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The Need for Renewable Energy Policy

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The mission of GWEC

GWEC' s mission is to ensure that wind power establishes itself as one of the world's leading energy sources, providing substantial environmental and economic benefits. The main objective is to promote the development and growth of wind energy around the world through:

Policy development

To participate in policy and regulatory forums that can assist the creation of frameworks for wind power development.

Business leadership

To provide the strategic and business leadership needed to engage external stakeholders.

Global outreach

To work with emerging markets to transfer know-how and strengthen the development of wind energy worldwide.

Information and education

To serve as a platform for providing quality information, expertise, analysis and data about wind energy.

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The Members of GWEC

GWEC represents a broad sectorial and geographical cross section of the Global wind energy community.

Members are the leading national and continental associations representing the different continents, plus the major turbine and components manufacturers, developers and energy companies.

The members of GWEC operate in over fifty countries and represent:

- **Over 1500 companies, organisations and institutions**
- **99% of the world's 58.000 MW installed wind power capacity**

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American Wind Energy Association

Australian Wind Energy Association

Canadian Wind Energy Association

Chinese Renewable Energy Industries Association

European Wind Energy Association

Indian Wind Turbine Manufacturers Association

Japanese Wind Energy Association

Japanese Wind Power Association

GWEC - Uniting the global wind industry and its representative associations

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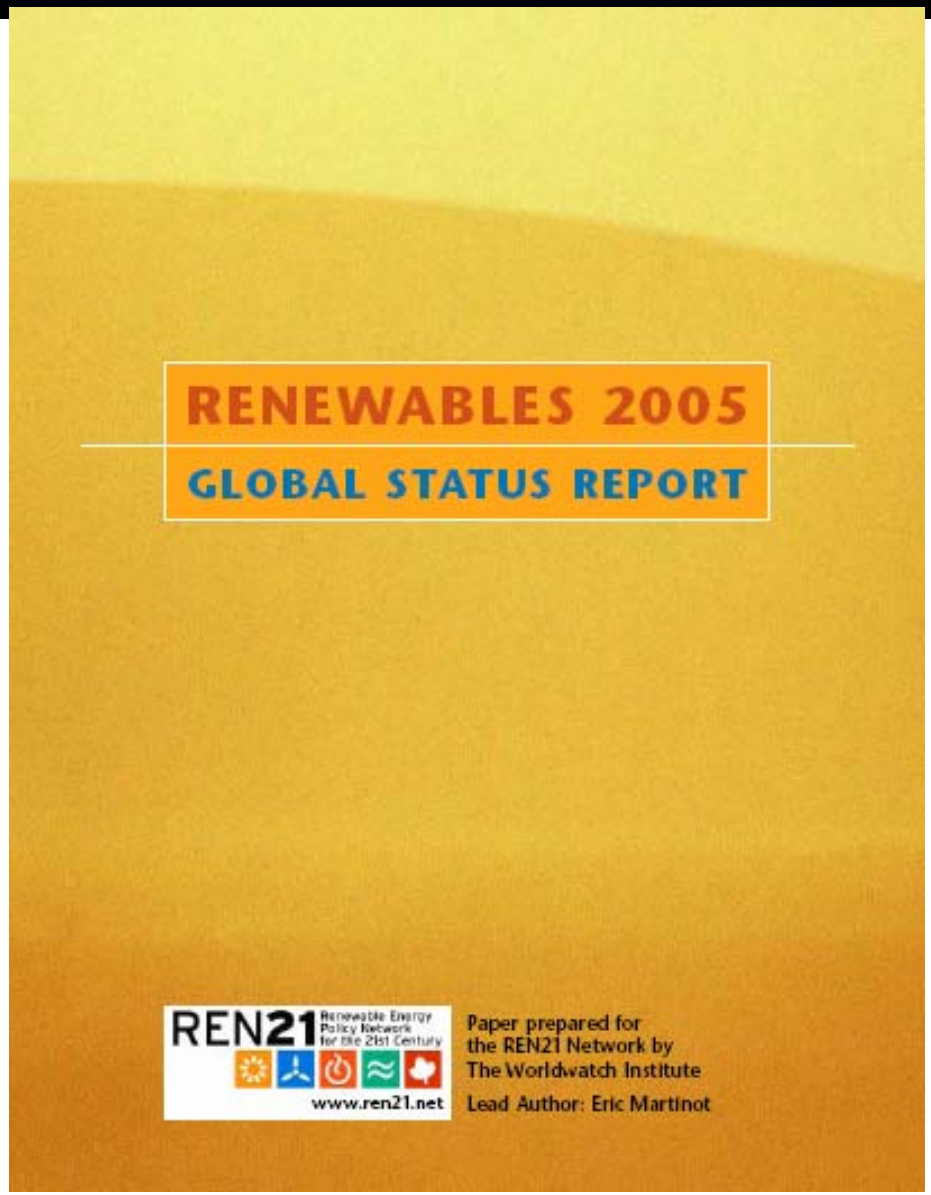
REN21 GLOBAL STATUS REPORT



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Renewable Energies in 2005

- About $30 billion was invested in new renewable energies worldwide in 2004, $20–25 billion in large hydropower and $150 billion in conventional power.
- Renewable power capacity totals 160 gigawatts (GW) worldwide (excluding large hydropower), about 4 percent of global power sector capacity. Developing countries have 44 percent of this capacity, or 70 GW.
- Renewable energy generated as much electric power worldwide in 2004 as one-fifth of the world's nuclear power plants, not counting large hydropower (which itself was 16 percent of the world's electricity).
- The fastest growing energy technology in the world is grid-connected solar photovoltaic (PV), which grew in existing capacity by 60 percent *per year* from 2000–2004, to cover more than 400,000 rooftops in Japan, Germany, and the United States.
- Second is wind power capacity, which grew by 28 percent per year, led by Germany, with almost 17 GW installed as of 2004.
- Rooftop solar collectors provide hot water to nearly 40 million households worldwide, most of these in China, and more than 2 million geothermal heat pumps are used in 30 countries for building heating and cooling.

