Topic 5: Green Energy Industry
Discussion 2:
Five Potential Growth Industries

Ministry of Economic Affairs

November 4,2009

Outline

I. Taiwan's Green Energy Industry Assessment & Promotion Plan

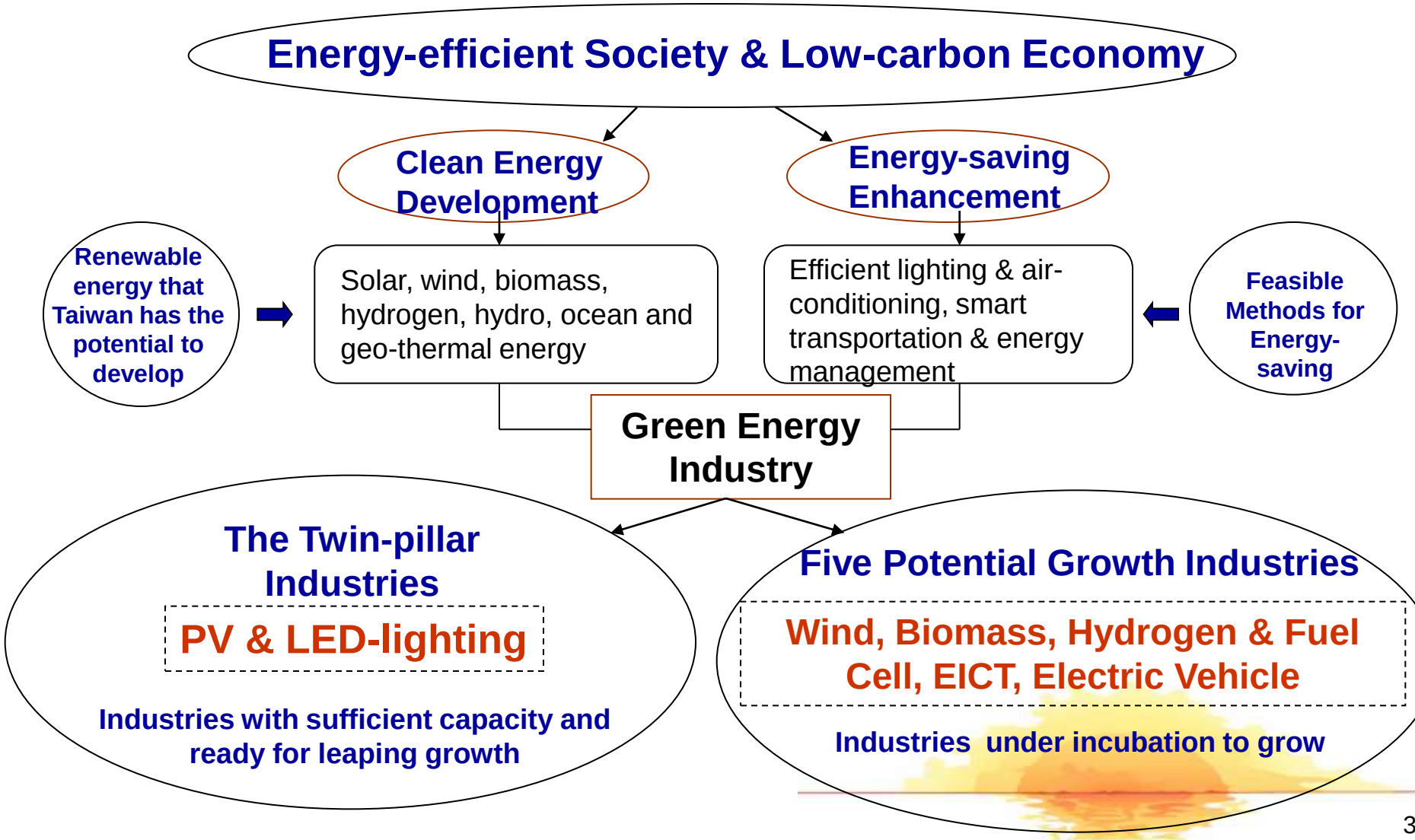
II. Strategy for the Five Potential Growth Industries Development

