Table A1: Residential case: capital cost and technical lifetime of all candidate technologies.

	Capital cost (€)	**Technical lifetime (years)**
Internal Combustion Engine (ICE)	1,000	15
Stirling engine (SE)	866	15
Proton Exchange Membrane Fuel Cell (PEMFC)	2,981	25
Gas Turbine (GT)	1,500	15
Gas Burner 1 (GB1)	120	10
Gas Burner 2 (GB2)	120	10
Heat Buffer Tank 1 (HBUF1)	30	10
Heat Buffer Tank 2 (HBUF2)	30	10

Table A2: Residential case: operational and economic data.

$\lvert \mathbf{I} \rvert$	mCHP, heat generators, heat storage tanks	$\boldsymbol{\lambda_{i1}^{+}}$	0.3 kW
$\lvert \mathbf{S} \rvert$	3 households	$\boldsymbol{\eta_{si}}$	1%
$\lvert \mathbf{T} \rvert$	4 seasons, 2 day types, 24 hourly time intervals	$\boldsymbol{v_t}$	0.0342 €/kWh
$\boldsymbol{B_{it=0}}$	0 kW	$\boldsymbol{\xi_{sit}}$	0.04674 €/kWh of fuel
$\boldsymbol{\gamma_i}$	1	$\boldsymbol{\varphi_{si}}$	0.01 €
$\boldsymbol{\delta_i}$	1	$\boldsymbol{\psi_{st}}$	0.1562 €/kWh
$\boldsymbol{\lambda_{i1}^{-}}$	0.6 kW	$\boldsymbol{\pi_t}$	0.114 €/kWh

Table A3: Urban case: capital cost and technical lifetime of all candidate technologies.

Type of technology	Capital cost (€)	Technical lifetime (years)
Gas Engine (GE)	110,000	20
Gas Turbine 1 (GT)	97,500	20
Gas Turbine 2 (MGT)	95,100	20
Gas Turbine 3(GGT)	2,782,000	20
Reciprocating Engine 1 (RE)	974,000	20
Reciprocating Engine 2 (GRE)	1,170,500	20
Micro-Turbine (MIT)	357,000	20
Phosphoric acid Fuel Cell (PAFC)	1,890,272	20
Gas Burner 1 (GB1)	20,000	10
Gas Burner 2 (GB2)	40,000	10
Heat Buffer Tank 1 (HBUF1)	4,500	10
Heat Buffer Tank 2 (HBUF2)	9,000	10

Table A4: Urban case: operational and economic data.

$\lvert \mathbf{I} \rvert$	CHP, heat generators, heat storage tanks	$\boldsymbol{\mu_{st}}$	15%
$\lvert \mathbf{S} \rvert$	4 sectors	$\boldsymbol{\eta_{si}}$	1%
$\lvert \mathbf{T} \rvert$	4 seasons, 1 day types, 24 hourly time intervals	$\boldsymbol{v_t}$	0.0342 €/kWh
$\boldsymbol{B_{it=0}}$	0 kW	$\boldsymbol{\xi_{sit}}$	0.04674 €/kWh of fuel
$\boldsymbol{\gamma_i}$	1	$\boldsymbol{\varphi_{si}}$	0.11 €
$\boldsymbol{\delta_i}$	1	$\boldsymbol{\psi_{st}}$	0.1562 €/kWh
$\boldsymbol{a_t}$	500 kW_{th}	$\boldsymbol{\sigma_t}$	0.004674 €/kWh

