

## **50<sup>th</sup> Anniversary of the Nuclear Energy Agency**

**Speech by Nobuo Tanaka, Executive Director, International Energy Agency**

**OECD Conference Centre, 16 October 2008**

Distinguished guests, ladies and gentlemen, it is an honour to be with you today on behalf of the International Energy Agency to share in the 50<sup>th</sup> anniversary of the Nuclear Energy Agency. Though the world may look very different to what it did in 1958 when the NEA was created, rising global energy demand, increased prices and growing pressure to address climate change make the mission of the NEA as important today as when the Agency was created by the Organisation for European Economic Cooperation fifty years ago.

At the IEA, we have always maintained that nuclear is an important part of the energy mix, in the face of varying attitudes to this source of power. For this reason, the IEA appreciates very much the efforts of the NEA to further the development of this vital energy source through its work in such fields as safety, technological development and regulation. In the next few minutes, I would like to share with you some thoughts from the IEA's own analysis regarding the future for nuclear power. Both our *Energy Technology Perspectives* (ETP) publication, released in June this year, and the 2008 *World Energy Outlook* (WEO), which will be launched on 12 November, highlight the continuing importance of this fuel source

The World Energy Outlook 2008 will clearly demonstrate that our energy system remains at a crossroads and that current trends in energy supply and consumption are unsustainable, environmentally, economically, and socially. It

is not an exaggeration to say that the future of human prosperity hinges on finding a way to supply the world's growing energy needs in a manner that does not irreparably harm the environment.

These findings come despite the fact that projected energy demand in 2030 is slightly lower than previously expected following downward revisions to economic growth assumptions, especially in OECD countries, and increased fuel price assumptions. The report will show that global energy demand is still expected to grow substantially. Due to continuing strong economic growth, China and India account for just over half of the increase while Middle East countries emerge as a key demand centre. The projected rise in emissions of greenhouse gases in the Reference Scenario puts us on a course of doubling the concentration of those gases in the atmosphere by the end of this century, entailing an eventual global average temperature increase of up to 6°C.

In seeking to address rising greenhouse gas emissions from energy, our recent publication, *Energy Technology Perspectives 2008*, sets out options for a cleaner, smarter energy future. This work demonstrates that the goal G8 Leaders endorsed in Hokkaido – of cutting global CO<sub>2</sub> emissions by 50% by 2050 – is achievable but extremely tough. There are three vital aspects to reaching this goal. First, we would first need to make very large improvements in efficiency. Second, we would need to substantially de-carbonise power generation, with nuclear playing an important role in that. Third, we would need to revolutionise the transportation sector. This will require a total additional investment of USD 4.5 trillion, representing 1.1% of global GDP. But if this target can be achieved, it will bring huge benefits for energy security – with oil demand in 2050 reduced to 27% below current levels.

Focusing on the second of these vital aspects – decarbonisation of the power sector, a 50% emissions reduction requires virtually CO<sub>2</sub>-free power generation by 2050 – worldwide. This can be achieved through a combination of renewables, nuclear power and the use of carbon capture and storage at fossil fuel plants. There is a degree of choice for each country as to the balance to be struck between these technologies. But action is needed by all countries urgently. For instance, we would need to build 17,000 large wind turbines and 32 nuclear power plants every year between now and 2050 to meet the 50% reduction goal.

So what of the role for nuclear generation specifically? Before I turn to the ETP's findings on this, let me mention that the ETP analysis of nuclear was carried out in close collaboration with the NEA, for which the IEA is most grateful. While on the topic of NEA contributions to our activities, I acknowledge the long-standing personal contribution of Mr. Luis Echávarri, Director-General of the NEA, to our own Governing Board meetings.