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Renewable Energies in 2005

- Production of biofuels (ethanol and biodiesel) exceeded 33 billion liters in 2004 (about 3% of global gasoline consumption). Ethanol provided 44 percent of all (nondiesel) motor vehicle fuel consumed in Brazil and was being blended with 30% of all gasoline sold in the United States.
- There were more than 4.5 million green power consumers in Europe, the United States, Canada, Australia, and Japan, purchasing power voluntarily at the retail level or via certificates.
- Direct jobs worldwide from renewable energy manufacturing, operations, and maintenance exceeded 1.7 million in 2004, including some 0.9 million for biofuels production.
- Renewable energy, provides electric power, heat, motive power, and water pumping for tens of millions of people in rural areas of developing countries, Sixteen million households cook and light their homes with biogas, and two million households use solar lighting systems.
- At least 48 countries worldwide now have some type of renewable energy promotion policy, including 14 developing countries. Policy targets for renewable energy exist in at least 45 countries worldwide, including 10 developing countries.

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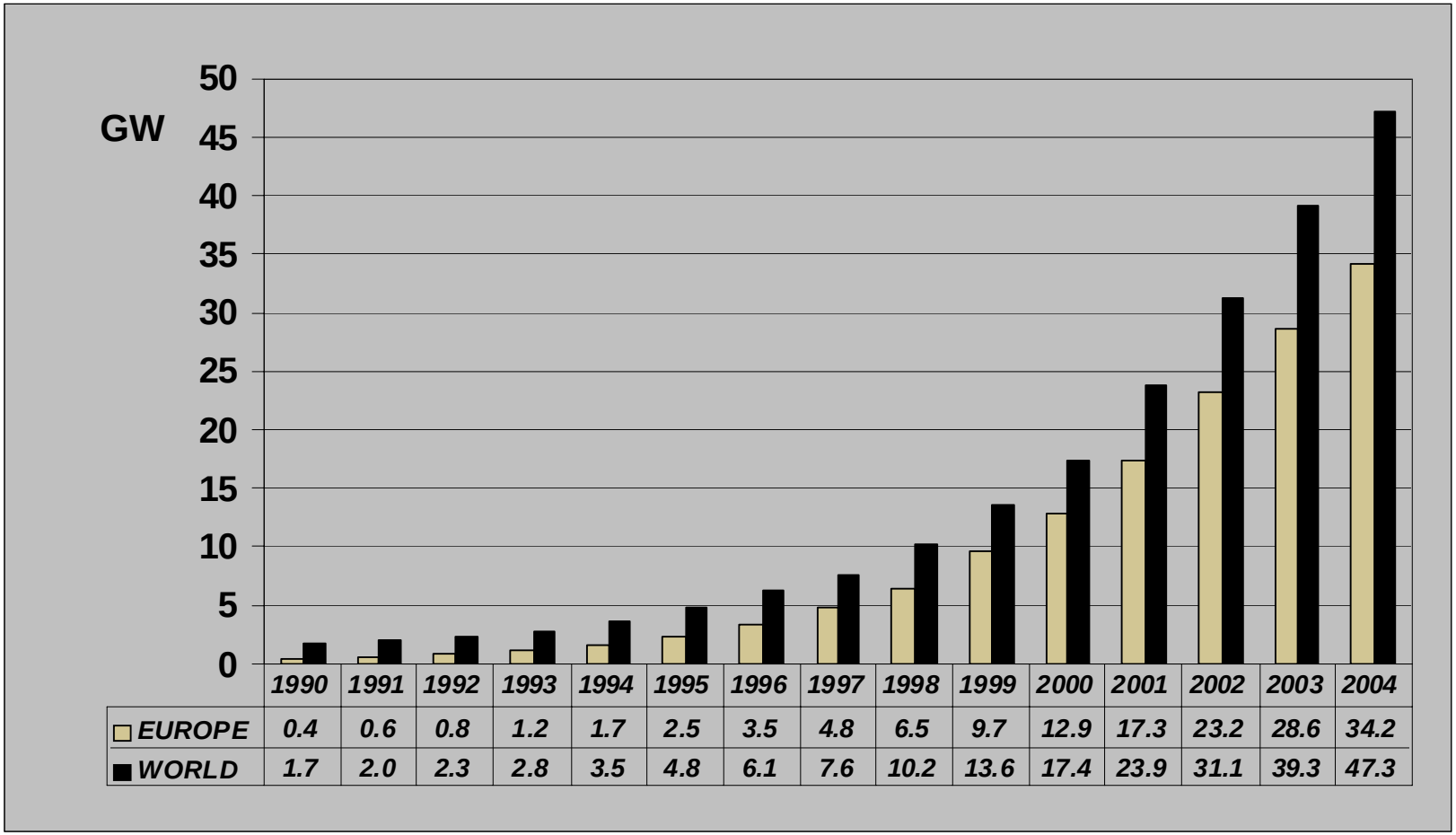
Market Development in Wind and PV

