

Nuclear Power & Climate change

New perspective of nuclear power and its risks:

- Climate change
- Security of supply
- Growing energy needs

Obvious need to re-evaluate former perception in the light of new threats.

Nuclear PR says that nuclear power is part of the solution.



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To avoid catastrophic impacts, we need to:

- Peak global GHG emissions by 2015
- 20 % drop of global GHG emissions by 2030
- 50 % drop of global GHG emissions by 2050

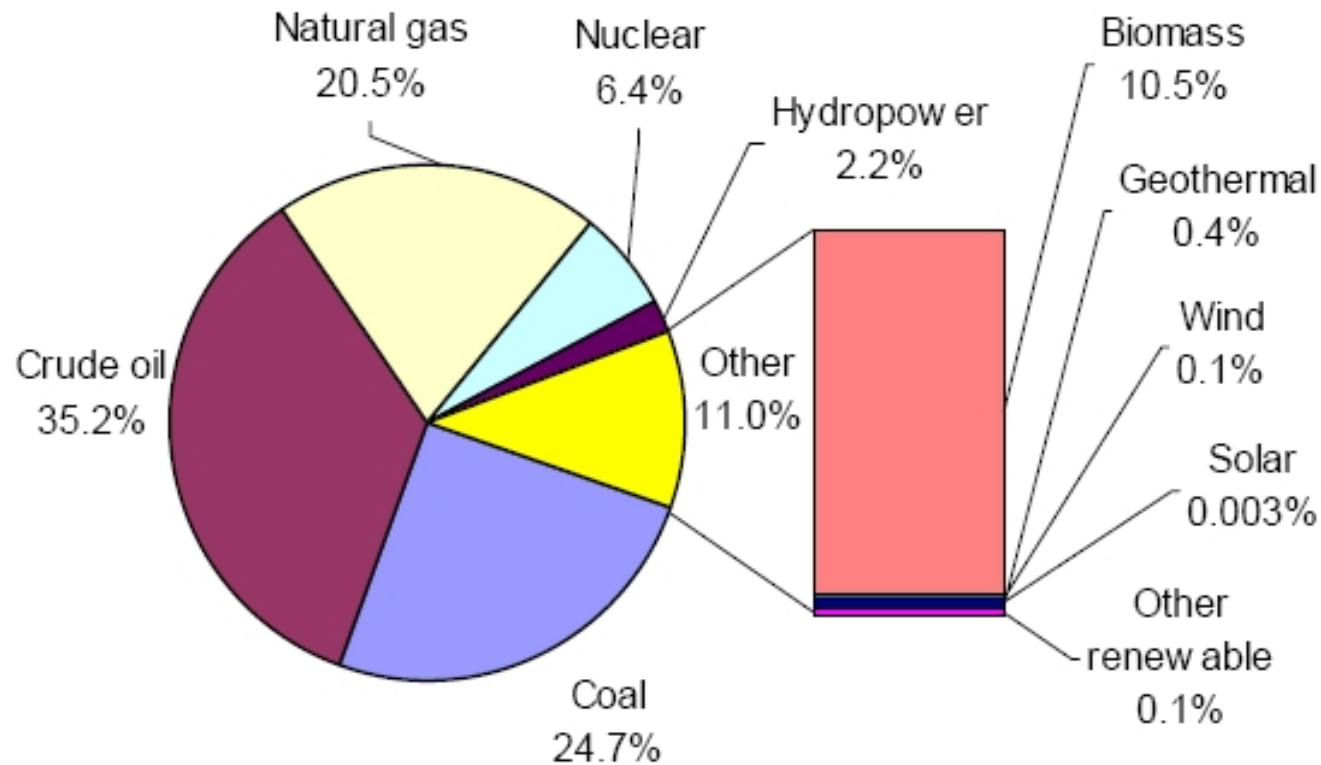


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Figure 6. Global primary energy mix in 2004



Source: IEA, 2006.

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Hypothetical scenario:

What would it take to double nuclear share in the global energy mix?

Double 439 reactors with 372,000 MWe installed capacity by 2030 would require building more than 500,000 MWe of new reactors, because many existing plants will be closed.

The share of nuclear would not exceed 10 % and GHG reduction would be less than 5 %.

