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Projected Climate Change Impacts for Mediterranean Security by 2020 and 2050

Vulnerability of Mediterranean Urban Centres

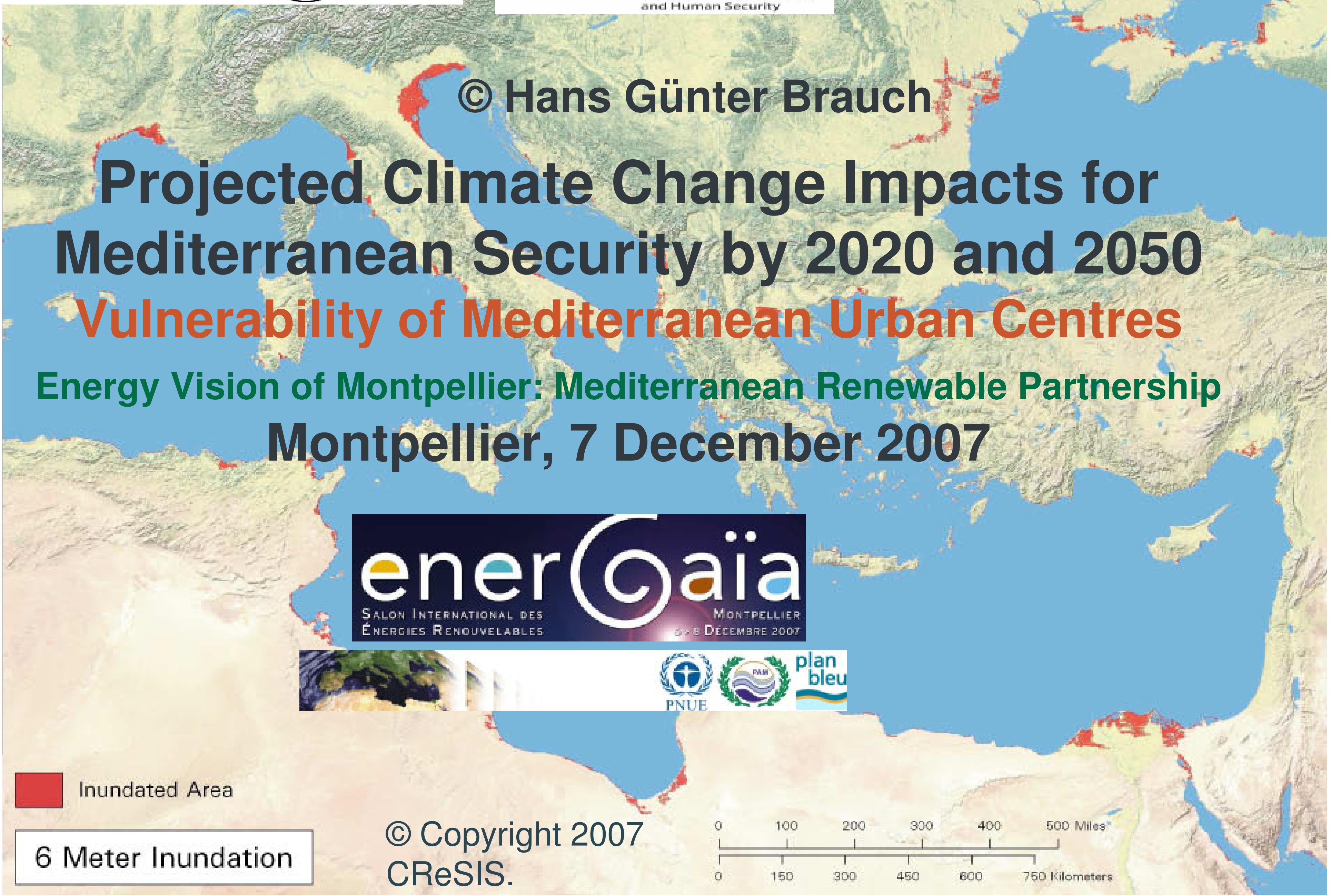
Energy Vision of Montpellier: Mediterranean Renewable Partnership

Montpellier, 7 December 2007

enerGaïa
Salon International des Énergies Renouvelables
Montpellier 6-8 Décembre 2007

PNUE

plan bleu



Contents

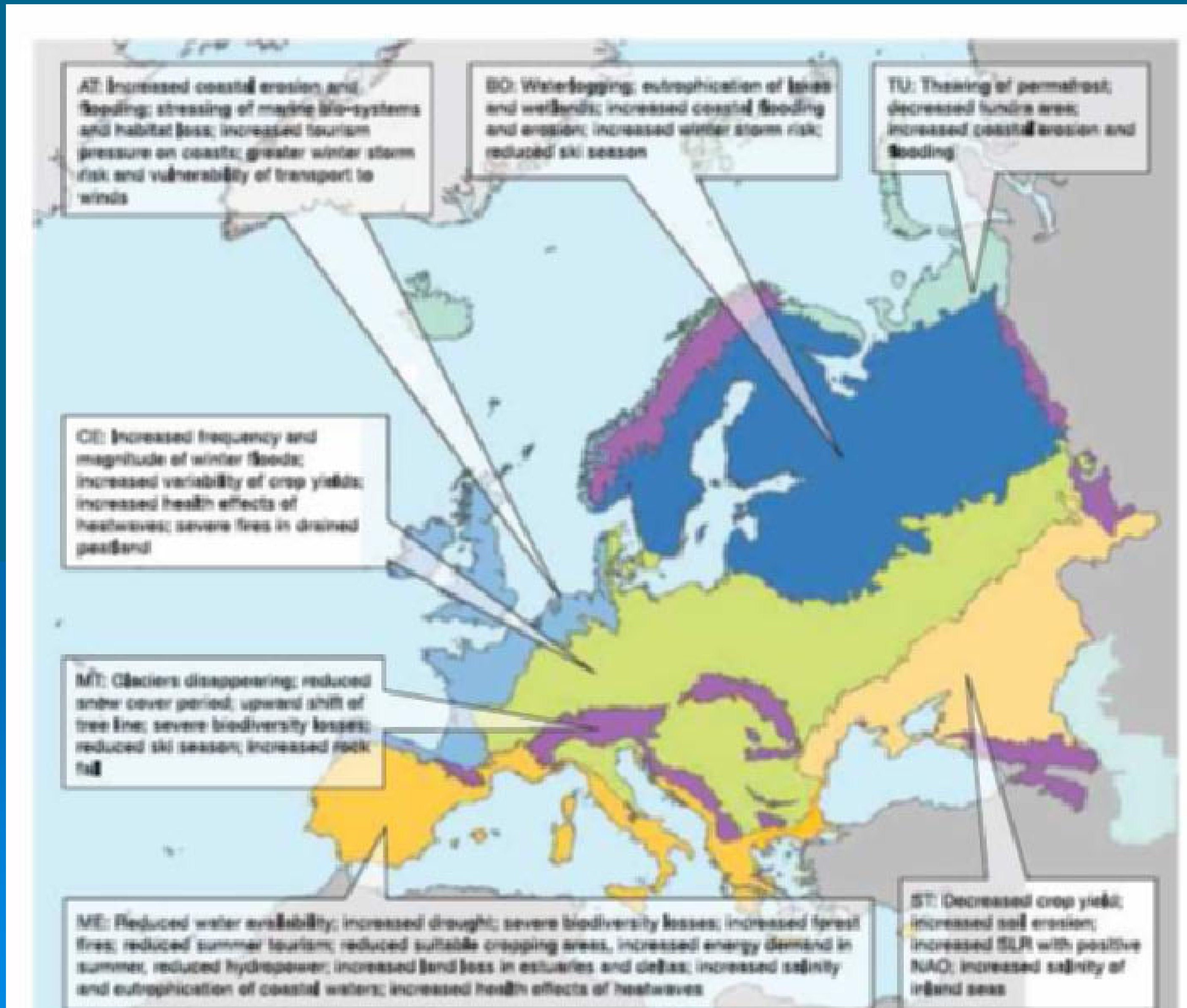
1. Introduction and Overview

- Climate change causes temperature increase, sea level rise and an increase of climate-related hazards.
- Heat wave of 2003 killed 50-70.000 people in Europe
- Sea-level rise: severe impacts on urban centres in the deltas of the Nile, Po, Rhone and Danube
- Climate change impacts threaten health, security & survi-val of Mediterranean people & affect agriculture, tourism
- Climate change poses challenges, vulnerabilities & risks for regional, national, environmental & human security
- Adaptation: protection of urban centres: city planning, dams
- Mitigation: Implementation of Kyoto Protocol and Post 2012 Climate Change Regime: GHG reduction, energy efficiency Mediterranean renewable energy strategy

1.1. Climate Change Impacts for MENA

- Climate change in the 21st century will affect Mediterranean more than Central and Northern Europe
- MENA will get much hotter, precipitation will decline, sea level will rise and affect coast lines
- Weather related hazards will rise: droughts, forest fires, heat waves, flash floods, land slides and the yield of many crops will decline
- The public awareness, social vulnerability, impact and coping capacity differ in Europe & MENA
- Solution requires a Euro-MENA climate partnership
- Renewables are a key component of policy response

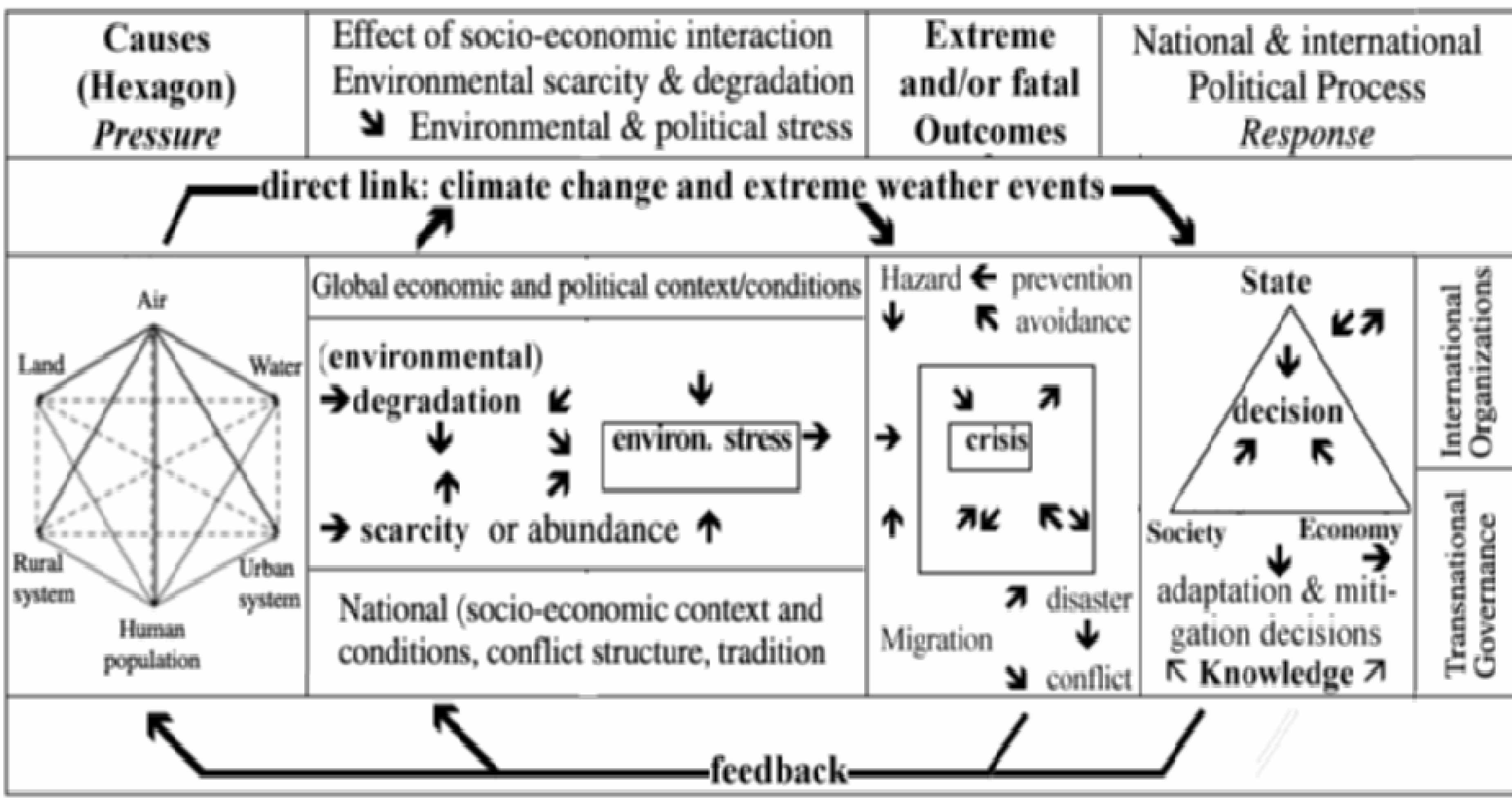
1.2. Key vulnerability of European systems to Climate change (IPCC, WG II, AR4: p. 558)



2. PEISOR Model: Impact of Global Climate Change

- Focus: environment <–> human interaction
- PEISOR model distinguishes 5 stages:
  - P: Pressure: Causes of GEC : Survival hexagon
  - E: Effect: environmental scarcity, degradation & stress
  - I: Impact: Extreme or fatal outcome: hazards
  - SO: Societal Outcomes: disaster, migration, crisis, conflict or c. resolution and peace making
  - R: Response by state, society, business and by using knowledge to enhance coping capacity and resilience

2.1. PEISOR Model: Global Change, Environmental Stress, Impacts & Extreme Societal Outcomes



3. Global Climate Change as a Security Danger

- **Climate change** poses many „soft security“ threats, challenges, vulnerabilities & risks for **Mediterranean, national, environmental and human security** that **require non-military coping strategies:**
  - Effective policy implementation to cope with **climate change** by reducing greenhouse gas emissions in all countries

Policy response: Reactive vs. proactive

- Stern (06) Price of non-acting is higher than two world wars!
- **Energy resource conflicts**: wars over control of oil and gas
- **Reactive:** postpone burden to next generations, adaptation
- **Proactive:** Shift in energy consumption, increase energy efficiency, shift from fossil to renewable energy sources.

