

# Chapter 11. Conclusion

This report is built on two fundamental propositions. First, given the current inefficient development patterns of developing Asian and Pacific countries, the economies of the region cannot continue long to support the very high demand for renewable and nonrenewable resources without significant negative impacts from resource trends, including higher prices, severe degradation, and growing internal competition. Second, governments around the region have the ability to follow an alternative path to development that can not only help avoid these impacts, but can also take advantage of enormous opportunities to invest wisely in infrastructure and institutions for their future in ways that will simultaneously strengthen their competitive advantage, generate jobs and provide for a clean and productive environment.

The clock is running to avert global resource constraints and unmanageable amounts of wastes. Under current development patterns, the faster economic growth occurs, the worse the problem will become, because the intensity of natural resource use and the amount of pollutants discharged into the environment are not yet falling as fast as production is rising. Thus, economic growth may seem like a success, but the present track is leading to an inherently unsustainable and unstable condition. Finding ways to improve the resource efficiency of Asia's economies can help perpetuate the enormous benefits of economic expansion the region has enjoyed while minimizing the environmental and other associated costs. Through increased employment opportunities (and income generated) and reduced health and environmental impacts from harmful wastes, resource efficiency can also lessen the conditions that contribute to poverty, the major focus of the Millennium Development Goals (MDGs).

However, the potential impacts of Asia's growth extend well beyond its borders, especially with respect to climate change impacts. Much of the

global increase in greenhouse gas (GHG) emissions over the next 20 years is expected to occur in the developing world, where emerging economies—such as the PRC and India—continue to base their economic development on heavy use of fossil energy derived from hydrocarbons. Climate change may result in wide-scale regional and global changes in the existing environmental and ecological balance. It is not an exaggeration, then, to say that the future of humankind and the planet will depend in large measure on the ability of the developing economies in this region to break from their current inefficient and environmentally damaging resource use patterns.

The second point made above is that governments around the region have the ability to follow an alternative path to development that can not only help avoid these impacts, but can also take advantage of enormous opportunities that lie ahead in the region. There are enormous investment requirements for economic infrastructure, and choices made now about the nature of these investments offer the chance to enhance long-run competitive advantage by leapfrogging over older-generation technologies and greatly increasing resource efficiency.

This path involves countries shifting from current inefficient patterns of resource use and embracing more resource-efficient norms. On a planet that may push its limits in a number of areas (demographic, environmental, energy, and agricultural) within this century, nations must not only plan strategically about how to achieve far more resource-efficient economies, but they must also commit the financial resources and develop the political will to implement their strategies before it is too late.

The choice should be clear—make the necessary adjustments and gain the benefits now or pay dearly later. All countries in Asia and the Pacific face increased competition for resources and rising costs. They cannot afford to respond slowly to

rapidly emerging constraints on environmentally sustainable economic growth. The adoption of new approaches to reducing, reusing, and recycling wastes are essential to the sustainable future of Asian economies.

This report has focused most of its attention on the roles that governments can play in this transition, and it has described a framework they can follow to start moving their economies toward greater resource efficiency. In describing this framework, the authors identified eight important roles for national and subnational governments, each elaborated in separate chapters of the report. This final chapter recaps these points, along with some of the important related examples and opportunities given throughout the report.

### **Role 1: Adopting Integrative Thinking to Change Perspectives and Decision-Making Processes**

Responding adequately to mounting environmental challenges in the region demands greater integration and coordination across several dimensions of resource management. Major improvements in resource efficiency—not just modest incremental changes—are needed. Four important dimensions that policy makers need to consider are:

**Integrative planning across economic, social, and environmental spheres.** One of the keys to achieving sustainable development is recognizing that economic, social, and environmental systems are actually complementary, not in conflict. The three systems are coequal and interdependent, with major areas of overlapping interest. Structural reforms to address resource efficiency can offer benefits in two areas that policymakers might not expect—poverty reduction and job creation.

**Materials, energy, water, and land as integrated systems.** Integration for resource efficiency in policy making and investment should emphasize interactions and efficiency improvements among the basic resource flows and stocks, including materials, energy, water, and land. When focused on one type of resource, it is important to always consider how it interacts with others, because the production or use of each type of resource places demands on all

the others. The policies and practices of sustainable agriculture illustrate the power of integrative planning and management to achieve high resource efficiency. The use of an integrated approach to resource management is also applicable and cost-effective for green building design and the planning of livable cities.

