# Wind Power

## *Emerging Market Opportunities*


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Global Wind Energy Council


Financing for Climate:
*Innovative Solutions and New Markets*

Rüschlikon Sept 11 2008

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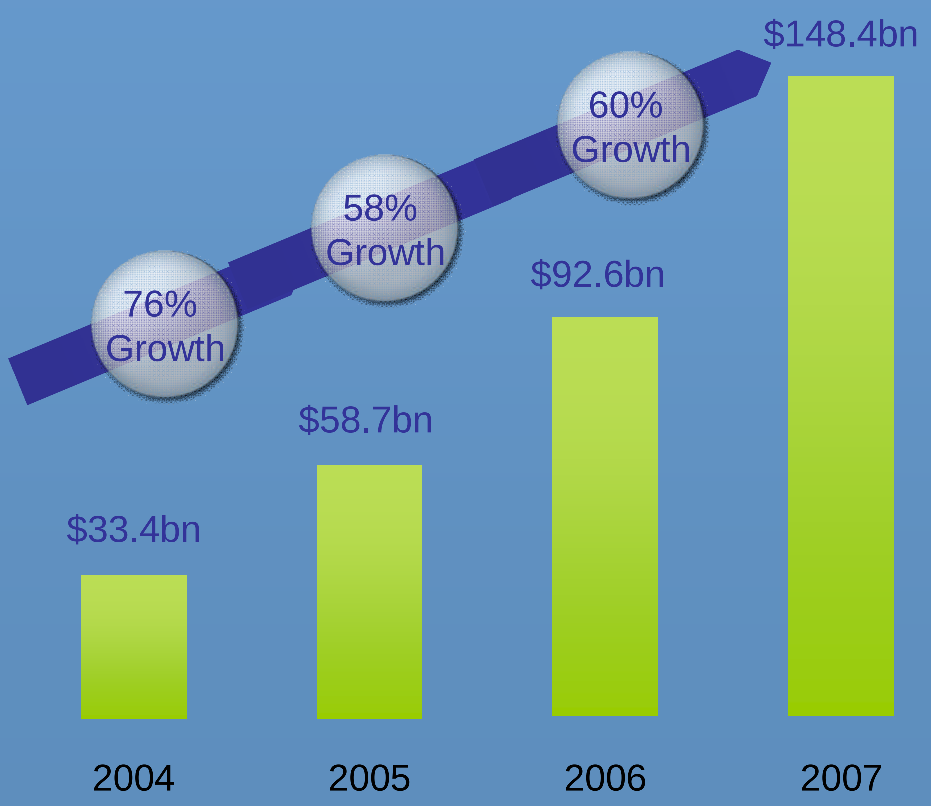
# Total Global New Investment in Clean Energy 2004 – 2007




**1%** of global fixed asset investment

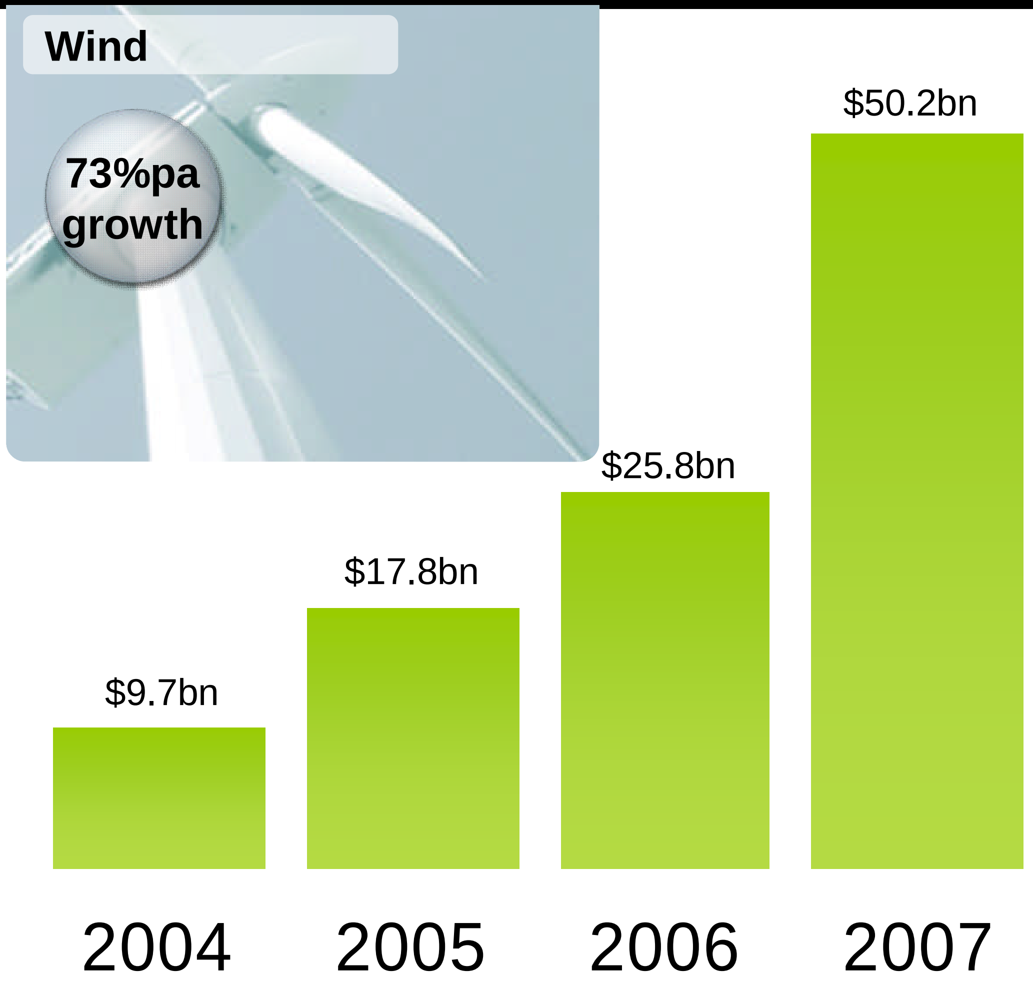
**19%** of global energy industry infrastructure investment