3.1. Reconceptualizing Security: Towards Environmental & Human Security

Trends in rethinking of security since 1990:

- Widening, Deepening and Sectorialisation
- Dimensions & Levels of a „wide security concept“

Security dimension ⇒ ⇓ Level of interaction	Mili-tary	Political	Economic	Environ-mental ⇓	Societal
Human individual ⇒			Food sec. Health sec.	Cause & Victim	Food sec. Health sec.
Societal/Community				↓↑	
National	In Middle East this Security c. prevails		Energy security	↓↑	Food, health security
Mediterranean (Regional) International			Water security	↓↑	Water security
Global/Planetary ⇒				GEC	

4. Environmental Security Threats for the Mediterranean

- **Southern Europe**: High impact and high economic, political coping capacity and higher resilience;
- **North Africa:** High impact and low economic, political coping capacity and higher social vulnerability;

Impact of climate related hazards: Flash Floods

- Different vulnerabilities of cities in North & South
- Due to higher social vulnerability & lower coping capacity: MENA countries will be affected more severely
- 1975-2001; 38 floods: 2,924 fatalities in North Africa
  - November 2001: Algiers 921 died (31% of total), 300 mio.
  - Most costly flood in Mediterranean: November 2005 in Italy: US$ 13 billion damage, 64 fatalities

5. Regional Demographic Trends by 2025 and 2050 (UN 2000/2006)

UN Population Projections, medium variant, Revisions of 2000, 2004, 2006

- Southern EU Europe: Projections for 2025 and 2050
  - Rev. 2000: significant population decline in Spain and Italy
  - Rev. 2006: stabilization due to immigration:-23 mio.; +12,7 mio.
- North Africa: UN medium population projections: 2006 revision
  - Rev. 2000: Increase (2000-2050) for North Africa by 96 million
  - Rev. 2006: : Increase (2000-2050) for North Africa by 93 million
  - Changes between 2000 and 2006: Growth (2000-2050)
    - Slower growth for Morocco by 12.7 instead of 20.5 million (due to estimated emigration to Europe)
    - Higher growth for Egypt by 53,3 million instead of 46 million

6. Climate Change Impacts and Regional Socio-Economic Consequences

Climate Change Impacts: Temperature & Sea level Rise

- Global average temperature rise in 20th century: + 0.6°C

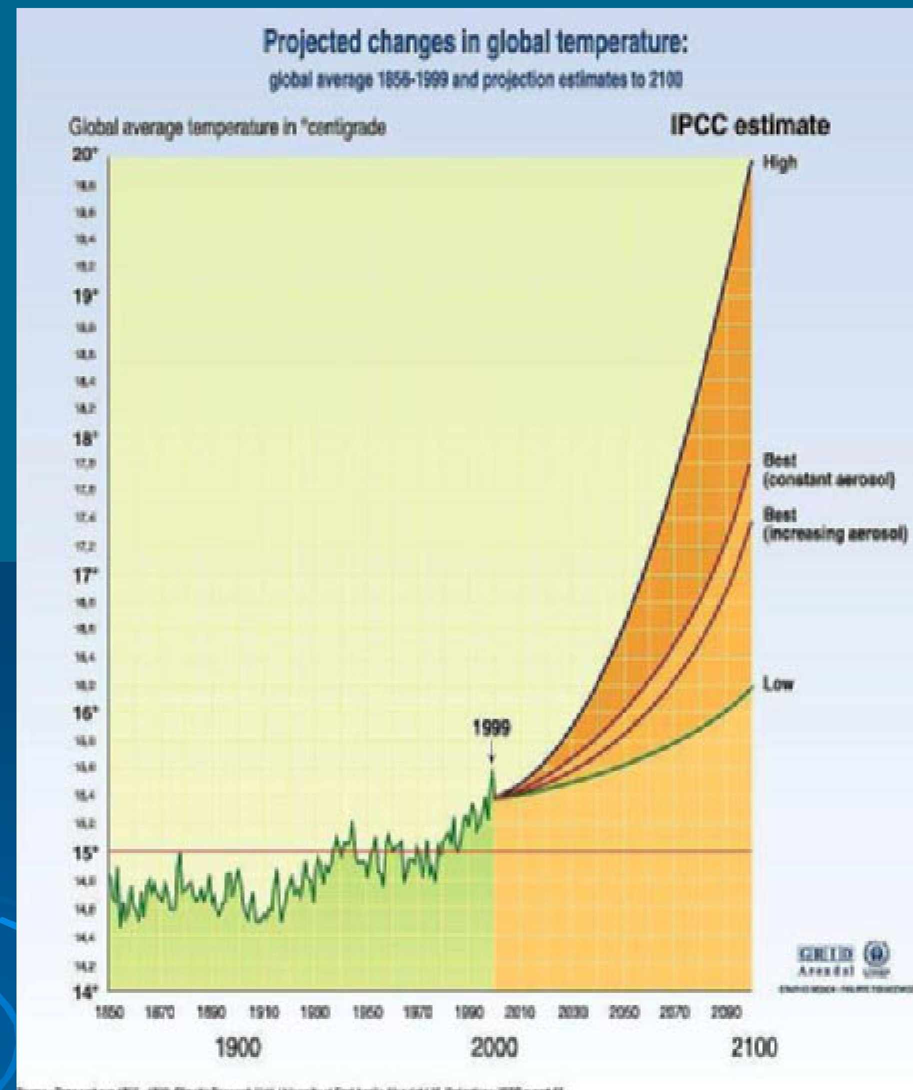
Projected temperature rise:

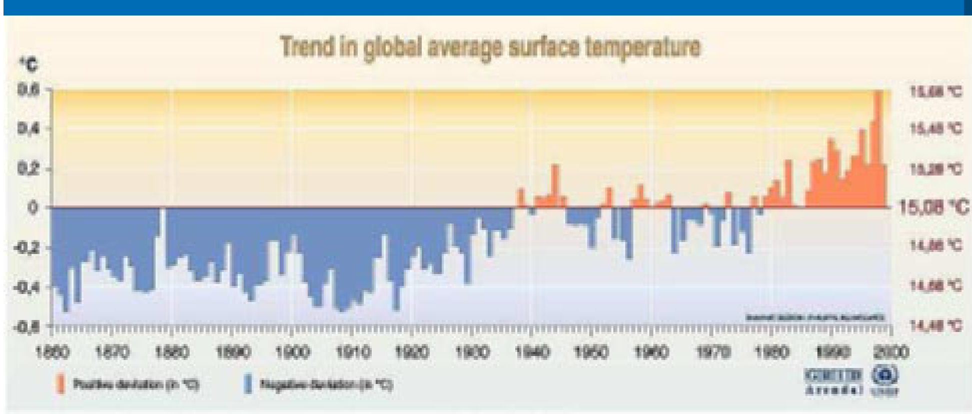
- TAR (1990-2100):+1.4-5. 8°C
- AR4 (07):+1.1-6.4 (1.8-4)°C

Sources: IPCC 1990,1995,2001,’07

Sea level Rise:

- 20th cent.: +0,1-0,2 metres
- TAR: 21st century: 9-88 cm
- AR4 (2000-2100): 18-59 cm