**Integrative planning across naturally defined regions.** Typical planning processes fragment different types of land use in a region, focusing on urban or rural or wild land without perceiving the interactions among them. Integrative regional planning seeks to optimize solutions by addressing multiple issues as a whole system. It may begin with a defined problem or a proposed solution. One area in which integrative planning is essential, for example, is making economic use of the huge amount of biomass waste overloading landfills around the region. The core issue is planning sustainable programs and initiatives to absorb this largest component of both urban and rural waste, while integrating its use with appropriate bioenergy production.

**Integrative planning across time horizons—climate change.** Policy makers and investors often plan over a relatively short time frame. They make choices that appear cost effective in the present but create major economic or environmental problems later. There are many principles, methods, and tools to support longer-term planning. One illustration of such planning relates to one of the most critical challenges facing the world: responding to the present impacts of climate change and preparing for the likely future impacts. Given the complexity of the causes and consequences of climate change, it is important to consider diverse scenarios of what may happen and determine what short- and mid-term initiatives are the best investments.

### **Role 2: Developing National Policy Frameworks**

To bring about changes in the way countries use resources, it is vital to achieve a collaboration of government, business, civil society, and other stakeholders, all focused on developing and implementing a coherent and implementable

national framework for greater resource efficiency. National frameworks range from overall development strategies to specific environmental standards and regulations.

**Overarching policies.** For the necessary reforms to occur, policy makers must first see resource efficiency as a means to improve economic performance and environmental quality and then establish policies through legislation or executive order mandating an integrative approach for all agencies with supporting capacity-building programs. Such policies should seek to optimize economic efficiency across the resource inputs of materials, energy, water, and land use. Policy makers should consider adopting life-cycle assessment as a basic component of policy and investment analysis.

**Targets, monitoring, and benchmarking.** In formulating policies to improve resource efficiency, it is vital to quantify problems, establish priorities, and monitor progress toward achieving them through benchmarking. Quantitative indicators can help indicate what needs to be changed and by how much. They also allow comparisons, either between governments or between companies, and are important for measuring the progress of government and business actions against predefined targets.

**Policy and program instruments.** Achieving resource efficiency requires careful analysis planning and coordinated execution of the chosen policies and programs, which can be broadly described in four categories: regulatory instruments, economic and financial instruments, information-based instruments, and voluntary initiatives. An optimal mix of environmental policy instruments will often include elements of more than one of these categories. Decision makers must carefully evaluate and select each policy instrument to be appropriate to the objective and to the setting.

**Policies to promote materials, energy, and water efficiency.** While countries should consider developing an integrated policy to promote resource efficiency, it is also important to establish sound policies that separately encourage greater resource efficiencies in the use of materials, energy, and water applying the policy instruments referenced above.

- **Materials.** In a number of Asian countries, national and local government leaders are developing and implementing upstream and downstream measures to deal more effectively with the enormity of their waste problems as part of national plans and programs to promote the 3Rs in waste management. Specific examples discussed in this report include: substance, product, or technology bans; take-back provisions; green purchasing regulations; biomass policies and programs; recycling programs; deposit-refund programs; performance bonds; and regulations for construction and demolition debris.
- **Energy.** Energy efficiency covers many diverse and distinct market segments, all targeting the creation of a low-carbon, sustainable energy future that is cognizant of climate change risks. Examples of policies include energy audits targeting industry, energy efficiency standards and labels for appliances and vehicles, energy pricing and taxation, favorable subsidies (tax credits and loans), financing through energy service companies (ESCOs), demand-side management, carbon (GHG reduction) projects, and net metering to allow excess electricity production from renewable sources to be sold back to the grid.
- **Water.** Reforming the water sector for greater efficiency must involve decision makers at all levels working together and hinges first and foremost on waster pricing. National and regional efforts must focus mainly on improving allocative efficiency of price mechanisms based on the "scarcity" value of water, while local efforts must focus more on improving the technical and productive water efficiency by increasing water recycling and water saving. It is crucial that efforts at all levels be mutually reinforcing and that they be implemented with full participation of the agencies and stakeholders involved, including surrogates (such as environmental nongovernment organizations [NGOs]) for the water needs of natural systems.

### Role 3: Building Institutional Capacity

Without sufficient institutional capacity and arrangements, even the most progressive legislative

reforms will fail to have the desired effect, and any efforts at economic or environmental planning can easily be compromised by political interests and mismanagement. As a result, scarce resources, such as water, materials, and energy, will continue to be used inefficiently. Most countries in the region face common institutional challenges, including: strengthening political awareness, building adequate capacity in key government and resource management institutions, clarifying roles among government agencies, optimizing budgetary allocations, enhancing access to justice, fostering public involvement, and generating and disclosing relevant information. Three of the most important institutional measures that developing countries can take to address these deficiencies are discussed in the following paragraphs.

