Non-CO2 emission scenario for China

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Objective

By Middle of 21st Century, China will reach the level of OECD countries at end of 20th Century

Emission gases

CH4

CO

N2O

NOx

SO2

HFC

PFC

SF6

Methodology

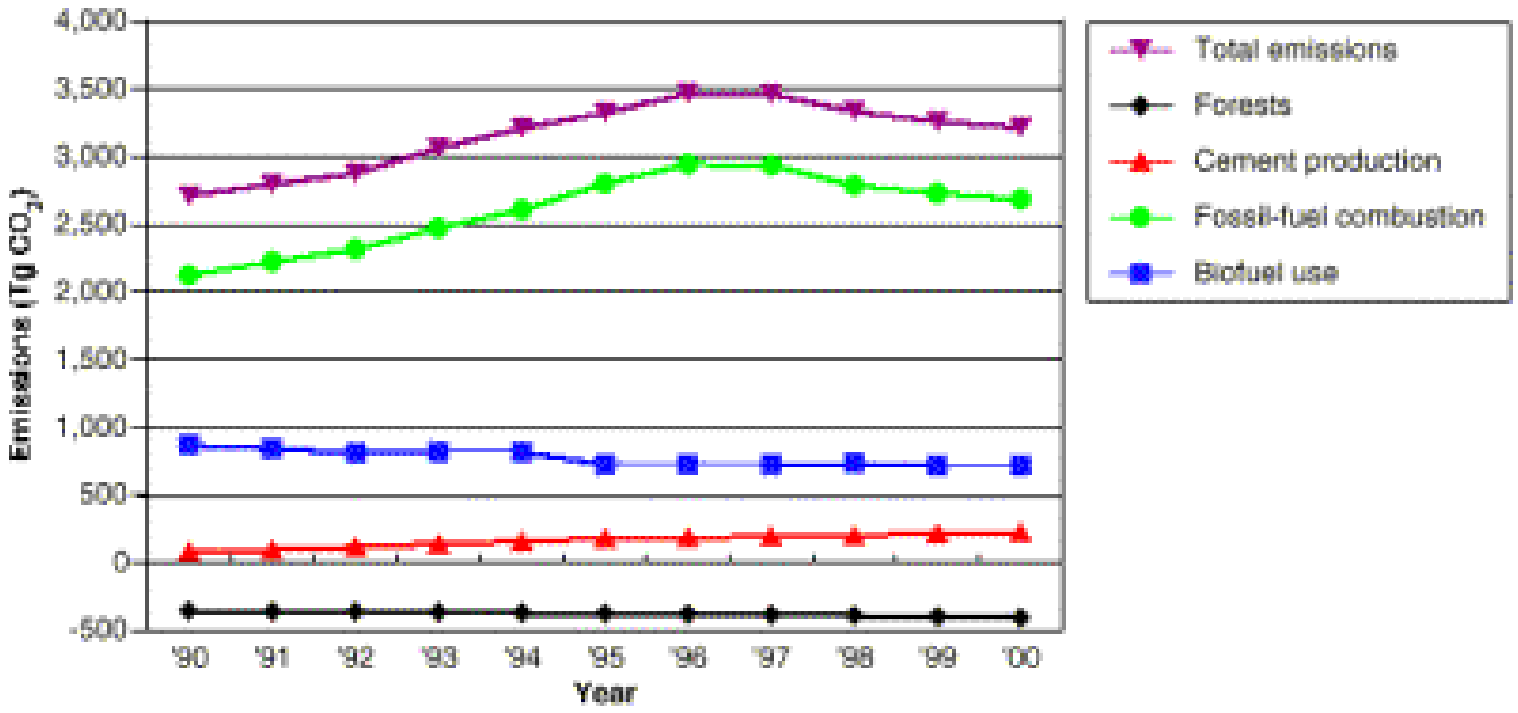
- Scenario
- IPAC-emission model

Emissions: CH4

Year of completion	1993	1994	1998	1998
Emission estimates:				
All energy				
Fuel combustion	609.2 Mt-C	667.64 Mt-C, 1.8-2.6 Mt-CH_4	559.56 Mt-C, 2.97 Mt- CH_4	559.6 Mt-C, 2.97 Mt- CH_4
Fugitive fuel emission	0.4 Mt- CH_4			0.092 Mt- CH_4
Oil and gas	5.3 Mt- CH_4	0.179 Mt- CH_4	0.092 Mt- CH_4	8.78 Mt- CH_4
Coal mining	25.5 Mt-C	18.45 Mt- CH_4	8.689 Mt- CH_4	25.59 Mt-C
Industrial processes	20.5 Mt- CH_4	28.29 Mt-C	22 Mt-C	12.59-20.09 Mt- CH_4
Agriculture		20.841 Mt- CH_4	18.2 Mt- CH_4	-75.93 Mt-C
LUC and forestry	0.6 Mt- CH_4	42.53 Mt-C	-86 Mt-C	0.899 Mt- CH_4
Waste		0.792 Mt- CH_4	2.5 Mt- CH_4	

Emissions: SO2

CO2 emission in China



Source of emitted gases in IPAC: CH4

Gas	Sources			
	Fossil fuel use and production	Land use change	Production process	Others
CH4	Fossil fuel combustion	Deforestation		Landfill
	Leakage from extraction	Cultivation		Sewage
		Enteric ferment		
		Agricultural waste burning		
		Biofuel resident		

Source of emitted gases in IPAC : CO

Gas	Sources			
	Fossil fuel use and production	Land use change	Production process	Others
CO	Fossil fuel combustion	Deforestation		
		Agricultural waste burning		
		Biofuel resident		

