

Knowledge Sharing Platform (KSP) Workshop for the Energy Smart Communities Initiative

Low Carbon Pathway for Chinese Taipei

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Outline

The 2008 Double Crisis & Solutions

- International & Domestic Actions
 - > The Green New Deal
 - Green New Deal in Chinese Taipei
- Energy Smart Community
 - Smart Transportation
 - Smart Buildings
 - Smart Grid
 - Smart Jobs and Consumers
- Major Challenges to Sustainable Transitions
 Final Words



The 2008 Double Crisis & Solutions



The 2008 Double Crisis & Solutions

The Age of a Double Crisis

- Economic and Financial Crisis
- Energy and Environmental Extravagance

Some Common Features of, and Potential Interlinks

between, the Two Crises

An Integrated and Consistent Approach to the Remedy for these Two Kinds of Quandaries



Common Features of the Two Crises

- The government often left the market alone when the market failed to signal the full true cost of an economic activity
 - E.g., do not internalize external costs
- But the government frequently intervened in the market and distorted the market signals while the price signal could have correctly signaled a part of the true cost of an activity
 - E.g., subsidize the use (or sale) of (renewable) energy



Common Prescriptions

Market-based quantity control

- Emission trading
- Price Policy
 - Subsidies specifically directed to the use of new energy
 - Taxation on carbon or energy products
- Public R&D investment in energy science and technology
- To fasten economic development to strengthen the adaptation and mitigation ability



International & Domestic Actions: The Green Economy Initiative in UN

The Green Economy Initiative in UN



- Reviving the world economy
- Developing
- sustainable
- environment, economy
- and the society
- Achieving the MDGs,

Green Economy

Improved human well-being and social equity, while significantly reducing environmental risks and ecological scarcities

Global Green New Deal (UNEP, 2009)

- The UNEP proposed in 2009 a grand public spending program *with green flavor*. (Edward B. Barbier, 2009, UNEP)
 - Proposed Investments in
 - **R&D** in clean and renewable energies
 - Education
 - **Conservation** of natural resources and the environment

Goals

- Reviving the world economy, creating or saving jobs, and protecting vulnerable groups
- Reducing carbon dependency, mitigating ecosystem degradation, putting the economy onto a path of sustainable development
- Achieving the MDGs, ending extreme poverty by 2015



Rationale for a Green New Deal

The Keynesian Theory

- A recession is caused by a slump in aggregate demand
- Government should **spend** to lift aggregate demand to **stimulate** the economy

Potential Long-run Benefits of a Green New Deal

- Investment in the green technologies and the green industries will
 - not only lift the aggregate demand in the short run
 - but also enhance energy efficiency, reduce carbon emissions, and increase productivity in the long run

UNEP's Proposal for Global Green New Deal

Fiscal Stimulus

Domestic Policy Reforms

- A full review of domestic *subsidies*
- *Removing the subsidies* that are clearly harmful to the environment
- To operationalize *the Polluter Pays Principle*
- An incentive system of subsidies, taxes, and regulations to encourage environmentally responsible behavior and helps to internalize externalities
- Reforming of *land use and urban policies*
- Integrated management of *freshwater*
- Introducing or improving environmental legislation

International Coordination



Energy Smart Community in Chinese Taipei

Current Development and Strategies



Policy Framework



Sustainable Energy Policy (2008)



The Bottom-Up Consensus Building Process





Guideline of Sustainable Energy Policy



Master Plan of Energy Conservation and Carbon Reduction

10 benchmark projects with 35 sub projects (concrete implementation of Guideline of Sustainable Energy Policy)



Smart Transportation (1/4)



By 2015:

- +share of public transportation by 30%
- +automobile fuel efficiency standards by 25%
- + truck fuel efficiency standards by 25%
- + Motorcycle fuel efficiency standards by 25%

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Great

Reliable

Environmental

Equitable

Networked

- Increase Investments
- Government Subsidies
- > Regulations
- Policy Advocacy

> BOT

Smart Transportation (2/4)