**Coordinating developmental and environmental policies.** Any efforts to improve institutional capacity must be broad-based. They must target authorities in charge of environmental protection and sustainable development, those responsible for the coordination and integration among different sectors—agriculture, construction, education, environment, finance, health, industry, and transportation—and also those governing specific environmental areas, such as water resources management and energy planning. In coordinating with others, environmental agencies should address gaps and overlaps in authority, and ambiguity in operational roles. Possible cooperation mechanisms include interagency agreements that establish clear coordination procedures, joint research programs, and multi-agency committees or task forces.

**Devolving authorities to local governments.** Despite the challenges encountered in decentralizing environmental functions, national or central governments should continue their efforts to grant increased powers to regional or local authorities. Overall, devolution and autonomy can foster increased efficiency and equity. For many functions, regional or local authorities have a more complete understanding of conditions and needs and can better plan and implement responses within a national framework. The challenge is to strike a balance between which responsibilities are retained at the national level and those devolved to local

levels. At a minimum, national agencies should retain authority over national standard-setting and policy making and issues related to transboundary pollution. National agencies should also retain ultimate enforcement powers over responsibilities devolved to local authorities. In this effort, it is important that national environmental agencies should build and strengthen the capacity of subnational units and provide the necessary oversight, implementation support, and coordination.

**Increasing financial resources.** According to recent estimates, government spending on environmental protection amounts to less than 1% of gross domestic product (GDP) in Asia and the Pacific. Under these budgetary constraints, environmental agencies in many countries in the region are hindered in effectively repairing and upgrading environmental infrastructure, as well as investing in strengthening technical skills of officials. Insufficient resources also prevent investment in supporting facilities to upgrade production equipment and apply advanced technology to treat wastes by domestic enterprises. Clearly, countries need to increase their budgetary allocations for environment protection—including those aimed at improving resource efficiency—beyond present regional norms.

#### Role 4: Supporting Local Action

The critical role of local authorities in promoting resource efficiency should not be overlooked. Because local governments have jurisdiction over the large populations living and working within their boundaries, they are in a good position to influence the habits that cause inefficient resource consumption patterns. Local initiatives are most effective when supported by comprehensive national legislation and national programs, especially those that provide incentive mechanisms for local governments. Community-based organizations and NGOs also play an essential role in local programs, especially in the areas of public awareness and education. Meanwhile, international agencies and organizations can do their part by channeling financial and technical support to the local level and by fostering collaboration to provide a common platform to share ideas, experiences, and knowledge.

**Solid waste management.** The cities that have enjoyed the most success in managing their wastes have typically combined conventional solutions with affordable and community-based solutions that work well in a developing country context. This typically includes considering the contribution of informal waste collectors and resellers (waste pickers or scavengers). Local programs, often supported by NGOs, can improve resource efficiency, help create jobs, protect the environment, promote community participation, and encourage and support entrepreneurship.

**Energy efficiency and reducing greenhouse gas emissions.** When cities plan and develop with energy efficiency and reduced GHG emissions in mind, per capita energy consumption for municipal, residential, and transportation needs can be cut significantly. While they cannot legislate national carbon taxes or mandate nationwide changes in the fuel mix for electricity, local governments can choose to either mitigate GHG emissions and contribute to the solution or they can exacerbate unsustainable energy practices that waste money, cause air pollution, and contribute to climate change. Since local governments design and manage public assets and operations, such as buildings and facilities, they frequently have regulatory influence or responsibility for building codes, make or influence infrastructure decisions and investments that determine energy use in the transportation sector, and control local land-use policies.

**Water efficiency.** While large-scale, capital-intensive projects are needed where feasible and appropriate, some of the most promising measures to improve the efficiency of water use are being mounted in households, farmers' fields, villages, and city neighborhoods across the developing world. If such efforts are to expand, local authorities need to operate within a national framework that includes water codes, laws, and regulations, including sound water pricing. Local strategies work best when complemented by national and international programs of resource management and conservation, as well as by scientific research and extension programs to develop and popularize ways to increase water efficiency. Because agriculture is a major consumer of water resources in most countries,

much local effort should be focused on developing more sustainable agricultural water management systems alongside the introduction of irrigation or groundwater pumping fees.

