

General model equations (Algorithm)

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init   Built_up_space_supply = 6250
flow   Built_up_space_supply = -dt*BSR_depreciation_rate
      +dt*BS_Construction_rate
doc    Built_up_space_supply = SQM
init   Earning_from_IT_industry = 9.125
flow   Earning_from_IT_industry = +dt*IT_earning_growth_rate
doc    Earning_from_IT_industry = millionUSD
init   Housing_supply = 167000
flow   Housing_supply = -dt*Degradation_rate
      -dt*Depreciation_rate
      +dt*H_Cnstruction_rate
init   Knowldge_workers = 625
flow   Knowldge_workers = -dt*Attrition_rate
      +dt*Knowledge_worker_growth_rate
init   Populatuion = 463064
flow   Populatuion = -dt*OMR
      +dt*BR
      +dt*IMR
      -dt*DR
aux    Attrition_rate = Knowldge_workers*ARF
aux    BR = Populatuion*BRF
aux    BS_Construction_rate =
Built_up_space_supply*(BSCRF+BSRF)*(Impact_on_built_up_space+Impact_of_investment_o
n_built_up_space)
aux    BSR_Degradtion_and_change = Built_up_space_supply*(BSCFRF+BSDRF)
aux    BSR_depreciation_rate = Built_up_space_supply*BDRF
aux    Degradation_rate = Housing_supply*HDGRF
aux    Depreciation_rate = Housing_supply*HDPRF
aux    DR = Populatuion*DRF
aux    H_Cnstruction_rate =
Housing_supply*(HCRF+HRF)*Impact_of_investment_on_housing_supply
aux    IMR = Populatuion*IMRF
aux    IT_earning_growth_rate =
Earning_from_IT_industry*((ITEGRF+Contrutions_of_knowledge_wrokers_to_IT_industry*0.2
0/Earning_from_IT_industry))
aux    Knowledge_worker_growth_rate =
Knowledge_workers*KWGRF*(Ratio_of_Built_up_space_supply_and_demand+Ratio_of_suppl
y_and_demand_of_special_quality_houses)*Impact_on_knowldge_workers
aux    OMR = Populatuion*ORF
aux    Contrutions_of_knowledge_wrokers_to_IT_industry = ((Knowldge_workers-
625)*(Earning_per_knowledge_worker_fraction*365))/1000000
aux    Demand_for_Built_up_space = Knowldge_workers*Demand_of_space_per_KWF
aux    Demand_for_specific_quality_houses_for_IT_industry =
Demand_of_houses*Demand_fraction_for_specific_quality_houses
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aux Demand_of_houses = Number_of_households+Student_houses
aux Energy_tarrif_ratio = Perspective_tariff_rate/Current_tariff_rate
aux Gap_in_built_up_space_demand_and_supply = (Demand_for_Built_up_space-
Built_up_space_supply)
aux Impact_of_investment_on_built_up_space =
GRAPH(Investment_in_built_up_space,0,0.1,[0.01,0.02,0.04,0.1,0.19,0.3,0.42,0.57,0.78,0.93,1"
Min:0;Max:1"])
aux Impact_of_investment_on_housing_supply =
GRAPH(Invetsment_on_housing,0,0.1,[0.04,0.07,0.09,0.13,0.21,0.34,0.49,0.59,0.84,0.99,0"Min
:0;Max:1"])*Invetsment_on_housing
aux Impact_on_built_up_space =
GRAPH(TIME,0,0.1,[0.02,0.08,0.13,0.16,0.19,0.27,0.36,0.45,0.6,0.69,1"Min:0;Max:1"])*Energy
y_tarrif_ratio
aux Impact_on_knowldge_workers =
GRAPH(Energy_tarrif_ratio,0,0.1,[0.03,0,0.05,0.1,0.17,0.25,0.34,0.45,0.59,0.77,1"Min:0;Max:1
"])*Energy_tarrif_ratio
aux Investment_from_IT_industry =
Earning_from_IT_industry*Investment_from_IT_industry_fraction
aux Investment_in_built_up_space =
Investment_from_IT_industry*Investment_on_built_up_space
aux Invetsment_on_housing =
Investment_from_IT_industry*Investment_fraction_on_housing
aux Number_of_households = (Populatuion-Student_population)/Family_size
aux Ratio_of_Built_up_space_supply_and_demand =
Built_up_space_supply/Demand_for_Built_up_space
aux Ratio_of_supply_and_demand_of_special_quality_houses =
Supply_of_specific_quality_houses/Demand_for_specific_quality_houses_for_IT_industry
aux Student_houses = Student_population*Housing_demand_per_student
aux Student_population = Populatuion*Student_population_fraction
aux Supply_of_specific_quality_houses =
Housing_supply*Supply_of_specific_quality_houses_fraction
const ARF = 0.015
const BDRF = 0.005
const BRF = 0.075
const BSCFRF = 0.0005
const BSCRF = 0.03
const BSCRF_1 = 0.03*0.5
const BSDRF = 0.0005
const BSRF = 0.0005
const Current_tariff_rate = 1
const Demand_fraction_for_specific_quality_houses = 0.056
const Demand_of_space_per_KWF = 10
doc Demand_of_space_per_KWF = SQM
const DRF = 0.02
const Earning_per_knowledge_worker_fraction = 40
const Family_size = 2.3

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const HCRF = 0.045
const HDGRF = 0.0056
const HDPRF = 0.0085
const Housing_demand_per_student = 0.5
const HRF = 0.01
const IMRF = 0.005
const Investment_fraction_on_housing = 0.4
const Investment_from_IT_industry_fraction = 0
const Investment_on_built_up_space = 0.6
const ITEGRF = 0.025
const KWGRF = 0.08
const ORF = 0.004
const Perspective_tariff_rate = 0.85
const Student_population_fraction = 0.10
const Supply_of_specific_quality_houses_fraction = 0.05
```