Appendix 1

Urban Transport Study

The urban transport study conducted in parallel to this East Asia energy report developed a model to determine the fuel consumption and emissions from on-road transport in selected East Asian cities. The transport study examined the potential to reduce transport fuel consumption and emissions through fuel economy standards, urban planning, public transport infrastructure, and pricing policies.

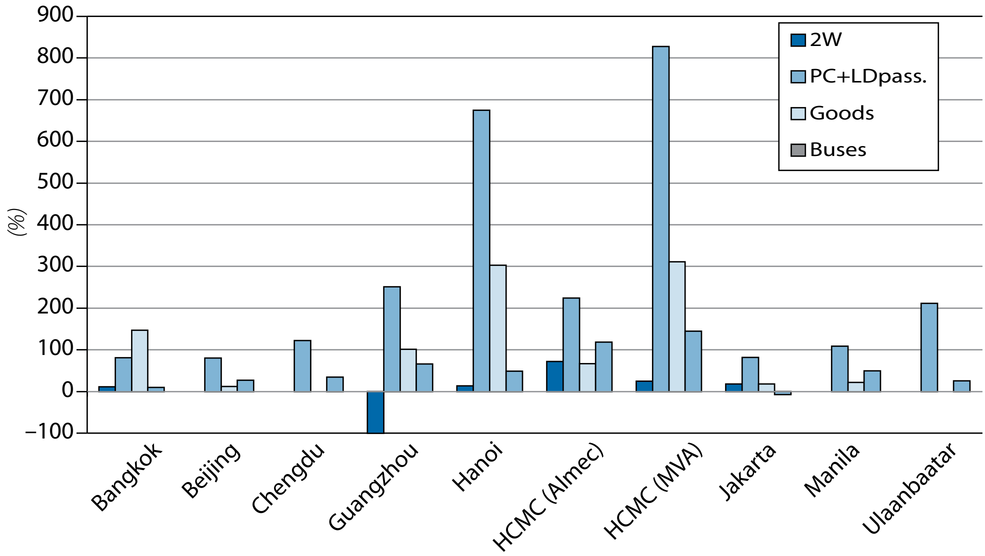
On-road transport is a significant consumer of energy in the urban environment. Of all sectors, on-road transport is the most closely linked to petroleum product consumption. Over the coming years, this sector can be expected to exhibit significant growth in energy requirements in most East Asian countries, in which rising household incomes and urbanization are fuelling private vehicle ownership and use.

The study evaluated the impact of urban transport master plans in 9 cities in the region principally from 2007–20. The 9 cities were Bangkok, Beijing, Chengdu, Guangzhou, Hanoi, Ho Chi Minh City (HCMC) (2 master transport plans), Jakarta, Manila, and Ulaanbaatar.[50] In each city, different levels of action and investment were considered across a range of scenarios. The first was a "Do-Minimal" scenario, in which no significant additional actions were taken to promote public transport other than the capital investment programs currently underway in each city. At the opposite end of the spectrum, a "Do Maximum" scenario was based on the complete implementation of the master plan plus complementary measures to further integrate public transport (focusing on coordination and minimizing the time and cost penalty of transferring between modes) and discourage private car use.

The transport study was based on pre-existing master plans. Thus, it could be concluded that each one had been designed to

50. The dates of the studies were dependent on pre-existing models and the work performed by each city. Beijing and Guangzhou had base years of 2005; Beijing and Bangkok had master plan years of 2021; and HCMC had a master plan year of 2025.

Figure A1.1 Growth in Active Vehicle Population by Vehicle Type between Base Year and Year of Master Plan: "Do Minimal" Scenario *(%)*



Source: Authors.

resolve specific real-life transport issues within each city and that none of these master plans had been developed to reduce fuel consumption. The cities were chosen as representative of urban transport in the East Asia region. Accordingly, their results may be extrapolated to the overall urban environment experienced in this region. Since the urban transport master plans focus on the movement of people, in most cases, freight may be incompletely modeled.

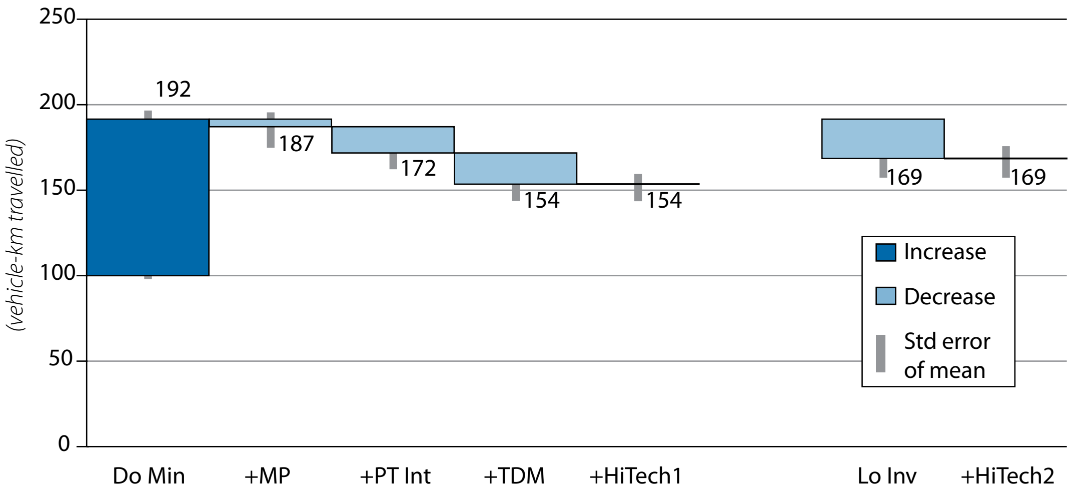
Vehicle Population

On average, the expected growth in the vehicle population in each city between the base year and the year of the master plan is 72 percent (figure A1.1).[51] Typically, the higher growth occurs in the smaller cities, and the vehicle segments with greatest growth are the passenger car and light-duty passenger vehicles.[52] This projected increase in the total vehicle population varies little across scenarios. Even though improved public transport incentivizes a modal shift from private vehicles, the shift is reflected in reduced vehicle usage, not in a significant change in the level of ownership.