Turning now to nuclear power, nuclear plays an important role even in the Baseline scenario, with capacity increasing from 368 GW now to 570 GW in 2050, and output increasing by 41%. However, this rises yet further in the low CO<sub>2</sub> BLUE Map scenario. In this scenario, nuclear power would account for an additional 6% of the necessary CO<sub>2</sub> savings between now and 2050, which means that an additional 1250 GW of nuclear capacity is needed in 2050 beyond the Baseline scenario. This increase would see nuclear accounting for nearly one quarter of power generation in 2050 in the BLUE Map, representing

a threefold increase from the 2005 Baseline scenario. Nearly another quarter derives from CCS and one half will come from renewables.

But the real challenge is how fast new capacity can come on stream and how to finance new nuclear operations. This challenge applies globally, with this graph showing that non-OECD countries would account for more than one half of increased nuclear power generation in the BLUE Map scenario in 2050.

To delve a little further into the issue of financing, our ETP analysis indicates that total additional investment above the Baseline scenario in the power sector amounts to USD 9 trillion. This comprises investments in transmission, and in wind, solar, nuclear, CCS and geothermal, with nuclear representing 17% of total investment. It is important to note, though, that this USD 9 trillion is offset by \$6.5 trillion of lower investments in hydro, gas, coal and distribution.

The projected costs of generating electricity from nuclear show that in many circumstances, nuclear energy is competitive against coal and gas generation – we anticipate a cost of USD 2000/kW by 2050 in the BLUE Map scenario. However, the cost of capital has a significant effect on the cost of nuclear power and risk perception varies across different types of nuclear generating plants. Here I would emphasise that governments can assist by streamlining planning and licensing regimes, thereby ensuring stability in nuclear power policy, which can help to reduce the huge risks affecting investment decisions by the private sector.

One final word on financing. While it may be possible in theoretical economic terms to construct nuclear plants at a pace that would see nuclear meet at least 18% of world power generation capacity requirements in 2050 (or even as much as 30% or requirements), in reality, supply-chain and skills constraints are likely to provide a cap on the overall level of construction. To this end, the IEA encourages both nuclear supply chain investment and workforce development.

So what will the new WEO say about the role for nuclear? In our new reference scenario, nuclear gets a boost from high fossil-fuel prices. As a result, the share of nuclear in primary energy demand edges down very slightly over the Outlook period but nuclear output increases in absolute terms in all major regions except OECD Europe. The largest increases will take place in developing Asia.

However, it is clear that a change in government policy to address the climate challenge could lead to a significantly higher share for carbon-free electricity such as nuclear and renewables. After all, over the past few years, a large number of countries have expressed renewed interest in building nuclear power plants, driven by concerns over energy security, surging fossil-fuel prices and rising CO<sub>2</sub> emissions. This is demonstrated by the report's 450 ppm stabilisation scenario in which nuclear capacity would have to increase by more than 50% compared to the reference scenarios.

Ladies and gentleman to conclude, I thank OECD Secretary-General Gurria, Mr. Richard Stratford, Chair of the NEA Steering Committee for Nuclear Energy and Mr. Luis Echávarri, NEA Director-General for the invitation to take part in

today's festivities on behalf of the IEA. I extend the IEA's congratulations to the Nuclear Energy Agency for 50 years of distinction in furthering global efforts for nuclear energy, and I wish the Agency another half century of the same.