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Cost of doubling nuclear capacity:

- industry promises 2,000 USD/kWe installed
- Olkiluoto-3 as a flagship seen increase in budget from 4.7 billion USD to 6.9 billion USD for 1,600 MWe (and more can come), which gives 4,300 USD/kWe installed
- recent Moody's economic estimation says all-in construction costs are between 5,000 and 6,000 USD/kWe installed

In order to achieve 500,000 MWe of new nuclear capacity it would take 2 to 3 trillion USD – only on construction!

Add running costs (fuel, operation, maintenance) and liabilities that represent many hundreds of billions, if not trillion USD.

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Delivery time of doubling nuclear capacity:

We need to peak emissions by 2015 and reduce them by 20 % by 2020.

Even in most favourable countries it takes 10 to 15 years from decision to production.

In many countries it would take years to first establish institutional framework and infrastructure.

Only a tiny fraction of needed 400 reactors would be on line by 2020 – many years after the deadline.

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Hazards of doubling nuclear capacity:

Seriously increasing risks related to fuel production, reactor operation, nuclear waste management.

Even more importantly, what would be the impact of vast proliferation of nuclear materials and technologies on global security?

With 20 tons of spent fuel containing 1 % of plutonium, additional 400 reactors would produce enough Pu for 8,000 nuclear warheads every year. And this would remain available for tens of thousands of years.

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Hazards of doubling nuclear capacity:

Potentially new nuclear countries include

Italy, Portugal, Norway, Poland, Belarus, Ireland, Serbia, Estonia, Latvia, Turkey, Iran, Gulf states, Yemen, Israel, Syria, Jordan, Egypt, Tunisia, Libya, Algeria, Morocco, Nigeria, Ghana, Namibia, Azerbaijan, Burma, Georgia, Kazakhstan, Chile, Venezuela, Bangladesh, Indonesia, Philippines, Vietnam, Thailand...

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Other obstacles for doubling nuclear capacity:

- Industrial production capacity.
- Uranium resources.
- Nuclear energy helping to dig out more carbon:
 - Canada: tar sands in Alberta, two CANDU reactors
 - Russia: floating reactors to explore oil in the Arctic
- Impacts on climate change!

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Climate change impacts on nuclear power:

- draughts in July 2006:

- Germany: Krummel (1316 MWe), Brunsbuttel (806 MWe) a Brokdorf (1440 MWe) on Elbe river closed
- Spain: Santa Maria (466 MW)
- Belgium: Doel (421 a 454 MWe) reduced power
- France: forced to import at 400 Euro/MWh, 28 reactors on five big rivers (Garonne, Rhone, Seine, Muese a Moselle) authorized to ignore limits and heating more than 3 C
- US: Cook (2 x 1000 MW) in Michigan

- central Europe: 15 % - 40 % less surface water by 2050

- Romania: Cernavoda 5 will not be built „as the climate change lowered the Danube's capacity to provide the resources for cooling down the reactors“ (October 6, 2007)

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Climate change impacts on nuclear power:

- **floods**

- **lack of water** for uranium processing:

 - Australia: Roxby Downs 35 million litres/day, expansion plans will lead to 150 million

