Inputs

Market and Industry

Variable	Data type	Example
inputs_market_industry	Struct	
demographics	Nested struct	
land_Area_km2	double	9
land_Area_country_km2	double	303900
population	double	66449
population_country	double	5478308
mobile_market	Nested struct	
mobile_penetration	double	1.727
market_share	double	0.39
proportion_of_data_users	double	0.851
service	Nested struct	
mobile_data_raffic_country_TB_6mon	double	465269
traffic_distribution_among_sites	double	15/50
BHratio	double	0.12
ULtoDLratio	double	0.1

Technology

Variable	Data type	Example
inputs_technology	Struct	
EUTRAN_s	Nested 1 x N struct (N = num of configurations)	
configuration	char	'EUTRAN@2600, LTE, R8, 20 MHz, 64 QAM, 2x2 MIMO, 172 Mbps'
bands	double	2.6
BW	double	20
typical_BW_efficiency_bps_per_Hz	double	1.56
cell_range_km	double	0.2
territory_coverage	double	0.36
maxpower	double	1000
power_share_non_operational_mode	double	0.5
EUTRAN_CA	Nested 1 x N struct (N = num of configurations)	
configuration	char	'EUTRAN@2600+1800, LTE-A, R11, CA, 20+20 MHz, 64 QAM, 2x2 MIMO, 344 Mbps'
CA_config	1 x N double (N = num of EUTRAN_s configurations)	[1,0,1,0,0,0,0,0,0,0,0,0,0,0,0,0,0,0]
bands	char	'2.6+1.8'
BW	char	'20+20'
territory_coverage	double	0.6
maxpower	double	1500
power_share_non_operational_mode	double	0.5
UTRAN	Nested 1 x N struct (N = num of configurations)	
configuration	char	'UTRAN@2100, DC-HSPA+, R8, 64 QAM, 42 Mbps'
bands	double	2.1
BW	double	9.9
typical_BW_efficiency_bps_per_Hz	double	1.05
cell_range_km	double	0.23
territory_coverage	double	1
maxpower	double	1500
power_share_non_operational_mode	double	0.55
GERAN	Nested 1 x N struct (N = num of configurations)	
configuration	char	'GERAN@900, GSM/EDGE'
bands	double	0.9
BW	double	0.95
typical_BW_efficiency_bps_per_Hz	double	0.4

		cell_range_km	double	0.4
		territory_coverage	double	0.5
		maxpower	double	2145
		power_share_non_operational_mode	double	0.6
	other_RAN		Nested struct	
		TRx_per_BTS	double	18
		BSCcapacity	double	2048
		BTS_per_PCU	double	32
		RNCcapacity	double	384
	site_types		Nested 1 x N struct (N = number of site types)	
		name	char	'owned_rooftop'
		share	double	0.09
		sites_to_basestations_ratio	double	0.4
	extra		Nested struct	
		sites_to_basestations_ratio	double	0.4
		caproom	double	0.1
		antDir	1x3 double	[90,210,330]
		labor	double	2

Costs

Variable			Data type	Example
inputs_costs			Struct	
	equipment_price		Nested struct	CAPEX: Unit price (euro per network component)
		site_buildout_owned_tower	double	50000
		site_buildout_owned_roof_top_site	double	25000
		site_buildout_rental_tower_site	double	50000
		site_buildout_rental_roof_top_site	double	25000
		site_buildout_shared_rental_tower	double	50000/3
		site_buildout_shared_rental_roof_top	double	25000/3
		basestation_eNodeB_s	double	60000
		basestation_eNodeB_CA	double	60000
		basestation_NodeB	double	50000
		basestation_BTS	double	30000
		otherRAN_BSC	double	350000
		otherRAN_PCU	double	100000
		otherRAN_RNC	double	1000000
	action_cost		Nested struct	IMPEX: cost per action
		new_site_buildout	double	35000
		other_installation	double	500
	operating_unit_price		Nested struct	OPEX: monthly cost per unit
		rental_tower_site_mon	double	500
		rental_roof_top_mon	double	600
		shared_rental_tower_mon	double	500/3
		shared_rental_roof_top_mon	double	600/3
		energy	double	40
		network_operation_maintenance_mon	double	1
		personnel_salary_mon	double	4000

My Site (only infrastructure)