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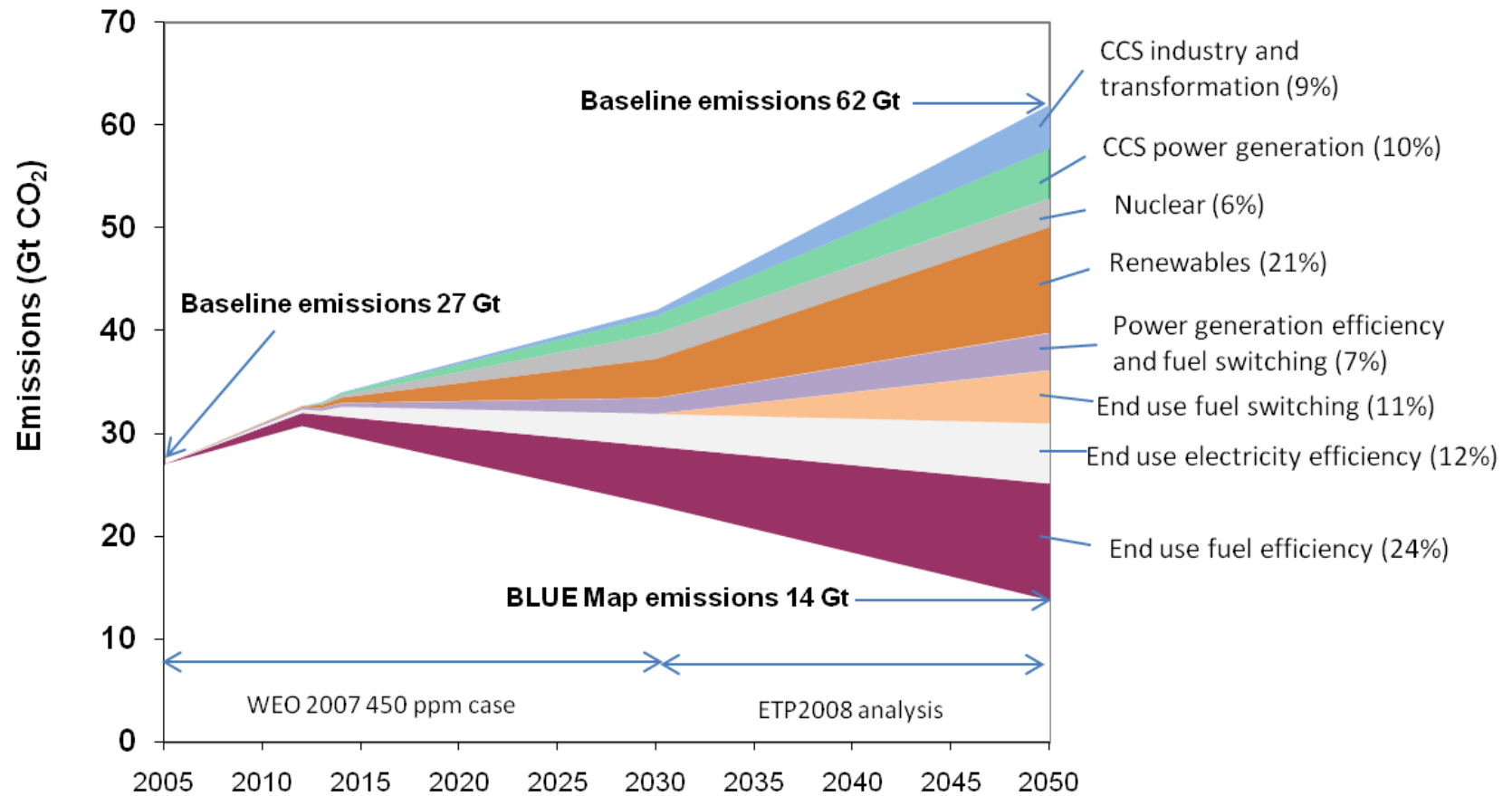
**Nobuo Tanaka  
Executive Director  
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# A new energy revolution....

