Set up the Game   Time: 30 min

- Set up the Room.
  - 4 tables with 6 chairs and 1 blackboard for each.
  - 1 region per table
- Materials for each table/region
  - Region folder : 1 background Manual, 2 In-Game manual, Change cards folder and Capacity Cards folder
  - Bag with Lego (Game & Bank)
  - A3 Info Posters: Global emissions, Climate Change & GHG Emissions, CommitmentBy2030Final
  - Specific Region Profile Map
  - A2 Info Poster: Region Target and Change Cards.

INFO POSTERS
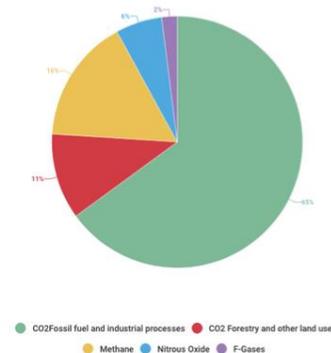
Key Facts and Figures on Made Commitments by 2030

The EU has committed to:

- Achieving at least a 40% reduction of its GHG emissions by 2030 compared to 1990 levels.
- Increasing the share of energy use from renewable energy by 27%.
- Achieving energy savings of 27% trough improvements in energy efficiency in relation to BAU scenarios.

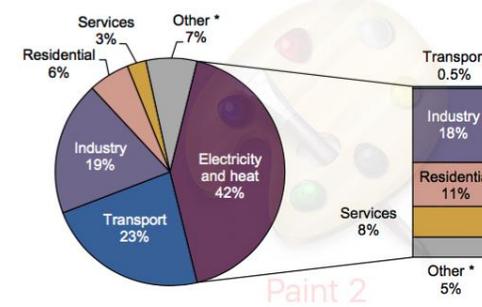Annual Trend in GHG Emissions per Capita (ton of CO2eq) and Share of Energy from Renewable Sources in EU-28.

Legend:
- Share of Energy from Renewable Sources (%)
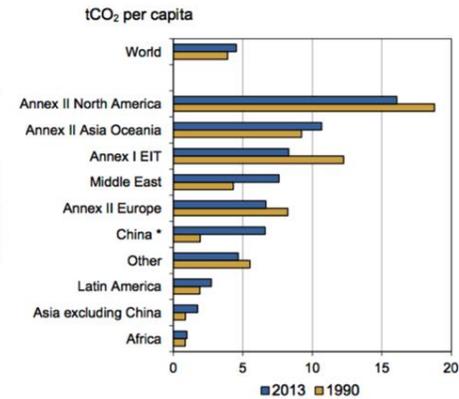- GHG Emissions per capita (ton of CO2eq)
- 2 °C 50:50 Chance

Global GHG Emissions by Gas (2010)

- CO2 Fossil fuel and industrial processes
- CO2 Forestry and other land use
- Methane
- Nitrous Oxide
- F-Gases

Global CO2 Emissions by Economic Sector (2013)

- Services 3%
- Residential 6%
- Other * 7%
- Industry 19%
- Electricity and heat 42%
- Transport 23%
- Transport 0.5%
- Industry 18%
- Residential 11%
- Services 8%
- Other * 5%

CO2 Emissions per capita by major world region

tCO₂ per capita

Regions: World, Annex II North America, Annex II Asia Oceania, Annex I EIT, Middle East, Annex II Europe, China *, Other, Latin America, Asia excluding China, Africa

- 2013
- 1990

* China includes Hong Kong, China.

The EU-28 encompasses 7.1% of the world population, and are responsible for 10% of the global CO2

CLIMATE CHANGE AND GHG EMISSIONS

2°C

Temperature changes can be kept to less than 2 °C if atmospheric concentrations in 2100 remain below 450 ppm CO2eq.

This would require lowering global GHG emissions by 40 % to 70 % by 2050 compared to 2010 levels

No additional mitigation could result in global mean surface temperature increases in 2100 from 3.7 °C to 4.8 °C compared to pre-industrial levels

From 2010 1000 billion tonnes of CO2 could still be released with a 50:50 chance of keeping temperature increases below 2°C. Over 40 years, this would average 3.65 tonnes per capita per year.