III. Major Promotion Plans & Status

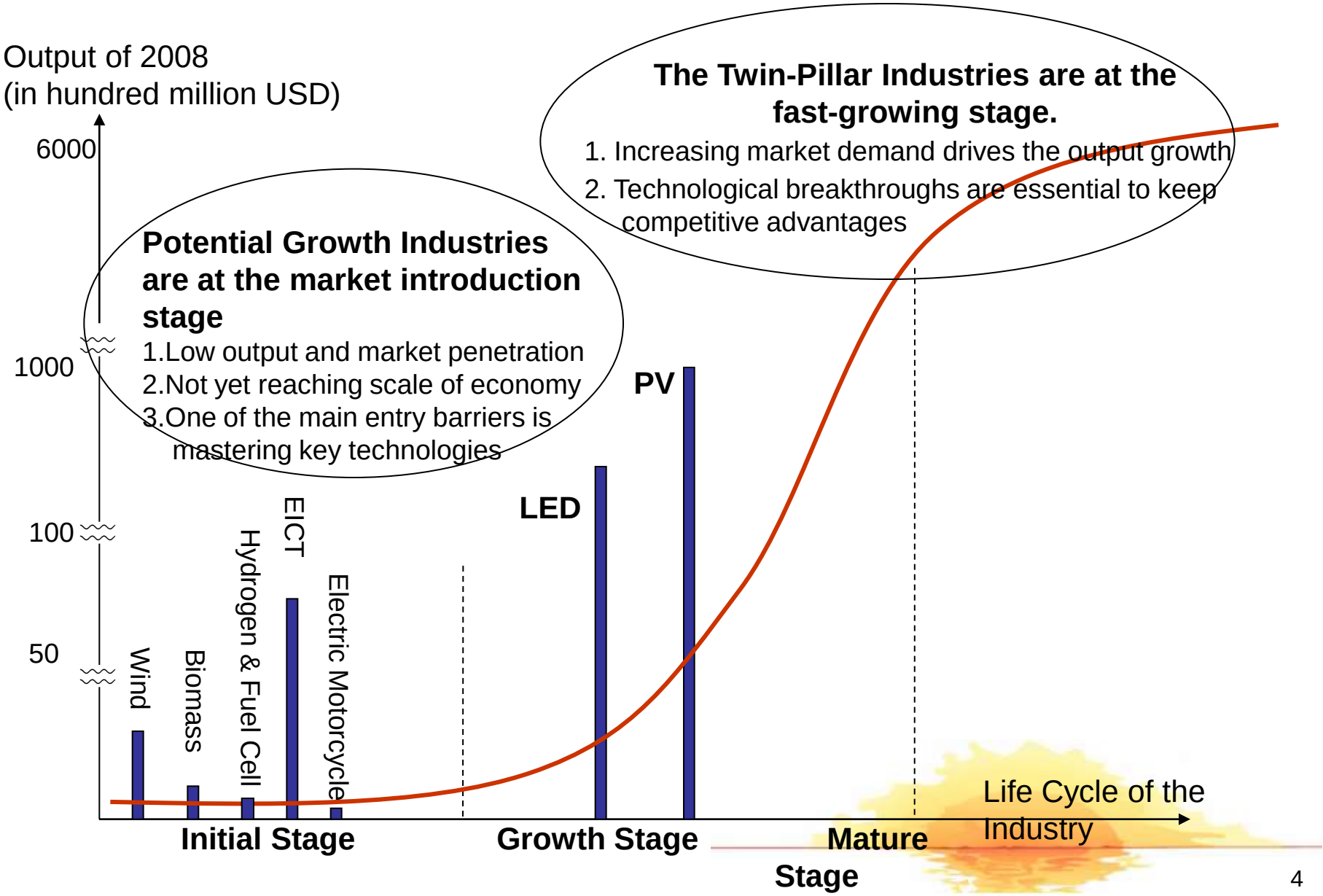
IV. Discussion Outline

I. Taiwan's Green Energy Industry Assessment & Promotion Plan

(I) Key Industries for Development



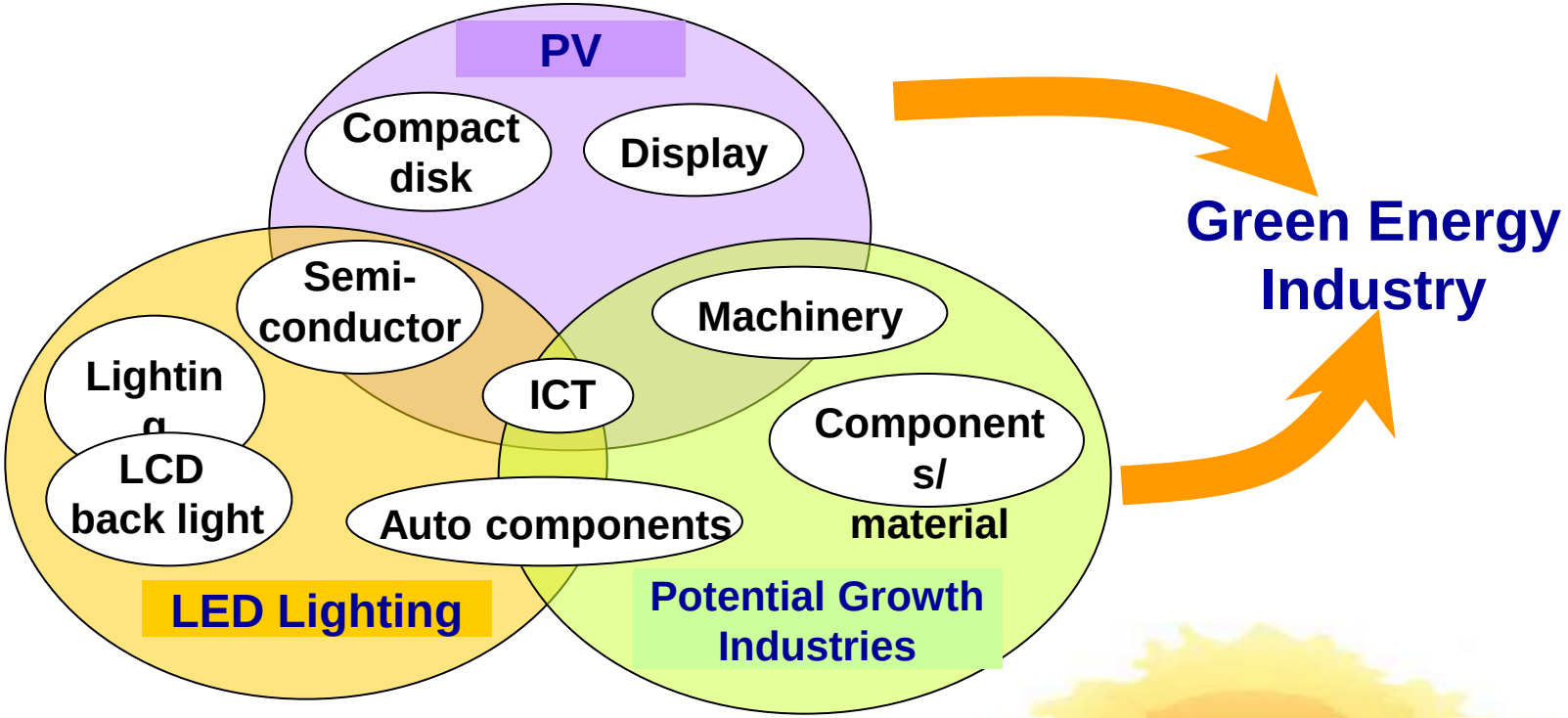
(II) Current Statuses of the Key Industries



