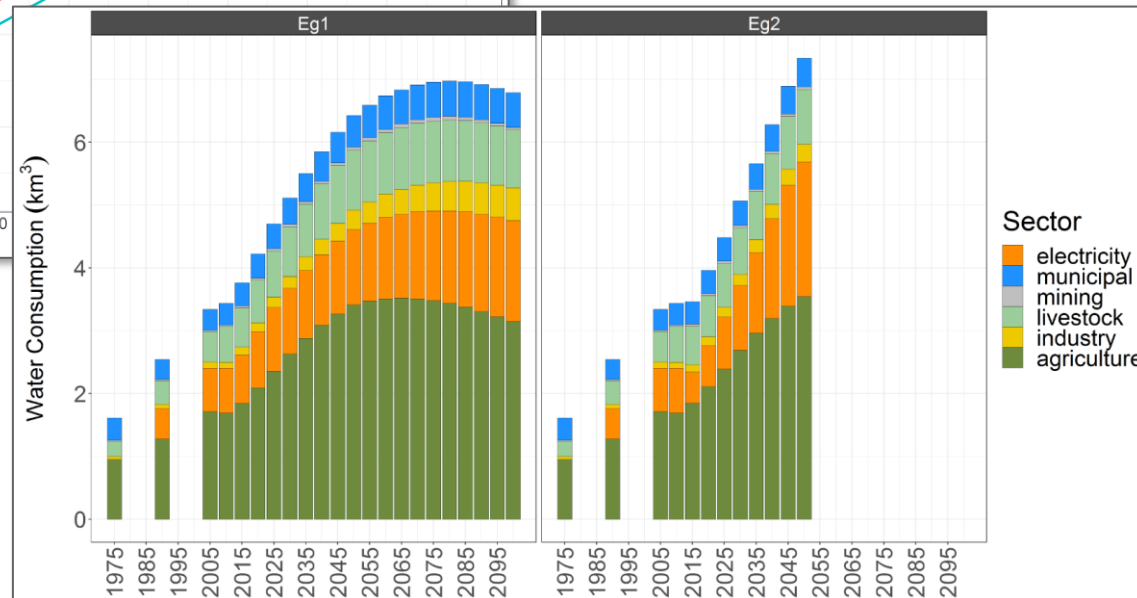


Final Result – Post Processing

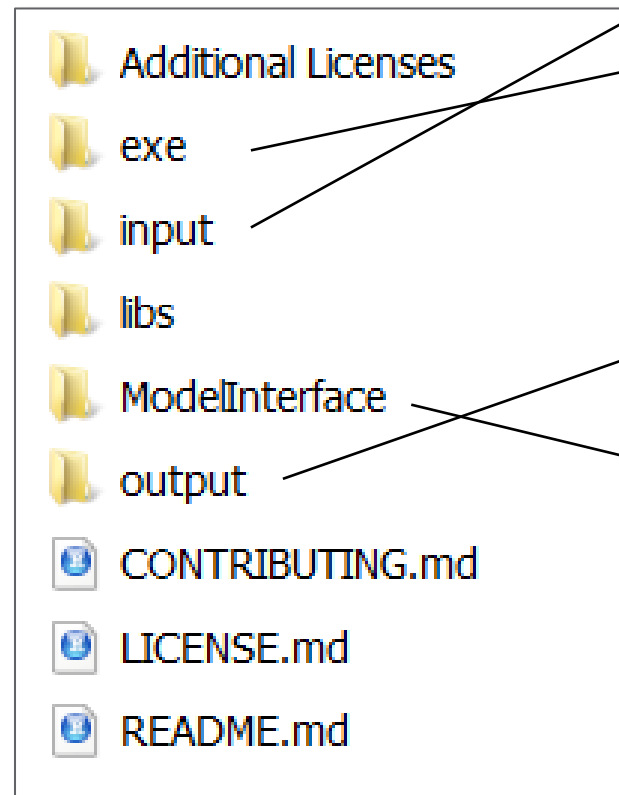
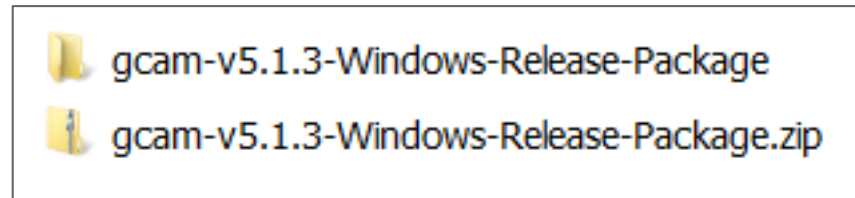
| population by region | | | elec gen by subsector | | | | | | | | | | | | | | | | | | |
|----------------------|----------|----------------|-----------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|------|
| scenario | region | subsector | 1990 | 2005 | 2010 | 2015 | 2020 | 2025 | 2030 | 2035 | 2040 | 2045 | 2050 | 2055 | 2060 | 2065 | 2070 | 2075 | 2080 | 2085 | 2090 |
| Referenc... | Pakistan | biomass | 0 | 0 | 0 | 0.004 | 0.007 | 0.012 | 0.022 | 0.036 | 0.055 | 0.081 | 0.112 | 0.149 | 0.206 | 0.268 | 0.338 | 0.415 | 0.499 | 0.585 | 0.67 |
| Referenc... | Pakistan | coal | 0 | 0 | 0 | 0.008 | 0.012 | 0.018 | 0.025 | 0.036 | 0.052 | 0.072 | 0.098 | 0.13 | 0.183 | 0.247 | 0.327 | 0.419 | 0.534 | 0.666 | 0.81 |
| Referenc... | Pakistan | gas | 0.046 | 0.149 | 0.093 | 0.208 | 0.266 | 0.331 | 0.409 | 0.501 | 0.609 | 0.73 | 0.855 | 0.986 | 1.046 | 1.168 | 1.288 | 1.408 | 1.518 | 1.615 | 1.70 |
| Referenc... | Pakistan | geothermal | 0 | 0 | 0 | 0.017 | 0.03 | 0.045 | 0.061 | 0.075 | 0.075 | 0.075 | 0.075 | 0.075 | 0.075 | 0.075 | 0.075 | 0.075 | 0.075 | 0.075 | 0.07 |