Source of emitted gases in IPAC : N2O

Gas	Sources			
	Fossil fuel use and production	Land use change	Production process	Others
N2O	Fossil fuel combustion	Deforestation	Nitric acid & adipic acid production	
	Agricultural waste burning			
	Biofuel resident			
	Manure management			

Source of emitted gases in IPAC : NOx

Gas	Sources			
	Fossil fuel use and production	Land use change	Production process	Others
Nox	Fossil fuel combustion	Deforestation	Steel & cement industry	
		Agricultural waste burning		
		Biofuel resident		

Source of emitted gases in IPAC : SOx

Gas	Sources			
	Fossil fuel use and production	Land use change	Production process	Others
Sox	Fossil fuel combustion	Deforestation	No-ferrous production	
		Agricultural waste burning		
		Biofuel resident		

Source of emitted gases in IPAC : HFC

Gas	Sources			
	Fossil fuel use and production	Land use change	Production process	Others
HFC			Production of HCFC, refrigerator	Use and disposal of air-conditioner, refrigerator, solvent, distinguisher

Source of emitted gases in IPAC : PFC and SF6

Gas	Sources			
	Fossil fuel use and production	Land use change	Production process	Others
PFC				Use and disposal of air-conditioner, refrigerator, solvent, distinguisher
SF6				Use of electricity facilities, other equipment, fire distinguisher

Methodology

Emission of CH4, N2O, CO from energy combustion is calculated from technology
CH4 emission from leakage in energy exploitation and transport is assumed as scenario. By 2100, recovery of CH4 from coal mining is assumed to be 65%, leakage from oil and gas exploitation and transport is assumed to be 1% of total production.

Methodology

SO2 and NOX emission is calculated by using Environmental Kuznets curve

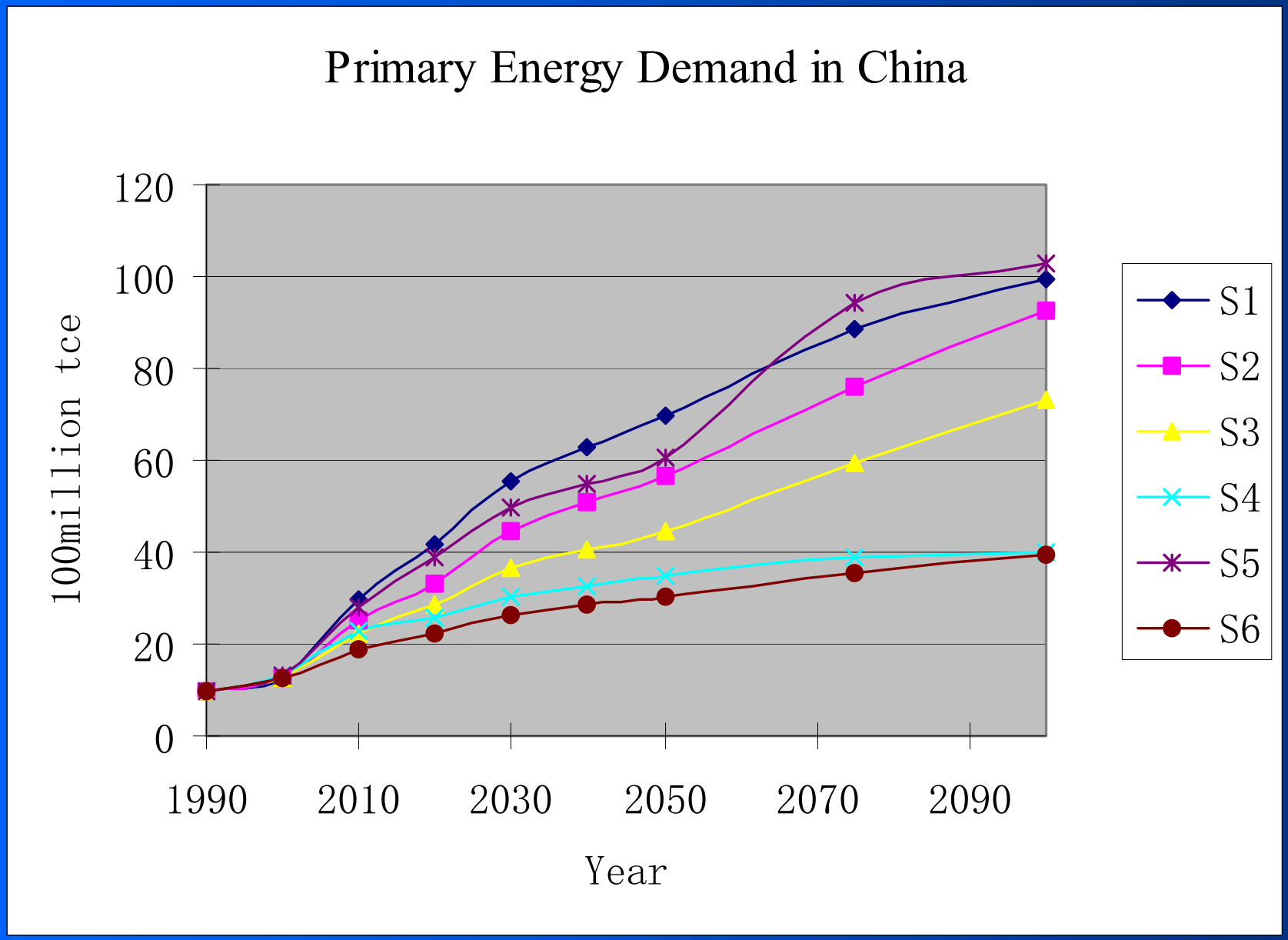
Reduction start point: US$2500 per capita for SO2
US$4500 per capita for NOx