51. A forecast of a 72% increase indicates that the expected active on-road fleet in the year of the master plan is likely to be 172% of that in use in 2007.

52. The light-duty passenger vehicle category includes Sports Utility Vehicles (SUVs), Multi-person vehicles (MPVs), and Asian utility vehicles(AUVs)/Multiple use vehicles (MUVs).

Figure A1.2 Vehicle Use Relative to 2007 Base Year *(vehicle-km travelled)*



Source: Authors.

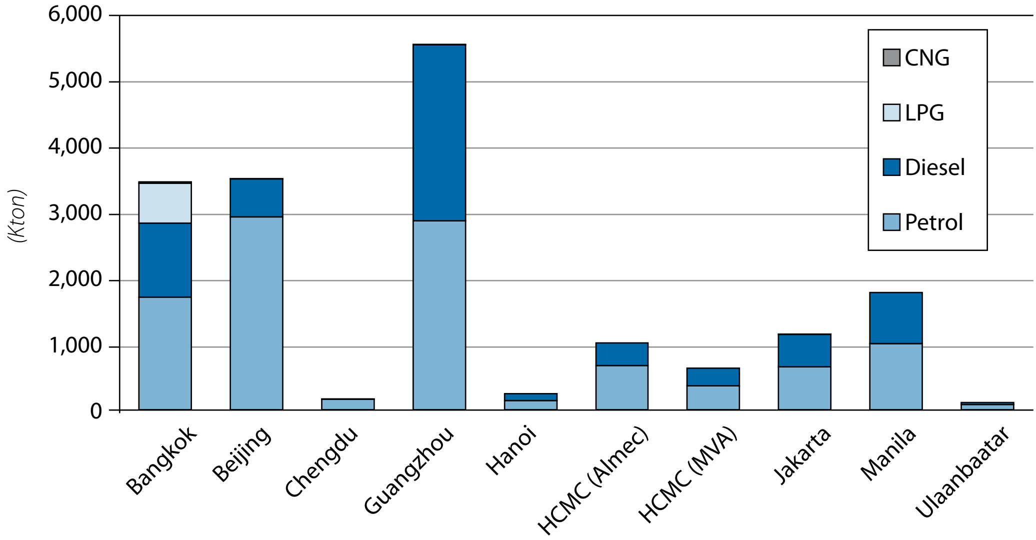
Vehicle-Kilometers Travelled

In the "Do Minimal" scenario, the annual vehicle-kilometers travelled (VKT) is forecast to be 192 percent [185 percent–199 percent][53] of that in the base year (figure A1.2).[54] Implementing the master plan makes only a slight difference to the total VKT (187 percent [177 percent–198 percent]). However, better integration of public transport and stronger transport demand managment (TDM) measures make a significant impact. Taken together, they reduce VKT to only 154 percent of the base year figure (integration contributes with [179 percent–172 percent] and TDM with [161 percent–146 percent]). If only a partial (low investment) implementation of the master plan is conducted, a higher VKT results (average 159 percent [159 percent–178 percent]) would be achieved. This analysis is based on an underlying assumption that vehicle operating costs are adjusted such that increasing vehicle fuel efficiency does not impact total VKT, which remains unchanged in the "HiTech" scenarios.

53. The numbers in square brackets indicate the likely upper and lower bounds of this average as given by the standard error of the mean. Inside the figures, these are shown as vertical, dotted "whiskers."

54. In figure A1.2 and subsequent figures in the summary, the "Do Minimal" scenario is shown on the figure as "Do Min"; implementation of the complete master plan is shown as "+MP"; additional improved public transport integration is depicted as "+PT Int"; additional transport demand management measures are given as "+TDM"; the higher vehicle technology (fuel efficiency) scenarios are shown as "+HiTech1/2"; and the impact of only a partial (low investment) implementation of the master plan is indicated as "Lo Inv."

Figure A1.3 Fuel Consumption in Base Year *(Kton)*



Source: Authors.

Fuel Consumption

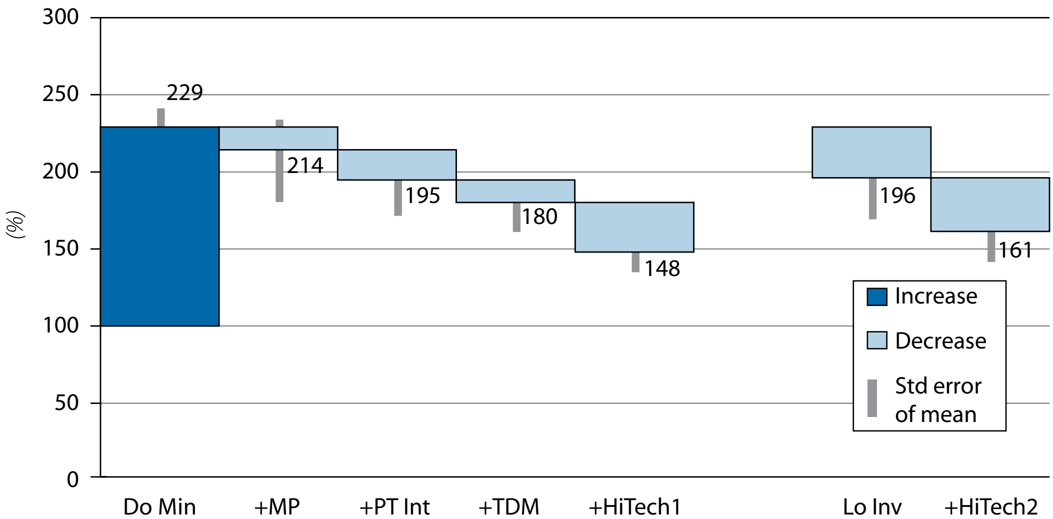
The fuel consumption in the base year of each city is given in figure A1.3. The 3 largest cities consumed an average of more than 4.2 million tons of automotive fuel within the study area: Guangzhou (5.6 Mt), Beijing (3.5 Mt), and Bangkok (3.5 Mt). The 3 cities with the lowest annual consumption in the base year were Ulaanbaatar (0.11 Mt), Chengdu (0.16 Mt), and Hanoi (0.24 Mt).