6.1. Average Value of Surface Temperature (IPCC 2007, WG 1, AR4, p. 14)

MULTI-MODEL AVERAGES AND ASSESSED RANGES FOR SURFACE WARMING

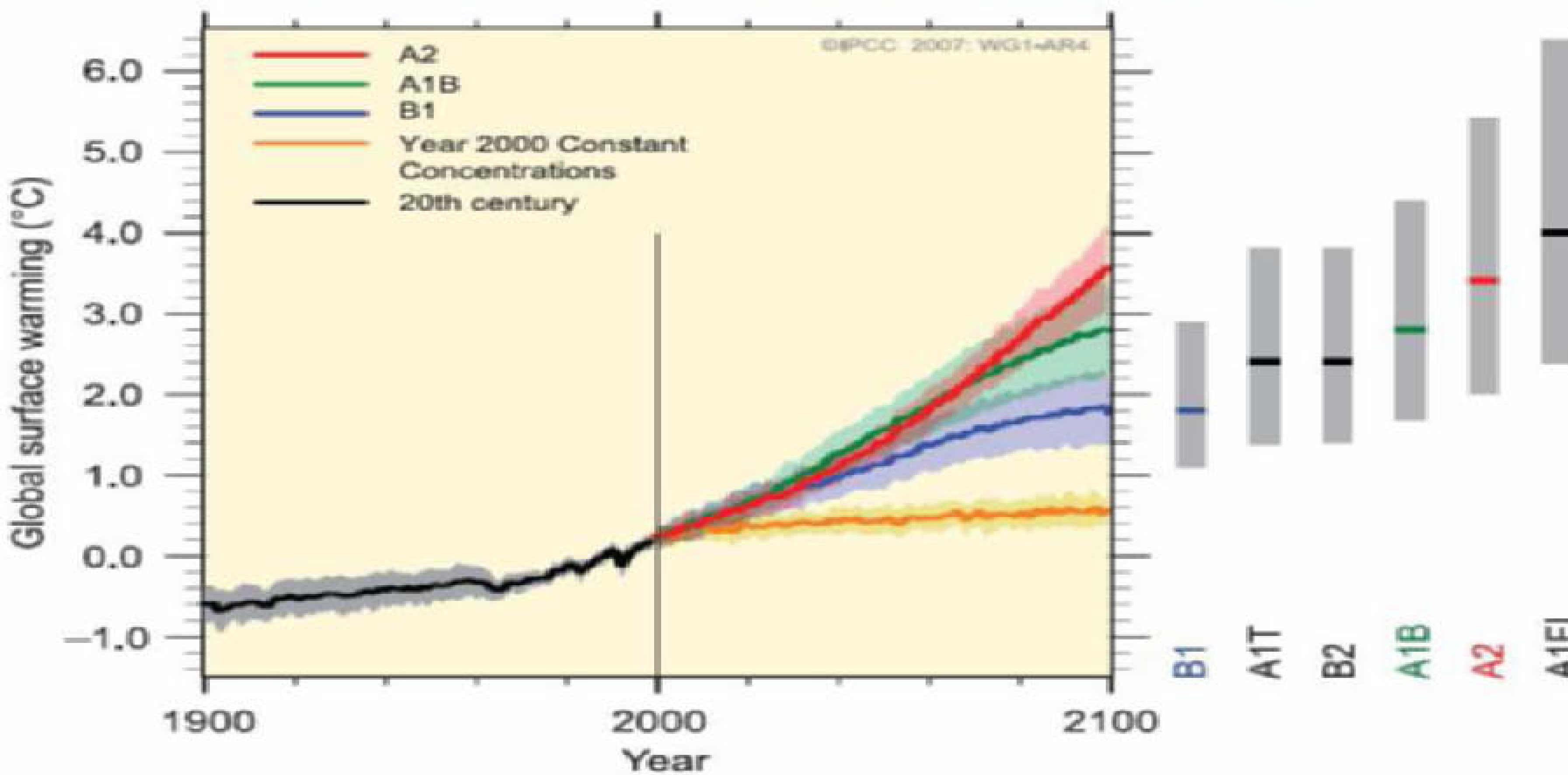
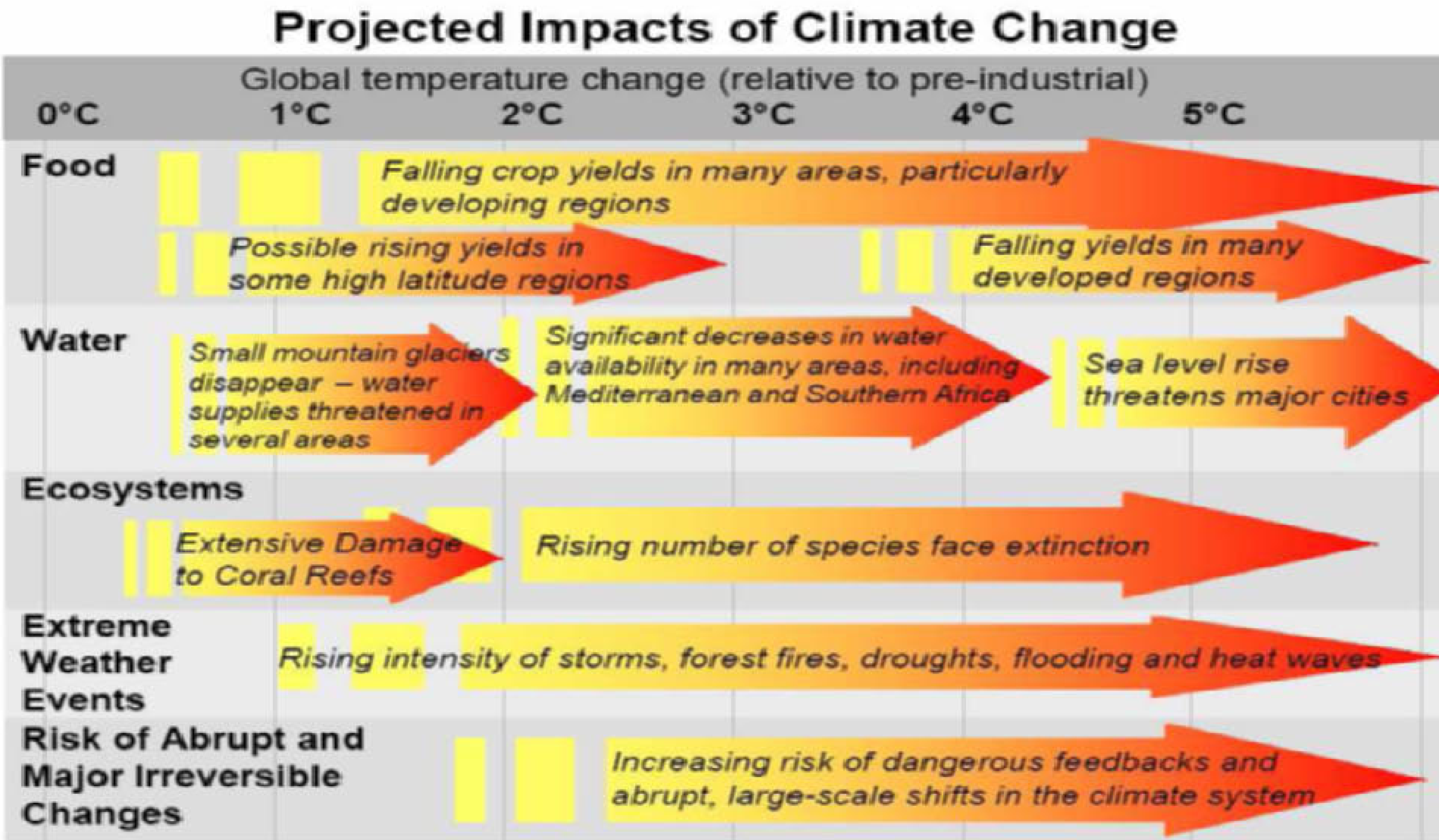
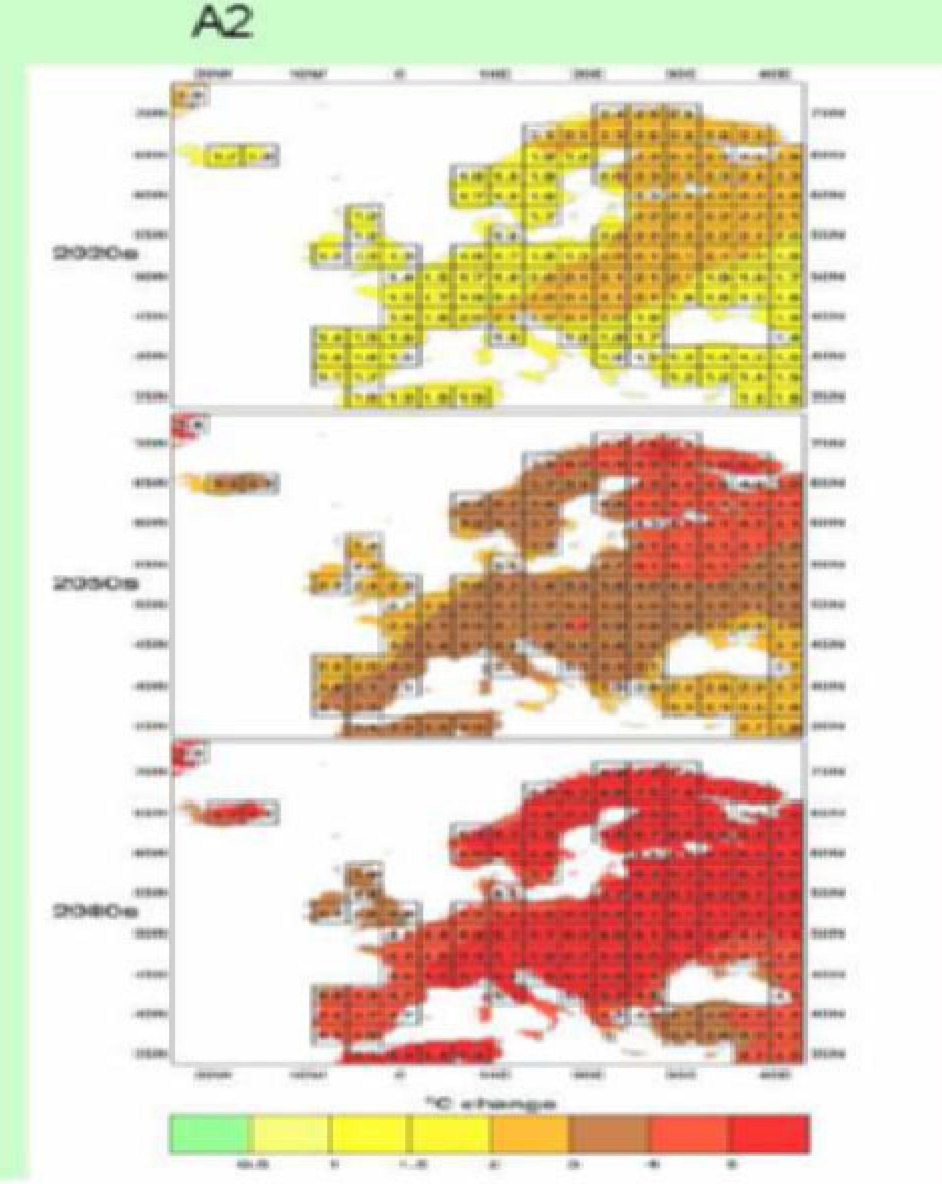


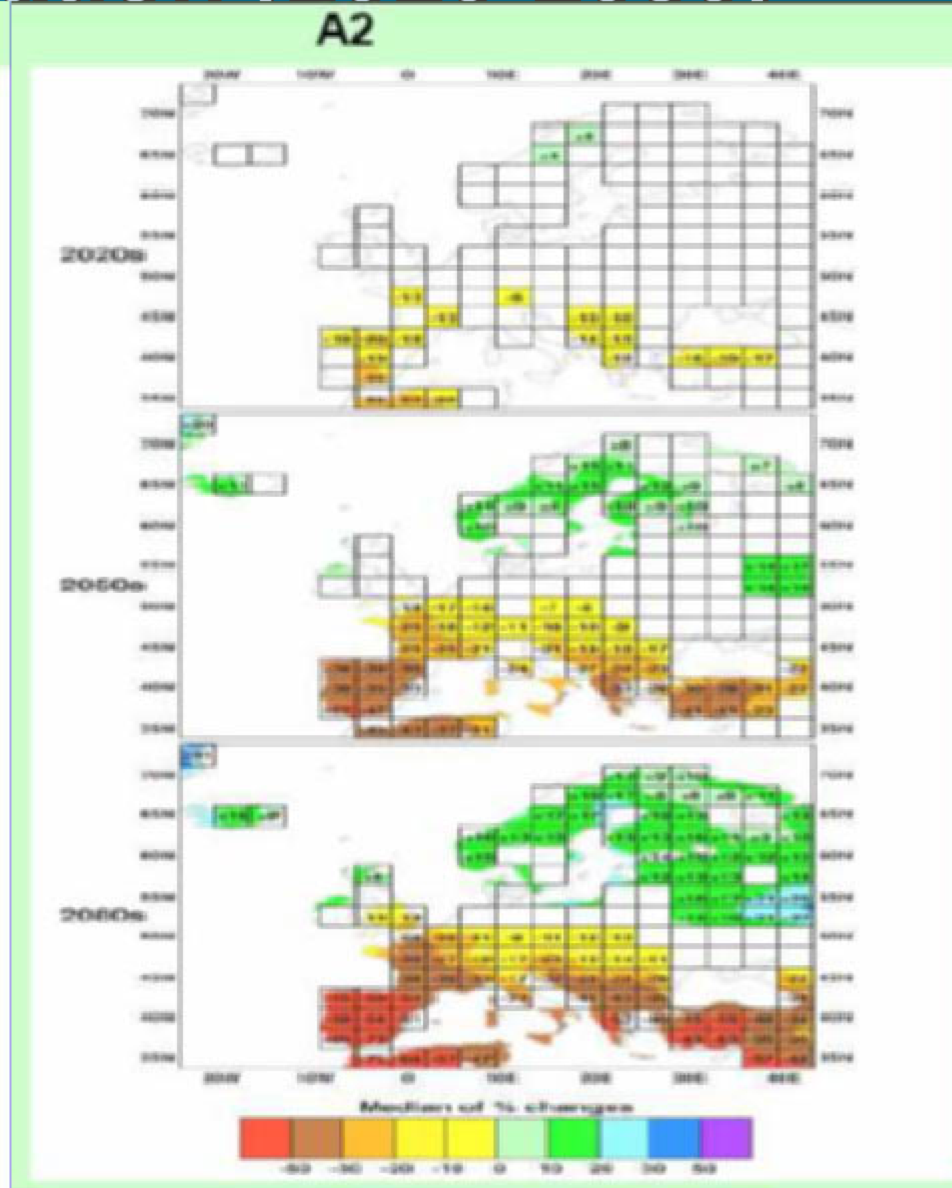
Figure SPM.5. *Solid lines are multi-model global averages of surface warming (relative to 1980–1999) for the scenarios A2, A1B and B1, shown as continuations of the 20th century simulations. Shading denotes the ±1 standard deviation range of individual model annual averages. The orange line is for the experiment where concentrations were held constant at year 2000 values. The grey bars at right indicate the best estimate (solid line within each bar) and the* ***likely*** *range assessed for the six SRES marker scenarios. The assessment of the best estimate and* ***likely*** *ranges in the grey bars includes the AOGCMs in the left part of the figure, as well as results from a hierarchy of independent models and observational constraints. {Figures 10.4 and 10.29}*