Cumulative Wind Energy Installed Capacity



	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
EUROPE	0.4	0.6	0.8	1.2	1.7	2.5	3.5	4.8	6.5	9.7	12.9	17.3	23.2	28.6	34.2
WORLD	1.7	2.0	2.3	2.8	3.5	4.8	6.1	7.6	10.2	13.6	17.4	23.9	31.1	39.3	47.3

Growth rates 1994-1999 : 31.2%
1999-2004 : 28.3%

Source: EWEA, GWEC

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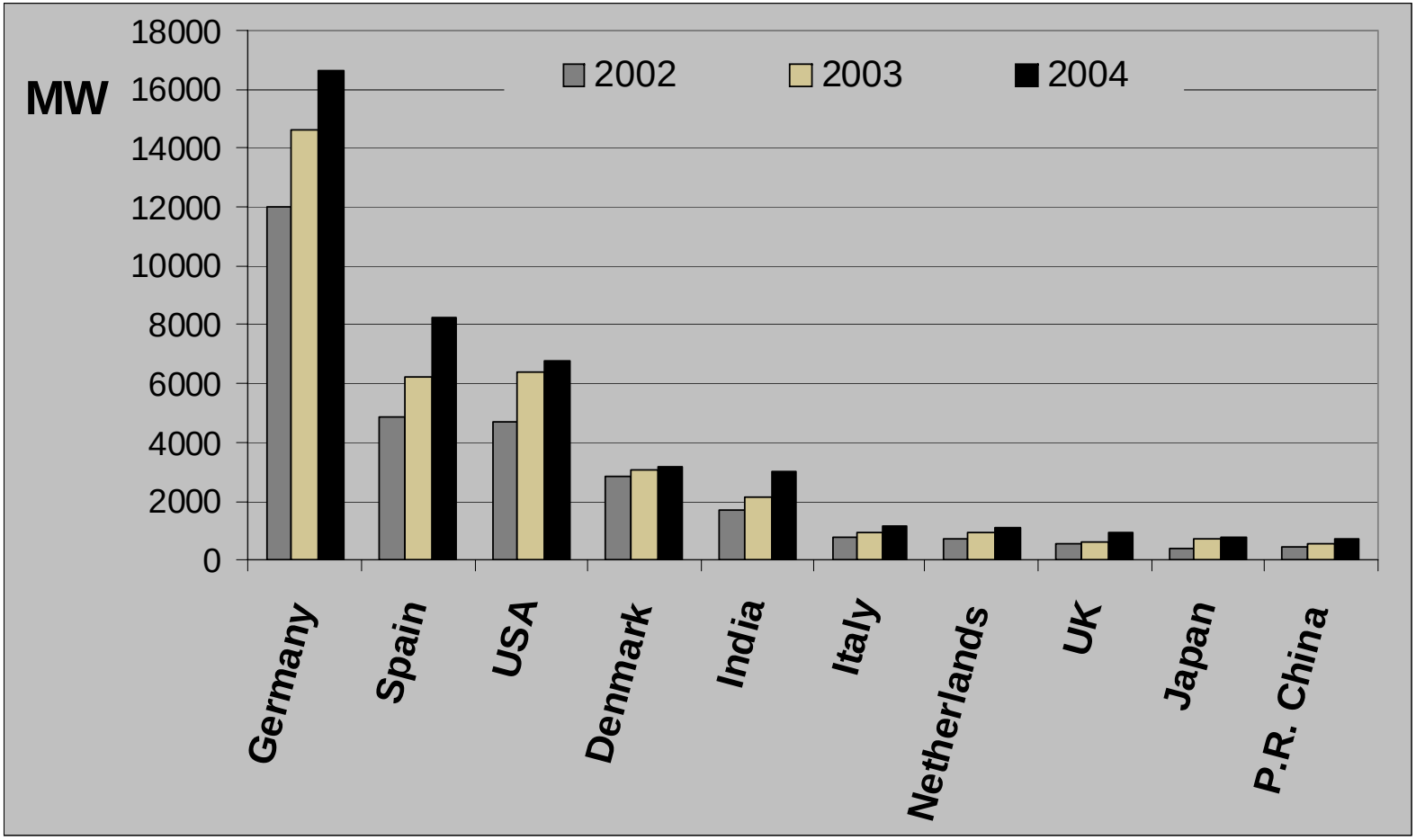
The Top-10 Wind Markets in the World