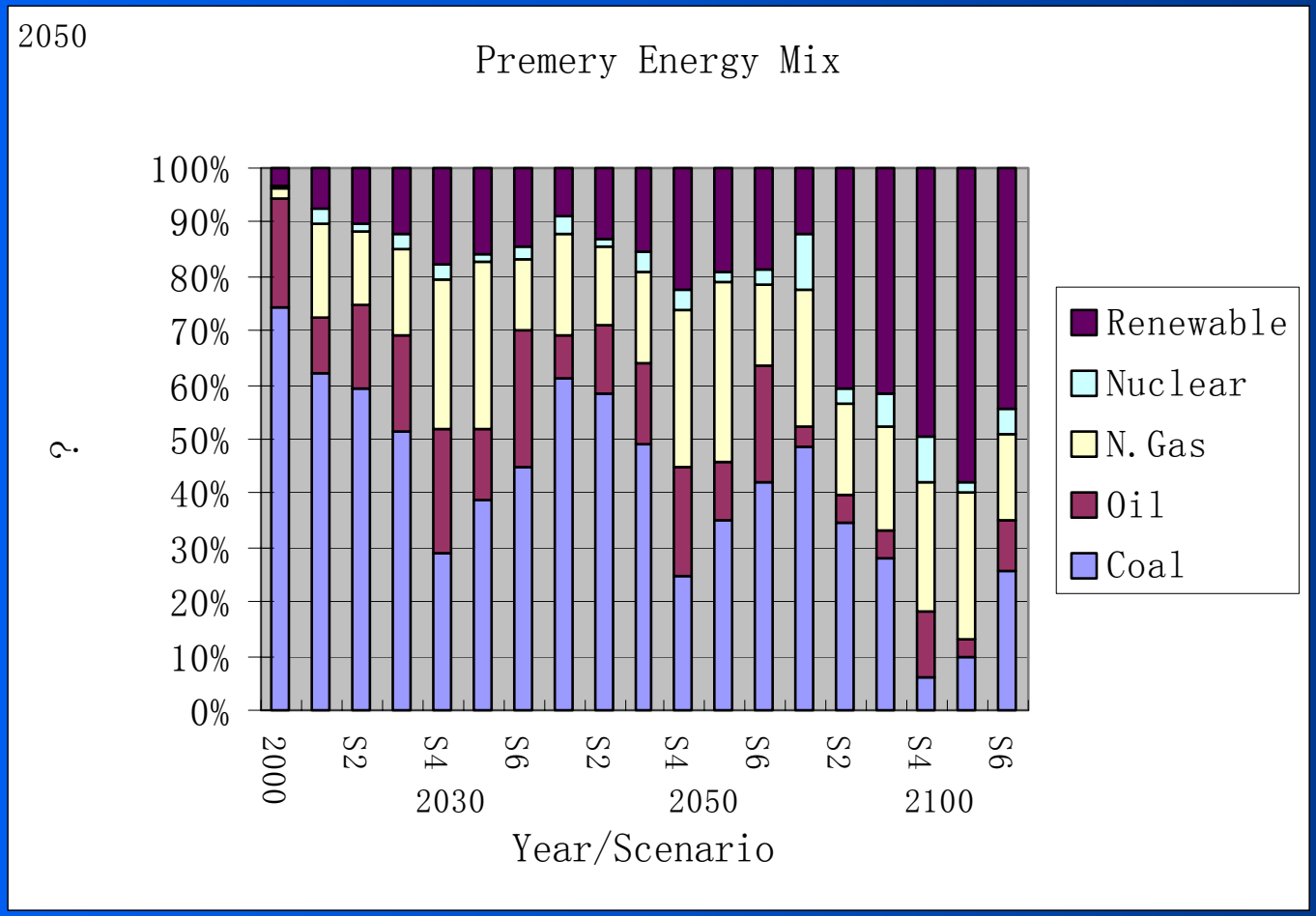
Methodology

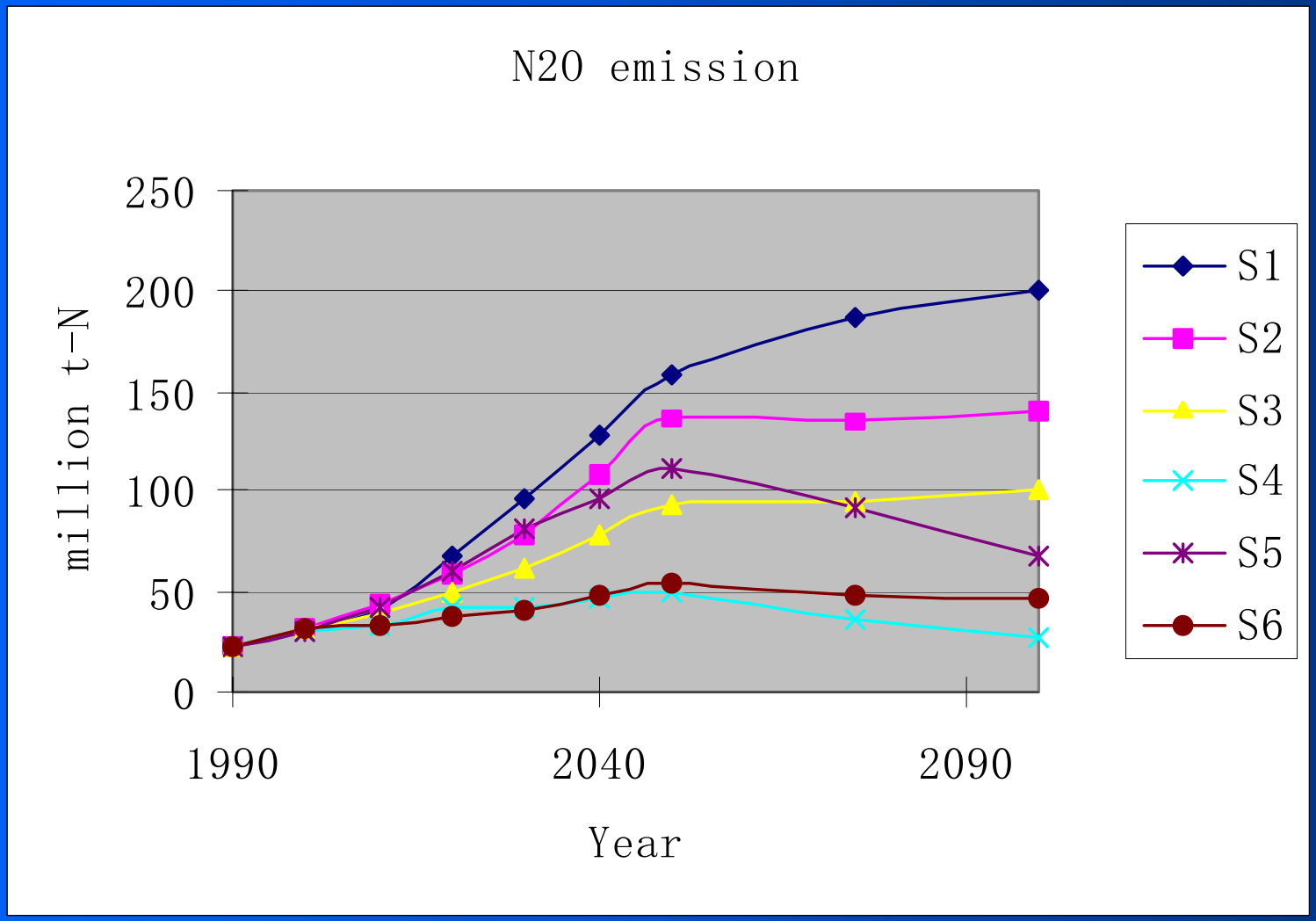
HFC, PFC, and SF6 is calculated with relation with relative emission activities. HFC and PFC are calculated by giving elasticity with development of GDP, SF6 is calculated with relationship on power generation by giving elasticity