6.2. Projected Impacts of Climate Change

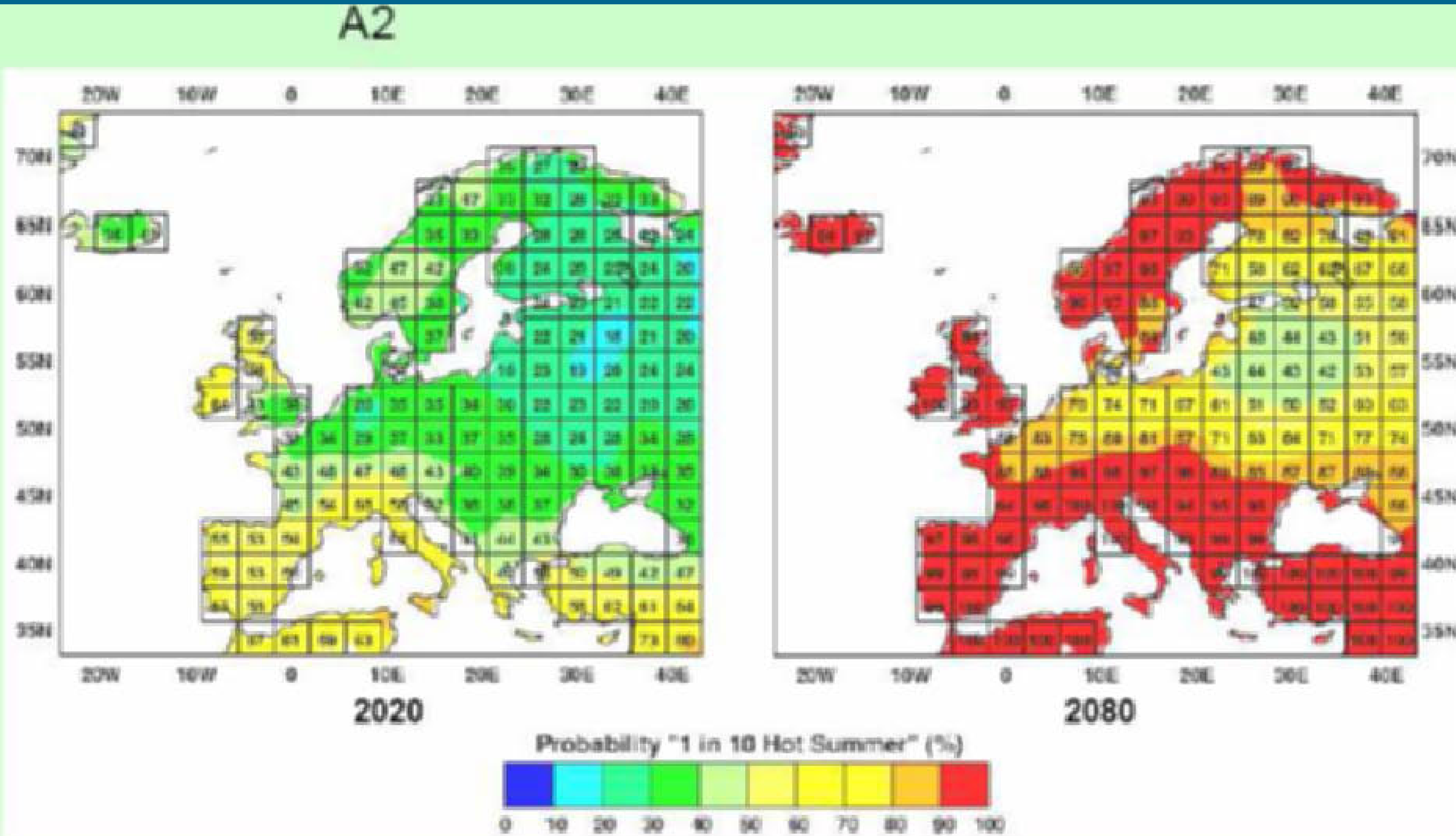


6.3. Projected Winter Temperature and Winter Precipitation (2020-2080)

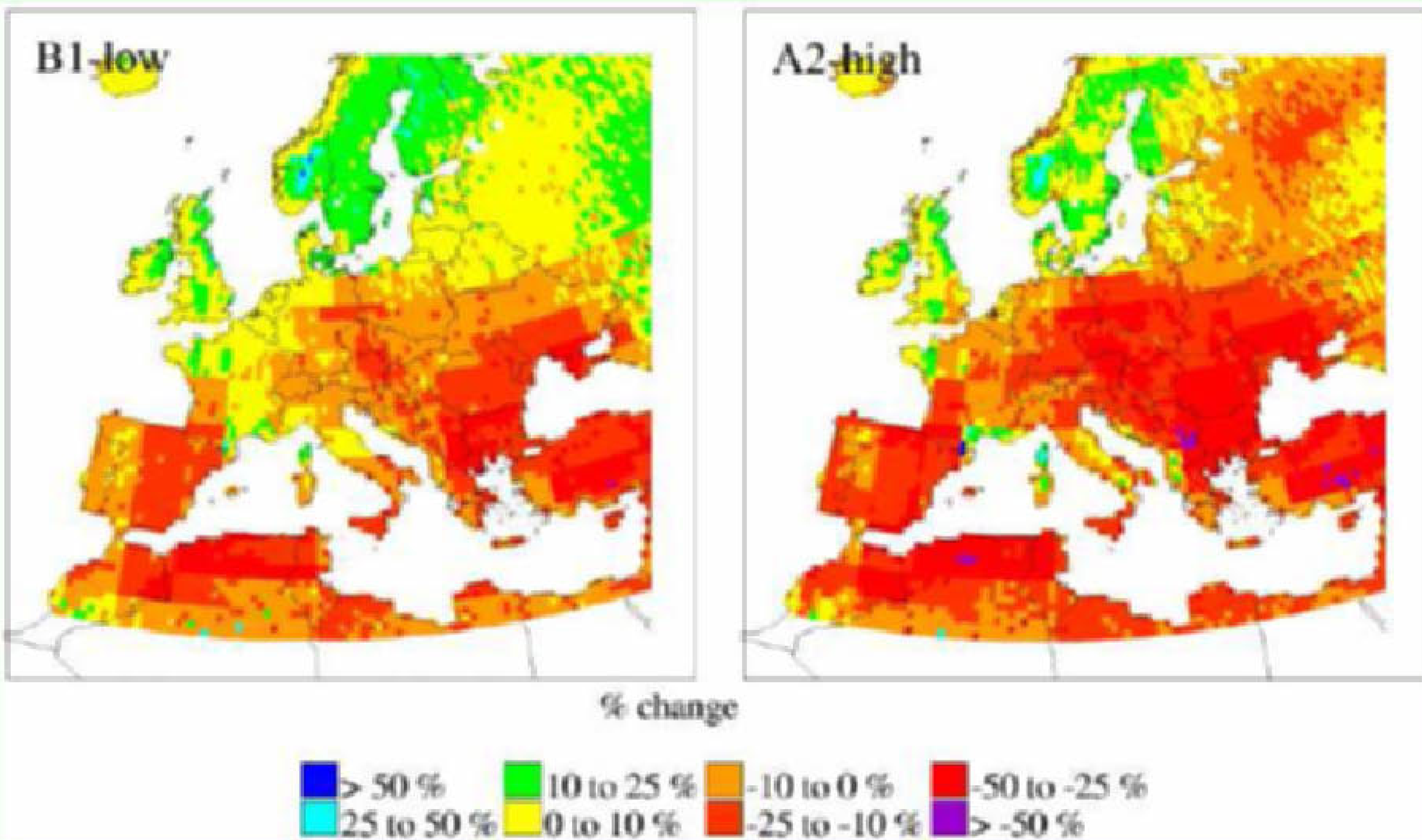




6.4. Probability of Hot Summers (M. Parry, IPCC, London, 2005)



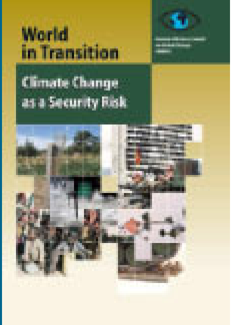
6.5. Water Availability 2050
(M. Parry, IPCC, London, 2005)



7. Environmental Impacts of Climate Related Natural Hazards

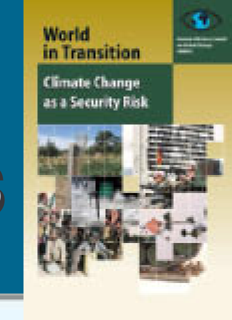
- **During the 20 th Century climate related natural hazards have increased:**
  - Drought (water scarcity and degradation)
  - Heat waves (impact on human beings, agriculture)
  - Forest fires
  - Flash floods and landslides
- **During the 21st Century climate change will**
  - increase temperature and reduce precipitation
  - Droughts may intensify and desertification may become irreversible in some regions
  - Heat waves will increase
  - In some areas agricultural yields will decline.

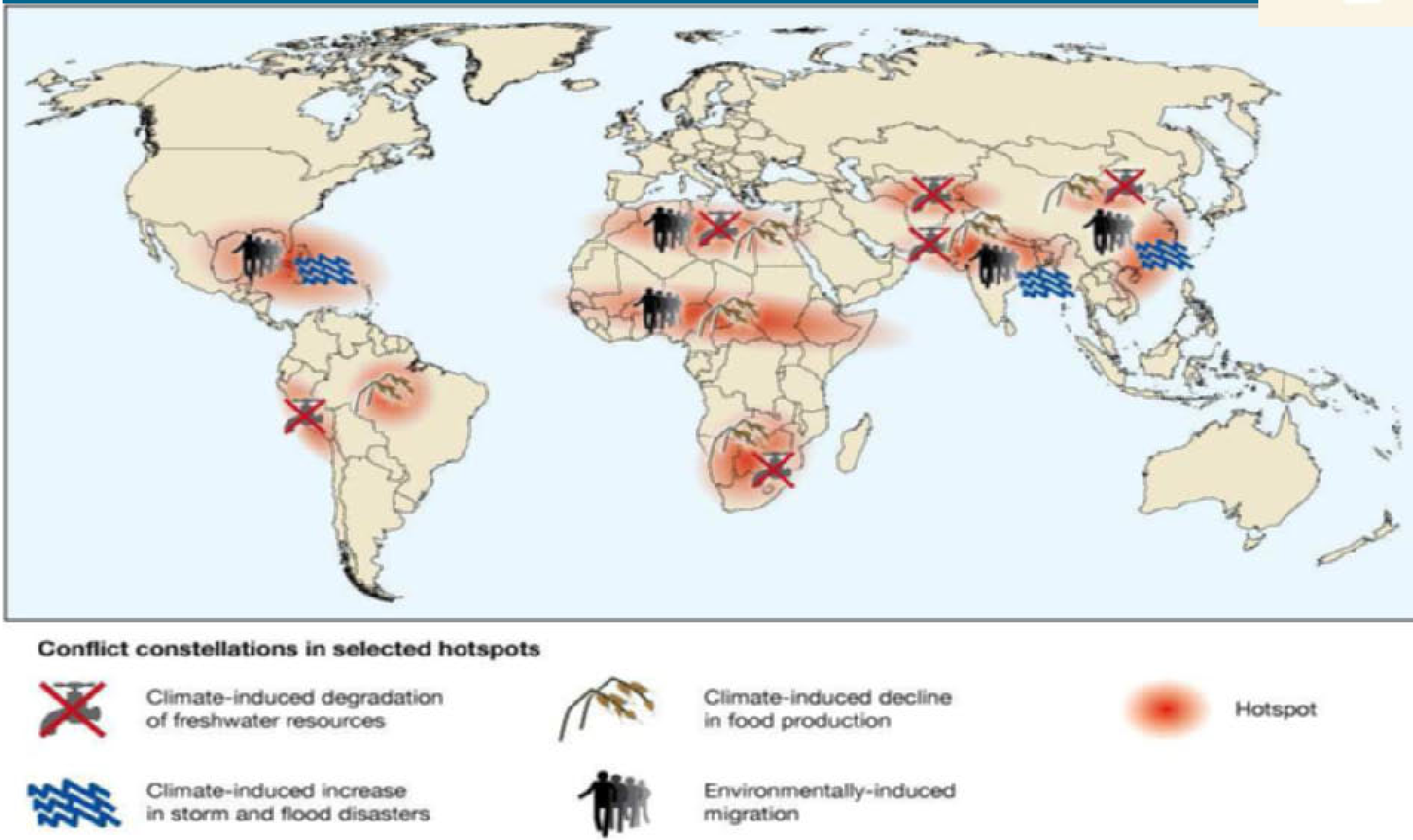
7.1. Climate change as a threat to international security



- **WBGU: climate change could exacerbate environmental crises: drought, water scarcity & soil degradation, intensify land-use conflicts & trigger further envi-ronmentally-induced migration.**
- **New conflict constellations are likely to occur. Sea-level rise; storm & floods could threaten cities & industrial regions in China, India & USA.**
- **WBGU identified 4 conflict constellations in different world regions:**
  1. **"Climate-induced degradation of freshwater resources": 1.1 billion people are currently without access to safe drinking water. The situation could worsen for hundreds of millions of people as climate change alters the variability of precipitation & quantity of available water.**
  2. **"Climate-induced decline in food production": More than 850 million people worldwide are undernourished. This situation is likely to worsen in future as a result of climate change.**
  3. **"Climate-induced increase in storm and flood disasters":**
  4. **"Environmentally-induced migration":**

7.2. WBGU Regional Hotspots





8. Mediterranean Region & Coast: Impact and Policy Implementation

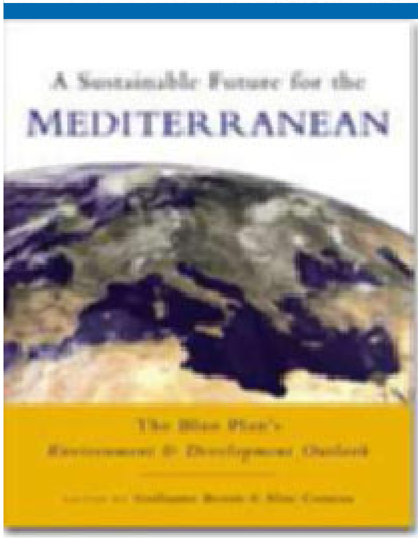
- Mediterranean region is more vulnerable to Climate Change than Central & Northern Europe
- Mediterranean coastline and coastal urban centres are most vulnerable to direct and indirect impacts.
- The MENA countries have no and South European Countries have low GHG reduction obligations.
- There is an awareness and policy implementation gap between Central & Northern Europe & Mediterranean.
- The Mediterranean and MENA region has a high and un-used renewable energy potential.