Source: EWEA, GWEC

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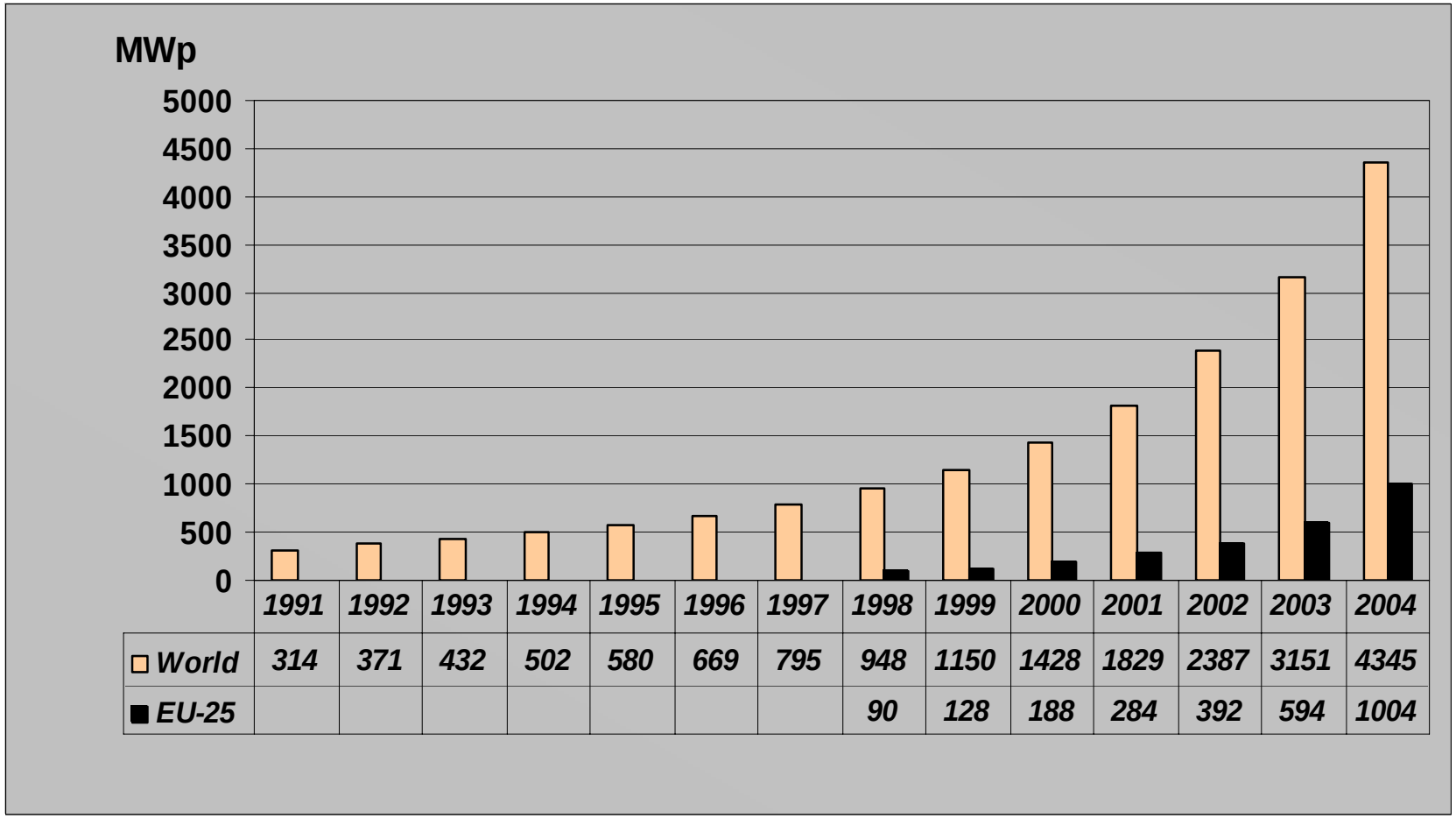
Cumulative Photovoltaic Installed Capacity (MWp)



	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004
World	314	371	432	502	580	669	795	948	1150	1428	1829	2387	3151	4345
EU-25								90	128	188	284	392	594	1004