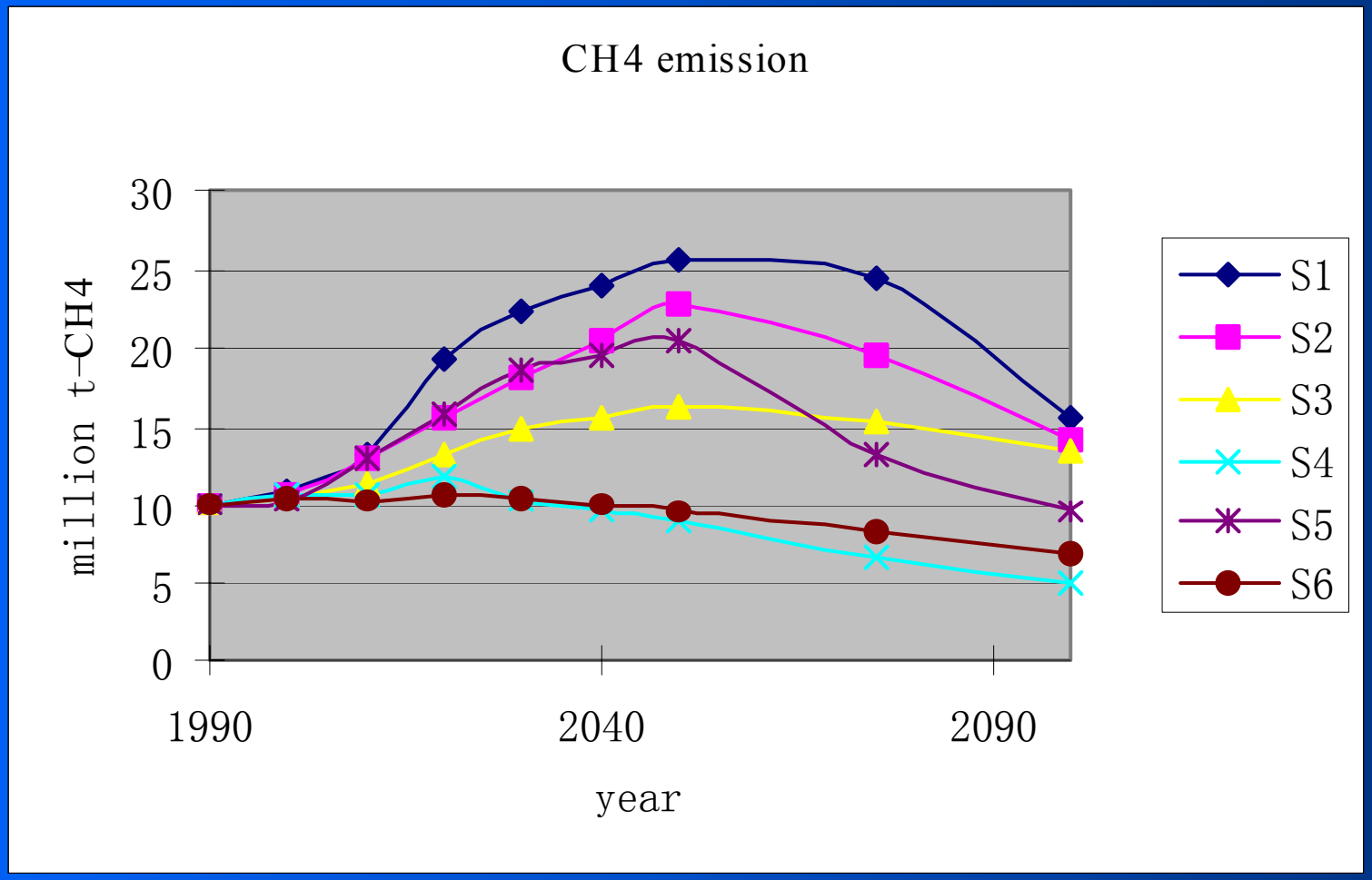
Scenario for China

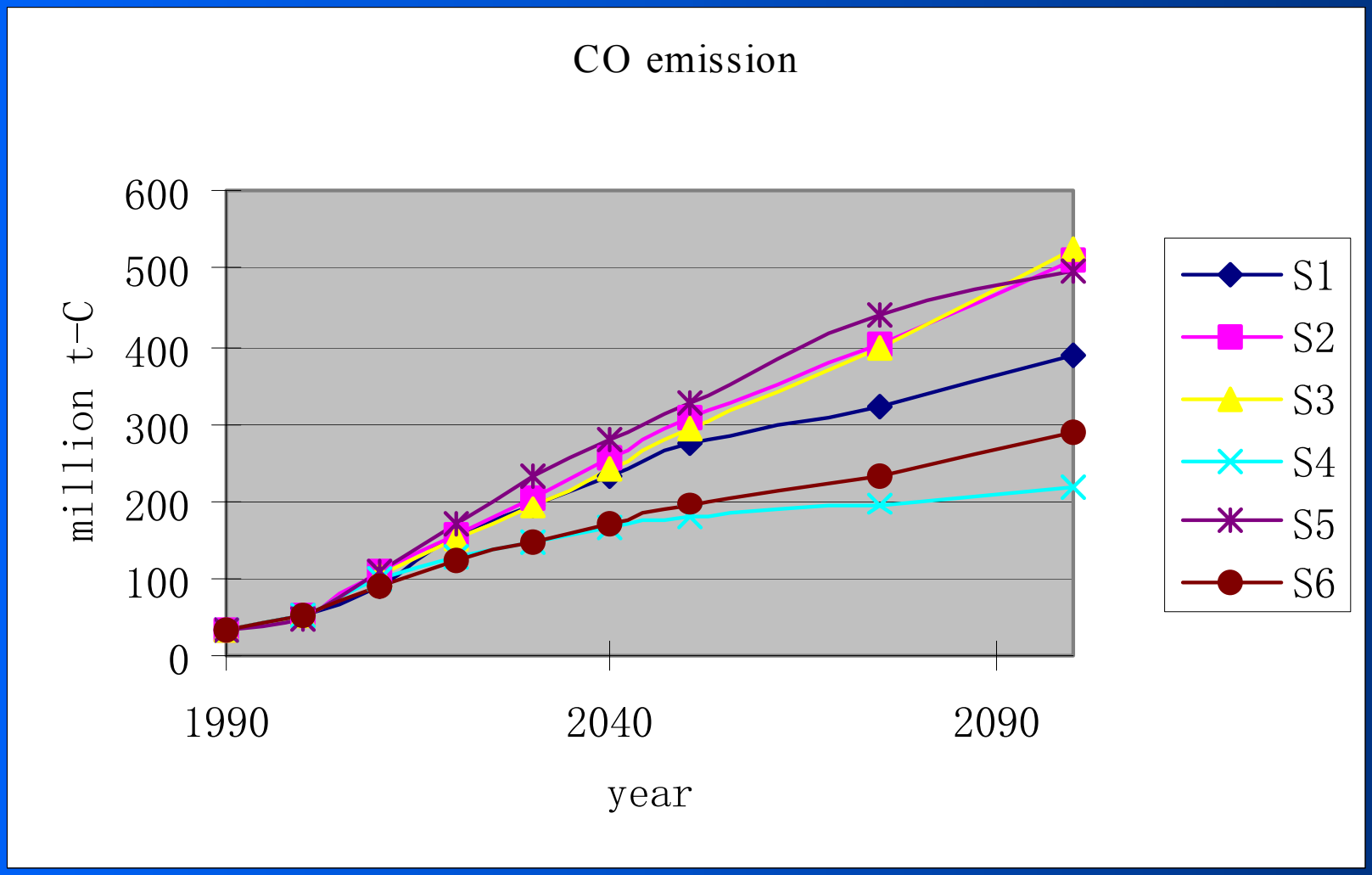
- S1: Traditional development pattern
- S2: Conventional development
- S3: Energy policy intervention
- S4: Environmental driven
- S5: Tiger economic development
- S6: Grey economic development