- **impacts on ecosystems:** jellyfish in Baltic Sea

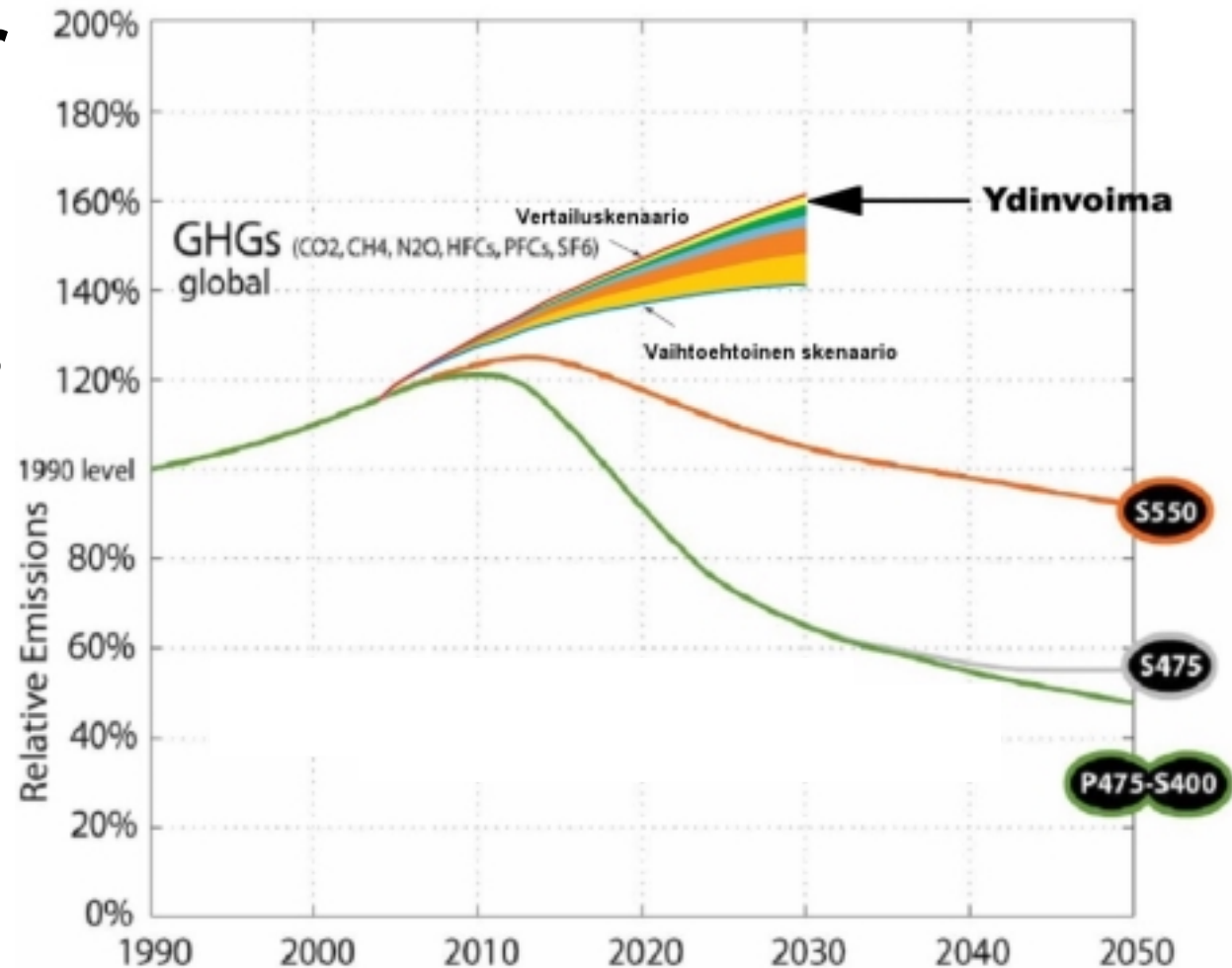
 - **water demand for cooling:** 0.01 litres of water if wind is the energy source, 0.26 litres if solar is the energy source, 4.5 litres if coal is the energy source, or 5.5 litres if nuclear power is the energy source

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Nuclear power too costly, too late, and too hazardous to deliver even few percent of GHG reduction.