(III) Taiwan's Competitive Advantages in Developing Green Energy Industry

Taiwan's major advantages:

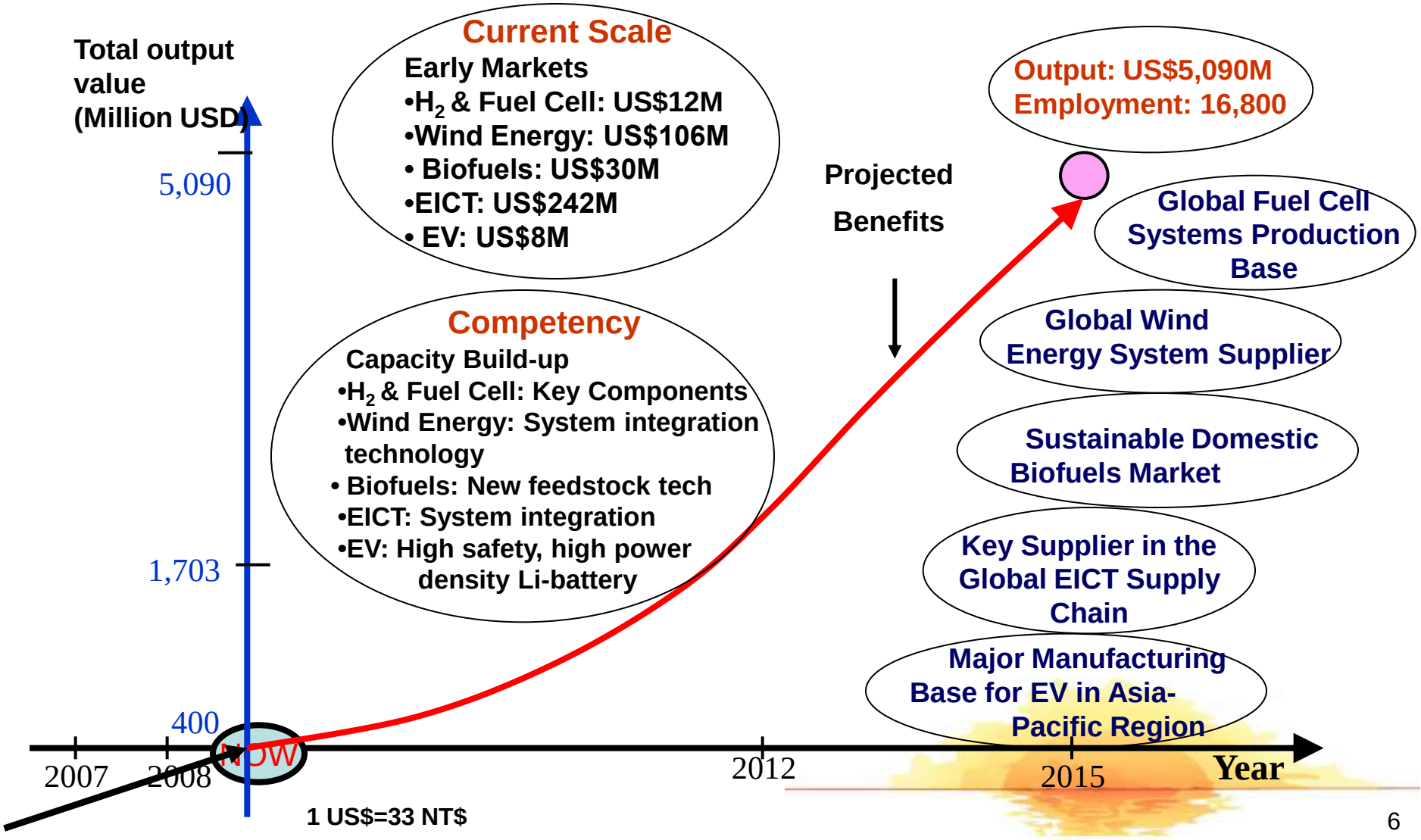
1. Strong & competitive IT industry base and skilled manufacturing process management
2. Well-developed manufacturing capacity and human resources in conventional industries, such as electro-mechanical, metal products, composite material, and electronic control
3. Excellent talent pool in semiconductor and TFT-LCD industries easily transferable to green energy industry



Leveraging the strengths of existing competitive industries to make Taiwan a leader in the global green energy Industry