In the "Do Minimal" scenario, the annual fuel consumed by the in-use, on-road vehicle fleet is forecast to be 229 percent [205 percent–253 percent] of that in the base year (figure A1.4). Implementing the master plan (MP) reduces fuel consumption to 214 percent [184 percent–245 percent]. Better integration of public transport and stronger TDM measures together reduce fuel consumption to only 180 percent of the base year figure (integration contributes with [174 percent–216 percent] and TDM with [161 percent–146 percent]). Here the impact of larger buses and trucks can be seen clearly since the fuel consumption increases faster than the total VKT.

An additional "HiTech" scenario is considered that increases light-duty vehicle fuel efficiency in line with current EU plans and proposals. This scenario contemplates new vehicle standards of 130 g/km for passenger cars and 170 g/km for light-duty commercial vehicles in 2015 that are tightened to 100 g/km for passenger cars and 140 g/km for light-duty commercial vehicles in 2020.

This "HiTech" scenario has a clear impact on constraining the increase in total fuel consumption to 148 percent [132 percent–164

Figure A1.4 Total Fuel Consumption Relative to Base Year *(%)*



Source: Authors.

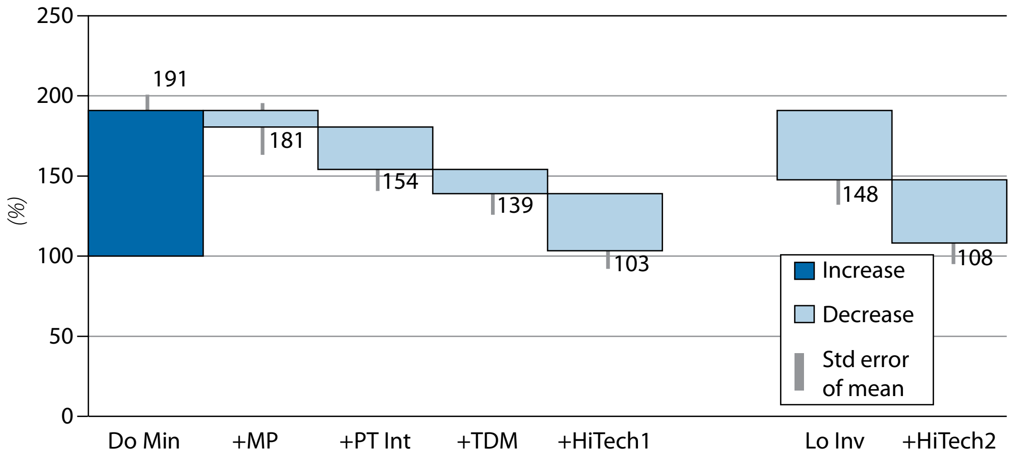
percent] of the base year figure. If only a partial (low investment) implementation of the master plan is conducted, the best fuel consumption forecast—including the "HiTech" scenario—is 161 percent [139 percent–184 percent] of the base year's figure.

These growth scenarios are very different for gasoline and for diesel. Under the best case scenario (master plan plus public transport integration, TDM measures, and higher vehicle technology), the consumption of gasoline in the year of the master plan is basically the same as that in the base year [92 percent–114 percent]. However diesel increases by a factor of 250 percent [212 percent–287 percent] (figures A1.5 and A1.6).

In the base year, the total retail value of the automotive fuel consumed in the 10 study areas was US$21.2 billion. This total corresponds to $1.1 billion for 2-wheelers, $10.7 billion for passenger cars and light-duty passenger vehicles, $8.3 billion for goods vehicles, and $1.1 billion for buses.

In the year of the master plan in the "Do Minimal" scenario, total retail automotive fuel consumed increased to $US43.6 billion. Implementing the master plan with better integration of public transport and stronger TDM measures together reduced the cost of fuel consumed to $36.7 billion, saving $6.9 billion. The "HiTech" scenario produced additional fuel savings of $5.6 billion, for a total expenditure on fuel of $31.1 billion. This total corresponds to $0.6 billion for 2-wheelers, $13.8 billion for passenger cars and light-duty passenger vehicles, $14.8 billion for goods vehicles, and $1.9 billion for buses.

Figure A1.5 Gasoline Consumption Relative to Base Year *(%)*



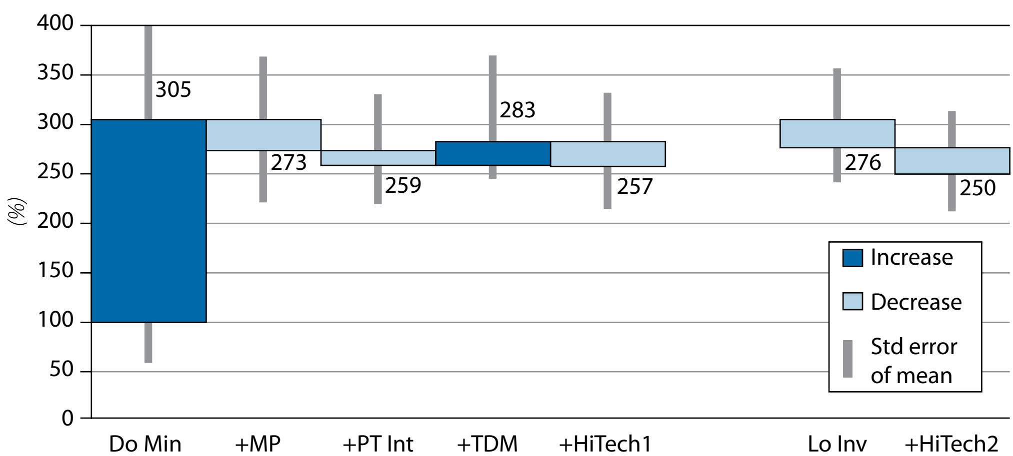
Source: Authors.

CO_2 Emissions

CO_2 emissions increase in virtually the same proportion as the fuel consumption. The slight difference is due principally to the emerging use of compressed natural gas (CNG) as an urban bus fuel. Under the best case scenario (complete master plan plus public transport integration, TDM measures, and higher vehicle technology), the average CO_2 emissions increase to 148 percent [132 percent–165 percent] of those in the base year.