## Cutting energy related CO<sub>2</sub> emissions

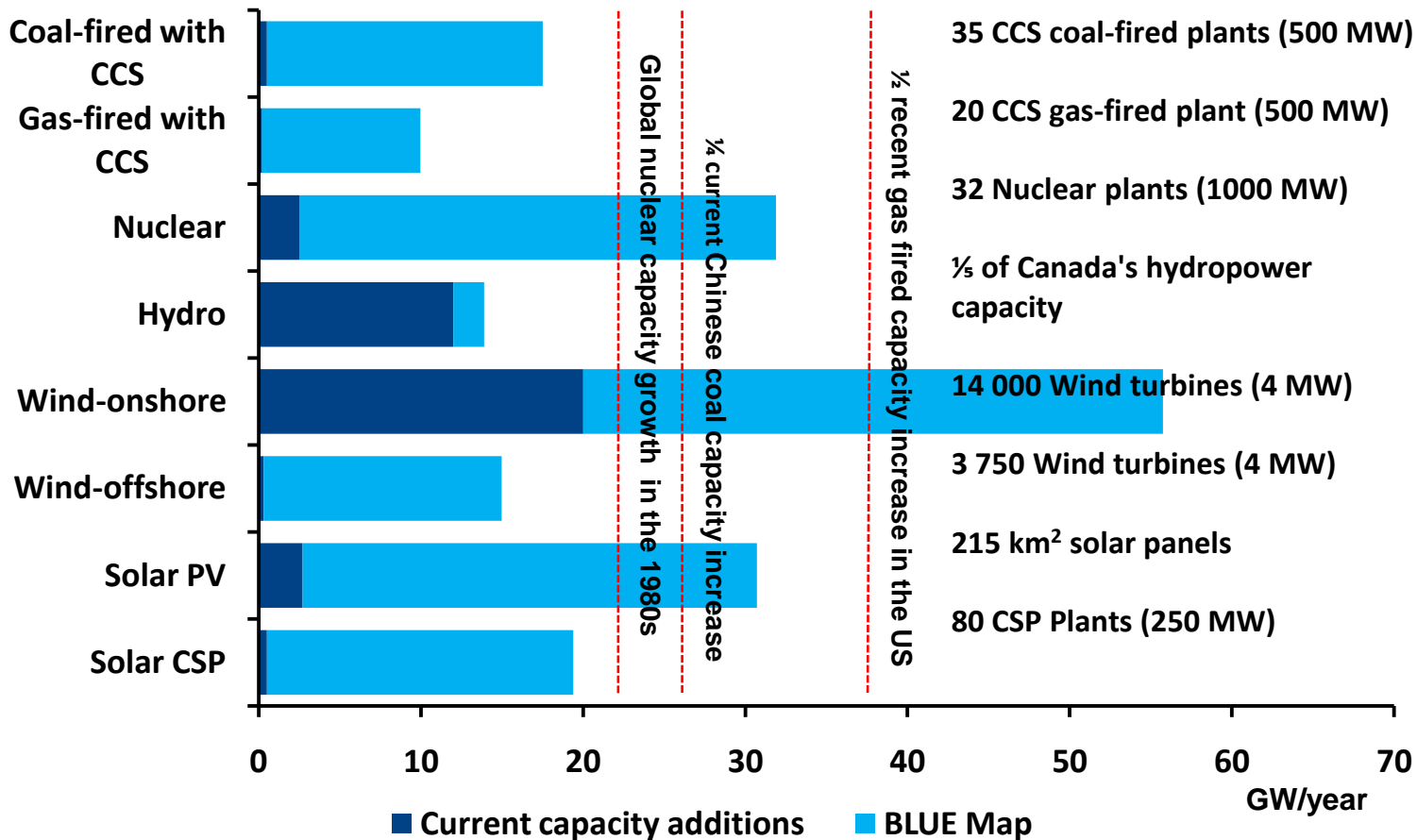


***Decarbonisation of the power sector, along with energy efficiency and revolutionisation of the transportation sector are necessary to achieve a 50% emissions cut; nuclear power plays an important role in that***