8.1. Mediterranean Coastal Cities & Pollution hot spots at the coast

Figure 2.1 Mediterranean coastal cities

Source: HCMR based on UNEP/MAP/MEDPOL/WHO, 2004.

Mediterranean coast is densely populated and highly vulnerable due to many pollution hotspots. The vulnerability will increase with population growth and sea-level rise until 2100. There is time for adaptation & mitigation.



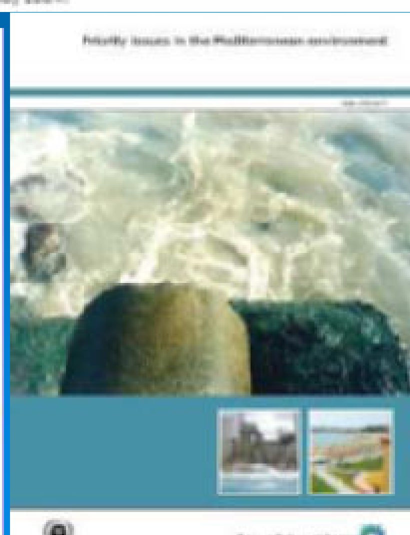


Figure 1.4 Pollution hot spots along the Mediterranean coast

8.2. Blue Plan: Population Change and Saturation of Mediterranean Coastal Region

Baseline scenario increase in pressures:

- coastal city populations rises: 70 (2000) to 90 mio (2025),
- 312 mio, tourists in coastal areas versus 175 million (2000)

a density per km of coast could triple in the South and East,

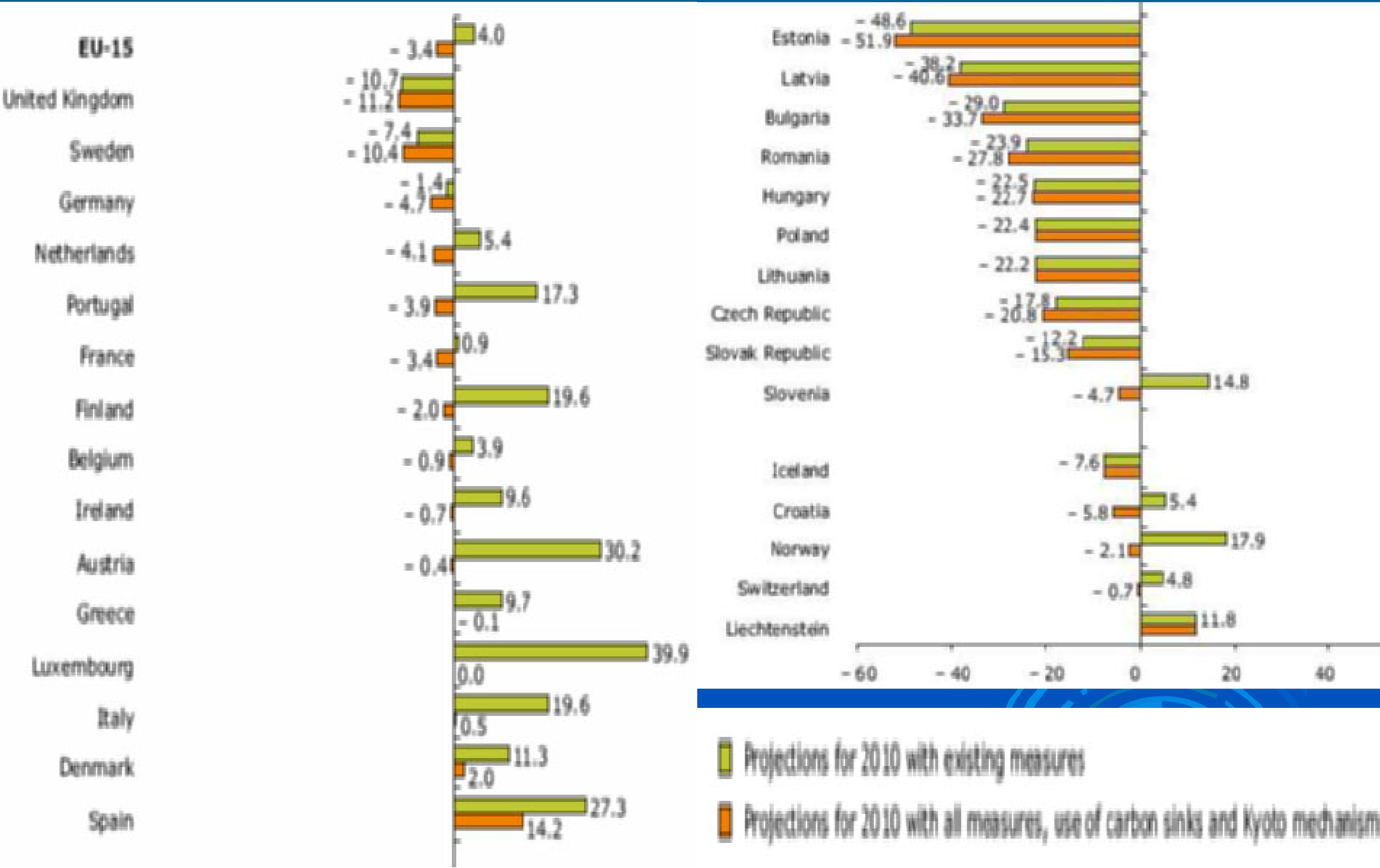
- 360 coastal power plants by 2025 versus 200 in 2000,
- several dozen refineries and additional industrial complexes in the South and East,

- Perhaps 175 new desalinization plants with a capacity of 6 000 m3 per day and new harbors, roads and airports.
- Population density and economic activity as well as installation and wealth increasing in Mediterranean coastal region.

8.3. Mediterranean Impact & Response

- **Kyoto Protocol (1997): -5% of GHG emissions by 2008-2012 from 1990 levels (EU-15: -8%)**
- **Obligations of five EU Mediterranean countries under EU implementation agreement**
  - Italy(-6.5),France (0),Spain (+15),Greece (+25),Portugal (+27)
  - Germany (-21%), UK (-12,5%)
- **Performance of five EU Mediterranean countries**
  - **Some Mediterranean countries have suboptimal performance & insufficient policy implementation**
  - **Lack of public awareness & pressure**
- **MENA countries have no obligations but climate change offers a huge opportunity. They have a huge solar energy potential that can satisfy total energy needs of the Euro-Mediterranean region**

8.4. Greenhouse emissions of 25 EU countries by 2010, missing reduction goals (EEA 2007)



9. Coping with the Causes and Impacts: Potential of Renewables

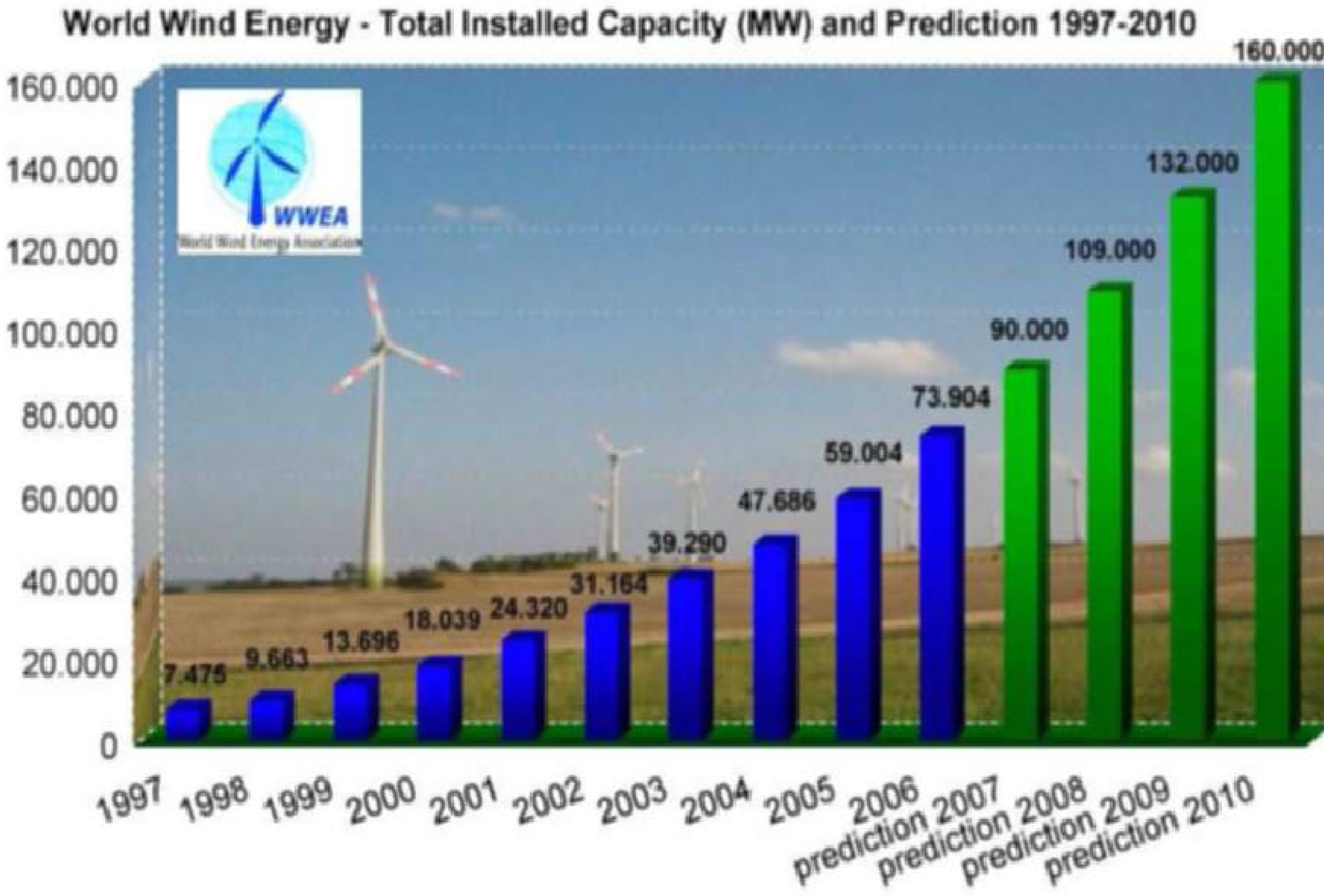
- **IEA, WEO 2007: Reference Scenario** – world's energy demand will grow over 50% in 2030 (2007). China & India account for 45% of increase in global primary energy demand. Their energy use will double from 2005 to 2030.
- Oil, gas, coal will dominate; coal will grow most rapidly due to demand in China & India. Global energy-related CO2 emissions will rise by 57%.
- **China will overtake the US as biggest emitter in 2007**, India becomes 3rd emitter by 2015. China's per-capita emissions = OECD Europe by 2030.
- **Net oil imports in China & India** jump from 5.4 mb/d in 2006 to 19.1 mb/d in 2030 – (more than combined imports of **United States & Japan today**).
- A supply-side crunch up to 2015, with abrupt escalation in oil prices!
- **Alternative Policy Scenario,** global energy-related CO2 emissions would level off in the 2020s and reach 34 Gt in 2030 - almost a fifth less than in the Reference Scenario. Global oil demand would be 14 mb/d lower – a saving equal to entire current output of United States, Canada & Mexico combined.
- **Global (fossil) energy demand will grow and prices will rise: this will create a positive investment climate.**
- **Stern Report (October 2006): significant growth rates in CO2 emissions from 2002 to 2025: China (+145%). Brazil (+99%), India (+95%), Africa (+78%), US (+39%), Russia (+32%), E. Europe (+11%) Japan (+5%)**