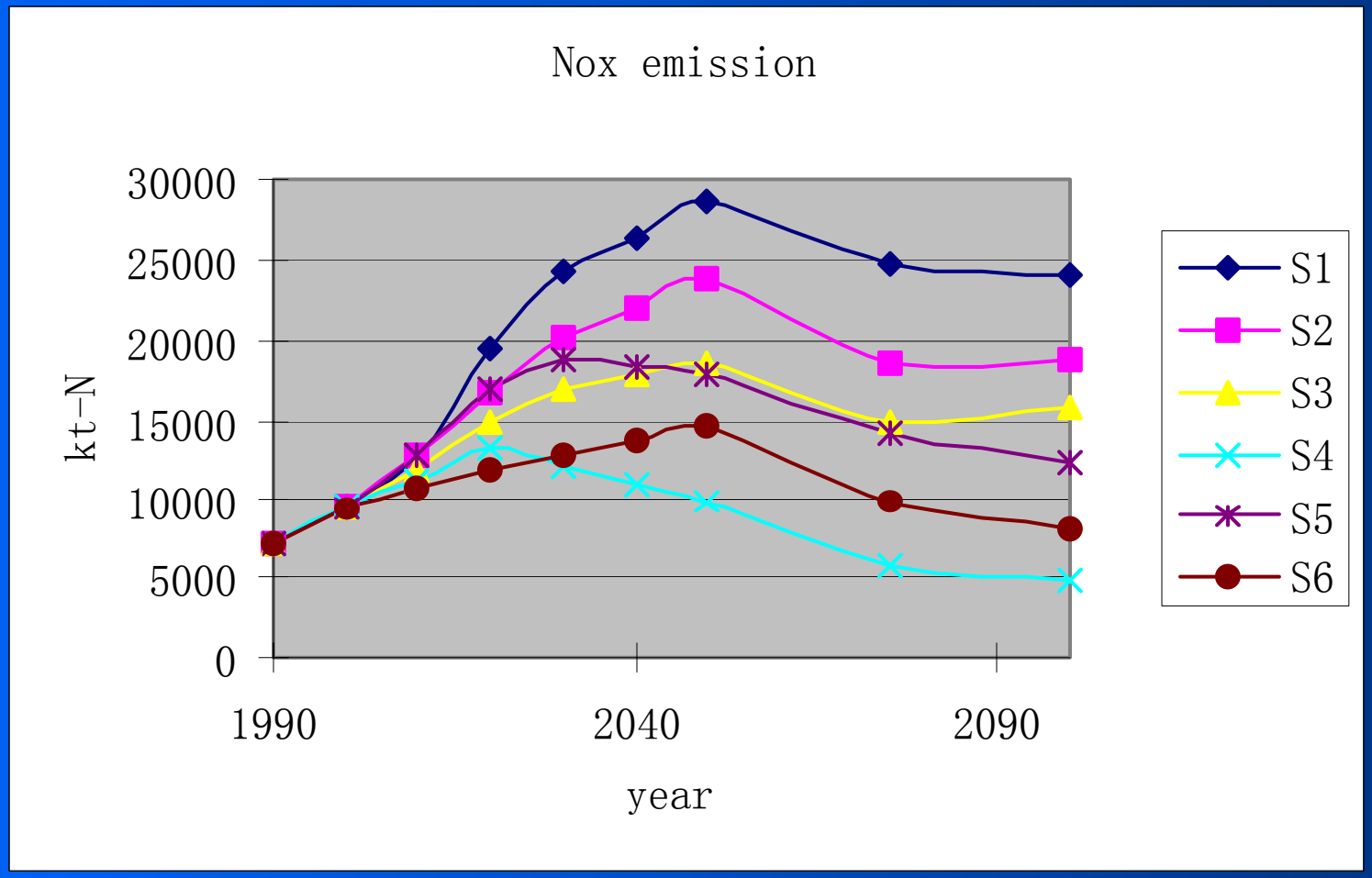

Primary Energy Demand in China
120
100
80
60
40
20
0
100million tce
1990
2010
2030
2050
2070
2090
Year
S1
S2
S3
S4
S5
S6