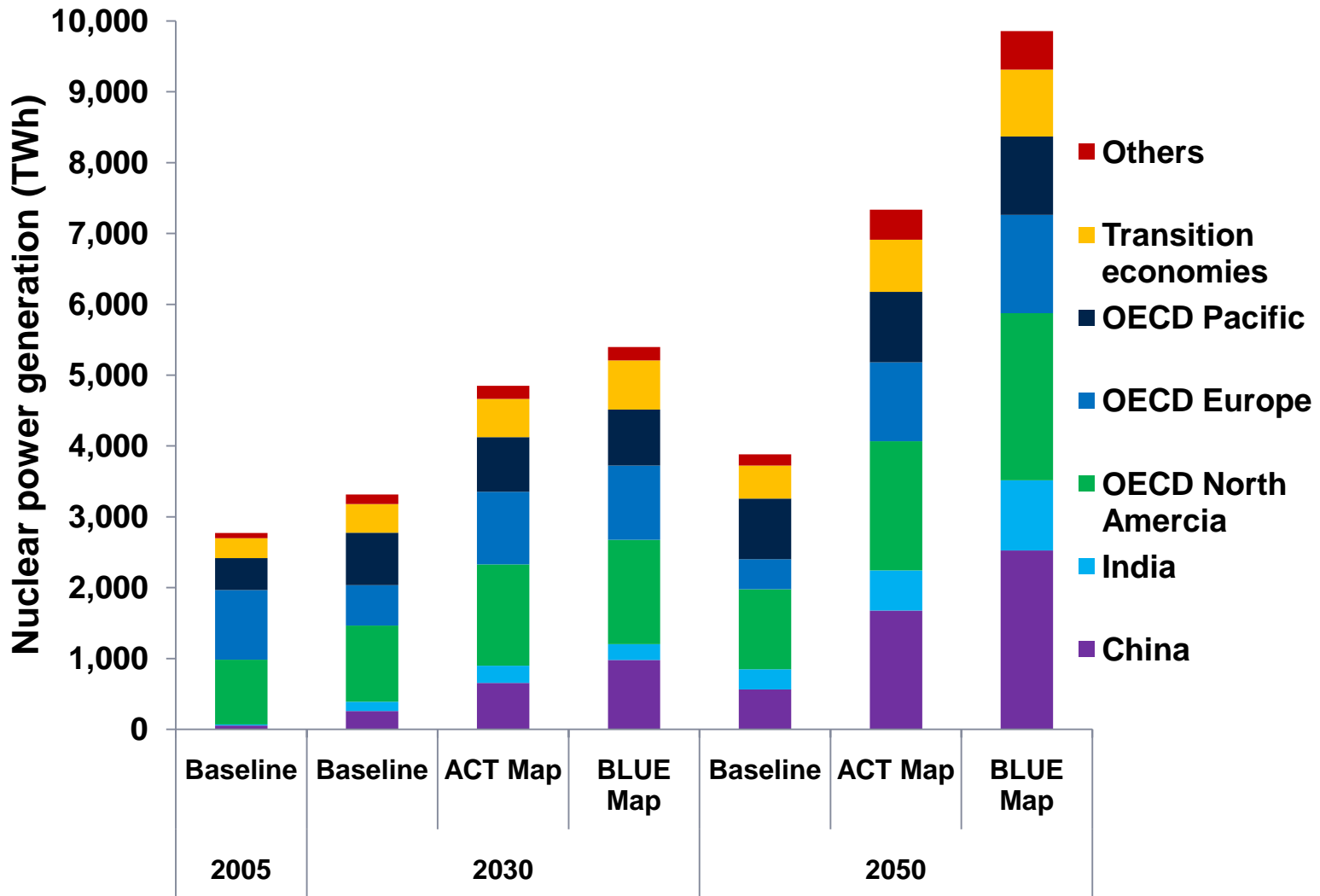
# Average annual power generation capacity additions in the “50% CO<sub>2</sub> reduction scenario” 2010 – 2050