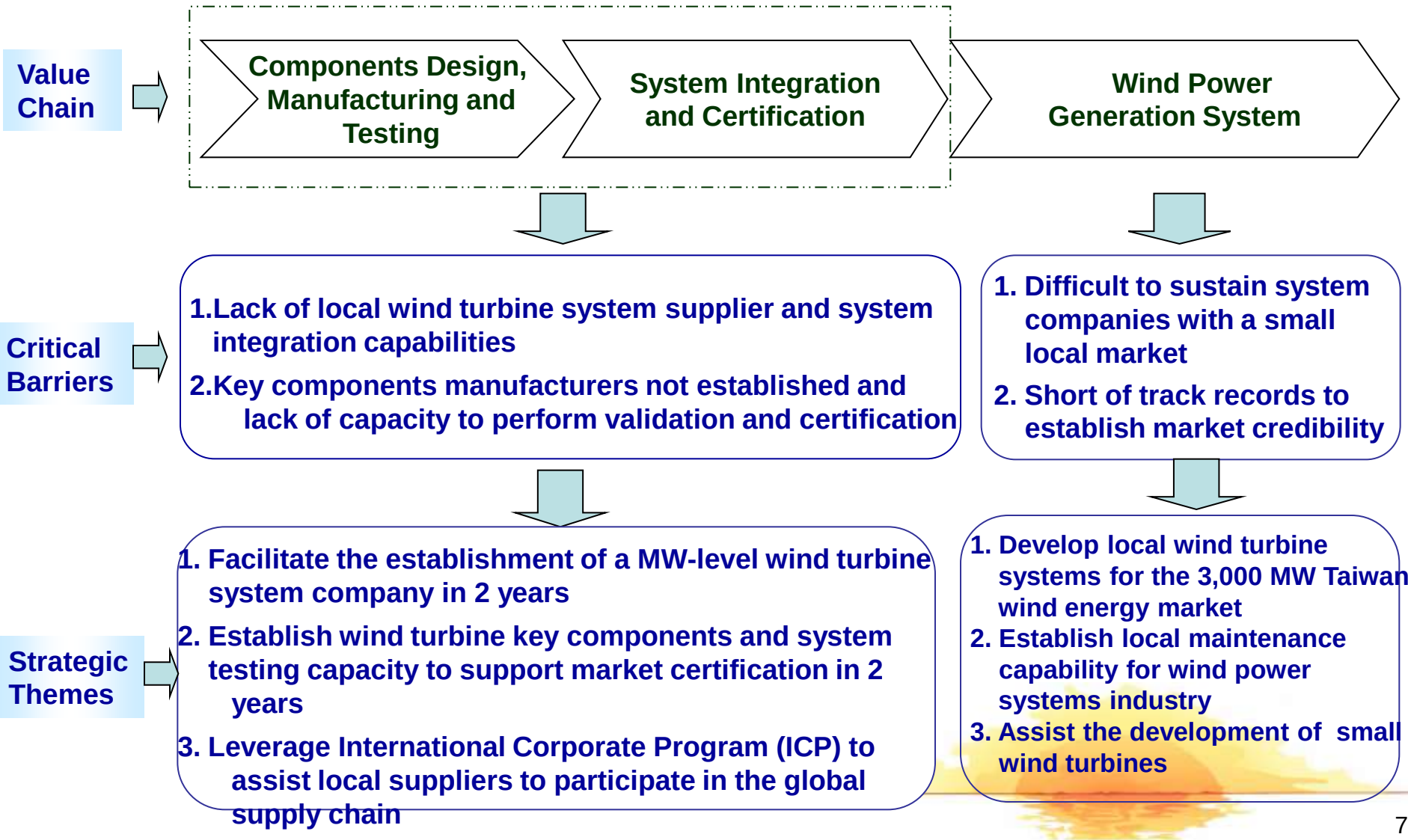
II. Strategy for the Five Potential Growth Industries Development