When the new vehicle fuel efficiency standards are not entirely adopted, average CO_2 emissions increase to 181 percent [162 percent–200 percent] of those in the base year.

Figure A1.6 Diesel Consumption Relative to Base Year *(%)*



Source: Authors.

Local Pollutants

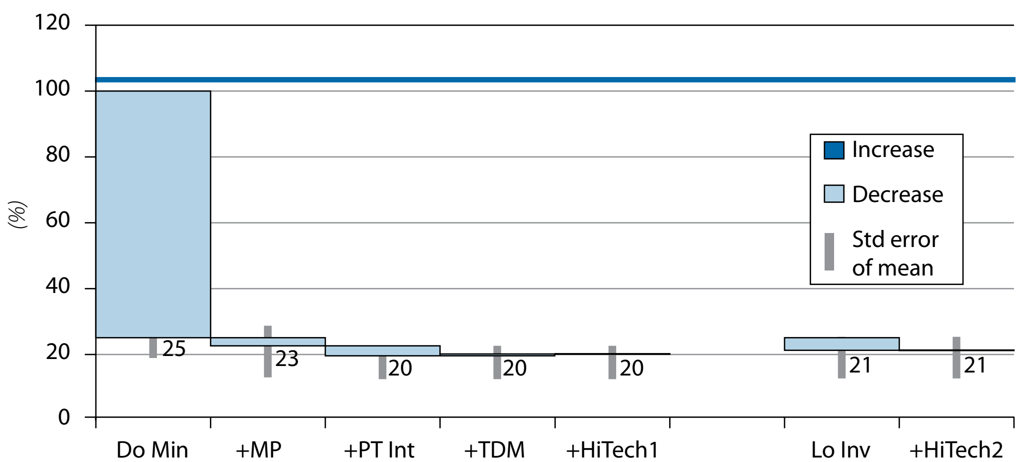
Figure A1.7 shows the change in average CO emissions and approximate average volatile organic compound (VOC) emissions (on a per-city basis, excepting Ulaanbaatar) for each scenario relative to the base year.

Changing vehicle emissions specifications between the base year and the year of the master plan (up to Euro V) more than compensate the increase in traffic (movement of people and goods) within the urban environment ("Do Min"). The change in specifications reduces CO and VOC emissions by 75 percent compared to the 2007 base values. However, a similar deep reduction does not take place with NOx (figure A1.8), which, in the "Do Min" scenario, remain at 96 percent of their 2007 baseline.

PM2.5 (less than 2.5 microns of particulate matter) emissions fare even worse, showing a "Do Min" scenario value of 12 percent above their 2007 baseline (figure A1.9). However, with the implementation of the master plan, better integration of public transport, and stronger TDM measures combined, as with NOx, PM2.5 emissions end up at approximately 85 percent–87 percent of the 2007 baseline.

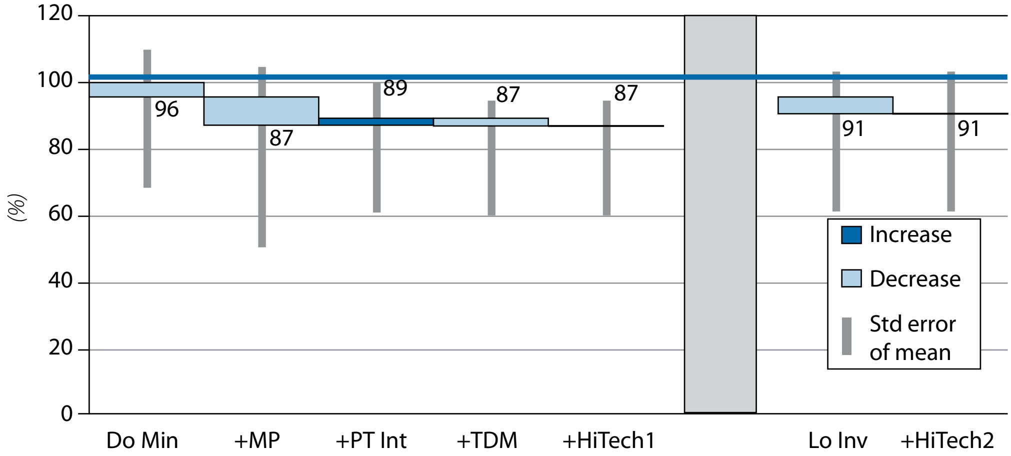
In both cases, (NOx and PM2.5), this is due entirely to changing use of heavy duty vehicles and the adoption of only Euro V heavy-duty vehicle emissions standards. Euro VI is focused on the reduction of NOx and PM2.5 from heavy-duty vehicles. Euro VI would limit the value for total oxides of nitrogen (NOx) to 0.4 g/kWh (80 percent less compared with Euro V), and particle mass to 0.01 g/kWh 10 mg/kWh: a 66 percent reduction compared with the Euro V stage limits.

Figure A1.7 CO and VOC Emissions Relative to the Base Year *(%)*



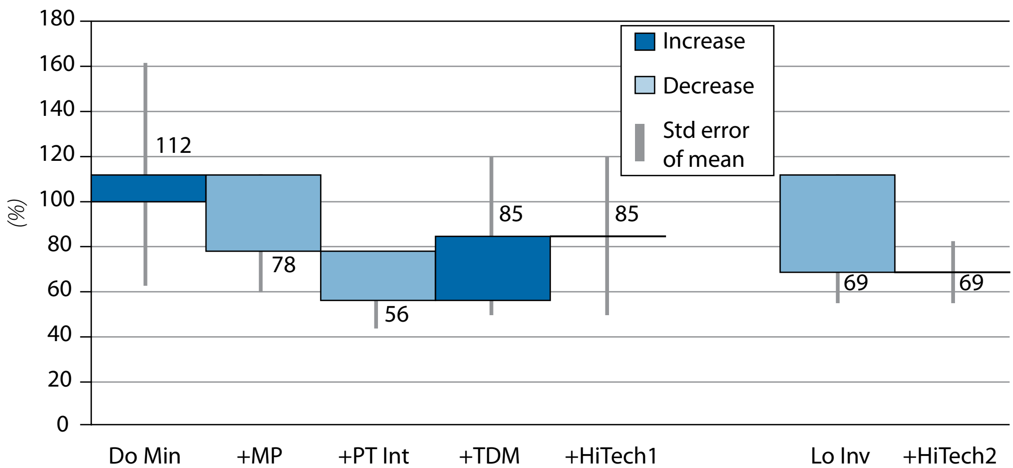
Source: Authors.