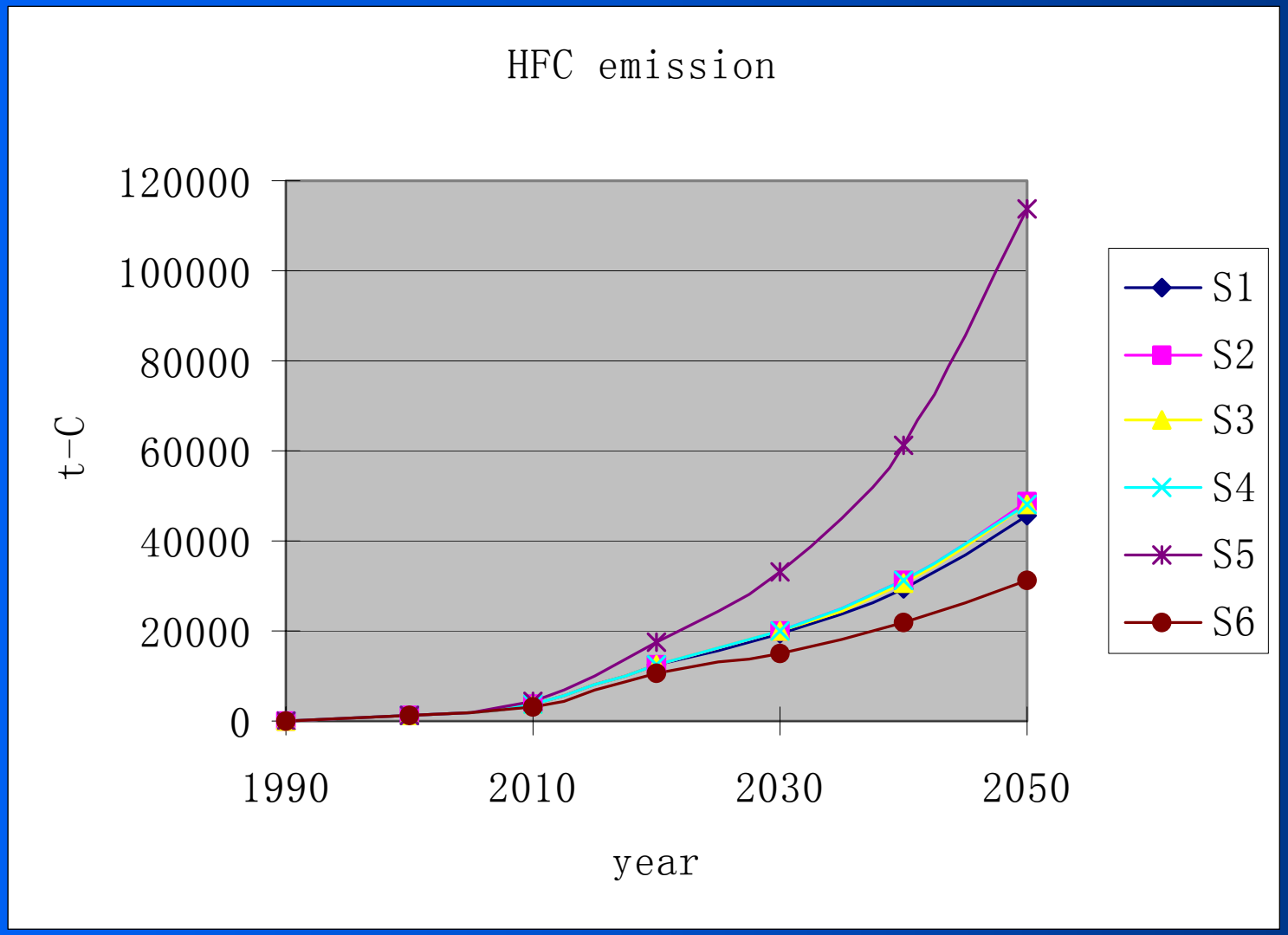

2050
Premery Energy Mix
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
2000
S2
S4
S6
S2
S4
S6
S2
S4
S6
2030
2050
2100