**250%** of commercial aircraft investment

Adjusted for reinvestment. Geared re-investment assumes a 1 year lag between VC/PE/Public Markets funds raised and re-investment in projects.

Source: New Energy Finance, IMF WEO Database, IEA WEO 2007, Boeing 2006 Annual Report

# New Investment in Wind, 2004 - 2007

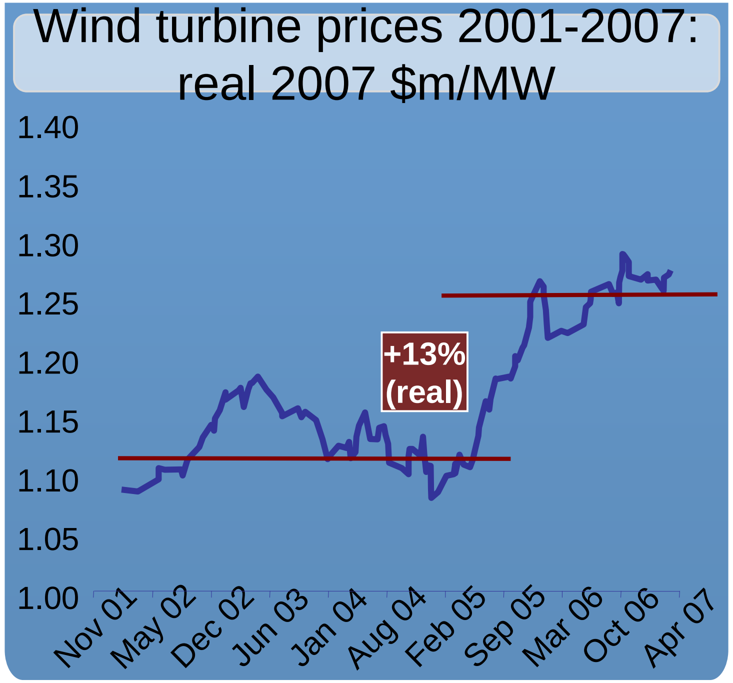



2007 equipment installed:

ca. € 25 bn (US$ 38 bn)

2007 employment:

ca. 450,000




VC/PE, Public Markets and Asset Finance only. Excludes re-investment adjustment

Source: New Energy Finance

# Global Cumulative Installed Capacity 1996-2007

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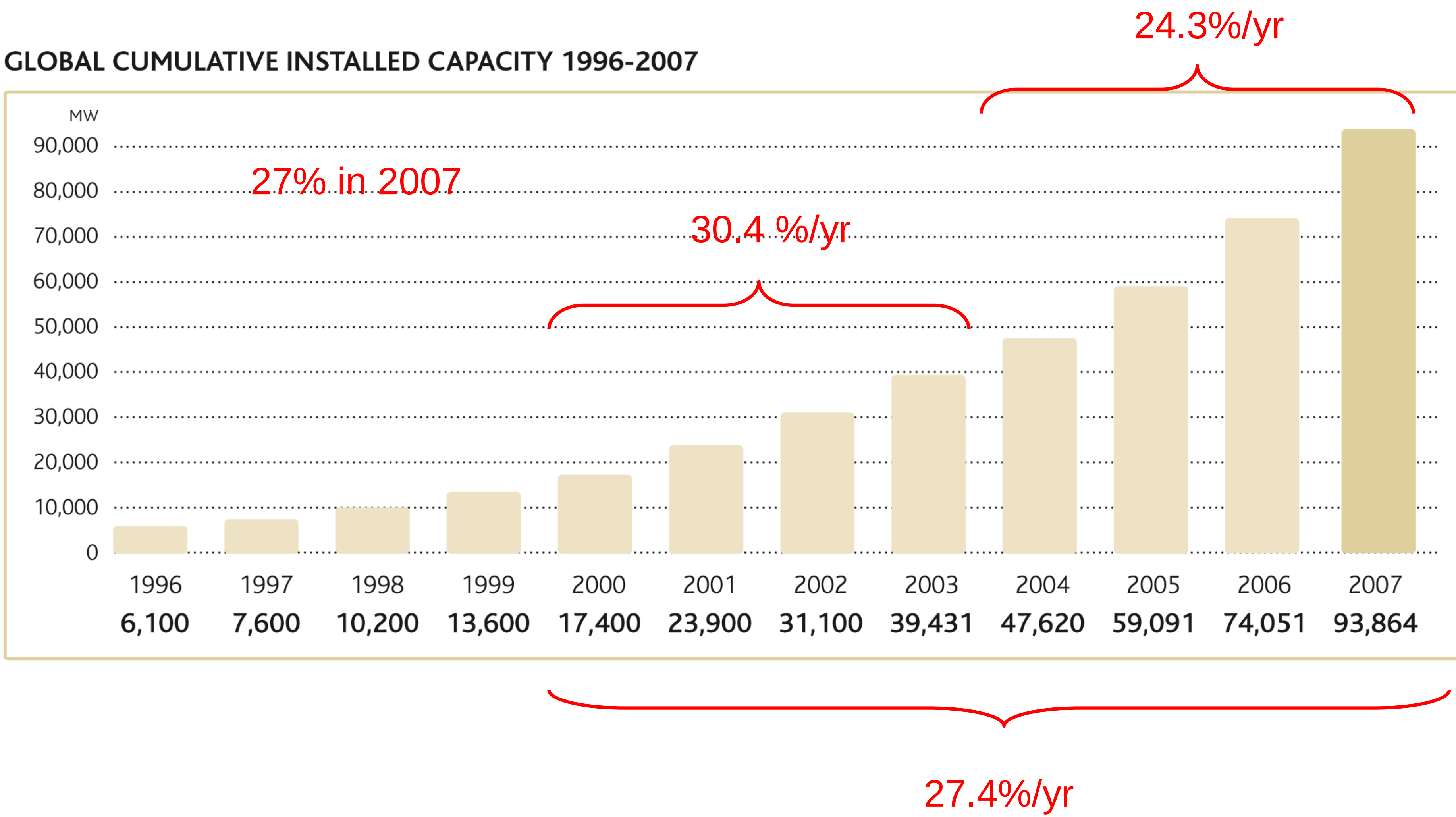
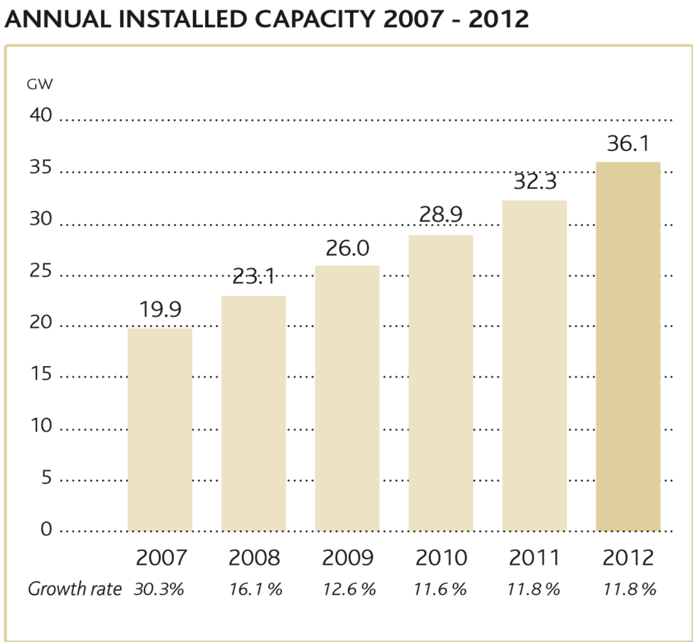
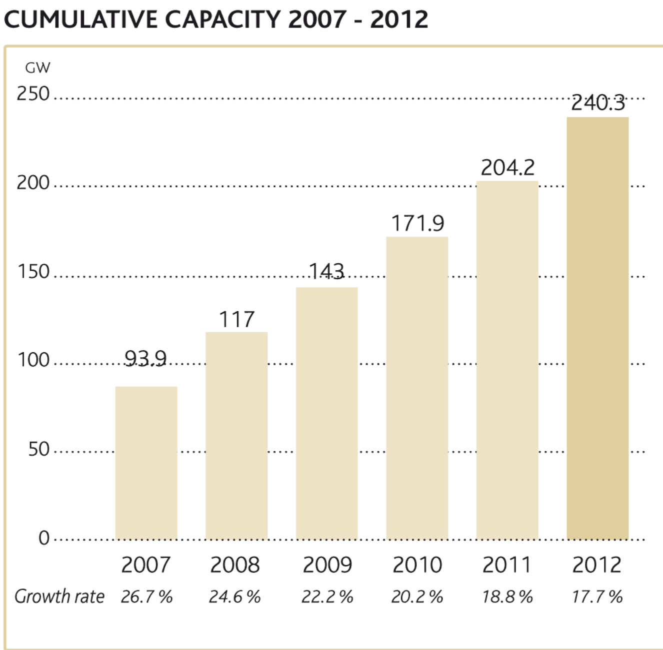