Figure A1.8 NO_x Emissions Relative to Base Year *(%)*



Source: Authors.

Figure A1.9 PM2.5 Emissions Relative to Base Year *(%)*



Source: Authors.

Appendix 2

Household Study

East Asia is one of the fastest growing regions in the world. From 1990 to 2006, real per capita incomes for the region more than tripled—from $1400 to $4700. This growth is expected to increase in the next few decades. The region also is urbanizing rapidly. By 2030, nearly 53 percent of the population are expected to be living in urban areas. Rising incomes and the transition to urban centers will drive up the demand for appliances in households and increase the demand for electricity consumption.

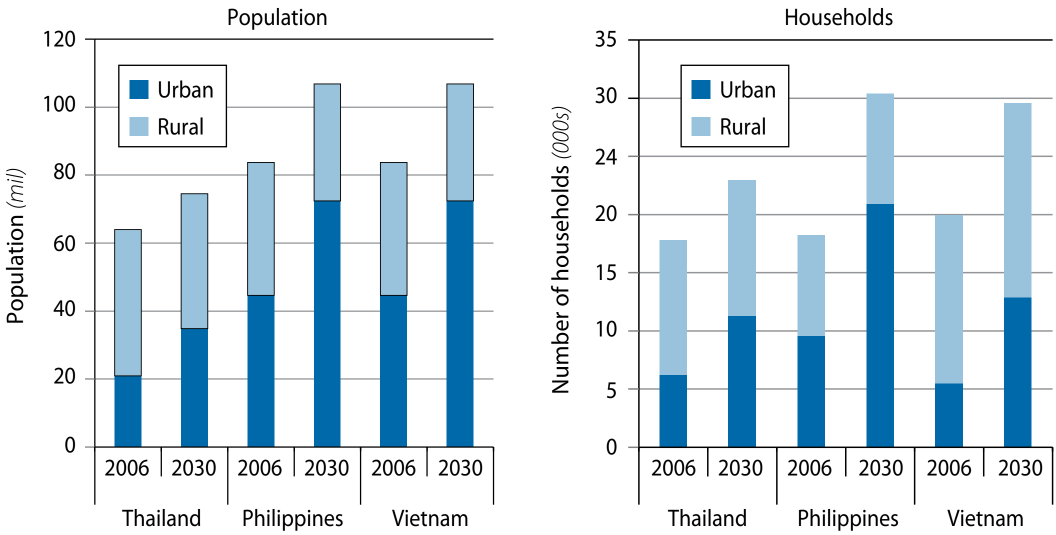
This parallel household study aims to forecast energy consumption in the region to 2030 and to identify potential energy savings by introducing more energy-efficient appliances. As part of this study, residential energy consumption patterns were evaluated for three countries in the region: Philippines, Thailand, and Vietnam. In each, different levels of action and investment were considered. At one end of the spectrum was the ***Baseline (or business-as-usual) scenario***, which predicted how residential electricity consumption might evolve up to 2030 based on market influences if a government did nothing other than what it already had committed to do via existing policies. At the opposite end was the ***Alternative (or energy-efficient end-use) scenario***, which modeled a portfolio of technologies through the deployment of new policies that the government could consider in the future.

Key Findings

Economic growth and increased urbanization will drive up household consumption of electricity. The average urbanization rate for the 3 countries studied will be approximately 52 percent by 2030. The Philippines is expected to be the most urbanized with nearly 68 percent of its population living in cities by 2030 (figure A2.1). The mean monthly household expenditures are expected to more than double for urban and rural households.

Under the Baseline scenario, residential energy demand will grow at an average of 4.3 percent per annum to 2030. The Baseline or business-as-usual (BAU) scenario predicts how residential energy consumption could evolve up to 2030 based on current market influences if the governments continue with the existing policies. BAU estimates that the residential sector's annual average electricity consumption will grow at 4.1 percent for Thailand, 4.6 percent for the Philippines, and 4.2 percent for

Figure A2.1 Population and Number of Households in the Philippines, Thailand, and Vietnam, 2006–30 *(mil)*



Source: Authors.

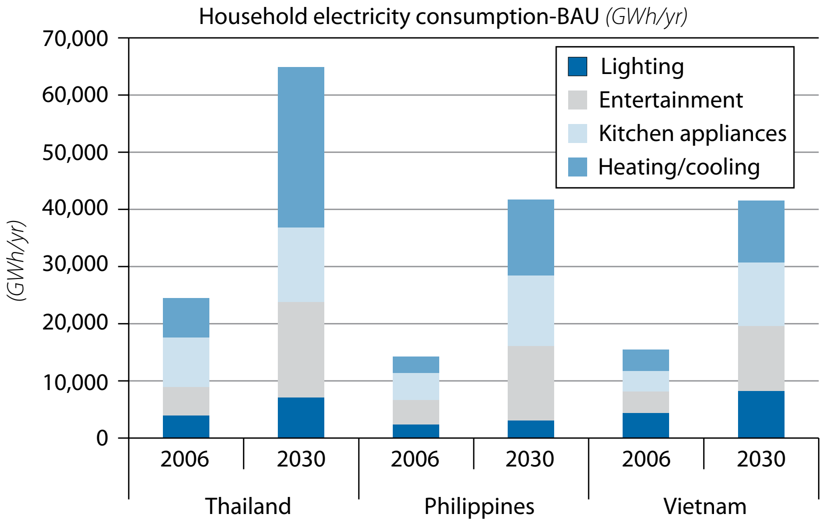
Vietnam to 2030. Appliance penetration will be particularly important in driving up demand.