### Role 5: Investing in Resource-Efficient Infrastructure

Developing countries need to invest in all types of infrastructure, including energy, transport, and water, to improve living standards and to achieve the MDGs. Infrastructure investments often establish a country's pattern of resource use for decades to come. If conventional low-efficiency infrastructure continues to be introduced, the economies and the sustainability of resource use will suffer in the long term. Thus, private and public investors in developing countries should consider opportunities to bypass outmoded or conventional infrastructure solutions, that is, to "leapfrog" over them by shifting investments to highly resource-efficient alternatives that are readily available. These include renewable energy sources, energy efficient buildings and lighting schemes, modern sanitary landfill designs, pedestrian-friendly urban areas, electronic information management and communication systems that lower paper demands and the need for travel, mass transit systems, integrated water resources management solution, and demand-side management for all resources. The report gives three examples to help illustrate this point:

**Centralized versus decentralized wastewater systems.** For many developing countries, there are a number of disadvantages in investing in costly, centralized systems. Capital-intensive systems take up considerable urban land and import technologies that are typically inappropriate; and large-scale systems rarely pay for themselves out of revenues generated in developing countries. Decentralized wastewater systems can reduce public investment, increase efficiency of water use, generate renewable energy and organic fertilizer, and avoid solid waste disposal of sludge.

**Landfills and incinerators versus resource recovery and recycling.** Because of the rapidly increasing volume of waste, the cost of its disposal is growing. Yet, many cities that are finally starting

to address their waste management problems are turning primarily to conventional solid waste management solutions, such as sanitary landfills or incineration that focus on improving downstream disposal, while failing to fully pursue upstream options to reduce the waste load. To be truly cost efficient and sustainable, equal attention should be paid to upstream options to reduce waste for final disposal and to reuse and recycle valuable resources. Governments should be responsible for promoting appropriate and cost-effective technologies and infrastructure investments to manage partly recyclable products and unrecoverable wastes properly.

**Conventional versus green buildings.** The energy performance of buildings will become increasingly important to the energy outlook of Asian countries, as the built environment continues to expand throughout Asia. Initial design of a building or retrofitting an existing one can greatly reduce the energy, water, and other resources needed for the life of the facility. High-performance design creates the possibility that the building's management or owner can even gain revenues from selling energy and recycled resources internally or externally. The cost savings alone may pay back added costs of the resource-efficient design in relatively few years. Further savings can be gained through energy conservation practices building operation. Most of the known high-performance innovations have been demonstrated to be cost effective in the operation of hotels, apartments, office buildings, and individual residences.

### Role 6: Promoting New Technologies and Solutions

A big part of government's role in promoting resource efficiency is supporting the development and/or transfer of promising technologies. Governments set policies for manufacturing and service firms and for the operation of their own facilities and services. Governments are themselves major investors in environmental technology and research and development (R&D), and play a role in regulating and guiding private investors, such as banks and investment funds. They also have the power to reduce subsidies that discourage

development and to introduce incentives for innovation through market-based and other policy measures. The private sector is more likely to invest in new technologies if public policy provides a favorable government regulatory framework that permits full cost recovery and a market environment that rewards efficiency improvements. All these functions give government special leverage in promoting innovation, designs and application of new technologies and other resource-efficient investments.

**Research and development.** For national governments, promoting R&D is central to supporting investment in the environment and energy industries for resource efficiency. Most new technologies originate in the more developed countries, although some adaptations of these technologies or indigenous technologies are also produced in developing countries. R&D may be carried out by educational and research institutions, by industry institutes, and by the companies themselves. Government can encourage R&D by creating appropriate market incentives for environmental and resource efficiency improvements (tradable permit schemes, performance bonds, removal of perverse subsidies and careful use of grants or tax breaks to encourage innovation), providing grants through nonprofit institutions, and by making purchase commitments to create market demand. Green industrial parks can also help centralize research and extension services by providing a home for new and expanding businesses. Governments can also work with business associations, incubator services, and the research community to improve the success of investment in various sectors.

**Technology transfer.** Another strategy is to promote technology transfer by supporting partnership development with companies in more developed countries. Companies based in the European Union, Japan, and United States are rapidly entering the growing Asian market for the provision of infrastructure as well as environmental goods and services, competing with local firms. However, they often benefit from joint ventures with these same firms and are themselves employers of the local workforce. In many cases, a foreign company with an advanced technology may be relatively small and needs to partner with local entrepreneurs and

technologists to market their innovations. Even larger firms usually find market entry in Asia and the Pacific easier in partnership with local entities.

**Technology evaluation.** Competent, systems-based evaluation of environmental technology innovations is essential for understanding how they can most effectively be deployed and for beginning their cost-effective use earlier in the development cycle. An important role for technology evaluation is assessing their commercial-scale application, and government agencies can help to remove barriers to market entry through such assessments.