Growth rates
1994-1999 : 18.0%
1999-2004 : 30.5%

Source: Eurec Agency, EPIA, Observ'ER

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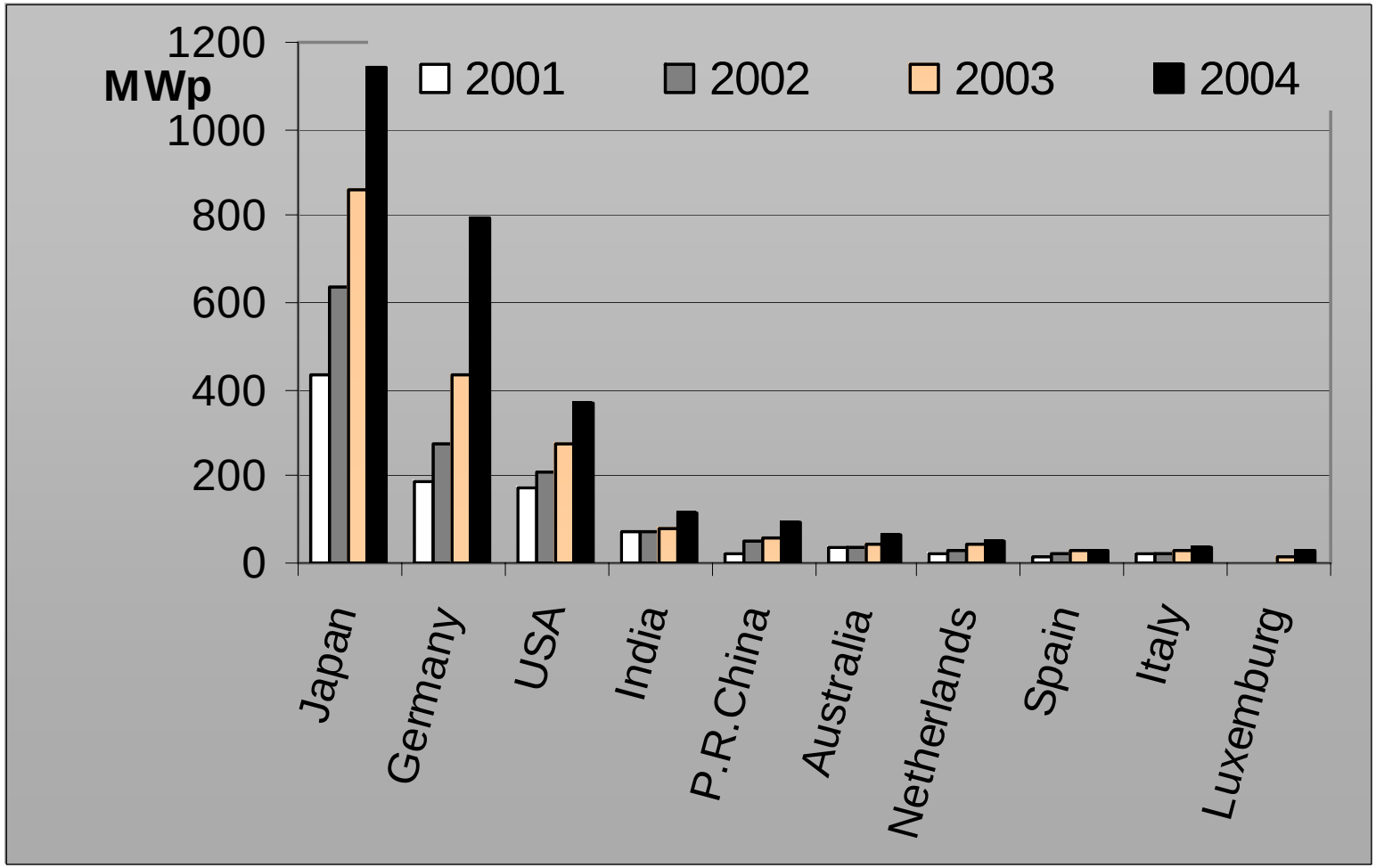
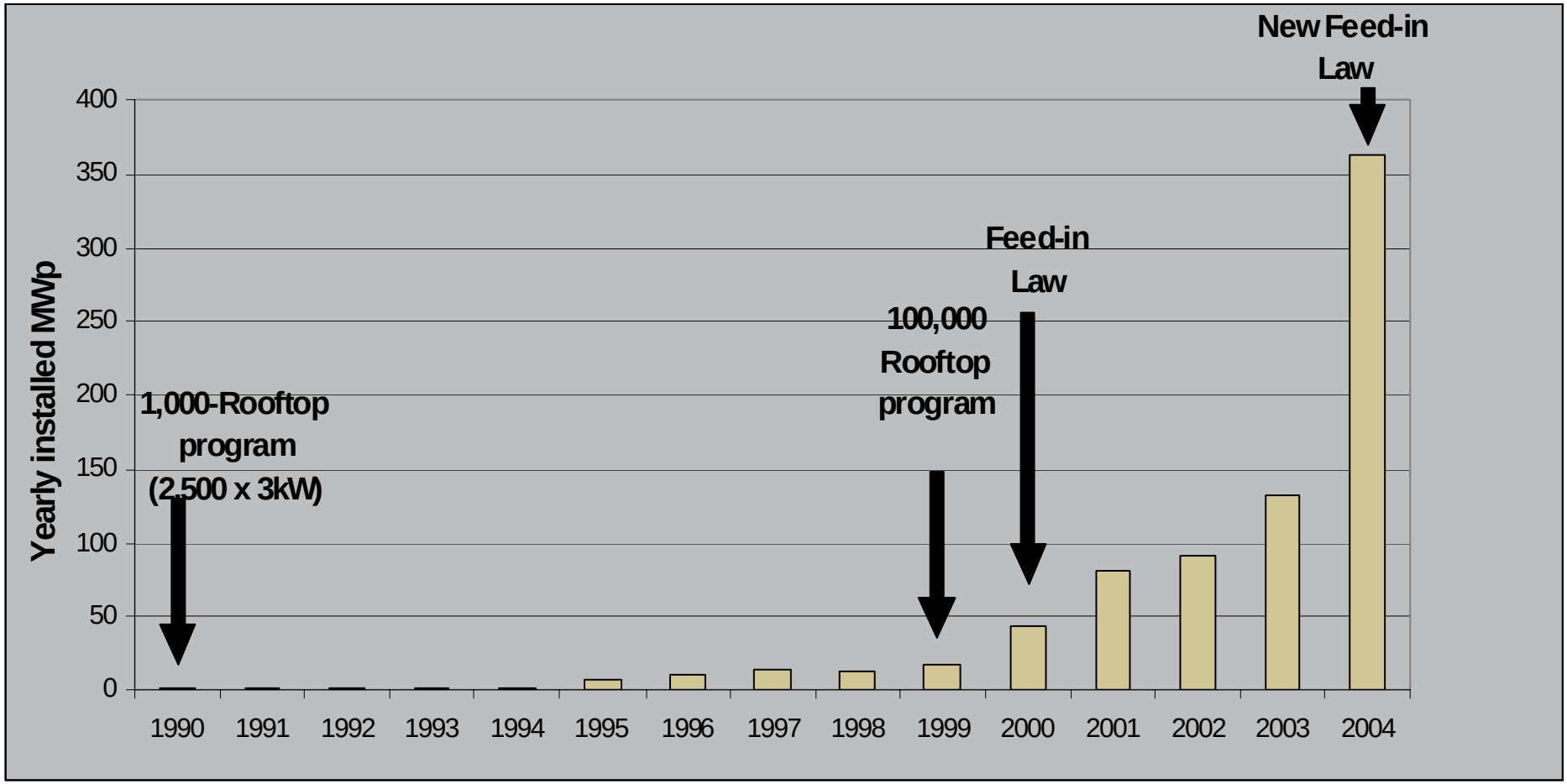
The Top-10 PV Markets in the World



