

Super Grid for Future Renewable Energy Paradigm

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Energy defines Economy

- **Coal → 1st Industrial Revolution**
- **Oil/Electricity → 2nd Industrial Revolution**
- **Digital/Information Technology → 3rd I.R.**
- **4th I.R. → what energy?**
- **Due to Climate Change, cheap fossil fuel can no longer be sustainable**
- **Sustainable future requires low carbon green energy**

Climate Change

- **CO₂ concentration: 280 ppm before 1st Industrial Revolution**
- **Now, already 400 PPM,**
- **In order to stabilize global warming below 2°C, we have to reach 350ppm**
- **Paris Climate Agreement: action plan for low carbon future, But**
- **It requires decisive, definitive & drastic paradigm shift towards Green Economy/
Green Growth**

Transition to Low carbon green energy

- **Is not just a matter of reducing CO₂ emission**
- **Not just a matter of money and technology**
- **It is a matter of paradigm shift to a new green economy**
- **If we green our economic growth, then we can arrive at green economy.**
- **Green Growth is reforming our visible and invisible structure of our economy.**

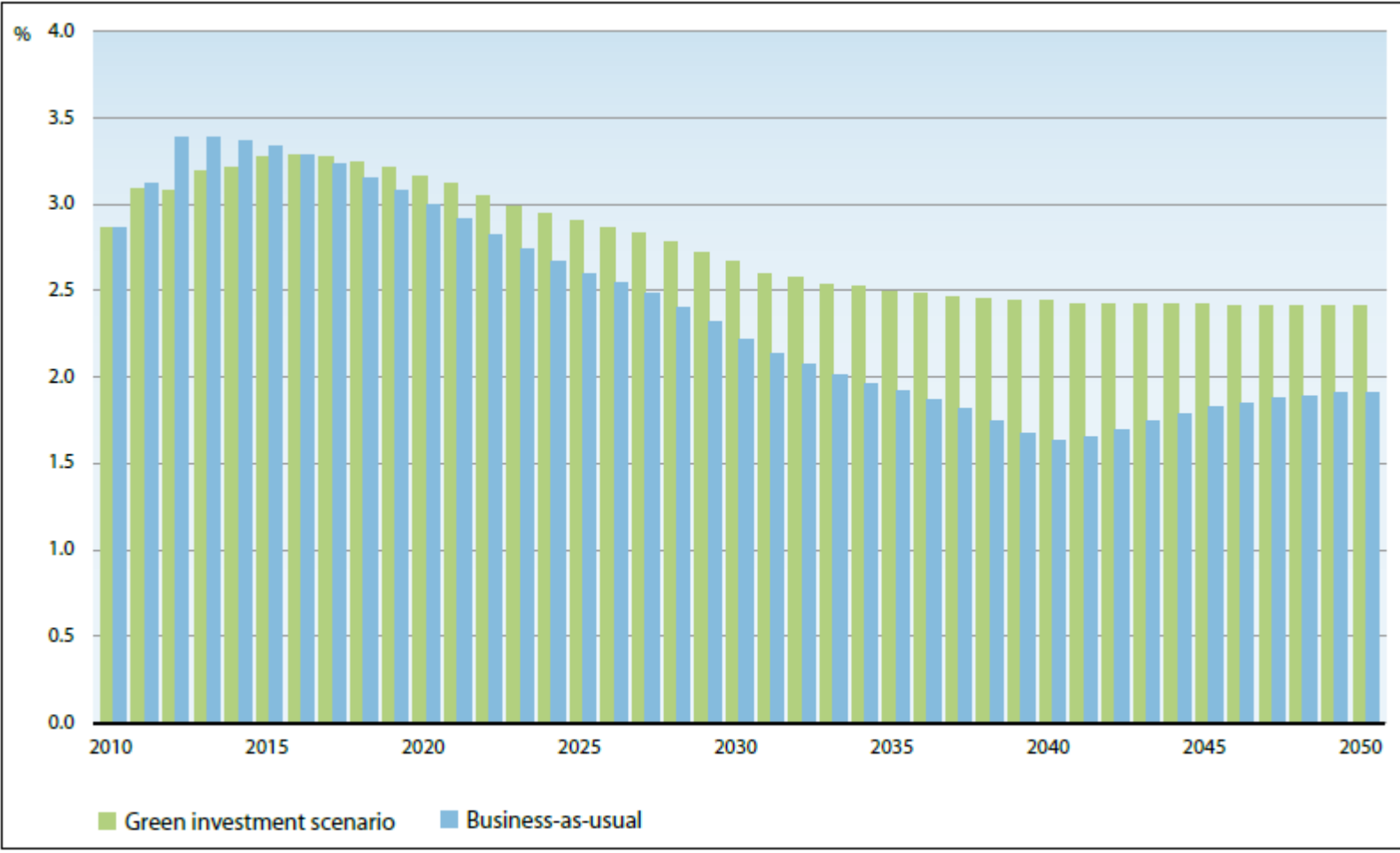
Structure of our economy

- **Visible Structure: city & land planning, transport system, building designs, energy system, physical infrastructure,**
- **Invisible Structure: tax, fiscal policy, regulation, energy efficiency standard,**
- **We have to re-orient, re-design, re-shape our visible and invisible structures towards low carbon green growth**

But shifting towards Green Growth

- **Is not just to cope with climate change**
- **It is a strategy for future economic growth, job creation and industrial competitiveness.**
- **We have to shift our policy focus from short-termism to long-termism.**
- **Not just Short term growth but
Long term growth**

Projected trends in annual GDP growth rate



Source: UNEP Green Economy Report (2011)

GG Paradigm shift will not happen automatically

- **It requires political leadership and political push**
- **To close price gap: market price vs ecological price of energy through tax and incentive**
- **To close time gap between short term and long term return through fiscal policy**
- **Investment in green energy requires longer time frame to reap higher return than fossil fuel**

Getting the Price Right is Critical

- **Eco-Tax Reform: Powerful tool for GG/GE**
 - **shifting tax base from Labor to Pollution**
without raising tax burden (Revenue Neutrality)
 - **then Double Dividend of**
 - improving ecological efficiency &**
 - increasing Employment & Growth**
 - simultaneously (GE) is possible.**

Kazakhstan Leader of Green Growth: MCED6: Astana Green Bridge 2010 linking Europe & AP with GG



Kazakhstan:

- **Already taking bold actions; reducing carbon intensity in 2015 by half from 1990 level**
- **Pursuing Green Economy concept & renewable energy development plan for 3 GW by 2020**
- **Huge potential for renewable energy: Hydro 55 GW, Solar 2.5 GW, Wind 1,820 GW/per year, current renewable energy share only 0.5% of 21.3 GW**

Super Grid

- **HVDC (High Voltage Direct Current) technology can transmit electricity over 3 to 6,000 kms**
- **Kazakhstan can export green energy (wind) to China, Korea, Japan by linking to Asia Super Grid now under development in Mongolia**
- **Green Energy can be a new driver of green economic growth of Kazakhstan in the future**
- **4 countries already signed MOU in March 2016**



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Gobi Desert

Beijing

Seoul

Chengdu

Tokyo

Delhi

Bhutan

Shanghai

Dacca

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ASIAN SUPER GRID



Super Grid – Renewable Energy from Remote Sites to Cities