### Role 7: Supporting Industry Awareness and Change

More than 50 million companies are now operating in Asia, but few have been leaders in environmental performance. Many remain oblivious that their competitiveness is already at stake in a business world that is rapidly catching on to the benefits of “going green.” Countries may find it worthwhile to develop sector-specific programs for industry to promote more efficient resource use. Environment authorities need to engage actively with the business community they regulate, including small and medium-sized enterprises (SMEs), to agree on clear and fair targets for resource efficiency improvement. Government actions specifically targeted at industry include the following:

**Raising awareness and capacity.** Disseminating best industry practices can provide firms with both useful information that they can use to alter their own practices, and a reference point as to how they are doing relative to the entire industry. Practices may be defined by a government agency or the government may provide assistance to industry sector institutes to identify and disseminate the practices. There are a range of organizations that can help in the effort to disseminate and showcase best practice, management tools, and technologies—including information clearinghouses and networks, extension services and technical assistance systems, industry clubs or associations, demonstration projects, and training facilities.

**Co-regulation.** With appreciation growing of the

limits facing conventional policy instruments, many governments are encouraging the adoption of self-regulatory and co-regulatory policy instruments. The basic concept of voluntary initiatives is that more can be accomplished through a negotiated partnership between government and the private sector than through enforcement of regulations alone. They come in an infinite variety of forms and include any relationship in which the government, a firm or a business sector or a particular locality or consumer group agree to mutually beneficial terms to solve a commonly defined problem. Examples include: negotiated agreements between the firm and the regulatory body; auditable environmental management systems (e.g., ISO14001); and public-private partnerships between industry and government or industry and civil society to achieve agreed objectives and self-enforced industry codes of practice.

**Informational measures targeting industry.** Governments can further stimulate the adoption of appropriate industrial practices through informational measures. Action can be taken in a variety of areas, including ecolabeling schemes, public disclosure of firms’ environmental performance, energy audits, and environmental accounting systems.

**Eco-industrial park development.** Several Asian countries have established programs to transform existing industrial parks or estates into eco-industrial parks. In a few instances, these programs aim at developing new parks, but most have started by implementing shared waste management schemes and have sometimes moved on to experiment with industrial symbiosis, seeking exchange of by-products among companies. A firm’s decision to locate in such a park can provide lower waste management costs, access to resource efficient technologies and services, and new business opportunities.

### Role 8: Participating in Regional and International Initiatives

Many of the efforts in Asia to increase the efficiency of resource use will be strengthened through regional cooperation and integration. This is especially true in addressing problems associated with

hazardous wastes and transboundary pollutants. This report examined two important elements of regional cooperation related to resource efficiency: information sharing/capacity building and promoting the safe trade of secondary materials.

**Regional information sharing and capacity building.** Information sharing at the regional and international levels is critical to harmonizing policies and reducing the gap between countries in recycling-related institutional structure and recycling and management capacity. Sharing the experience of developed countries regarding recycling and waste management mechanisms can be useful for such capacity development to help improve systems for collection, transport, treatment, storage, recovery, and disposal.

**Promoting the safe trade of secondary materials.** The expanding trade in materials that are used by-products of consumer or producer actions offers both opportunities and threats in terms of Asia's environment and its sustainable development prospects. Depending on how such secondary materials are handled, trade can either complement waste minimization in the region or significantly increase environmental pollution and human health risks. Particularly troubling are the hazardous materials that form part of existing transboundary movements. This includes hazardous wastes contained in secondhand goods—older finished

consumer products that are partly recyclable—including electronic and computer equipment (e-waste) and used vehicles. Although the establishment of the Basel Convention represented the start of international efforts to control transboundary movements of hazardous wastes, illegal traffic is still prevalent. Both exporting and importing countries must strive jointly to prevent the transfer of environmental pollution and health risks that can result from transboundary movements of wastes. The problem is complex, and a comprehensive solution will require a range of remedies, including passing and enforcing tougher national laws, tracking shipments of secondary materials, and controlling shipments of secondhand goods.

## In Conclusion

With collaboration and perceptive planning, the nations of Asia and the Pacific can identify the needed policy measures, institutional reforms, technological innovations, and associated investments that will put the region's economic growth onto an environmentally sustainable path. By appreciating their common interests and objectives, governments the private sector, civil society and other stakeholders and partners can accomplish much more collaboratively than separately in building resource efficient economies that will contribute to a sustainable future.