Source: EPIA, Observ'ER, IEA-PVPS

100,000 Rooftop program/ Feed-in Law (EEG) in Germany



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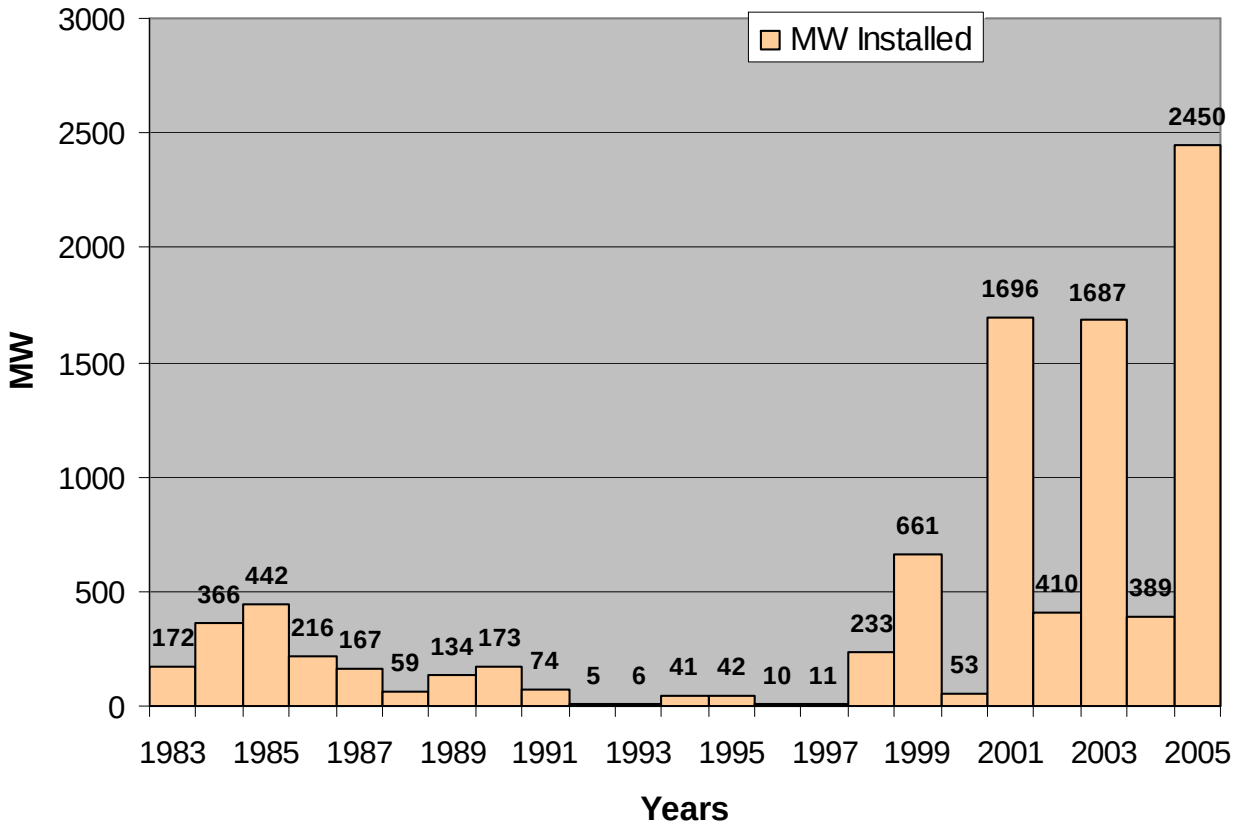
U.S. Annual Wind Capacity Additions



Inconsistent Policy Yields an “Up and Down” Market

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Policies to Facilitate the Large Scale Development of Renewable Energy

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The driving forces for a renewable energy policy

- **Security of supply** - independence from energy import
- **Protection of environment** –including the necessity to reduce greenhouse gas emissions
- **Regional and local development**
- **Industrial development** -new innovative business sector
- **Employment**
- **Insurance Against Fuel Price Risk**

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Environment Driven Markets (Mainly OECD Countries)

Market characteristics:

- ✓ **No need for immediate additional capacity**
- ✓ **Financially able to invest**
- ✓ **Political interest and obligation to reduce CO2 emissions**
- ✓ **Wind energy development is <u>not very sensitive</u> to variations in international fuel prices**

Energy Driven Markets (Mainly Africa, Asia and Latin America)

Market characteristics:

- ✓ Immediate need for additional energy - especially electricity
- ✓ Capacity shortfall
- ✓ Dependence on fossil fuel imports
- ✓ Shortage of foreign currency
- ✓ Higher average increase in population, economic growth and energy consumption than OECD countries
- ✓ Very sensitive for variations in international fuel prices

Main policy issue: Create a level playing field

Energy prices do not reflect the true social costs of generation - a market failure:

- **The social and environmental costs of polluting energy are not internalised**
- **There are still massive subsidies to 'conventional' energy sources**

To achieve the benefits of Renewable Energy, support frameworks should be established

- **They should be viewed as compensation mechanisms for correcting these market failures.**

Renewable Energy would not need special provisions if markets were not distorted by the fact that it is still virtually free for energy producers to pollute.