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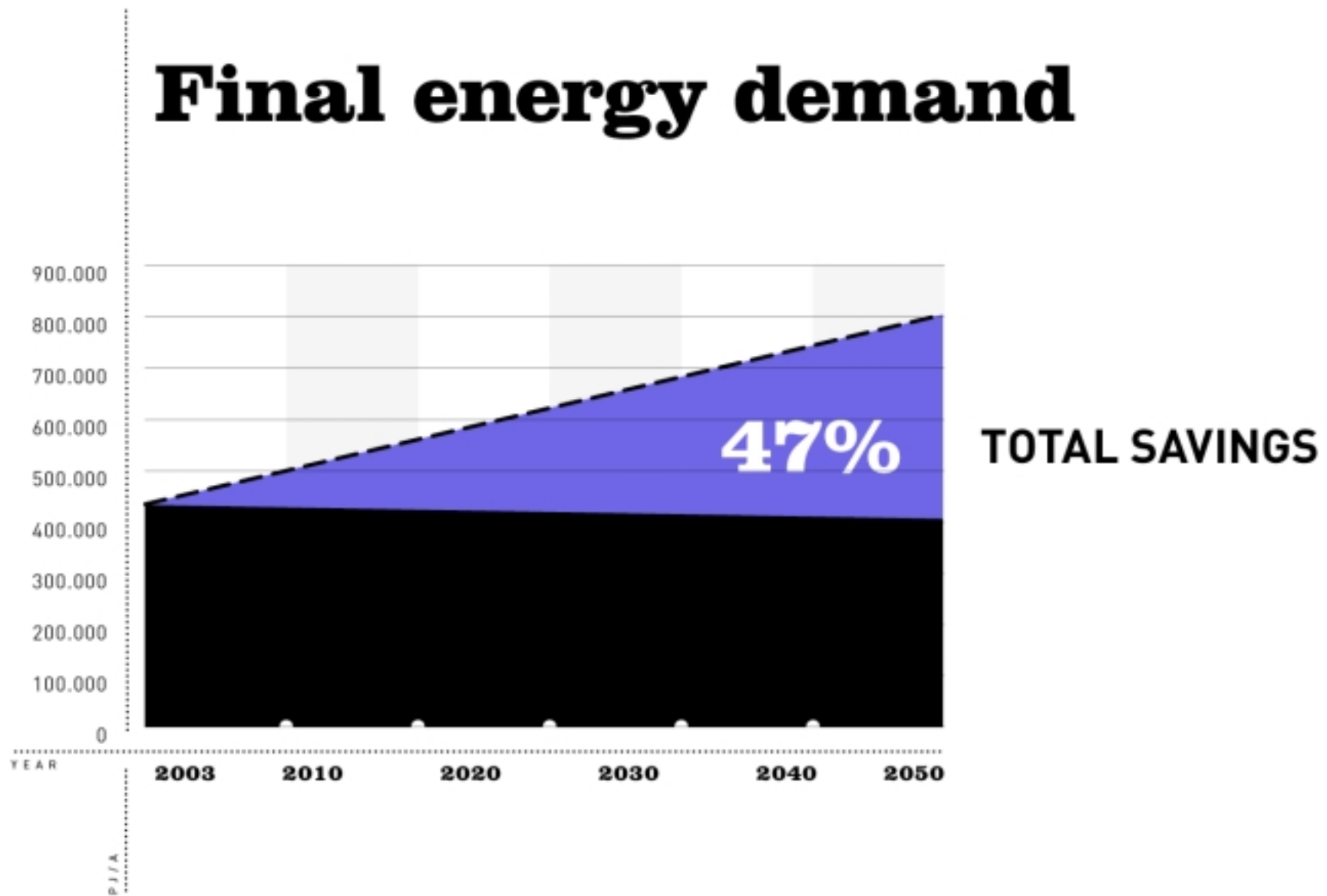
"[Meeting the 20% renewables target] crucially undermines the [trading] scheme's credibility ... and reduces the incentives to invest in other low carbon technologies like nuclear power", says the leaked UK cabinet paper.