(I) Current Status and Vision of the Potential Growth Industries



(II) Challenges and Development Strategy

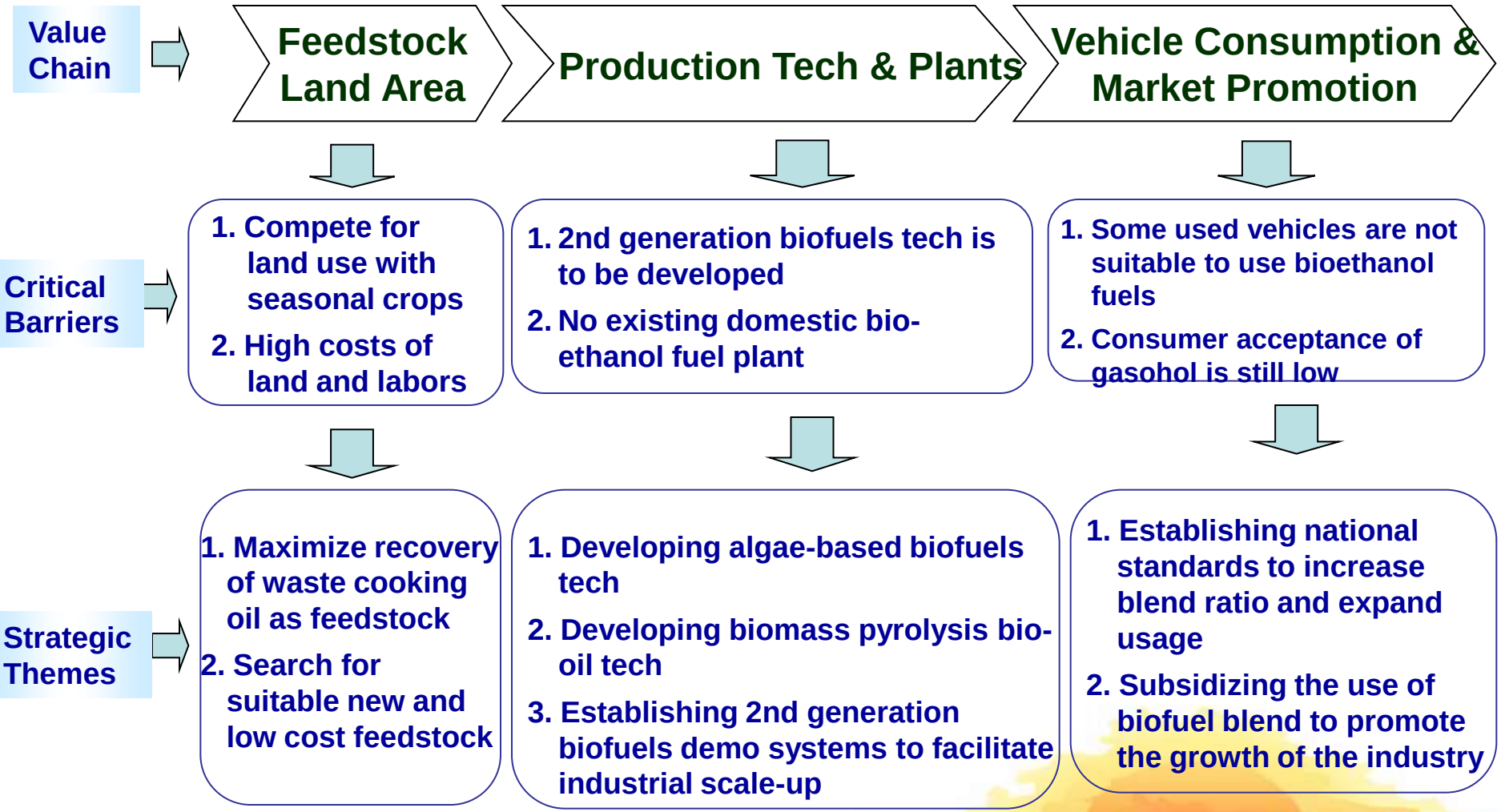
A. Wind Energy Industry



Strategies and Specific Measures

Strategy	Measure
Technology breakthrough	
Establish the capacity for on-shore key wind turbine components	The development of domestic 2MW wind turbine system integration with local key components exceeding 50% and international certification
	Assist in the development of small wind turbines
Develop offshore wind turbine technologies	Develop typhoon- and earthquake-resistant key technologies
Critical investments	
Assist in the establishment of MW-class wind turbine manufacturers	Assist in the establishment of a local MW-class system manufacturer within 2 years in Taiwan
Establish the capacity for turbine repair and maintenance	Promote international cooperation to establish Taiwan-based system maintenance and service teams
Conducive environment	
Establish wind turbine testing and certification capability	Set up a key component and system testing platform within 2 years for international products certification
	Establish a 150kW-class wind turbine system standardized inspection and verification platform
Build a wind power key components and subsystem inspection laboratory and certification platform	Establish an on-shore wind turbine key components and subsystem certification, inspection laboratory and testing platform to enhance certification capability, assist manufacturers in securing international certification to enter the supply chain of major international suppliers, and improve the domestic maintenance capacity and international competitiveness

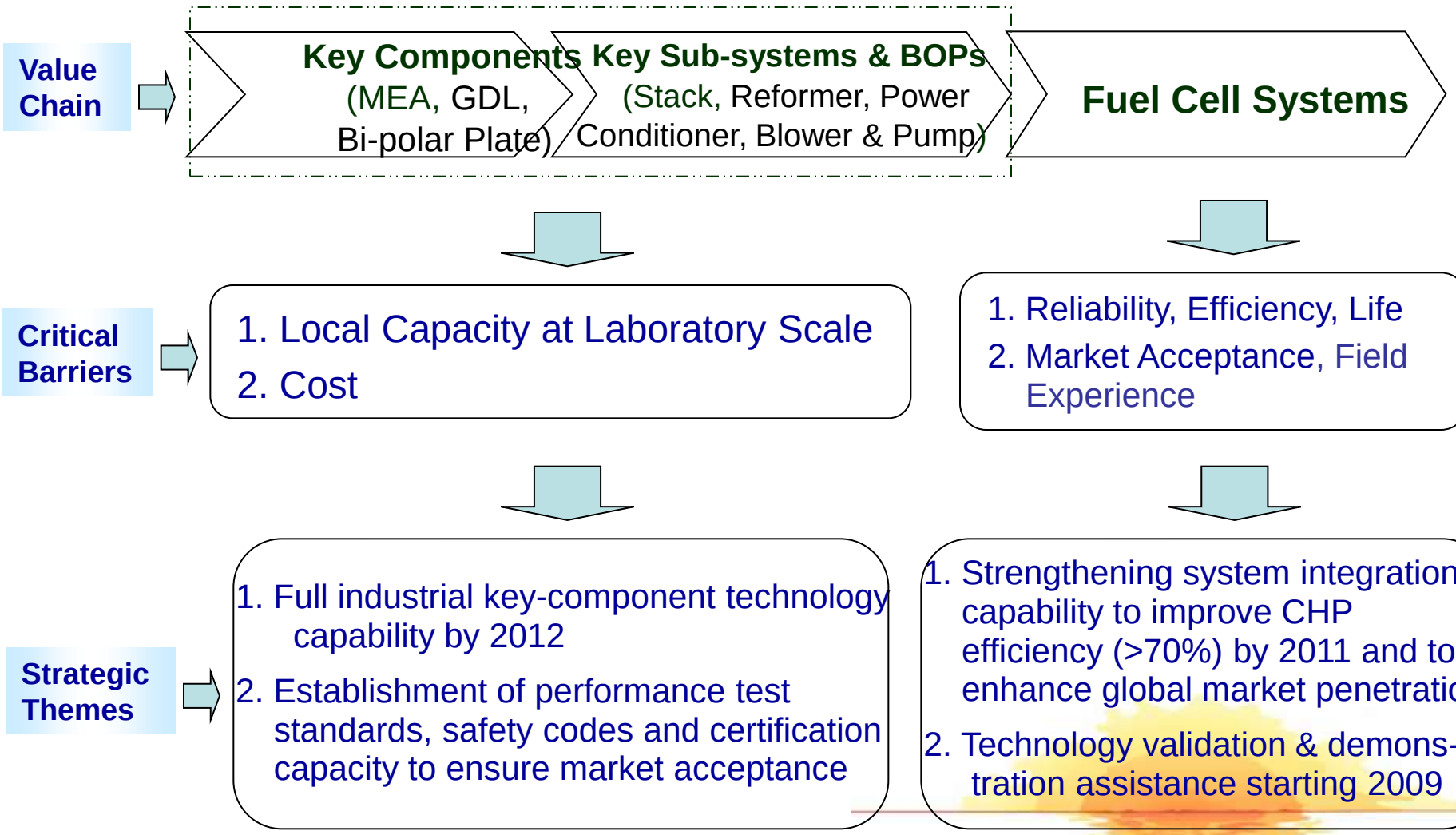
B. Biofuels Industry



Strategies and Specific Measures

Strategy	Measure
Technology breakthrough	
Development of new feedstock and new technologies	Establish cellulosic ethanol technologies with local rice straws as the main feedstock
	Achieve breakthroughs in key oil-producing microalgae technology, foster and establish internationally competitive manufacturers with indigenous technologies according to international commercialization schedule (2015)
	Use of agricultural and forestry waste with pyrolysis technology for fuel oil and to establish a commercial scale pilot demonstration system for technology transfer
Critical investments	
Establishment of domestic biomass fuels supply system	Provide assistance on setting up the second-generation biomass fuel production systems and demo plants
	Assist in the establishment of bio-ethanol plants
Conducive environment	
Establishment of national standards, and gradual increase of blending ratio	Amend and promulgate national standards and relevant regulations for rising blending ratios
	Establish the biomass source identification, characteristics measurement standards and traceable system
Domestic market growth	
Expansion of domestic demand and promotion of industrial development	Plan and promote the comprehensive supply of B2 biodiesel and E3 ethanol gasoline