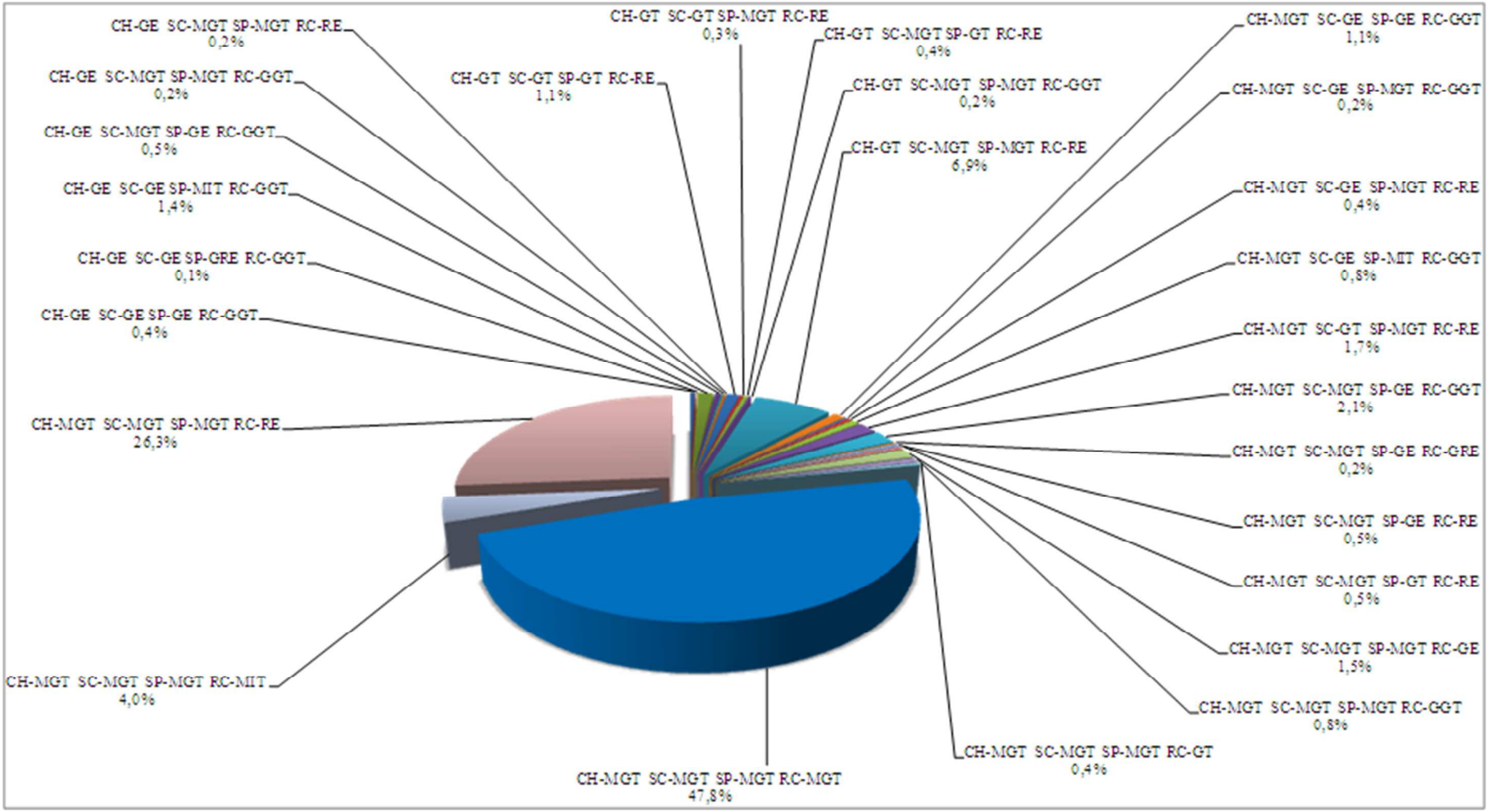

Figure B1: Uniform probability distribution for the network technology selection of the urban energy system.

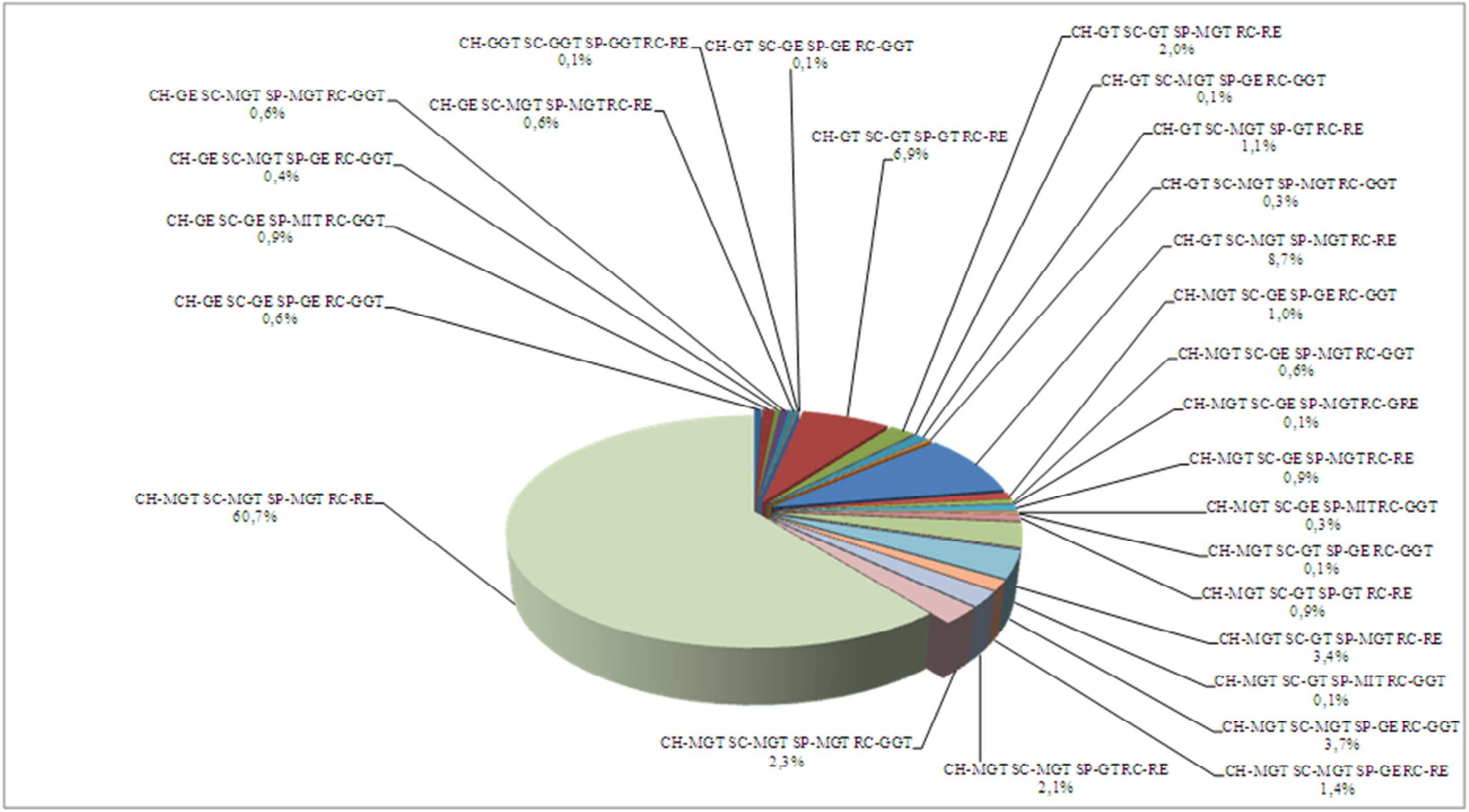

Figure B2: Normal probability distribution for the network technology selection of the urban energy system.