From 2006 to 2030, total electricity consumed by the household sector is expected to more than double. Figure A2.2 shows the total electricity consumption for the 3 countries in 2006 and 2030 under the Baseline scenario. Consumption is expected to grow at an average of 175 percent for the 3 countries over these 24 years.

The main contributor to growth will be increased ownership of high-electricity-consuming devices as household incomes rise. Most of the anticipated growth is expected to be driven by high-energy-consuming appliances for heating/cooling (air conditioners, fans), entertainment (televisions), and kitchen appliances (refrigerators). The average growth rates for these 3 categories over 2006–30 are expected to be 285 percent, 209 percent, and 143 percent, respectively.

The Alternate scenario will engender an average annual savings of 8 percent in energy consumption by 2030. Introducing efficiency improvements in the appliance sector will reduce energy use and gradually will reduce energy consumption. The consumption savings in 2030 are forecast to be the highest for the Philippines (9.5 percent) and somewhat less for the others (7.8 percent for Thailand

Figure A2.2 Household Electricity Consumption in the Baseline Scenario, 2006–30 *(GWh/yr)*



Source: World Bank calculations.

and 7.23 percent for Vietnam). Figure A2.3 depicts the total household energy consumption in 2030 under the 2 scenarios.

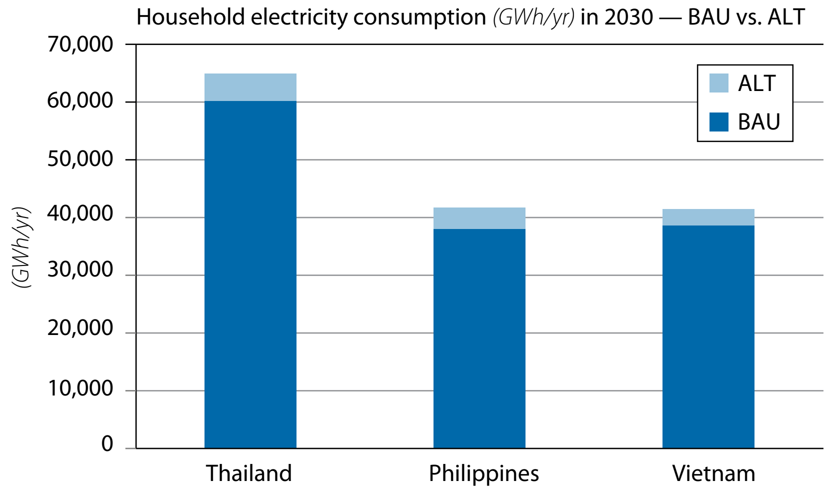
Focusing on appliances that account for the bulk of electricity consumption will have a higher impact on energy savings. Potential savings by introducing improvements in efficiency vary across appliance groups (figure A2.4). However, the savings are highest for the high-energy-consuming appliances such as air conditioners, refrigerators, and televisions.

Methodology

Household electric appliance ownership is assumed to depend only on household income. This assumption simplifies the projection of appliance ownership. The rate of electrification was found to be very high for the three countries considered by this study. Hence, only electrified households were used to project appliance ownership and usage.

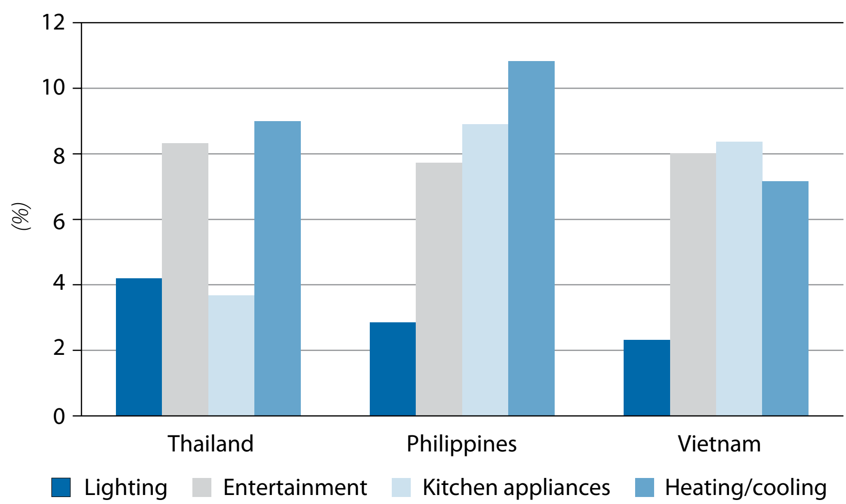
There are three main steps in forecasting household electricity consumption (figure A2.5). The first step is to project numbers of households and their expenditures in urban and rural areas. The second is to forecast ownership of appliances among the households. The third step computes the electricity consumption, or usage.

Figure A2.3 Household Electricity Consumption in 2030: Baseline vs. Alternate Scenarios *(GWh/yr)*



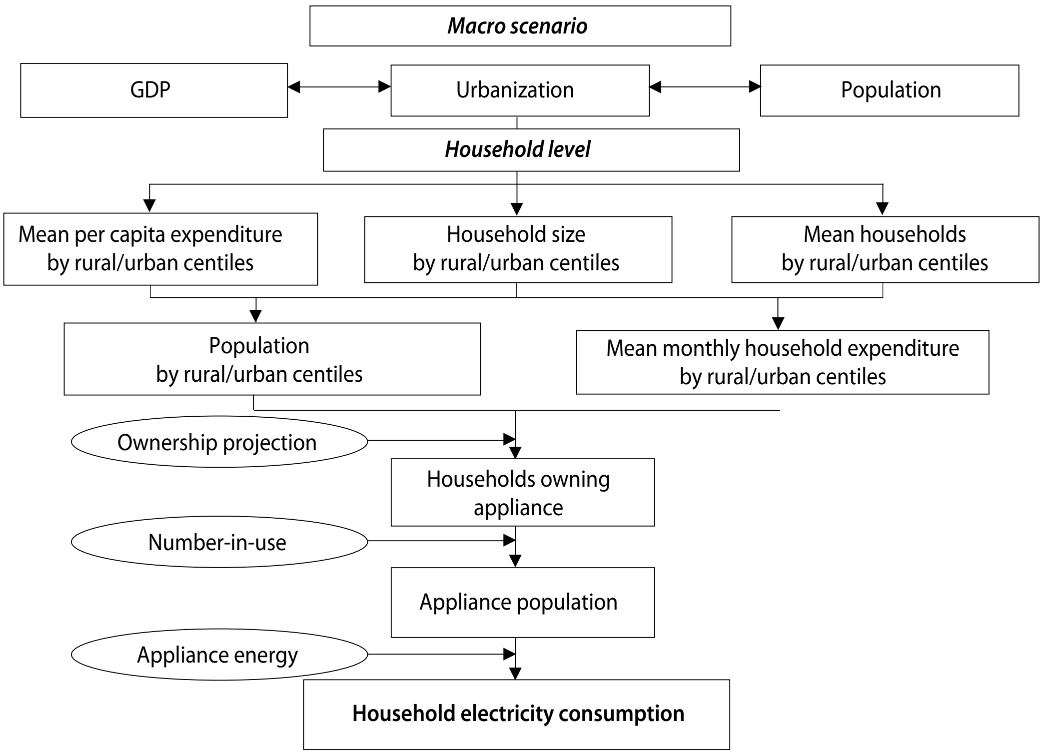
Source: Authors.