SOURCE:IPCC, 2014: Summary for policymakers. In: Climate Change 2014: Impacts, Adaptation, and Vulnerability. Part A: Global and Sectoral Aspects. Contribution of Working Group II to the Fifth Assessment Report of the Intergovernmental Panel on Climate Change [Field, C.B., V.R. Barros, D.J. Dokken, K.J. Mach, M.D. Mastrandrea, T.E. Bilir, M. Chatterjee, K.L. Ebi, Y.O. Estrada, R.C. Genova, B. Girma, E.S. Kissel, A.N. Levy, S. MacCracken, P.R. Mastrandrea, and L.L. White (eds.)]. Cambridge University Press, Cambridge, United Kingdom and New York, NY, USA, pp. 1-32.

South Region

REGION: SOUTH
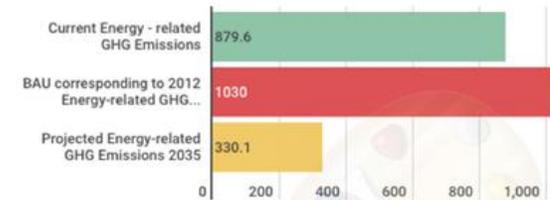
Population: 166.3 Million (2015)

Total Primary Energy Consumption: 517.8 Mtoe (2013)

Energy-related CO2 Emissions: 879.6 Million tonnes (2013)

Countries: Bulgaria, Greece, Italy, Malta, Portugal, Slovenia, Spain, Switzerland, Romania.

## Southern Region Energy-related GHG Emission Scenarios (Million tonnes)

Current Energy - related GHG Emissions	879.6
BAU corresponding to 2012 Energy-related GHG...	1030
Projected Energy-related GHG Emissions 2035	330.1

Renewable Energy:

Wind and Sun: See respective maps

Hydro: Existing dams in the Alps can be sustained; additional energy is only possible if currently protected areas will be ooded.

Biomass: Agricultural biowaste provides a signi cant share of biomass. Beyond that, dedicated energy crops could provide a signi cant increase in available Biomass

Solar

Wind
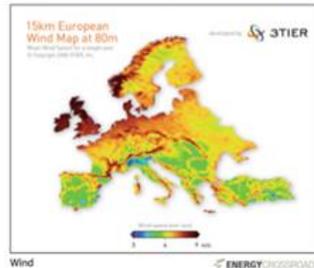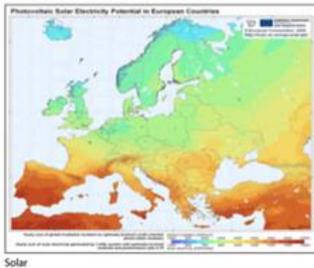
Non-renewable Energy:

Coal: Brown coal reserves are found in Greece. Production is declining and imports from outside EU are increasing.

Gas: Local reserves in Italy and Romania. Imports are increasing, mostly from Russia.

Oil: Some oil reserves in Romania, but most is imported. Worldwide reserves are mainly in Middle-East and Russia.

Uranium: Nuclear power is used in Bulgaria, Romania, Slovenia and Spain. Uranium is mostly imported and recycled.

TARGETS & RESULTS
REGION: SOUTH

Group name	2012	2035 BAU	2035 TARGETS	2035 RESULTS
Energy related CO2 emissions (tonnes per capita per year)	4,7 t	5,9 t		
Total energy consumption	127 bricks	154 bricks		
Share of renewables	18%	18%		
Consumption of oil and gas	84 bricks	102 bricks		

Other targets:

FINANCIAL SURPLUS/DEFICIT

ENERGYCROSSROADS

North Region

**Population:** 101.7 Million (2015)

Total Primary Energy Consumption: 334.3 Mtoe (2013)

Energy-related CO2 Emissions: 669.5 Million tonnes (2013)

Countries: Denmark, Estonia, Finland, Ireland, Latvia, Lithuania, Sweden, United Kingdom

## Northern Region Energy-related GHG emission scenarios (Million tonnes)

Current Energy - related GHG Emissions	669.5
BAU corresponding to 2012 Energy-related GHG...	614
Projected Energy-related GHG Emissions 2035	199.4
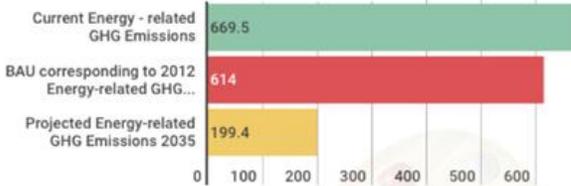
Renewable Energy:

Wind and Sun: See respective maps

Hydro: Existing dams, mostly in Sweden and Norway, can be sustained; additional energy only possible if areas will be flooded that are currently protected.