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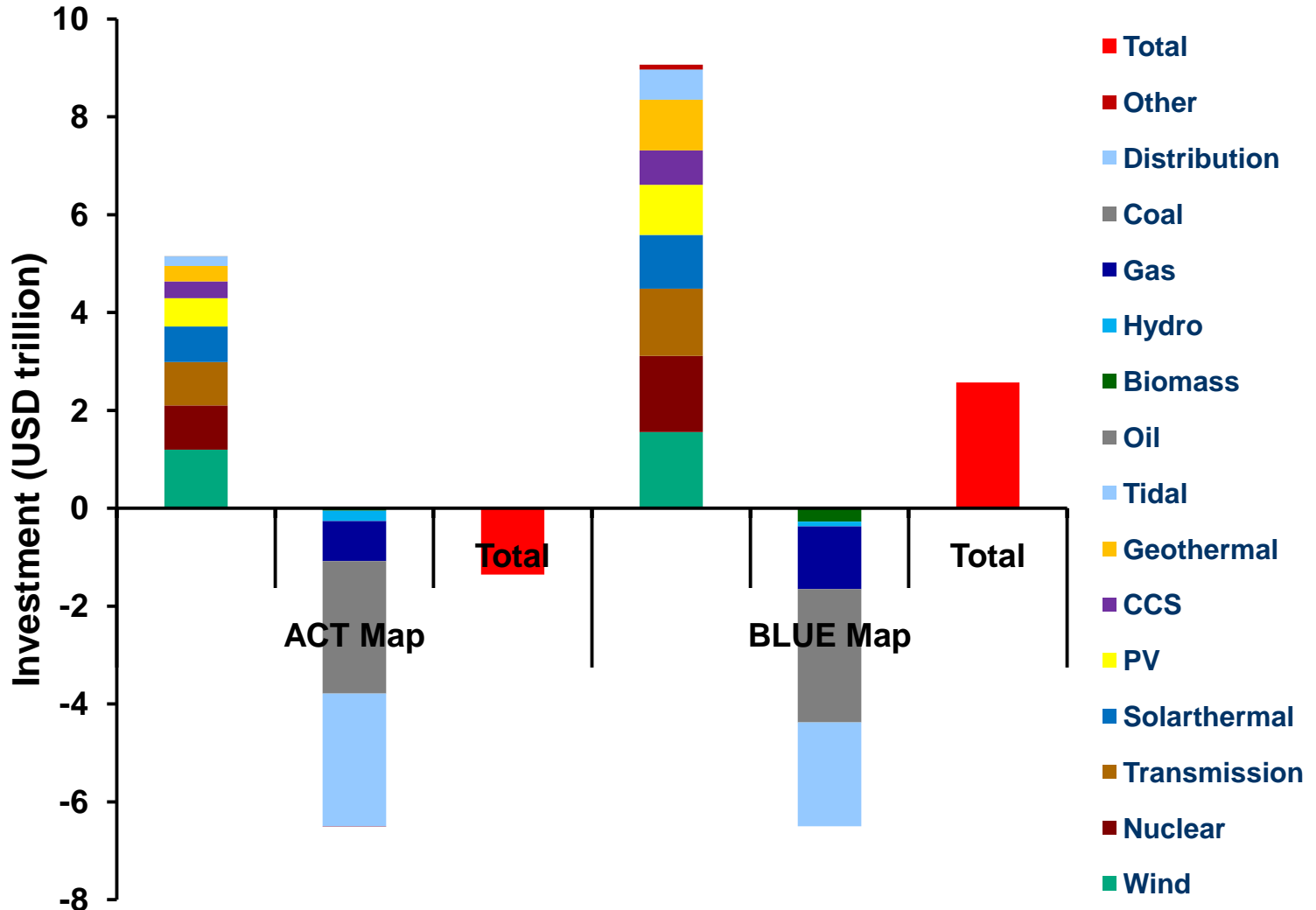