Current Development

- Developing High Speed Rail
 - **Reducing CO2 emissions by 21.2 million tons in 2012**
- > Boosting Railway Capacity

the ridership has increased 2.7 million

- Improving Transit Ridership
 - The total length of Taipei MRT currently in operation is 116.9km. CO₂ reduction in 2012 is about 63.9 thousand tons.
 - The total length of Kaohsiung MRT is 42.7km. daily ridership reached 320000.
 - In 2010-2011, the Government allocated NTD 11.5 billion to improve the quality of bus service. The ridership increased nearly 15% in 2010 over 2009



Smart Transportation (3/4)

EV Strategies & Approaches



Smart Transportation (4/4)

iEV Pilot Run Project

On going & potential projects for pilot run

- Target: 3,000 EVs/ 3000 charge stations running in 10 pilot projects
- Period: 2010-2013
- Subsidy Budget: US\$ 70M
- Approach: Encourage City governments to cooperate with car manufacturers, battery suppliers and other related operators come up with new biz models, such as shuttle services,
 EV sharing services, official fleet... and so on.



Smart Buildings (1/2)



Adoptions of ICT, intelligent materials, products and services on green buildings to make buildings safer, healthier, more convenient, and more energy-saving



Smart Buildings (2/2)





Intelligent Green Building Promote IGB by making full use of ICTs advantage



- Mandatory Green Building Design
- Government Subsidies
- Green Building Material Labeling System
- Green Building Awards
- Laws and Regulations
 - Government Procurement Act
 - Regulations of Bulk Reward for Urban Renewal



Smart Grid (1/2)

Plan of Smart Grid in Taiwan (2011~2030)



Strategies

Smart Grid (2/2)

- Conducted through the Cooperation Between Government, Industry, Academy and Research Institute
- Pilot Project and Test Beds



Low-carbon Communities/Cities/Islands (1/2)



Low-carbon Communities/Cities/Islands (2/2)



Major Challenges to Sustainable Transitions



Major Challenges to Sustainable Transitions

Green paradox

Innovation slow-down: a new Malthusian constraint

Economic

- How much the energy prices will increase with a low-carbon pathway?
- How much poorer people will become after the energy prices increase?

Political

• Current generation or future generations will bear most of the emission reduction costs?

How to alleviate the reduction costs?

- Free allowances in cap-and-trade?
- Rebating firms that reduce emissions under a carbon tax framework?



Green paradox: the rebound effect

- Reducing demand for fossil fuels via subsidies to alternative energy sources and via support for innovation.
- Leading to more emissions and a (weak) Green Paradox/Rebound effect



New Malthusian Constraint: Innovation slow-down



Rate of innovation since the end of the Dark Ages (Huebner, 2005)

Source: Jonathan Huebner, 2005, "A possible declining trend for worldwide innovation", Technological Forecasting & Social Change 72.



The causes of innovation slowdown

Two different technological limits

- Physical and biological limits
- Economic limit:
 - Increasing marginal cost vs. diminishing marginal benefit of R&D
 - Tyler Cowen, 2011, *The Great Stagnation, How America Ate All the* Low-Hanging Fruit of Modern History, Got Sick, and Will (Eventually) Feel Better, Dutton.

Institutional Barriers

- Incomplete property rights
- Information asymmetry
- Intertemporal market failure



Final Words



An <u>Incentive-based</u> Approach Is the Core Apparatus in Low-Carbon Pathways!

- > Putting a price tag on carbon emissions is most essential
- Fully auction off the allowances if a cap-and-trade system is adopted
- Public investment in, and only limited to, where the market fails to work efficiently.
 - Basic research and R&D
 - Energy-saving mass transportation
 - No Investment in infrastructures that encourage energy use

Regional/International collaboration

- A regionally uniform carbon tax (Joseph Stiglitz)
- A regional cap on emissions with a regionally integrated carbon trade market
- Comprehensive knowledge and experience sharing

Thank You !