Biomass: Some energy can be harvested from unprotected forests in Sweden and Finland. Biowaste has significant potential and there is the option to develop dedicated energy crops, especially in the UK and Lithuania.

Solar | Wind
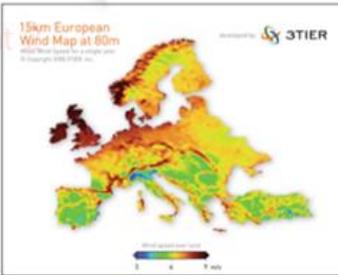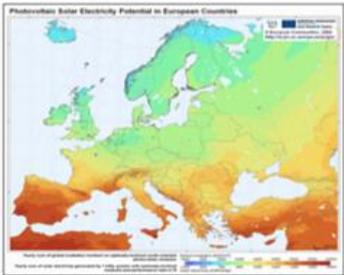
Non-renewable Energy:

Coal: Remaining hard coal reserves only in UK, imports mainly from outside EU. Coal is used for electricity production in UK, Finland and Denmark.

Gas: Gas reserves are mainly located in the North Sea, but are depleting. Increasing imports, mostly from Russia.

Oil: Currently large production, mainly located in the North Sea (Norway, UK and Denmark), but reserves are depleting within next 10 years. Worldwide reserves mainly in Middle-East and Russia.

Uranium: Nuclear power is used in Sweden, Finland and Lithuania. Uranium is mostly imported. Local resources estimated in Denmark.

TARGETS & RESULTS
REGION: NORTH

Group name	2012	2035 BAU	2035 TARGETS	2035 RESULTS
Energy related CO2 emissions (tonnes per capita per year)	6,4 t	6,4 t		
Total energy consumption	101 bricks	111 bricks		
Share of renewables	22%	23%		
Consumption of oil and gas	60 bricks	66 bricks		

Other targets:

FINANCIAL SURPLUS/DEFICIT

West Region
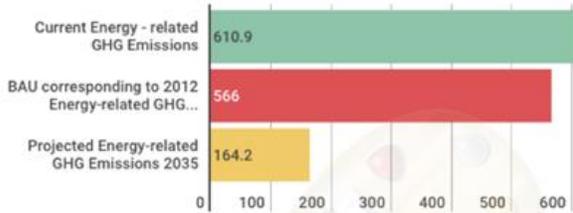
Population: 95.1 Million (2015)

Total Primary Energy Consumption: 404.5 Mtoe (2013)

Energy-related CO2 Emissions: 610.9 Million tonnes (2013)

Countries: Belgium, France, Luxembourg, Netherlands.

## Western Region Energy-related GHG Emission Scenarios (Million tonnes)

	Million tonnes
Current Energy - related GHG Emissions	610.9
BAU corresponding to 2012 Energy-related GHG...	566
Projected Energy-related GHG Emissions 2035	164.2

Renewable Energy:

Wind and Sun: See respective maps

Hydro: Existing dams in the Alps can be sustained; additional energy is only possible if currently protected areas will be ooded.

Biomass: Agricultural biowaste provides a signi cant share of biomass. Beyond that, dedicated energy crops could provide a signi cant increase in available Biomass, especially in France.
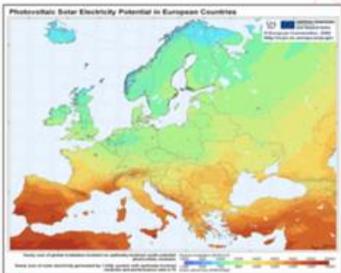
Solar
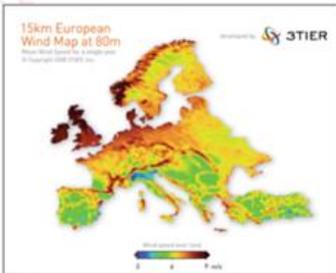
Wind

Non-renewable Energy:

Coal: Almost no regional coal reserves. Imports from outside EU are increasing.

Gas: Local production and use for electricity in the Netherlands, but reserves are declining

Oil: All oil is imported. Worldwide reserves are mainly in Middle-East and Russia.

Uranium: Nuclear power is used in France and Belgium. Uranium is mostly imported and recycled.