Year/Scenario
Renewable
Nuclear
N.Gas
Oil
Coal

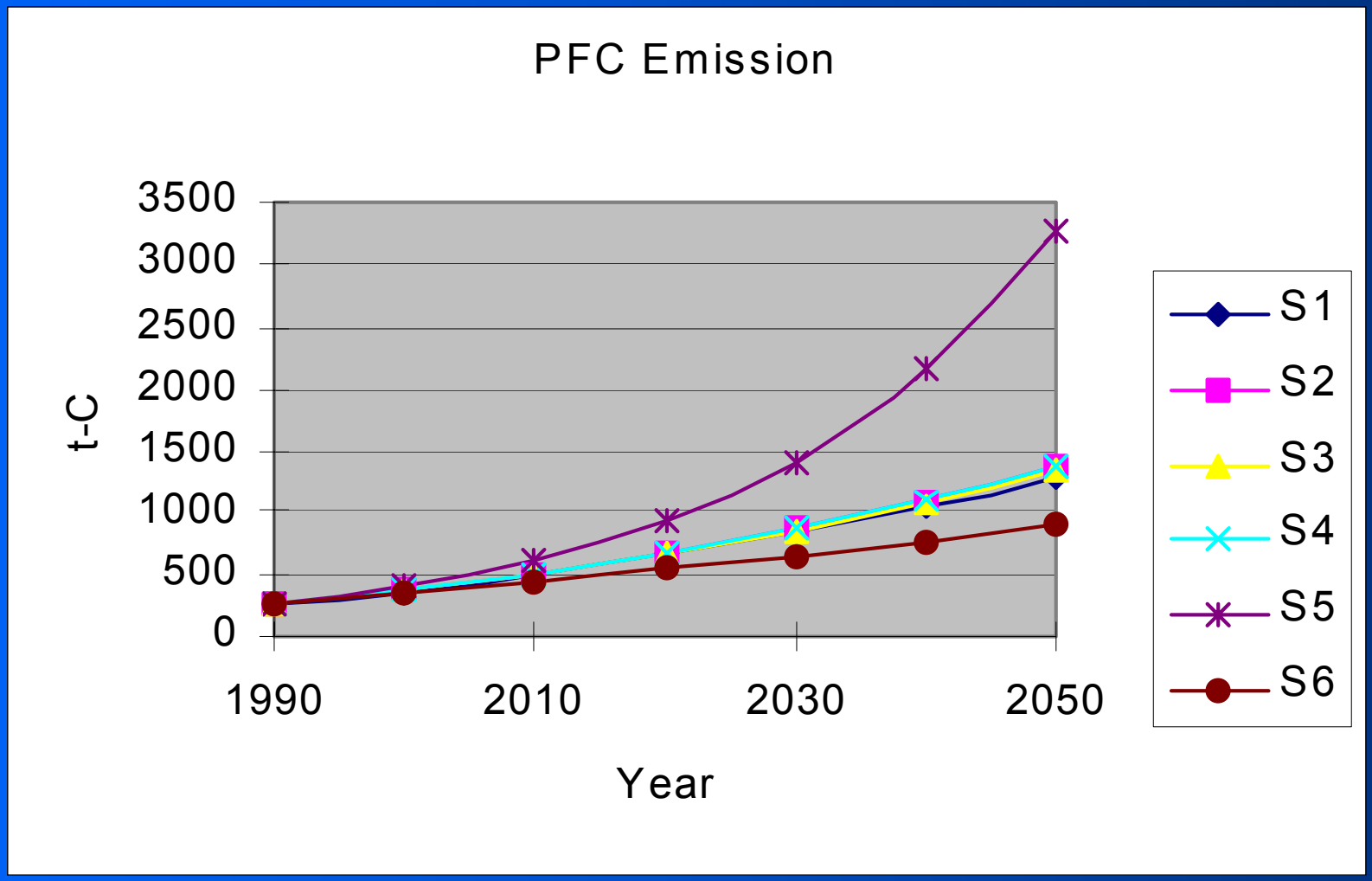

N20 emission
250
200
150
100
50
0
million t-N
1990
2040
2090
Year
S1
S2
S3
S4
S5
S6