C. H2&Fuel Cell Industry



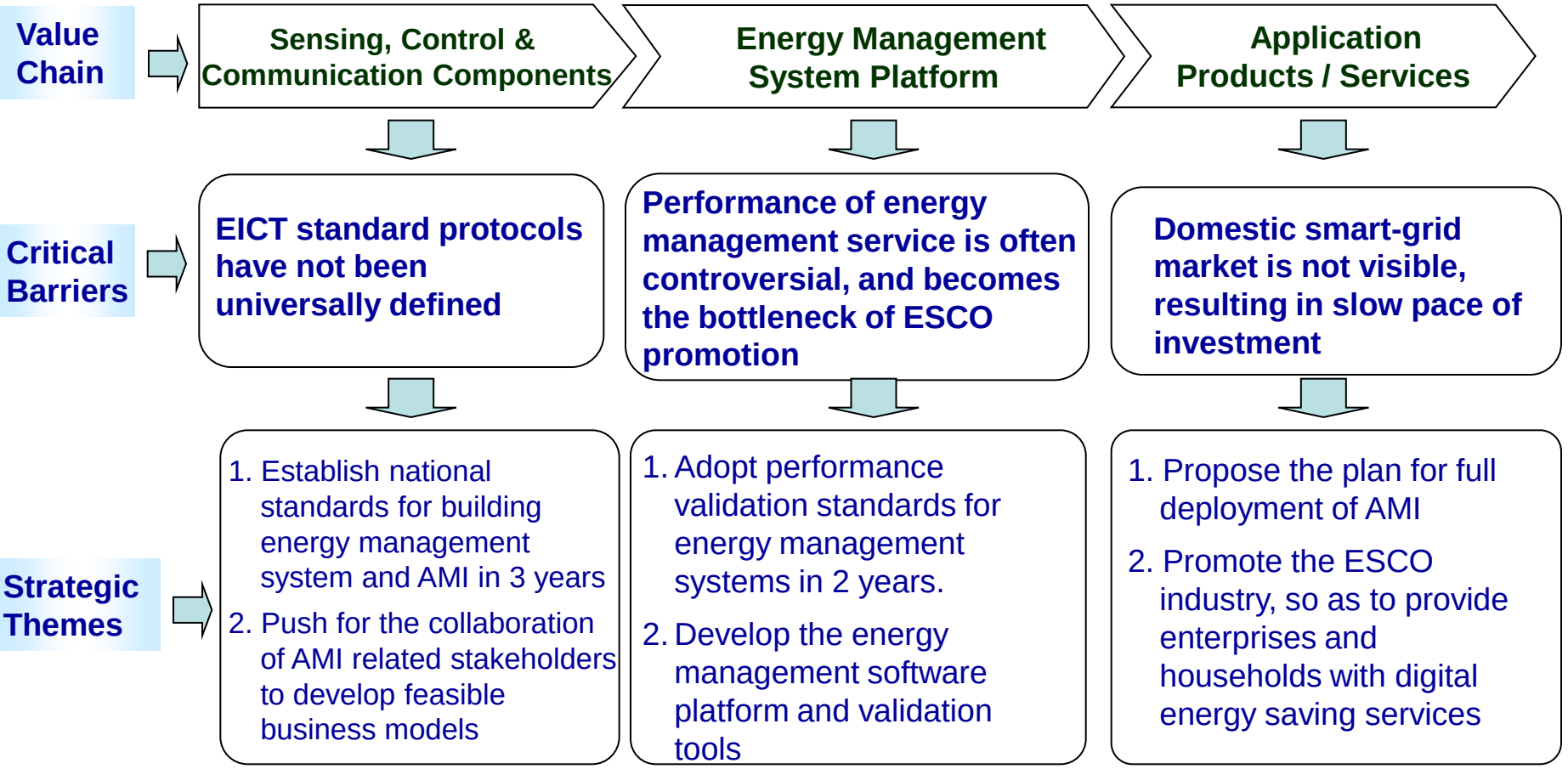
Strategies and Specific Measures

Strategy	Measure
Technology breakthrough	
Indigenous key and peripheral components (BOP) technology	Establish localized mass production technology for key components of fuel cell (GDL, MEA, the fuel reformer, etc.) within 2- 3 years
	Establish BOP volume production technology
Improve systems integration capability and system efficiency to international benchmarks	Improve overall efficiency, durability, as well as reduction of cost of combined heat & power systems
Develop portable hydrogen energy products to expand niche markets and industrial scale	Commercialization of portable hydrogen charger / power supply
Critical investments	
Assist and facilitate volume production of key components and systems in Taiwan	Assist in the setting up of backup power and system suppliers

Strategies and Specific Measures (cont'd)

Strategy	Measure
Conducive environment	
Establish national standards conforming with international standards	Develop fuel cell performance testing standards
	Establish fuel cell testing & verification platform
	A standardized hydrogen and fuel cell system testing platform
	Establish national measurement standards and internationally traceable system
Export markets expansion	
Cross-strait common standards and participation in major international exhibitions	Establish a cross-strait standards cooperation platform
	Assist in technology cooperation between local industry and potential markets, and help at least one manufacturer to gain access into international supply chain
	Assist in participation in major international exhibitions for markets development
Domestic market growth	
Promote demonstrations to accelerate product development	Promote fuel cell demonstration programs for markets validation and introduction