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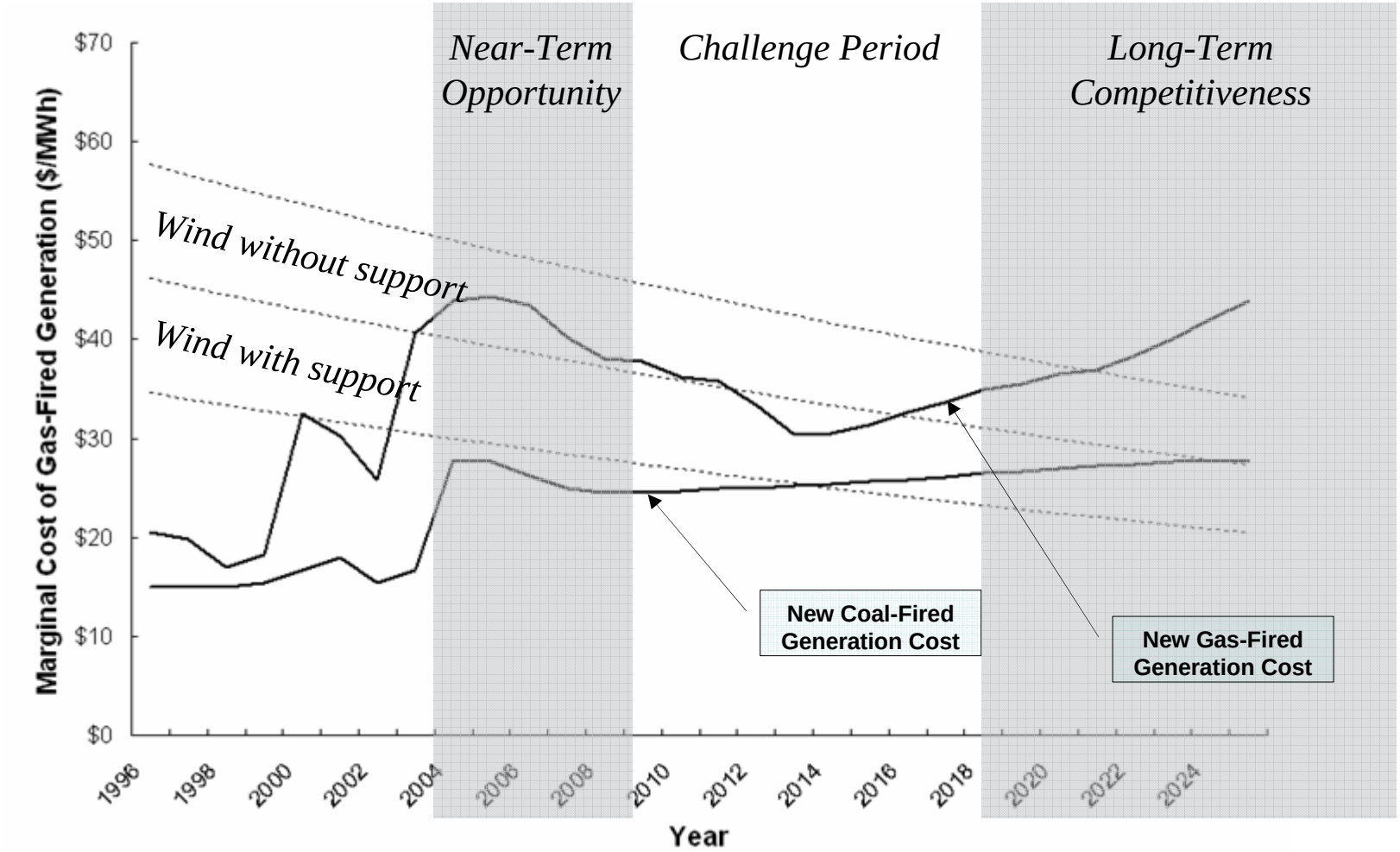
Wind: Competitive Posture



Source: Platts Analytics

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National Policy Measures

Establish a successful framework for the development of renewable energy

Successful frameworks for the development and deployment of renewable energy must include the appropriate measures in each of these four vital areas:

- Well designed payment mechanism
- Grid access and strategic development of the grids
- Good governance and appropriate administrative procedures
- Public acceptance and support

If one or more of these key components are missing, little progress will happen.

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National Policy Measures

Establish legally binding targets for renewable energy

National targets for the share of renewable energy are vital for maintaining and further stimulate investor confidence.

In recent years an increasing number of countries have established targets for renewable energy, as part of their greenhouse gas reduction policies. These are either expressed as specific amounts of installed capacity or as a percentage of energy consumption.

The most ambitious target has been set by the European Union - 21% of EU electricity consumption by 2010.

Setting targets serve as a very important catalyst for governments to take action and develop the necessary regulatory frameworks to expand renewables such as financial frameworks, grid access regulation, planning and administrative procedures. However, targets have little value if they are not accompanied by policies which compensate for historical and present distortions in electricity markets, eliminate market barriers and create an environment which attracts investment capital.

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National Policy Measures

Establish incentive mechanisms which provide defined and stable returns for investors

- The price for renewable power must allow for risk return profiles that are competitive with other investment options.
- The duration of a project must allow investors to recoup their investment.