October 2007

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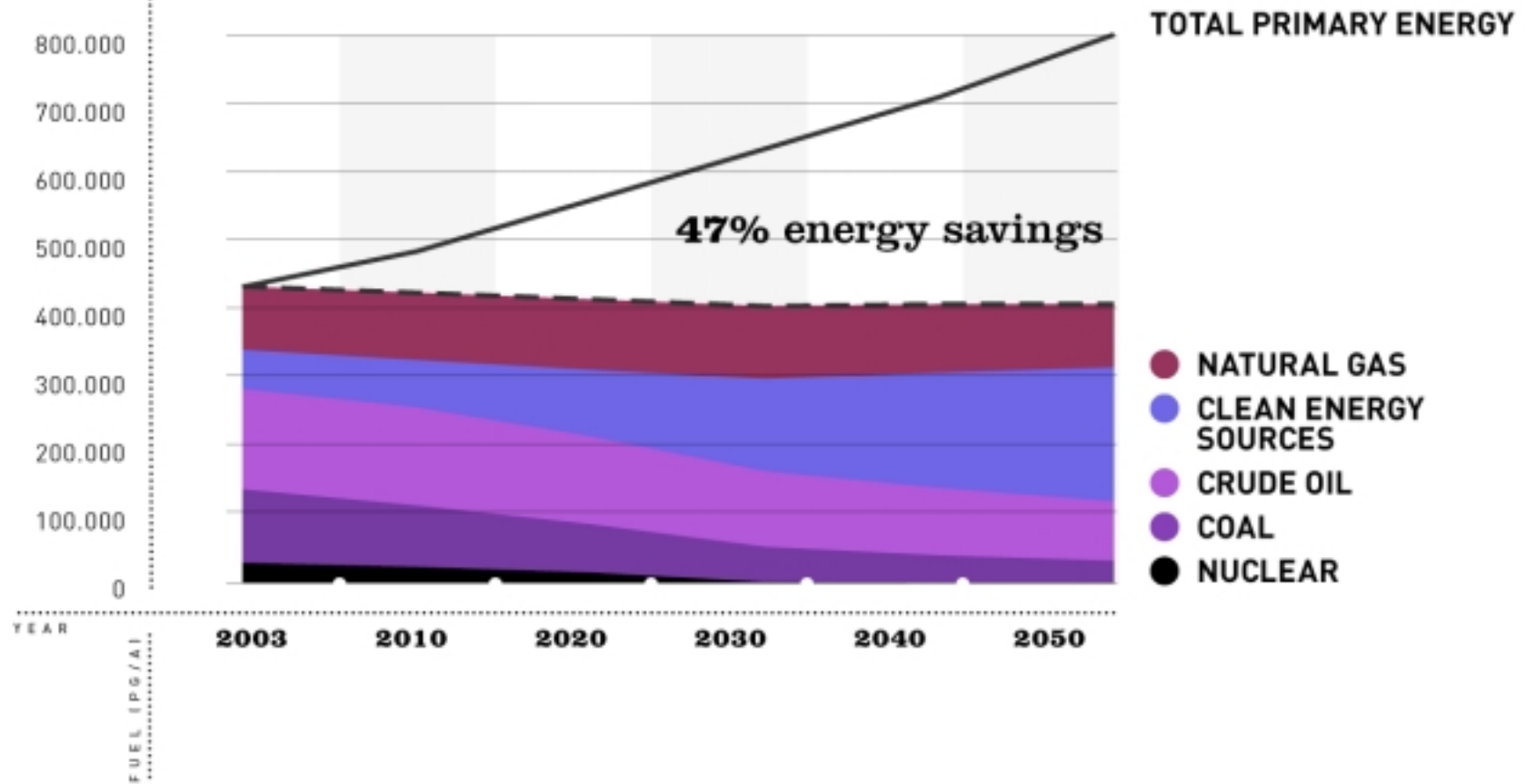
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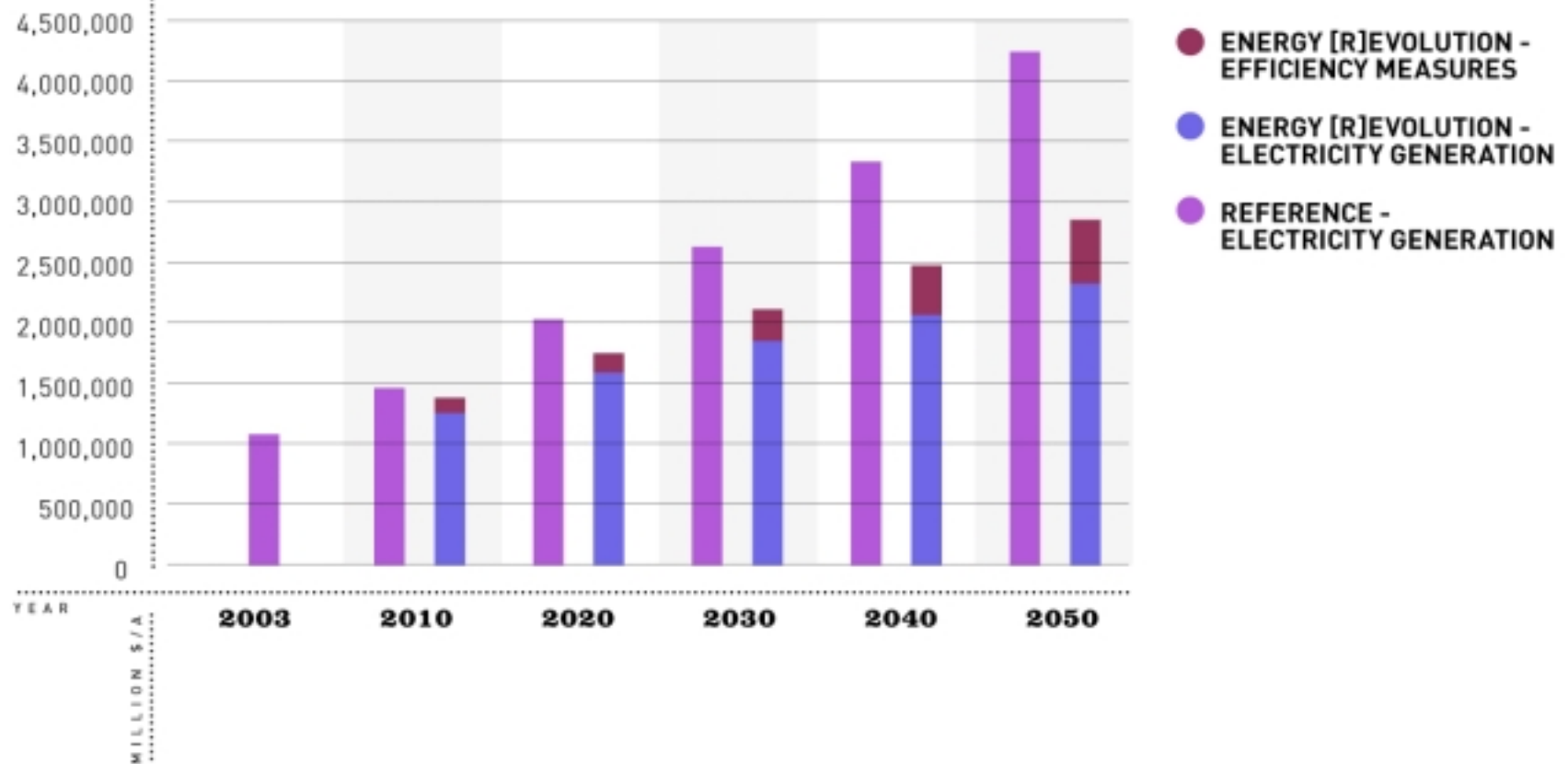
primary energy demand