D. Energy Information & Communication Technology Industry



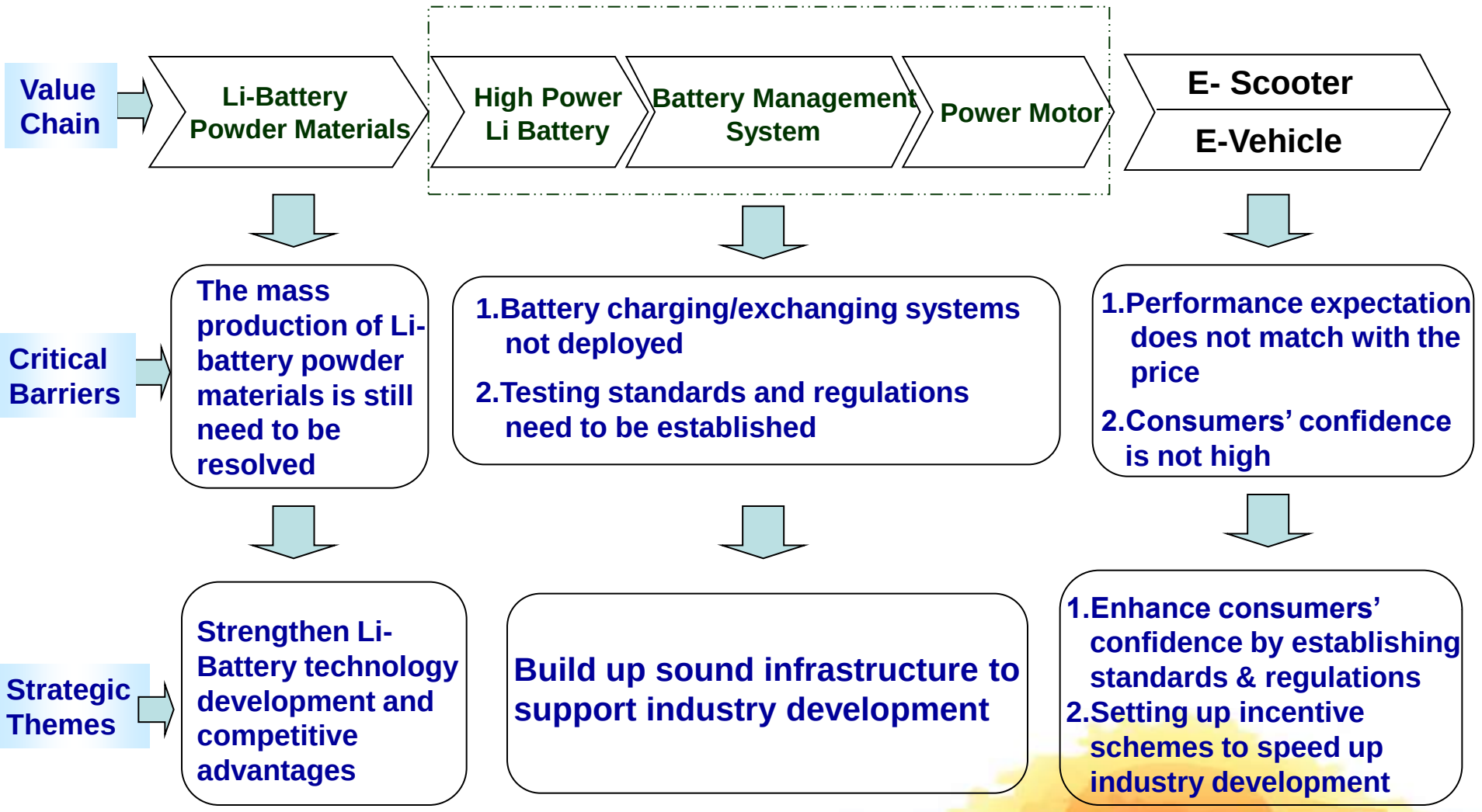
EICT： Adopting the information and communication technologies in the industrial process optimization, intelligent transportation system, residential and commercial energy management, and smart grids. The scope contains software, hardware and system service technologies.

AMI： Advanced Metering Infrastructure, including smart meters, communication system, and metering data management system, is essential for the advanced power management.

Strategies and Specific Measures

Strategy	Measure
Technology breakthrough	
Enhance research and development capacity for indigenous technologies	Assist 2-3 manufacturing and power information system vendors to establish Taiwan's own AMI technology within two years
Conducive environment	
National standards in line with international norms	Develop electric power system information exchange standards and establish a verification mechanism for smart meters
	Establish national validation platform for energy efficiency compliance
Domestic market growth	
Stimulate industry development with AMI domestic demand	Install AMI smart meters for 23,000 high-voltage users
	Promote residential, commercial and industrial smart energy management systems
	Plan for the installation of 100,000 low-voltage AMI demo systems

E. Electric Vehicle Industry



Strategies and Specific Measures

Strategy	Measure
Technology breakthrough	
Develop batteries with high-energy content material and high efficiency power modules	Key IPs: costs of batteries and modules reduced to 1/3 of current level; battery life extended to twice as long (10 years); battery materials for 5-minute quick charge
	Development of core and key technologies: motors (incl. driver controllers) power density up by 40%; energy efficiency increase by 20%; weight reduction by 10%; range extension technology development
	Facilitate the industry to cooperate with R&D organizations for advanced technology and product commercialization
Set up electric vehicle testing standards and create modular system integration and verification platforms	˙Establish component and systems engineering development platform ˙Establish electric vehicle and component verification platform and testing technology development of key components for various specifications
Conducive environment	
Establish a large-scale electric vehicles R&D base	Promote cross-industry alliances to conduct research and innovation, attracting 30 cross-strait companies to invest, and to achieve global leadership in system R&D, validation and joint marketing
Domestic market growth	
Provide subsidies for the purchase of preferred products to achieve economies of scale	Provide subsidies for the purchase of 160,000 electric motorcycles over a four-year period
Install electric vehicle charging facilities for convenience of use	Facilitate the establishment of motor vehicles charging and maintenance industry
	Cooperate with local governments to establish public charging facilities for electric motorcycles

III. Major Promotion Plans & Status

(I) Wind Power Generation

A. Critical Investment: TECO is scheduled to complete the assembly of the first wind turbine nacelle in Taiwan in March 2010.