# Market Development 2008-2012



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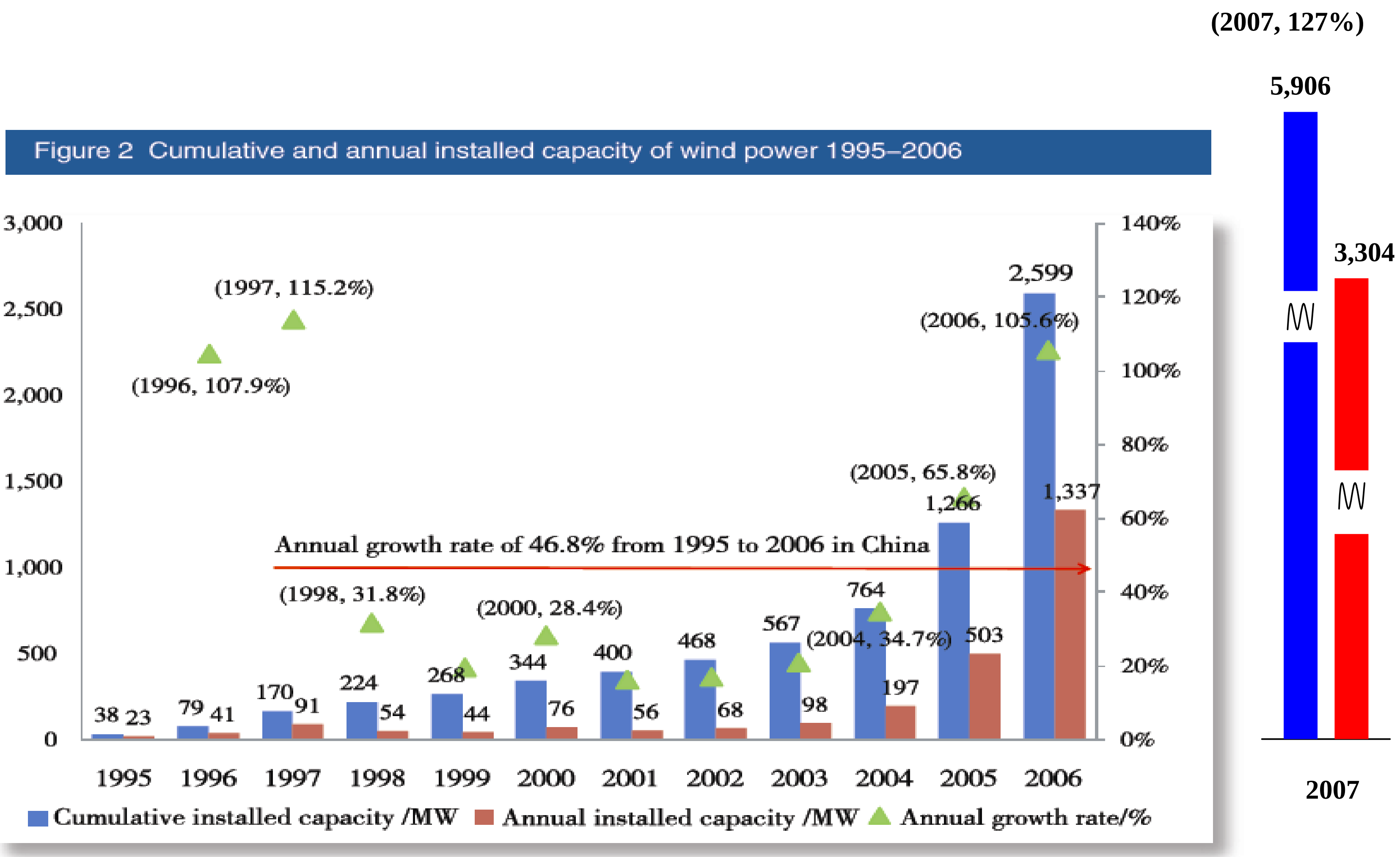
# Investment hotspots