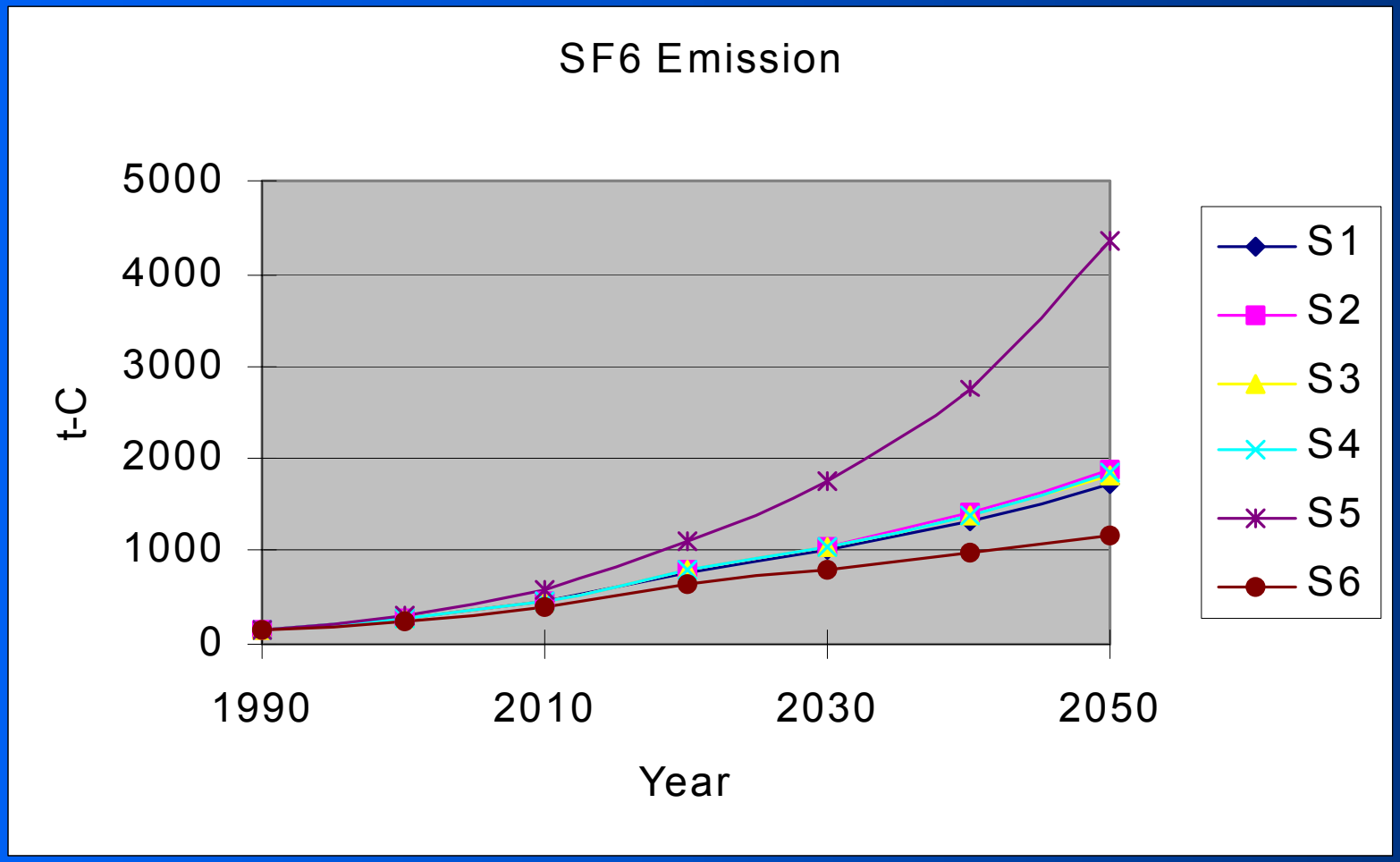

CH4 emission
million t-CH4
30
25
20
15
10
5
0
1990
2040
2090
year
S1
S2
S3
S4
S5
S6


CO emission
600
500
400
300
200
100
0
million t-C
1990
2040
2090
year
S1
S2
S3
S4
S5
S6


Nox emission
30000
25000
20000
15000
10000
5000
0
kt-N
1990
2040
2090
year
S1
S2
S3
S4
S5
S6


HFC emission
120000
100000
80000
60000
40000
20000
0
t-C
1990
2010
2030
2050
year
S1
S2
S3
S4
S5
S6


PFC Emission
3500
3000
2500
2000
1500
1000
500
0
t-C
1990
2010
2030
2050
Year
S1
S2
S3
S4
S5
S6


SF6 Emission
5000
4000
3000
2000
1000
0
t-C
1990
2010
2030
2050
Year
S1
S2
S3
S4
S5
S6