TARGETS & RESULTS
REGION: WEST

Group name	2012	2035 BAU	2035 TARGETS	2035 RESULTS
Energy related CO2 emissions (tonnes per capita per year)	6,0 t	6,1 t		
Total energy consumption	102 bricks	111 bricks		
Share of renewables	10%	9%		
Consumption of oil and gas	61 bricks	68 bricks		

Other targets:

FINANCIAL SURPLUS/DEFICIT

ENERGYCROSSROADS

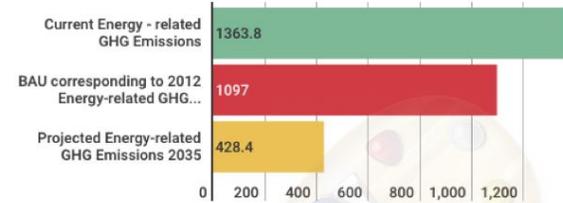# East Region

Population: 153.6 Million (2015)

Total Primary Energy Consumption: 537.3 Mtoe (2013)

Energy-related CO2 Emissions: 1363.8 Million tonnes (2013)

Countries: Czech Republic, Hungary, Poland, Slovakia, Germany, Austria.

## Eastern Region Energy-related GHG Emission Scenarios (Million tonnes)

Renewable Energy:

Wind and Sun: See respective maps

Hydro: Existing dams in the Alps can be sustained; additional energy is only possible if areas will be ooded that are currently protected.

Biomass: Agricultural biowaste provides a signi cant share of biomass. By 2030, the amount of bioenergy is almost doubled if more farmland in Poland and Germany is dedicated to energy crops
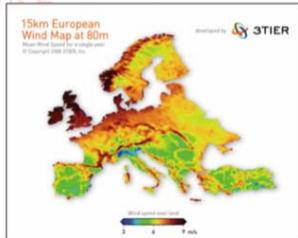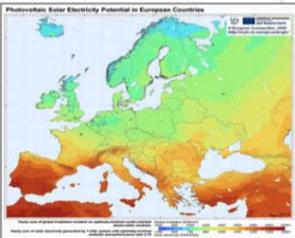
Non-renewable Energy:

Coal: Both hard coal and brown coal reserves are found in Germany and Poland. Production is declining and imports from outside EU are increasing.

Gas: Almost no local reserves. Imports are increasing, mostly from Russia

Oil: Almost no local reserves, oil is imported. Worldwide reserves are mainly in Middle-East and Russia.

Uranium: Nuclear power is used in most countries except Poland and Austria; Germany has commmited, however, to phase out the use of nuclear power by 2022. Uranium is mostly imported and recycled. Local resources estimated in Hungary.

TARGETS & RESULTS
REGION: EAST

Group name	2012	2035 BAU	2035 TARGETS	2035 RESULTS
Energy related CO2 emissions (tonnes per capita per year)	7,1 t	7,1 t		
Total energy consumption	143 bricks	141 bricks		
Share of renewables	14%	14%		
Consumption of oil and gas	78 bricks	77 bricks		
Other targets:				FINANCIAL SURPLUS/DEFICIT

Include 1 applied change Poster in each Region

APPLIED CHANGES IN THE REGION:

INDUSTRY

- ☐ PROCESS OPTIMIZATION
- ☐ MORE EFFICIENT ELECTRIC MOTORS
- ☐ CARBON CAPTURE AND STORAGE IN INDUSTRY
- ☐ IMPORT ENERGY-INTENSIVE GOODS

TRANSPORT

- ☐ ELECTRIC VEHICLES 1
- ☐ ELECTRIC VEHICLES 2
- ☐ 2ND GENERATION BIOFUELS
- ☐ NATURAL GAS FUELLED VEHICLES
- ☐ MORE EFFICENT VEHICLES
- ☐ INVEST IN RAIL
- ☐ MORE PUBLIC TRANSPORT
- ☐ CAR-FREE SUNDAYS
- ☐ WORK WHERE YOU LIVE

HEATING

- ☐ BETTER INSULATION 1
- ☐ BETTER INSULATION 2
- ☐ SOLAR ARCHITECTURE
- ☐ REPLACE ELECTRIC HEATING WITH FUEL
- ☐ DISTRICT HEATING
- ☐ HEAT PUMPS
- ☐ ACTIVE SOLAR HEATING
- ☐ HIGHER INDOOR TEMPERATURE
- ☐ LOWER INDOOR TEMPERATURE