9.1. Coping with Causes and exploiting opportunities

- **Coping with causes and impacts**
  - a) reduce emissions,
  - b) energy sufficiency, and c) shift from fossil to renewable energy
  - **Adaptation:** for vulnerable coastal cities, health, agriculture, tourism
  - **Mitigation:** unique opportunity for future Mediterranean cooperartion:
    - Declining Fossil Reserves: Tunisia, Egypt, Algéria, Lybia «après le pétrole»
    - Climate Change mitigation strategy offers unique opportunity for a long-term climate & renewable energy partnership accross the Mediterranean Coping with the Impact:
  - **Disaster preparedness & response**: A new task for Mediterranean cooperation
- **With growing energy demand & price rise renew-ables will become competitive: wind, biomass, solar thermal and photovoltaic**
- **Huge Renewable Energy Potential in Sahara**

for electricity, water desalination, hydrogen for transportation

9.2. Growth in Wind Power (1997-2006)

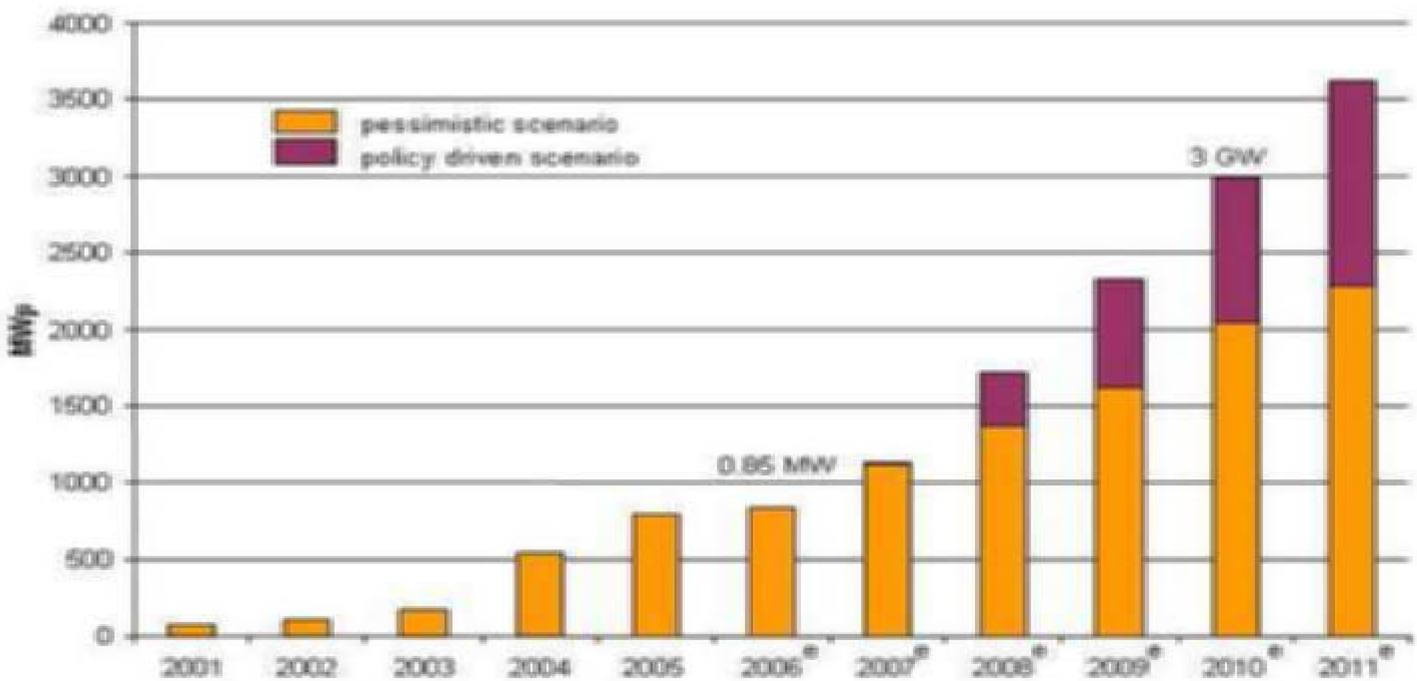


9.3. Wind power growth and capacity in 2006

Ranking total 2006	Country	Additional capacity 2006	Growth rate 2006	Total capacity end 2006	Total capacity end 2005	Ranking total 2005
		[MW]	%	[MW]	[MW]	
1	Germany	2.194	11,9	20.622	18.428	1
2	Spain	1.587	15,8	11.615	10.028	2
3	USA	2.454	26,8	11.603	9.149	3
4	India	1.840	41,5	6.270	4.430	4
5	Denmark	8	0,3	3.136	3.128	5
6	China	1.145	90,9	2.405	1.260	8
7	Italy	405	23,6	2.123	1.718	6
8	United Kingdom	610	45,1	1.963	1.353	7
9	Portugal	628	61,4	1.650	1.022	11
10	France	810	106,9	1.567	757	13
11	Netherlands	336	27,5	1.560	1.224	9
12	Canada	768	112,4	1.451	683	14
13	Japan	354	34,0	1.394	1.040	10
14	Austria	146	17,8	965	819	12
15	Australia	238	41,1	817	579	15
16	Greece	183	31,9	756	573	16
17	Ireland	147	29,6	643	496	18
18	Sweden	54	10,6	564	510	17
19	Norway	55	20,4	325	270	19
20	Brazil	208	729,6	237	29	34
	Rest	730	48,4	2.238	1.508	
TOTAL		**14.900**	**25,3**	**73.904**	**59.004**	

9.4. Photovoltaic installations in EU-25

EU - 25 Annual Installations of PV



9.5. Growth in Solar Thermal Capactiy in 2006

- **European Solar Thermal Industry Federation (ESTIF):**
  - **2 100 MWth of new capacity added during 2006** in EU 27 + CH
  - annual growth (47%) in Europe (3 million m2 of collector area).
  - Key drivers: public support schemes, solar obligations in Spain, training programmes in France, financial incentive schemes in most EU countries.
  - Germany more than 1.000 MWth newly installed (50% of EU market).
  - 5 Mediterranean countries: Greece, France, Italy, Spain and Cyprus, now account for almost 30% of the EU market.
  - Total solar thermal capacity in EU27 + CH reached 13.500 MWth, producing 9.600 GWh of solar thermal energy.
  - **Goal: 1 m2 per European is possible by 2020**
  - Cyprus or Austria are underway to exceed that level by 2020.
  - For 2007, growth expectations for EU27+CH are just 17%.

9.6. Germany‘s Renewable Strategy

- Legal bases of Germany‘s renewable energy strategy:
  - Chancellor KohL: Electricity Feed in law (1990)
  - Chancellor Schröder: Renewable Energy Law (2000)
  - Chancellor Merkel: Comprehensive Energy Concept (2007)
- Germany‘s Market Shares on Renewables:
  - Windpower: 2006: 20.622 MW of 73.904 MW
  - Solar Photovoltaic: annual installed capacity: 2006: 750 MW
  - Solar Thermal: 2006: 1000 MWth (50% of EU market)
  - Solar Thermal power genration:
- Germany‘s Jobs in the Renewable Energy Sector:

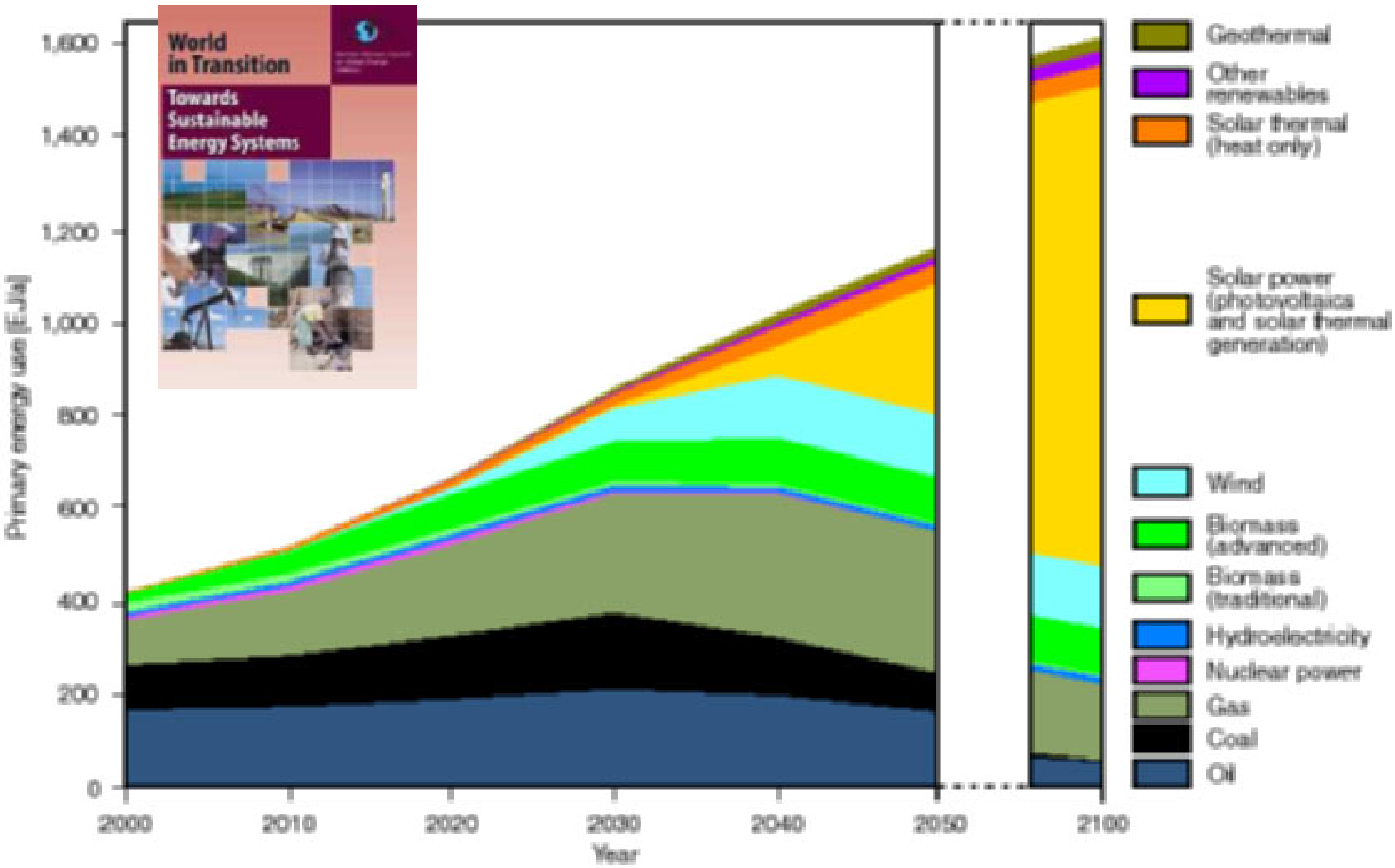
	2000	2002	2004	2006	2010	2020
Wind power			63.900	82.100		
Solar power			25.100	40.200		
Biomass			56.800	95.400		
Total			160.500	235.600	ca. 400.000 jobs	
Share of ren. in electricity generation			10.4%	11,8%	12,5%	20% (27%)

- Learning Costs for Renewable Energy Strategy
  - 2006 (0,75 cent per KWh or 4% of electricity costs of households)

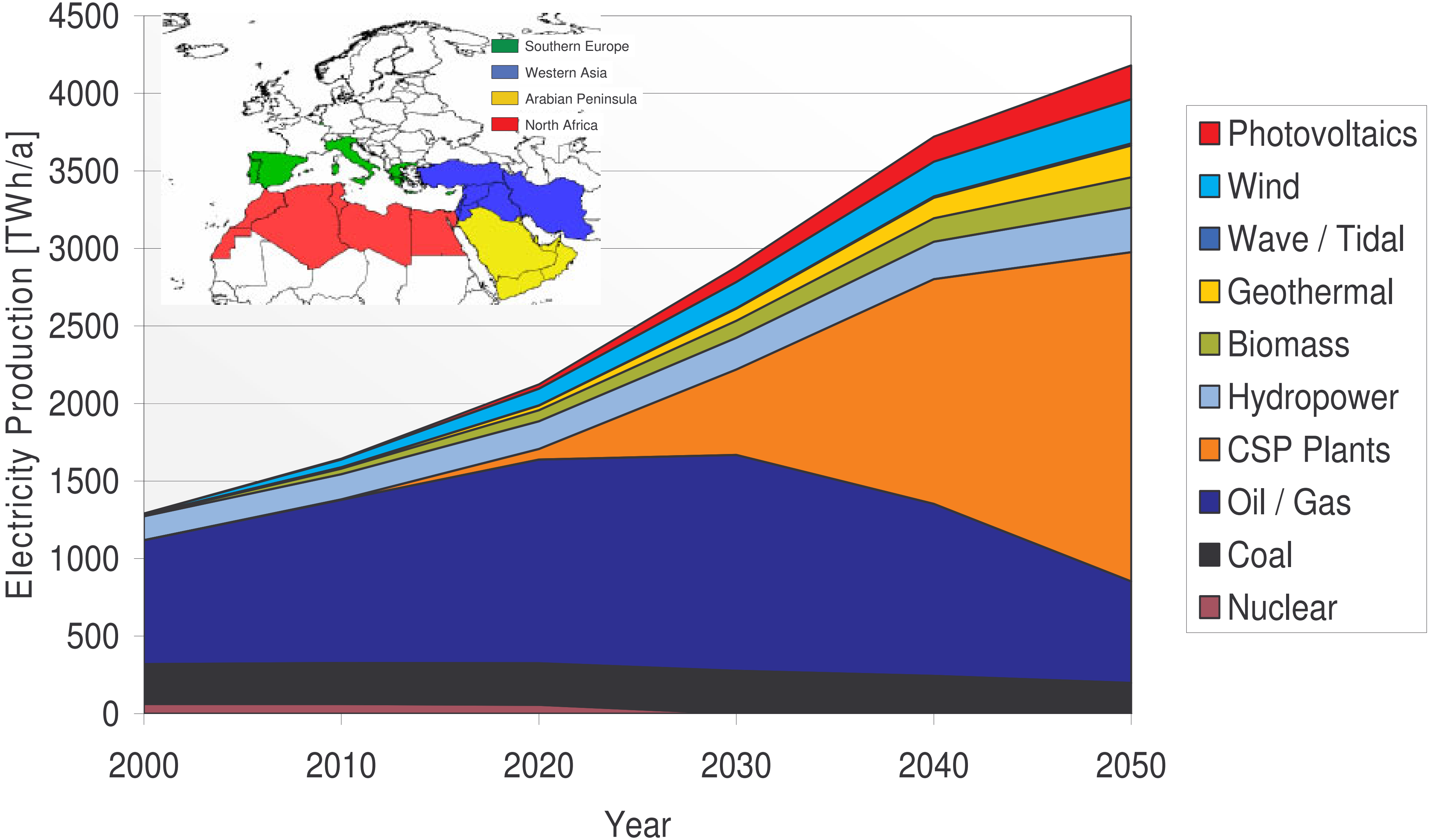
9.7. WBGU Energy Study of 2004

- Fossil energy jeopardize natural life-support systems
- 2 billion people lack access to modern forms of energy
- Corridor for sustainable energy policy embraces four key components:
  - Major reduction in the use of fossil energy sources;
  - Substantial development & expansion of new renewable energy sources,
  - Improvement of energy productivity far beyond historical rates;
  - Phase-out of the use of nuclear energy.
- Next 10–20 years are decisive window of opportunity for reconfiguring energy systems. The later the higher costs.
- Milestones on the WBGU transformation roadmap:
  - Improving energy productivity
  - Expanding renewables substantially
  - Eradicating energy poverty & seeking minimum levels of supply worldwide
  - Mobilizing financial resources for global transformation of energy systems
  - Using model projects for strategic leverage, for energy partnerships
  - Advancing research and development
  - Drawing together and strengthening global energy policy institutions