Available options:

- Capital Grants
- Price-based Mechanisms
  - feed-in price
  - fixed premium
- Quantity-based Mechanisms
  - quotas with tendering
  - quotas with trading- green certificates

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National Policy Measures

The Reforms Needed to Address Market Barriers to Renewable Energy:

- Streamlined and uniform planning procedures and permitting systems and integrated least cost network planning;
- Fair access to the grid at fair, transparent prices and removal of discriminatory access and transmission tariffs;
- Fair and transparent pricing for power throughout a network, with recognition and remuneration for the benefits of embedded generation;
- Unbundling of utilities into separate generation and distribution companies;
- The costs of grid infrastructure development and reinforcement must be carried by the grid management authority rather than individual renewable energy projects;

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Policy Measures – International Level

- **Establishment of legally binding RES targets**
- **Implementation of the Kyoto Protocol and post 2012 reductions framework**
- **More emphasis on renewable projects in development policy**
- **Implementation of key G8 task force recommendations**
- **Support from International Financial Institutions, Export Credit Agencies and Multi-lateral Development Banks**
  - ✓ **A defined and increasing percentage of overall energy sector lending directed to RES projects**
  - ✓ **A rapid phase out of support for conventional, polluting energy projects**

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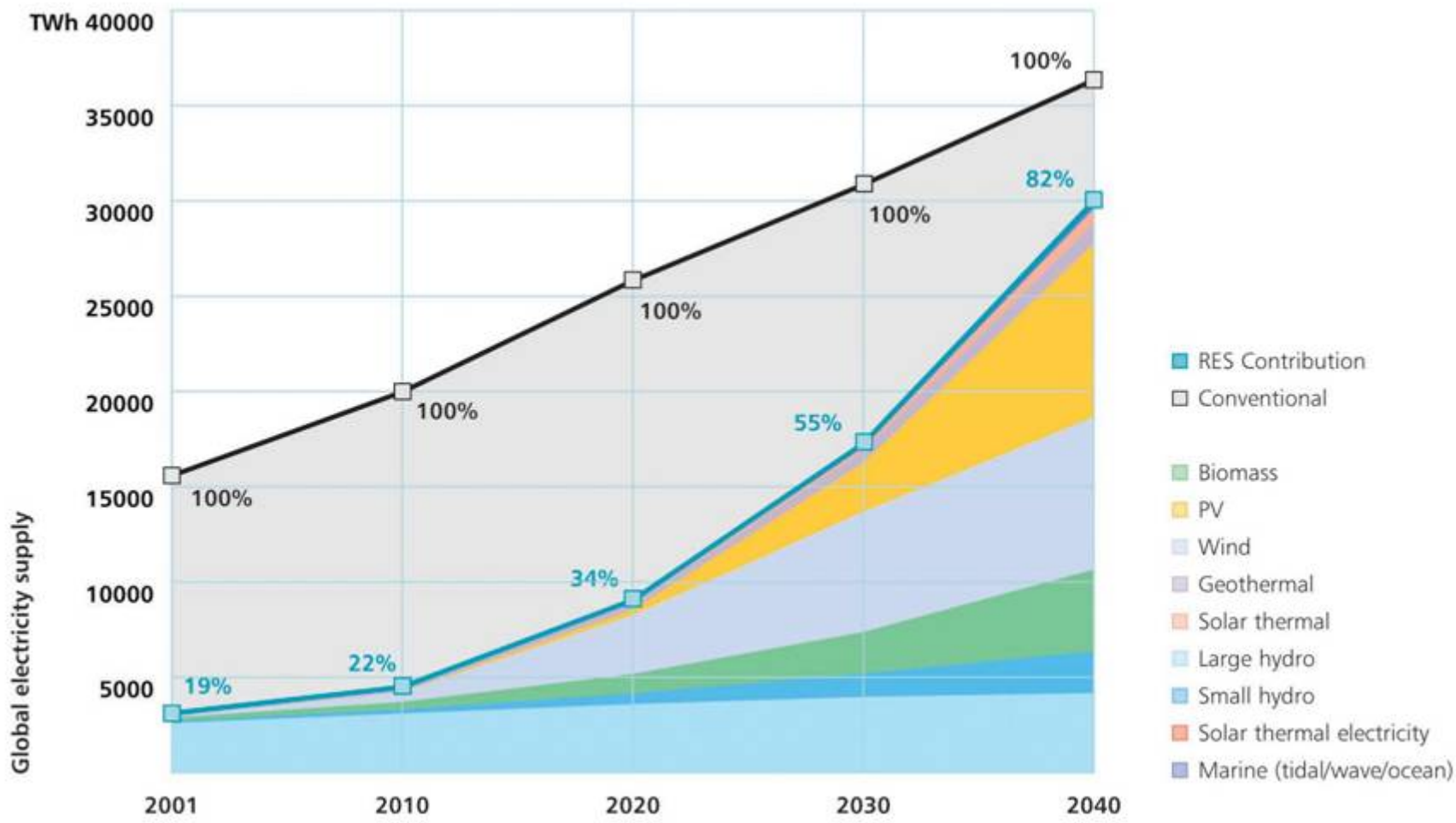
EREC - Advanced Policies Scenario for Electricity



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Market Development-Policy Link

RE has the technological potential to become a mainstream energy source.

RE is integral part of the energy supply in many countries today.

RE has tangible economic, ecological and social benefits.

BUT: RE market development depends on a coherent, predictable, supportive political & legal framework.


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"WHAT NATURE DELIVERS TO US IS NEVER STALE.
BECAUSE WHAT NATURE CREATES HAS ETERNITY IN IT."