ELECTRICITY

- ☐ MORE EFFICIENT APPLIANCES
- ☐ PHASE OUT HALOGEN LIGHTBULBS
- ☐ SMART METERING
- ☐ ELIMINATE STANDBY
- ☐ MORE EFFICIENT VENTILATION
- ☐ ELECTRICITY STORAGE

OTHER

- ☐ SUPER-GRID
- ☐ NORTH AFRICA IS ALMOST EUROPE
- ☐ R&D IN CARBON CAPTURE AND STORAGE

PEAK AND BASE BAU 2035

PEAK AND BASE YOUR RESULTS

ENERGYCROSSROADS

Set up each region Lego Game

NORTH REGION PACKING LIST

INDUSTRY TOWER

(dark grey)	2
(red)	3
(sand)	5
(green)	3

TRANSPORT TOWER

(dark grey)	2
(red)	3
(sand)	5
(green)	3

HEATING TOWER

(dark grey)	2
(red)	3
(sand)	5
(green)	3

ELECTRICITY TOWER

Black -	8
Red -	0
Sand -	11
Dark Green -	2
White -	2
Blue -	13
Yellow -	0
Light Green -	9
Light Grey (2x4) -	15
Light Grey (2x6) -	30
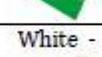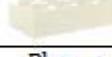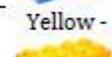
BANK

Black -	8
Red -	8
Sand -	20
Dark Green -	9
White -	25
Blue -	6
Yellow -	10
Light Green -	15
Light Grey (2x4) -	5
Light Grey (2x6) -	10
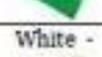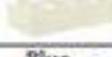
Set up each region Lego Game

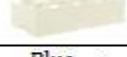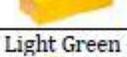South Region

SOUTH REGION PACKING LIST

INDUSTRY TOWER
- 3
- 5
- 11
- 2

TRANSPORT TOWER
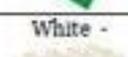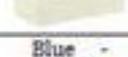- 0
- 41
- 11
- 2

HEATING TOWER
- 0
- 8
- 17
- 6

ELECTRICITY TOWER
- Black - 14
- Red - 3
- Sand - 16
- Dark Green - 0
- White - 4
- Blue - 12
- Yellow - 1
- Light Green - 8
- Light Grey (2x4) - 19
- Light Grey (2x6) - 39
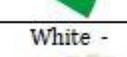
BANK
- Black - 8
- Red - 8
- Sand - 20
- Dark Green - 6
- White - 20
- Blue - 3
- Yellow - 20
- Light Green - 20
- Light Grey (2x4) - 5
- Light Grey (2x6) - 10

Set up each region Lego Game
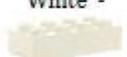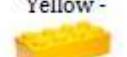
WEST REGION PACKING LIST

INDUSTRY TOWER

	2
	4
	7
	1

TRANSPORT TOWER

	0
	26
	0
	1

HEATING TOWER

	0
	7
	15
	3

ELECTRICITY TOWER

Black -	2
Red -	1
Sand -	8
Dark Green -	1
White -	1
Blue -	3
Yellow -	0
Light Green -	29
Light Grey (2x4) -	14
Light Grey (2x6) -	31

BANK

Black -	10
Red -	8
Sand -	20
Dark Green -	9
White -	20
Blue -	2
Yellow -	10
Light Green -	5
Light Grey (2x4) -	5
Light Grey (2x6) -	10
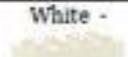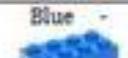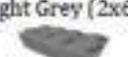
Set up each region Lego Game

EAST REGION PACKING LIST

INDUSTRY TOWER

(black)	6
(red)	3
(sand)	11
(green)	2

TRANSPORT TOWER

(black)	0
(red)	30
(sand)	0
(green)	2

HEATING TOWER

(black)	4
(red)	9
(sand)	17
(green)	6

ELECTRICITY TOWER

Black -		25
Red -		0
Sand -		7
Dark Green -		2
White -		3
Blue -		4
Yellow -		1
Light Green -		9

Light Grey (2x4) -		15
Light Grey (2x6) -		36

BANK

Black -		6
Red -		8
Sand -		20
Dark Green -		20
White -		20
Blue -		2
Yellow -		10
Light Green -		20

Light Grey (2x4) -		5
Light Grey (2x6) -		10