| Referenc... | Pakistan | hydro | 0.061 | 0.111 | 0.115 | 0.118 | 0.121 | 0.124 | 0.127 | 0.13 | 0.14 | 0.15 | 0.159 | 0.169 | 0.179 | 0.188 | 0.198 | 0.208 | 0.217 | 0.227 | 0.23 |
| Referenc... | Pakistan | nuclear | 0.001 | 0.009 | 0.012 | 0.025 | 0.031 | 0.039 | 0.05 | 0.064 | 0.083 | 0.107 | 0.134 | 0.165 | 0.211 | 0.256 | 0.305 | 0.344 | 0.393 | 0.44 | 0.48 |
| Referenc... | Pakistan | refined liq... | 0.028 | 0.069 | 0.12 | 0.153 | 0.21 | 0.254 | 0.301 | 0.349 | 0.405 | 0.465 | 0.526 | 0.595 | 0.659 | 0.702 | 0.734 | 0.759 | 0.733 | 0.691 | 0.65 |
| Referenc... | Pakistan | rooftop_pv | 0 | 0 | 0 | 0 | 0.001 | 0.002 | 0.005 | 0.009 | 0.016 | 0.027 | 0.039 | 0.048 | 0.049 | 0.059 | 0.075 | 0.094 | 0.111 | 0.125 | 0.14 |
| Referenc... | Pakistan | solar | 0 | 0 | 0 | 0.008 | 0.017 | 0.032 | 0.058 | 0.098 | 0.156 | 0.228 | 0.309 | 0.385 | 0.471 | 0.549 | 0.626 | 0.702 | 0.784 | 0.871 | 0.95 |
| Referenc... | Pakistan | wind | 0 | 0 | 0 | 0.011 | 0.022 | 0.041 | 0.07 | 0.113 | 0.171 | 0.235 | 0.311 | 0.392 | 0.511 | 0.626 | 0.743 | 0.86 | 0.978 | 1.086 | 1.15 |



Outputs are
post-processed
to get final figures



Summary



1. input: Raw Input Files, R datasystem

2. exe: configuration.xml, Model options, model run

3. output: logs and database

4. ModelInterface: view results

Thank you