Site_Infrastructure

site_ID

site_ID	Int (Input 2) - Basic information

site_type

site_type	String (input 2) - Basic information

x

x	Int (input 2) - Basic information

y

y	Int (input 2) - Basic information

EUTRAN_s

Sector 1-3

cell_ID	String (input)
cellgroupID	Int (input)
RANconfig	String (input)
band	String (input)
BW	Int (input)
cellRange	Int (input)
typicalcellcapacity	Int (input)
Throughput	Int (estimation)
loadfactor	Int (estimation)

EUTRAN_CA

Sector 1-3

Same as above	

UTRAN

Sector 1-3

Same as above	

Sector900 1-3

Same as above	

GERAN

Sector 1-3

Same as above	

bands

bands	

RANconfig

RANconfig	

SiteRanges

SiteRanges	

CellIDs

CellIDs	

Max_Traffic_to_be_satisfied_regional_TB_mon
ULtoDLratio
Site maxpower (e.g. max power of rectifier per base station)
Site idlemode_power_share

%equipment_otherRAN = [BSC_;
%   PCU_;
%   RNC_];
Or TRx_per_BTS, BSCcapacity, BTS_per_PCU, RNCcapacity for estimation (technology inputs)

% opex_unitsotherRAN = [energy_consumption; %MWhs of BSC, PCU
%   energy_consumption; %MWhs of RNC
%   employees;   %number of employees
%   network_operation_maintenance;
%   network_operation_maintenance];   %number of network components
which require O&M   UTRAN GERAN

-- COST INPUTS

Site: type - rent (€/month)
O&M cost (is it per network element?)
Energy: MWh - €/month
Allocated_operationCostShare_from_otherRAN

My Site (Complete: infrastructure and costs)

Site_Infrastructure

site_ID

site_ID	Int (Input 2) - Basic information

site_type

site_type	String (input 2) - Basic information

x

x	Int (input 2) - Basic information

y

y	Int (input 2) - Basic information

EUTRAN_s

Sector 1-3

cell_ID	String (input)
cellgroupID	Int (input)
RANconfig	String (input)
band	String (input)
BW	Int (input)
cellRange	Int (input)
typicalcellcapacity	Int (input)
Throughput	Int (estimation)
loadfactor	Int (estimation)
loadfactor_over_any_traffic	Int (estimation for energy consumption model)
energy_fixed	Int (estimation for energy consumption model)
energy_variable	Int (estimation for energy consumption model) - over any traffic
energy_total	Int (estimation for energy consumption model) - over any traffic
equipmentCost	Allocated buildout_site, basestation, allocated cost from otherRAN
operationCost	Allocated rent, O&M, energy
sunk_costCAPEX	
sunk_costIMPEX	
sunk_cost	
OPEX_fixed_excl_energy	
OPEX_fixed_only_energy	
OPEX_fixed	
OPEX_variable_only_energy	
OPEX_variable	
OPEX_total	
Energy_cost_share	
Average_Fixed_Cost	
Average_Variable_Cost	
Average_Total_Cost	
Marginal_Cost	

EUTRAN_CA

Sector 1-3

Same as above cells	

UTRAN

Sector 1-3

Same as above cells	

Sector900 1-3

Same as above cells	

GERAN

Sector 1-3

Same as above cells	

bands

bands	

RANconfig

RANconfig	

SiteRanges

SiteRanges	

CellIDs

CellIDs	

site_equipment_Cost

first column the units, second column the CAPEX, third column the IMPEX

site: type – buildout	
eNodeB_s	
eNodeB_CA	
NodeB	
BTS	
Allocated_equipCostShare_from_otherRAN	

site_operation_Cost

first column the name, second column the units, third column the cost

site: type - rent (€/month)	
one_site_and_basestations: #elements - O&M cost	
Energy_fixed: MWh - €/month	
Energy_variable: MWh - €/month	
Allocated_operationCostShare_from_otherRAN	

More calculation at the site level based on site_equipment_Cost and site_operation_Cost

sunk_costCAPEX	
sunk_costIMPEX	
sunk_cost	

OPEX_fixed_excl_energy	
OPEX_fixed_only_energy	
OPEX_fixed	
OPEX_variable_only_energy	
OPEX_variable	
OPEX_total	
Energy_cost_share	