Major short term investment hotspots:

1. China
2. India
3. Turkey
4. Morocco

Others to watch: Egypt, South Africa, Brazil, Mexico, Chile, Malaysia, Philippines, Thailand, Korea, Ukraine, Bulgaria, Romania

# China: Growth of Installed Capacity




***Source: "China Wind Power Report, 2007"***

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# Projections (Oct 2007)

**Table 7 Projection of wind power development in China**

| Year | Development Scenario (Low) | | | Development Scenario (Mid) | | | Development Scenario (High) | | | Global Annual Growth estimated byGWEC /% |
|---|---|---|---|---|---|---|---|---|---|---|
| | Installed Capacity /GW | Yearly Average Newly Installed /GW | Yearly Average Growth Rate /% | Installed Capacity /GW | Yearly Average Newly Installed /GW | Yearly Average Growth Rate /% | Installed Capacity /GW | Yearly Average Newly Installed /GW | Yearly Average Growth Rate /% | |
| 2006 | 2.6 | | | 2.6 | | | 2.6 | | | |
| 2010 | 8 | 1.35 | 32.4 | 10 | 1.85 | 40.0 | 13.16 | 2.64 | 55.0 | 18.0 |
| 2015 | 20 | 2.4 | 20.1 | 30 | 4 | 24.6 | 48.87 | 7.14 | 30.0 | 18.0 |
| 2020 | 40 | 6.4 | 14.9 | 70 | 8 | 18.5 | 122.12 | 14.65 | 20.1 | 14.0 |
| 2030 | 120 | 8 | 11.6 | 180 | 11 | 9.9 | 268.56 | 14.65 | 8.2 | 7.0 |
| 2040 | 250 | 13 | 7.6 | 300 | 12 | 5.2 | 429.20 | 16.06 | 4.8 | 2.0 |
| 2050 | 400 | 15 | 4.8 | 450 | 15 | 4.1 | 611.30 | 18.21 | 3.6 | 0.5 |

***Source: "China Wind Power Report, 2007"***

***http://www.gwec.net/index.php?id=80***

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# Turkey

<u>Stats</u>:

End 2007:146 MW

As of June 2008 ~250MW

Short term pipeline ~1500 MW

78,000 MW *current* applications

Government ‘goals’: 11GW by 2013, 15GW by 2015, 20GW by 2020

<u>Drivers:</u>

Excellent wind resources

demand growth ~8% per year

import dependency 50% of electricity from (mostly) Russian gas

EU Policy alignment/Kyoto ratification (June 2008)

attractive feed-in tariff 5-5.5 Euro cents/kwh

opportunities in balancing/spot markets and private PPAs can be very profitable;

wholesale trading market expected to be fully ‘open for business’ in t he next couple of years

<u>Obstacles:</u>

Grid capacity

# Morocco

| | |
|---|---|
| Stats: | End 2007:124 MW |
| | Current capacity: ~ 190 MW |
| | In construction: 200 MW |
| | Short term pipeline: 1300 MW |
| | Government 'goals': 1000 MW by 2012 |
| | >10,000 MW potential |
| Drivers: | Excellent wind resources |
| | demand growth 8-9% per year |
| | EU manufacturing and export opportunities |
| | Strong regional interconnection |
| | Increasingly good investment climate, stable currency |
| | ONE aggressively pursuing wind strategy, wants to organise CDM and/or EU certificates market |
| Obstacles: | Low tariffs |
| | Grid capacity |

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# Conclusions

- Investment opportunities continue to expand rapidly, however…

- Major obstacles remain in many countries, primarily having to do with:
  - Entrenched, subsidised monopolies
  - Ignorance and/or deliberate disinformation about RE in general, and wind in particular
  - Lack of grid investment

- Post 2012 Carbon market architecture will be important, but ultimately national energy policy is and will be decisive

# Thank you

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


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