B. Export Markets Expansion

1. **Overseas sales missions: As of Sept. 2009, overseas wind power generation sales resulted in US$50 million in orders on site, and US$150 million within one year.**
2. **Cross-strait Bridging : In August 2009, a cross-strait wind power industry cooperation and exchange conference was held. An industry cooperation memo was signed on future topics of cooperation, which includes wind turbine component supply, cross-strait wind condition research and information exchange, offshore wind turbine demonstration projects, in order to establish a cross-strait cooperation platform and to open up opportunities for both sides in the wind power industry.**
3. **Increasing domestic demand: 200 wind turbines have been completed, with total capacity of 380,000 kW; the number of wind turbines in the application process and those scheduled for completion are 162, and additional 25 turbines in planning stages.**

(II) Hydrogen energy and fuel cells

A. Technology Breakthrough: A fuel cell BOP development alliance has been established with the lead system integrators for CHPs and backup power systems.

B. Export Markets Expansion: Carry out 1kW CHP prototype system to participate in the Fuel Cell Expo in Japan in March 2010, to gain access into a major international market.

C. Domestic Markets Expansion:

1. Establish a “Fuel Cell Demonstration and Promotion Office” to demonstration and validation so as to accelerate products and industrial development.
2. In 2009 fuel cell demonstration subsidies have been awarded for the first time. A total of 18 applications has been approved, ushering in the fuel cell and hydrogen era, including:

(1) Backup power system (UPS): Pure hydrogen, reformate, methanol & NG reformers, kW-class stationary systems and etc.

(2) Specialty system: Four-wheeler (pure hydrogen), forklift, mobile air pollution monitoring, emergency medical transportation unit, motorcycles, mobile hawking carts, emergency disaster monitoring system application, hydrogen generation from agricultural wastes and etc.

(III) Biomass fuels

A. Critical Investment: Assist Cosmostar Bio-Chemical Corp. in the investment and construction of bioethanol factory; Taiwan CPC Corp. has planned to Jatropha crop plantation in Indonesia to produce biodiesel.

B. Domestic Market Growth

1. Biodiesel: All gas stations in Taiwan are selling biodiesel B1; currently preparation is underway for B2 implementation in 2010.
2. Biothanol: The green government vehicles pilot project has been expanded. E3 ethanol gasoline project is being implemented in the Taipei and Kaohsiung metropolitan areas.

(IV) Energy Information and Communication

A. Technology Breakthrough

1. Assist Shihlin Electric to complete the first domestic electronic meter in Taiwan, which with approval from Taiwan Power Corp. serves as a foundation for global market entry.
2. Develop a web-based distributed energy management system, which has been licensed to Family Mart convenience store chain and is scheduled to be implemented in 150 of its stores this year (2009). In the future, this system will be expanded to other stores, as well as to franchise stores in China and Japan.

B. Domestic Market Growth

1. AMI smart meter installations for 23,000 high-voltage users: high-voltage AMI Information Systems have been accomplished and smart meters are being installed.
2. Preliminary plan for the installation of 100,000 low-voltage AMI demo systems: test system of 50 households has been designed. Deployment is scheduled to be completed by the end of October 2009, and communications test will be carried out afterwards.

(V) Electric vehicles

A. Critical Investment

1. Motor systems: A total of 4 manufacturers, TECO, Fukuta Electric, Shihlin Electric and Rhymebus/Yeli will be involved in the investment and development.
2. Electrical power systems: Simplo (SMP), Molicel, Lite-On, MatriTek, TD HiTech Eneergy, and Amita Technologies will be involved in the investment and development.

B. Domestic Market Growth

1. Develop electric motorcycle performance and safety testing standards to ensure the safety of the public.
2. Promulgate electric motorcycle subsidies and incentives guidelines as the basis for policy implementation
3. One manufacturer has completed testing and has applied for subsidies for its products. It is expected that by the end of October certified products will be available on the market. It is planned that 160,000 vehicles will be promoted over a 4-year period.

IV. Discussion Outline

1. Build up key components supply chain, domestic technical capacity and industrial benefits of the five growth industries.
2. Directions and key considerations for Taiwan's next-generation growth energy technology development to ensure that a net energy output and reduction in greenhouse gases (GHGs) can be achieved via LCA analysis.
3. Future business models and R&D direction for energy management and advanced metering technologies in a decentralized energy system.
4. Energy policies and development strategies regarding biomass energy under the disadvantages of shortage in raw material and high costs.

MOEA

THANK YOU!

Discussion Outline

- **The Twin-pillar Industries**
  1. Strategies to accelerate the development of photovoltaics and LED technologies
  2. Strategies and plans to establish domestic key technologies and frontier science base in photovoltaics and LEDs through international cooperation and technology transfer
  3. Methodology to foster and develop worldwide marketing channels and brands for photovoltaics and LED products
  4. Policy & measures for professional training in innovative business development as the foundation for accelerated industrial development
- **Five Potential Growth Industries**
  1. Build up key components supply chain, domestic technical capacity and industrial benefits of the five growth industries.
  2. 2. Directions and key considerations for Taiwan's next-generation growth energy technology development to ensure that a net energy output and reduction in greenhouse gases (GHGs) can be achieved via LCA analysis.
  3. 3. Future business models and R&D direction for energy management and advanced metering technologies in a decentralized energy system.
  4. 4. Energy policies and development strategies regarding biomass energy under the disadvantages of shortage in raw material and high costs.