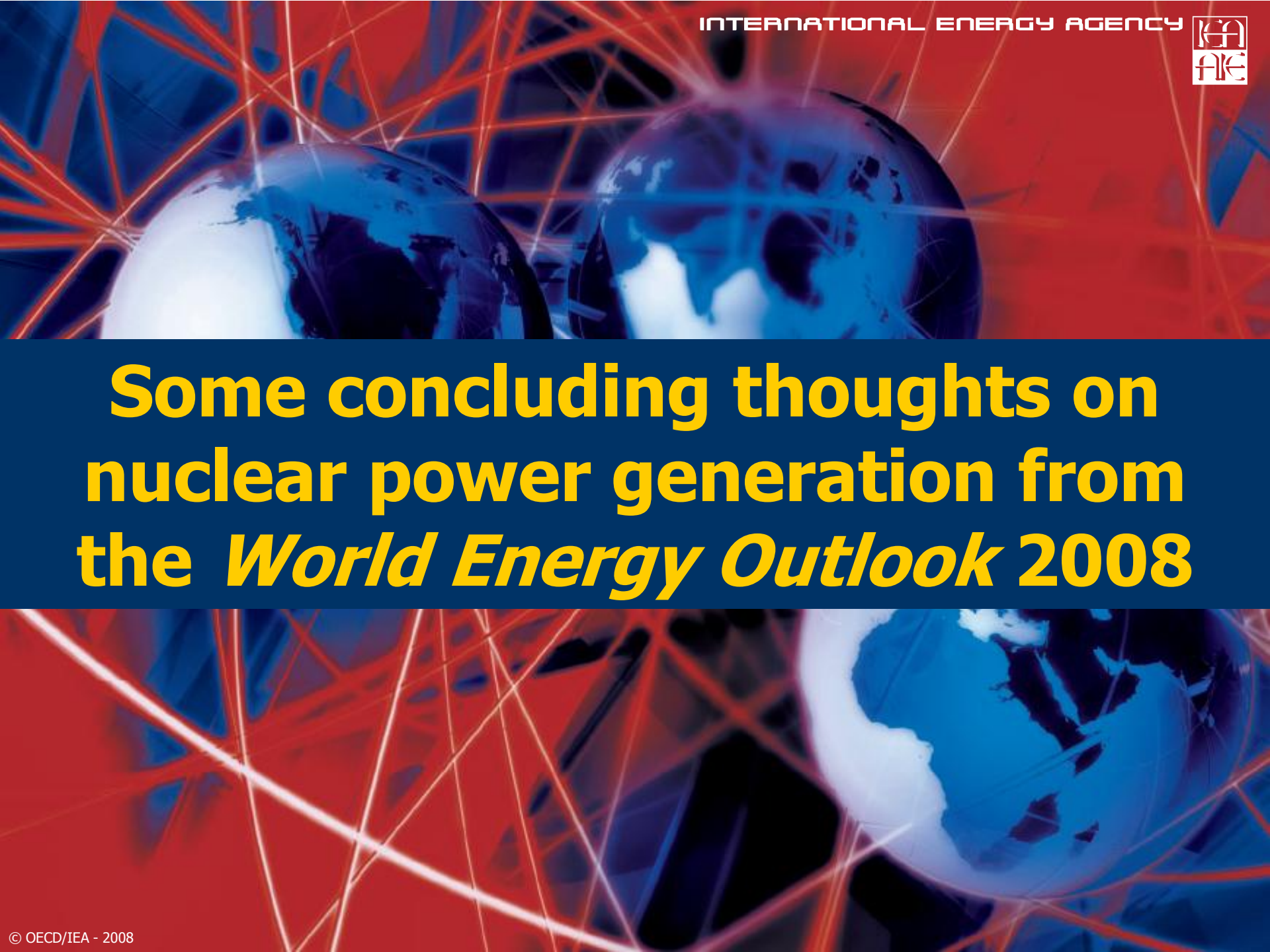
# Nuclear power generation projections





# Cumulative additional investment in the electricity sector (2005-2050)



The background of the slide features two globes of the Earth, one on the left and one on the right, set against a dark blue background. A complex network of bright red lines crisscrosses the entire scene, creating a sense of global connectivity or energy flow.

# **Some concluding thoughts on nuclear power generation from the *World Energy Outlook 2008***