9.8. WBGU Exemplary Path: Global Energy Mix

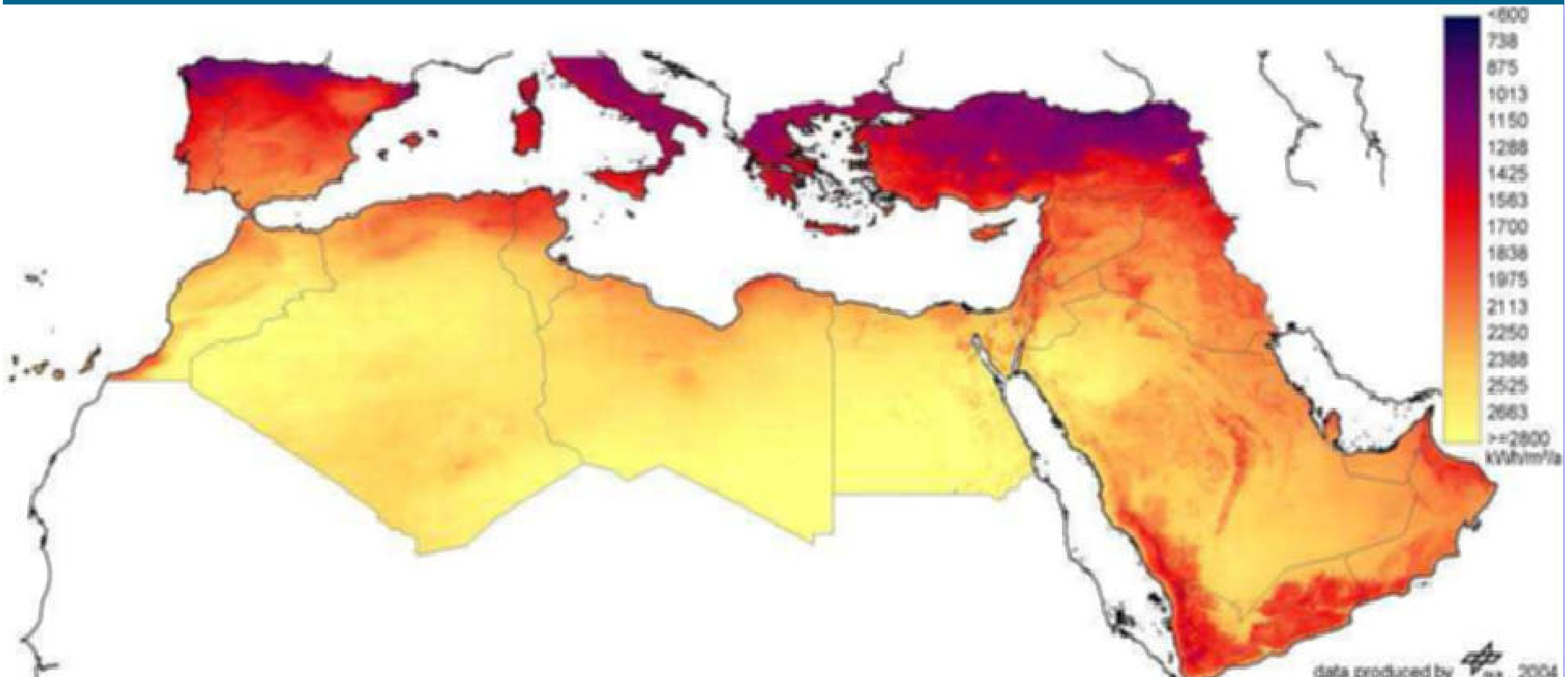


9.9. Annual electricity demand & generation within the countries analysed in the MED-CSP scenario



9.10. Annual Direct Solar Irradiance in the Southern EU-MENA Region. Primary energy per square meter equals 1–2 b oil per y.

Source: Trieb, Krewitt, May, in: Brauch et al. (2008 forthcoming)

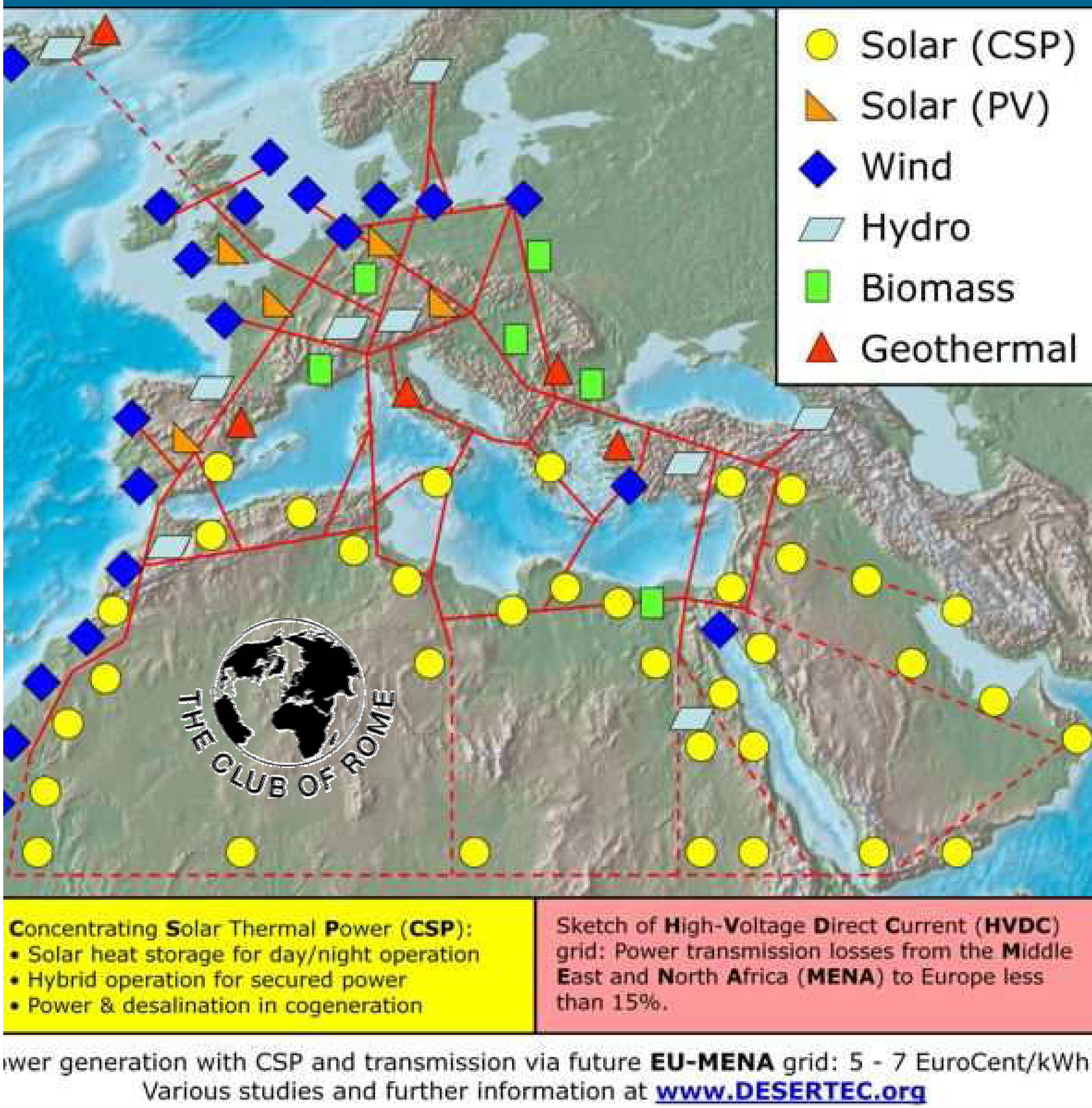


- http://www.dlr.de/tt/desktopdefault.aspx/tabid-2885/4422_read-6575/

9.11. DESERTEC Concept & Technology

- **DESERTEC Concept**: **less than 0.3% of desert** of MENA region, **solar thermal power plants** can generate enough electricity and desalinated seawater for current & future demands in EU-MENA. **High solar radiation outweighs transmission losses from MENA to Europe. Solar thermal power plants in MENA are more economic than in South Europe.**
- **Winds** in Morocco and Red Sea could generate additional elctricity.
- Solar & wind power can be distributed in MENA and transmitted via **H**igh **V**oltage **D**irect **C**urrent (**HVDC**) transmission lines to Europe with transmis-sion losses of 10-15%. **Loss of power during transmission can be limited to 3% per 1000 km.**
- **Solar thermal power plants (Concentrating Solar Thermal Power, CSP).**
- **Use mirrors to concentrate sunlight and create heat to drive steam turbines and electri-city generators. Excess heat from additional collectors can be stored in tanks of molten salt & used to power steam turbines during the night or when there is a peak in demand.**
- **To ensure uninterrupted service during overcast periods or bad wea-ther, the turbines can also be powered by oil, natural gas or biomass fuels. Waste heat from the power-generation process may be used (in cogeneration) to desalinate seawater and for thermal cooling – that can be a great benefit to local population.**

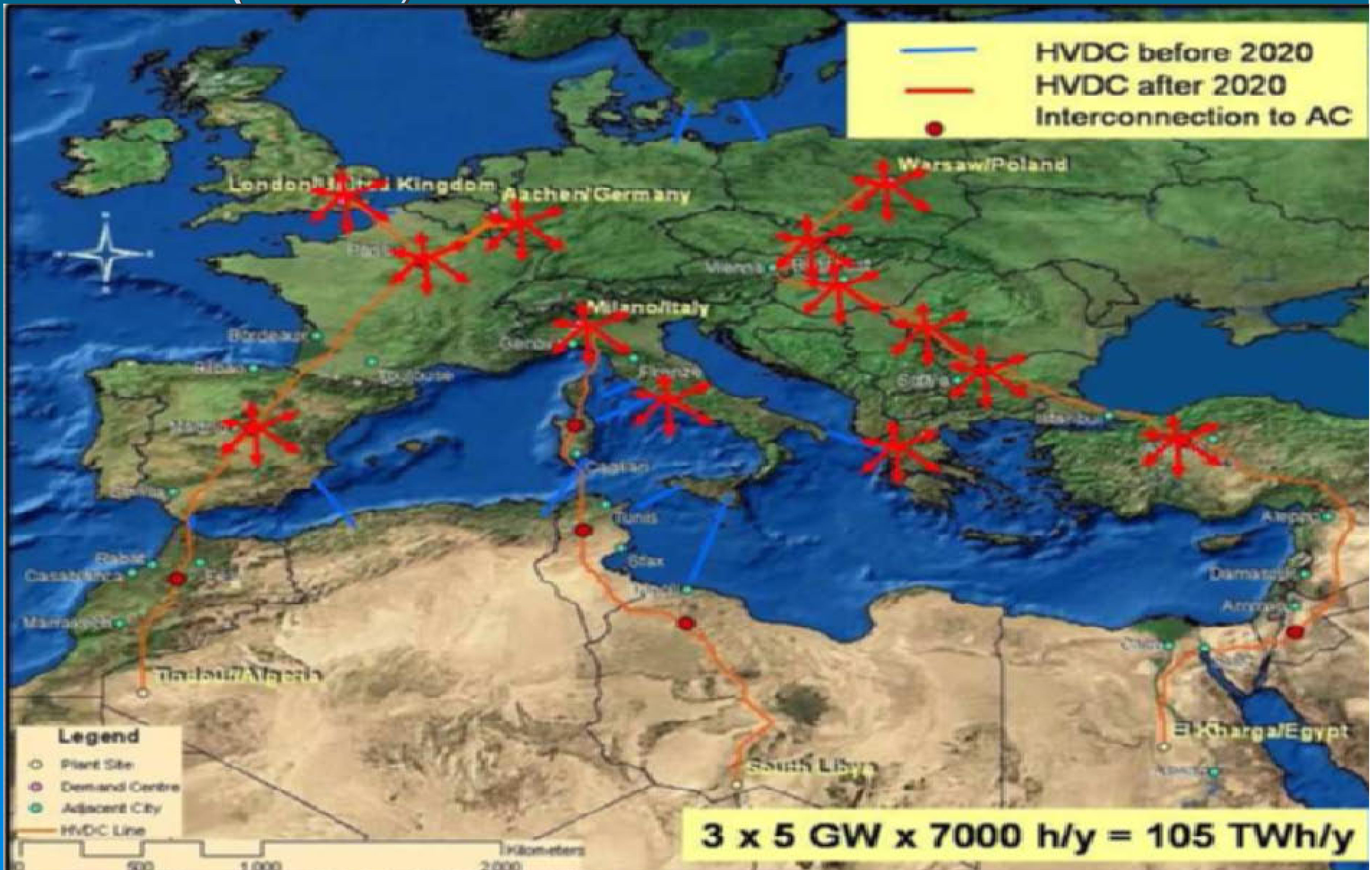
9.12. Mediterranean Renewable Energy Potential



Trans-Mediterranean **R**enewable **E**nergy **C**ooperation (**TREC**) is an initiative that campaigns for the transmission of clean power from deserts to Europe.