Figure A2.4 Energy Savings in 2030 *(%)*



Source: Authors.

Figure A2.5 Modeling Framework: Household Electricity Consumption Module



Appendix 3

Country Data

Table A3.1 Country Data

Energy	World	EAP	MIC	Cambodia	China	Indonesia
GDP per unit of energy use *(2005 PPP $/kg oil equivalent)*	5.2	3.4	4.2	4.5	3.2	4.2
Energy use per capita *(kg oil equivalent)*	1,820.0	1,258.0	1,267.0	351.0	1,433.0	803.0
Energy from biomass products and waste *(% of total)*	9.8	14.7	12.3	71.3	12.0	29.2
Electric power consumption per capita *(kWh)*	2,751.0	1,669.0	1,651.0	88.0	2,041.0	530.0
Electricity generated using fossil fuel *(% of total)*	66.4	82.0	72.9	95.7	82.6	87.8
Electricity generated using hydropower *(% of total)*	15.9	15.0	20.6	4.1	15.2	7.2
Emissions and pollution						
CO_2 emissions per unit of GDP M*(kg/2005 PPP $)*	0.5	0.9	0.7	0.0	1.0	0.6
CO_2 emissions per capita *(metric tons)*	4.5	3.6	3.3	0.0	4.3	1.9
CO_2 emissions growth *(%, 1990–2005)*	29.5	123.4	43.1	19.5	131.2	181.0
Particulate matter *(urban-pop-weighted avg., μg/cu.m)*	50.0	69.0	56.0	46.0	73.0	83.0
Transport sector fuel consumption per capita *(liters)*	291.0	106.0	144.0	31.0	93.0	118.0

Japan	Korea, Rep. of	Malaysia	Mongolia	Myanmar	Philippines	Singapore	Thailand	Vietnam
7.5	5.0	4.7	2.6	2.9	6.1	6.5	4.5	3.7
4,129.0	4,483.0	2,617.0	1,080.0	295.0	498.0	6,968.0	1,630.0	621.0
1.3	1.1	4.1	3.8	72.1	26.1	0.0	16.6	46.4
8,220.0	8,063.0	3,388.0	1,298.0	93.0	578.0	8,520.0	2,080.0	598.0
59.2	61.7	92.3	100.0	46.1	64.0	100.0	91.9	58.2
7.9	0.9	7.7	—	53.9	17.5	—	5.9	41.8
0.3	0.4	0.8	1.3	0.3	0.3	0.3	0.6	0.6
9.6	9.4	9.3	3.4	0.2	0.9	13.2	4.3	1.2
13.8	87.2	333.9	(12.0)	165.3	70.7	34.2	182.9	376.0
30.0	35.0	23.0	110.0	58.0	23.0	41.0	71.0	55.0
658.0	534.0	567.0	166.0	28.0	89.0	580.0	314.0	84.0

References

ADB (Asian Development Bank). 2009. "The Economics of Climate Change in Southeast Asia: A Regional Review." Manila. April.

APERC (Asia Pacific Energy Research Centre). 2006. *APERC Energy Demand and Supply Outlook 2006*. APERC under the Institute of Energy Economics.

Berrah, N., F. Feng, R. Priddle, and L. Wang. 2007. *Sustainable Energy in China: The Closing Window of Opportunity*. World Bank.

Blanford, G., R. Richels, and T. Rutherford. 2009. "Feasible Climate Targets: The Roles of Economic Growth, Coalition, Development and Expectations." *Energy Economics* 31 (Supp 2) (December).

BP (British Petroleum). 2009. "BP Statistical Review of World Energy." June. www.bp.com/.../bp.../globalbp/globalbp...energy_review.../2009.../statistical_review_of_world_energy_full_report_2009.pdf

Brown, M.A., F. Southworth, and T.K. Stovall. 2005. *Toward a Climate-Friendly Built Environment*. Arlington, VA: Pew Center on Global Climate Change.

Burton, R., D. Goldston, G. Crabtree, L. Glicksman, D. Goldstein, D. Greene, D. Kammen, M. Levine, M. Lubell, M. Savitz, D. Sperling, F. Schlachter, J. Scofield, and J. Dawson. 2008. "How America Can Look within to Achieve Energy Security and Reduce Global Warming." *Reviews of Modern Physics* 80 (4): S1–S109.

Calvin, K., J. Edmonds, B. Bond-Lamberty, L. Clarke, P. Kyle, S. Smith, A. Thomson, and M. Wise. 2009. "Limiting Climate Change to 450 ppm CO_2 Equivalent in the 21st Century." *Energy Economics* 31 (Supp 2) (December).

Capoor, K., and P. Ambrosi. 2009. *State and Trends of the Carbon Market*. World Bank.

China Energy Research Institute. 2009. "2050 China Energy and CO_2 Emission Report." Beijing.

Clarke, L., J. Edmonds, V. Krey, R. Richels, S. Rose, and M. Tavoni. 2009. "International Climate Policy Architectures: Overview of the EMF 22 International Scenarios." *Energy Economics* 31 (Supp 2) (December).