energy revolution



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development of total global electricity supply costs



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Nuclear energy is not only too costly, too late and too risky to deliver.

It is not part of the solution, but costly and hazardous obstacle.

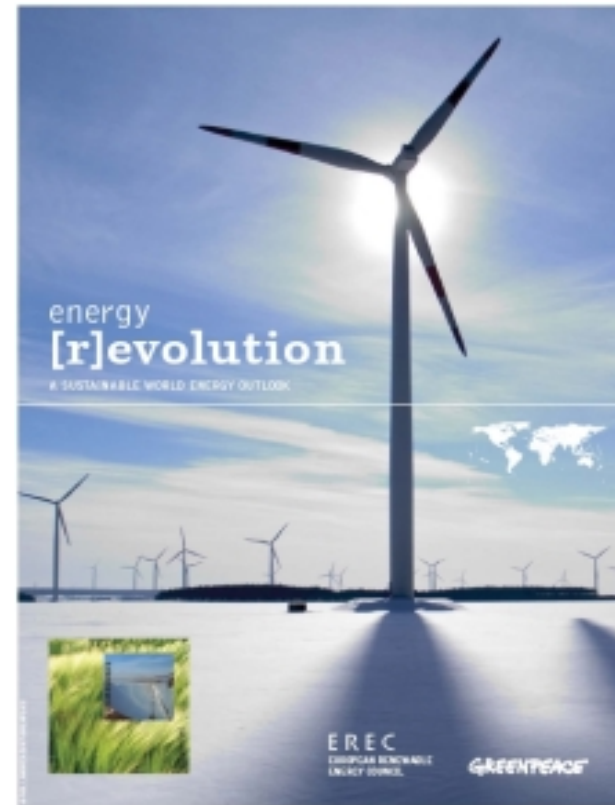


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Run away from Nuclear...



and launch Energy Revolution!

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