Since 2003 TREC has developed the **DESERTEC Concept**.

9.13. EU-MENA: existing & planned **H**igh **V**oltage **D**irect **C**urrent (HVDC) transmission lines before & after 2020



10. Energy Vision of Montpellier: Mediterranean Renewable Partnership

- Use Huge Renewable Energy Potential of MENA for Coping with Climate Change Impacts in the Mediterranean region
  - Southern Europe: Hydro, Wind, Biomass, Geothermal, Solar
  - Maghreb: Wind, Solar, biomass and city waste
- Relevance of Jean Monnet's Ideas for a Euro-Mediterranean renewable energy partnership for coping with environmental security challenges and exploiting technological opportunity
  - Preparing for the future: joint training of experts in North Africa by establishing EU funded joint research and training centres in the Maghreb and Mashreq (e.g. American universities in Cairo, Beirut).
  - Co-development and Sharing of energy technologies without nuclear proliferation and security risks.
  - Producing large scale solar thermal installations in the Sahara for domestic solar desalination, solar electricity (and in long-term future) solar hydrogen for export using expositing gas pipeline systems.

10.1. Monnet's Realist Visionary Thinking on the European Union

- Jean Monnet (1888-1979)
- **1950: proposed to French FM Robert Schuman a Franco-German coopera-tion on coal and steal**
- **1952-1954: first president of its high authority**
- **father of functional regio-nal economic (energy) co-operation in Europe lea-ding to European Union**
- **Major last peace project of 21st century.**

- Stern Report: cost of non-acting higher than costs of 2 world wars
- Apply Monnet's thinking to major security challenge of 21st century
- Transform the threat of CC to an opportunity for a lasting coopera-tion across the for Mediterranean
- Build a Mediterranean Union ba-sed on technologies that trans-form the threat posed by climate change into an opportunits by a
  - Climate change and renewable energy partnerhship of interested Mediterranean and European partne countries.

10.2. Nicolas Sarkozy‘s proposal for a Mediterranean Union

- **Nicolas Sarkozy** proposed a **Mediterranean Union (MU)** comprising Portugal, Spain, France, Italy, Greece, Cyprus, Malta, Turkey, Lebanon, Israel, Egypt, Libya, Tunisia, Algeria and Morocco).
- Areas of cooperation: sustainable development, **energy,** transport, water, culture, education, health, **security** and **immigration** and to fight inequalities.
- Create a Mediterranean Investment Bank to help develop the economies on the eastern and southern edge of the region.
- Mediterranean Union to work closely with EU.
- Need: for positive cooperation: „win-win-situations“.

10.3. From Vision to Realistic Projects

- Mediterranean is a common European concern & opportuntiy;
- MU membership **<u>should not be limited</u>** to Mediterranean but open to all European countries who are interested to cooperate and have something to offer economically, technologically
- Framework for few longer-term economic cooperative projects:
  - **Institution-building: Mediterranean Climate change partnership:** Research on regional climate change modelling and impact analyses
  - **GEC Research Centre in Cyprus or Malta**: Defining the challenge
  - **Renewable Energy Research Centre in Andalucia**
  - **Research Centre on Desertification and Migration in Almeria**
  - **Advanced European Technolgy Institute** in the Gulf of Aqaba (Egypt, Jordan, Palestine and israel: renewable desalination, desert agriculture
  - **Series of European Technical Universities in Maghreb & Mashreq** to develop the technologies in the region with experts from the region (information and technology sharing for coping with future challenges
  - Formation of **European-North African Industrial consortia** for development of solar thermal and photovoltaic concentrator technoloties.

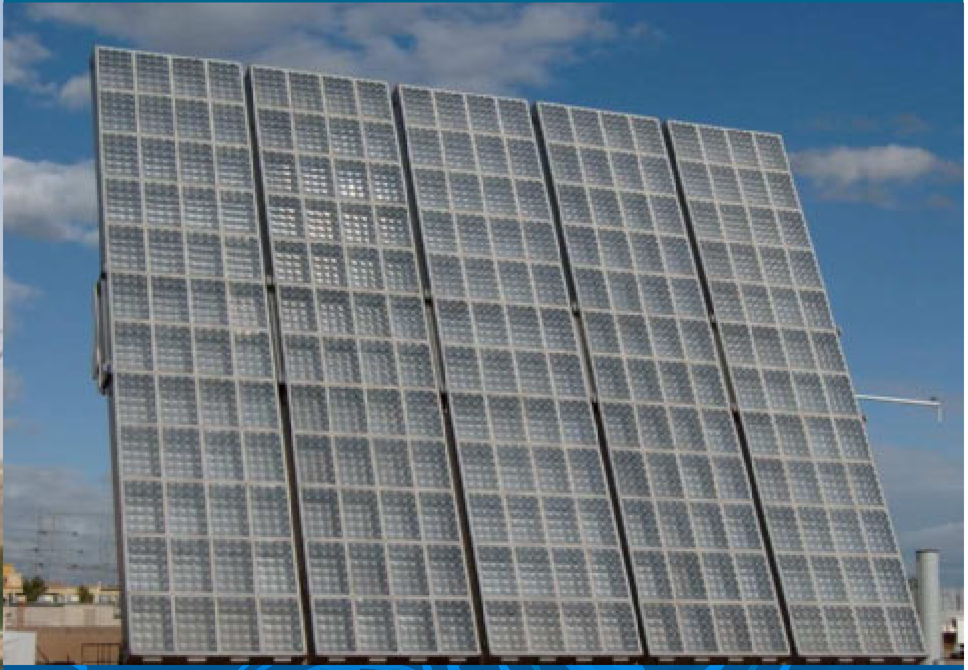
10.4. Solar Thermal Technologies for Electricity Generation in the Deserts

Concentrating Solar Power Technologies:

- alternatives: a) Fresnel concentrators, b) parabolic trough (400-600 ℃), c) solar tower concept with surrounding heliostat field (1200 ℃, up to 50 MW), d) solar dish (for small applications up to 50 kW).

10.5. Photovoltaic Concentrator Technologies in Israel and USA

A large pre-commercial CPV system under test in Phoenix, AZ, USA, consists of 5760 plastic fresnel lenses, which each focus sunlight onto one of a similar number of individual 1 cm x 1 cm silicon CPV cells.



CPV cell module exposed at 1000X at the 400 m2 *PETAL* solar dish test facility in Sede Boqer, Israel.

10.6. Need for Proactive Strategies

Developing the TechnoGarden by Technology Sharing and Codevelopment in the MENA region

- Centres of Excellence for Advanced Research, Technology Development and Training on Renewable Energy
  - Masreq:
    - Euro-Mediterranean Barcelona Process: project realization interregional: project funding
    - E.g. Egyptian-German Technical University in Cairo
  - Maghreb (Italy & Tunisia: MEDREP: Mediterranean Renewable Energy Programme (2004)

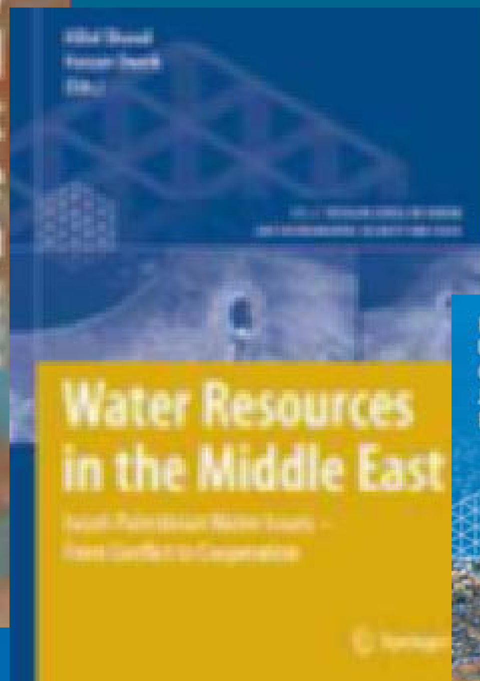
10.7. Climate & Renewable Energy Partnership: A Pillar for a Euro-Mediterranean Union

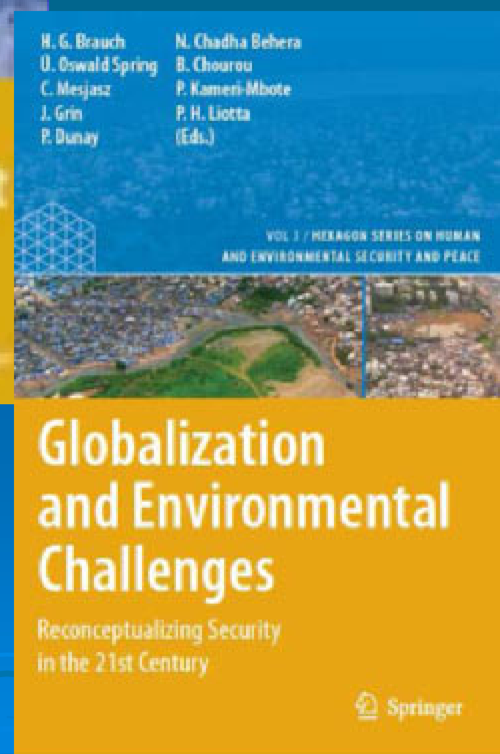
- Climate Change will severely affect the Mediterranean and its urban centres in the 21st century
- A proactive Euro-Mediterranean coping strategy is needed based on Monnet‘s functional cooperation
- Such a strategy requires major and longer-term resources.
  - Stage 1: Creating knowledge on the common threat
  - Stage 2: Develop scientific, technological and policy answers
  - Stage 3: Develop a policy framework for building up longer-term institutions: e.g. institutional pillars of a Euro-Mediterranean Union
  - Stage 4: Develop consortia for joint technology development (e.g. model of Euro-Soviet gas pipeline deal of 1980s: gas for pipelines)
  - Stage 5: Economic co-development in the Mediterranean requires addressing causes of economic, societal, environmental & human insecurity
  - Stage 6: Proactive Strategy as part of a functional peace project of the 21st century in the framework of a Euro-Mediterranean Union.

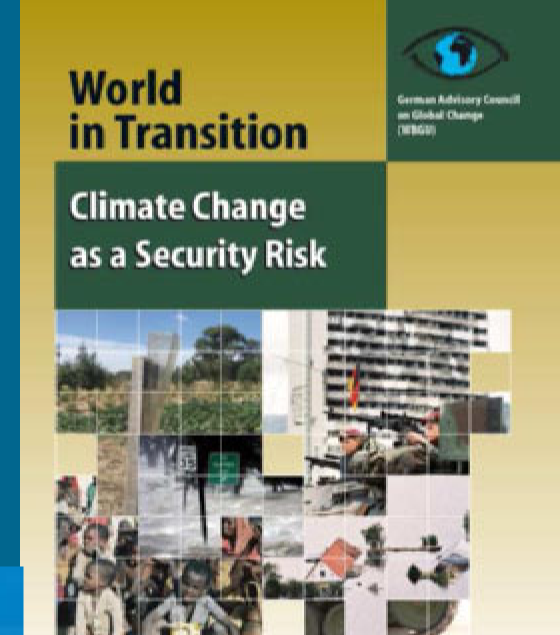
Moving from the Euro-Mediterranean Partnership Towards A Euro-Mediterranean Union:

An Enlightening Policy Vision Whose Time Has Come

11. Bibliographic References







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