CLASP (Collaborative Labeling and Appliance Standards Program). 2009. Washington, DC. http://www.clasponline.org/index.php

Dahowski, R.T., X. Li, C.L. Davidson, N. Wei, J.J. Dooley, and R.H. Gentile. 2008. "A Preliminary Cost Curve Assessment of Carbon Dioxide Capture and Storage Potential in China." *Energy Procedia* 1 (Issue 1) (February).

Diringer, E., J. Lewis, and L. Clarke. 2008. *Modeling Post-2012 Climate Policy Scenarios*. Washington, DC: Pew Center on Global Climate Change. http://www.pewclimate.org/post2012modeling

EESI (Environmental and Energy Study Institute). 2008. *Jobs from Renewable Energy and Energy Efficiency*. Washington, DC.

Energy Foundation. 2008. *China Energy and Climate Change: Myths, Realities, and Challenges*. San Francisco, CA.

———. 2009. *China Sustainable Energy Program*. San Francisco, CA.

ESMAP (Energy Sector Management Assistance Program). 2006. "Proceedings of the International Grid-Connected Renewable Energy Policy Forum." World Bank.

———. 2008. "An Analytical Compendium of Institutional Frameworks for Energy Efficiency Implementation." World Bank.

———. 2009. "Public Procurement of Energy Efficiency Services." World Bank.

ETAAC (Economic and Technology Advancement Advisory Committee). 2008. *Technologies and Policies to Consider for Reducing Greenhouse Gas Emissions in California*. Sacramento, CA.

Gibbins J., and H. Chalmers. 2008. "Preparing for Global Rollout: A 'Developed-Country-First' Demonstration Program for Rapid CCS Deployment." *Energy Policy* 36 (2008): 501–07.

Goldstein, D.B. 2007. *Saving Energy, Growing Jobs: How Environmental Protection Promotes Economic Growth, Profitability, Innovation, and Competition*. Berkeley, CA: Bay Tree Publishing.

Hosier R., N. Kulichenko, A. Maheshwari, N. Toba and X. Wang, 2010. "Financing Instruments for Climate Change Mitigation: Strategic Use for Expanded Impacts."

IEA (International Energy Agency). 2006. *World Energy Outlook 2006*. Paris.

———. 2007. *World Energy Outlook 2007*. Paris.

———. 2008a. *World Energy Outlook 2008*. Paris.

______. 2008b. *Energy Technology Perspective 2008: Scenarios and Strategies to 2050*. Paris.

______. 2008c. "Energy Statistics of Non-OECD Countries." Paris.

______. 2008d. "Energy Balances of Non-OECD Countries." Paris.

______. 2008e. *Worldwide Trends in Energy Use and Efficiency*. Paris.

______. 2008f. *CO_2 Capture and Storage: A Key Carbon Abatement Option*. Paris.

______. 2008g. *Empowering Variable Renewables: Options for Flexible Electricity Systems*. Paris.

IIASA (International Institute for Applied System Analysis). 2009. "GGI Scenario Database." Laxenburg, Austria.

IMF (International Monetary Fund). 2006. IMF World Energy Outlook. Washington, DC.

IPCC (Intergovernmental Panel on Climate Change). 2007. *Climate Change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*. Cambridge and New York.

Kats, G. 2008. *Greening Buildings and Communities: Costs and Benefits*. London: Good Energies.

Keystone Center. 2007. *Nuclear Power Joint Fact-Finding*. Keystone, CO.

Kenworthy, J., and F. Laube. 2002. "Urban Transport Patterns in a Global Sample of Cities and Their Linkages to Transport Infrastructures, Land Use, Economics and Environment." *World Transport Policy and Practice* 8 (3): 5–20.

Knopf, B., O. Edenhofer, T. Barker, N. Bauer, L. Baumstark, B. Chateau, P. Criqui, A. Held, M. Isaac, M. Jakob, E. Jochem, A. Kitous, S. Kypreos, M. Leimbach, B. Magne, S. Mima, W. Schade, S. Scrieciu, H. Turton, and D. van Vuuren. 2010. "The Economics of Low Stabilisation: Implications for Technological Change and Policy." In M. Hulme and H. Neufeldt (eds.), *Making Climate Change Work for Us*. Cambridge University Press.

Lin J., N. Zhou, M. Levine, and D. Fridley. 2006. *Achieving China's Target for Energy Intensity Reduction in 2010: An Exploration of Recent Trends and Possible Future Scenarios*. Lawrence Berkeley National Laboratories, University of California Berkeley, CA.

Martinot, E., and J. Li. 2007. *Powering China's Development*. Washington, DC: Worldwatch.

Mao, J. 2009. "How China Reduces CO_2 Emissions from Coal-Fired Power Generation." Prepared for Energy Week. World Bank.

McKinsey Global Institute. 2008. *China's Green Revolution*. Washington, DC.

______. 2009a. *Promoting Energy Efficiency in the Developing World*. Washington, DC.

______. 2009b. *Toward a Global Climate Agreement: Project Catalyst*. Washington, DC: ClimateWorks Foundation.

Meyers, S., J. McMahon, and M. McNeil. 2005. *Realized and Prospective Impacts of U.S. Energy Efficiency Standards for Residential Appliances: 2004 Update*. Berkeley, CA: Lawrence Berkeley National Laboratory, University of California.

MIT (Massachusetts Institute of Technology). 2003. *The Future of Nuclear Power: An Interdisciplinary MIT Study*. Cambridge, MA.

National Bureau of Statistics of the People's Republic of China. 2006. *China Statistical Yearbook 2006*. Beijing: China Statistics Press.

NRDC (National Resources Defense Council). 2007. *The Next Generation of Hybrid Cars: Plug-in Hybrids Can Help Reduce Global Warming and Slash Oil Dependency*. Washington, DC.

Philibert, C. 2007. *Technology Penetration and Capital Stock Turnover: Lessons from IEA Scenario Analysis*. Paris: International Energy Agency (IEA). May.

Rao, S., K. Riahi, E. Stehfest, D. van Vuuren, C. Cho, M. den Elzen, M. Isaac, and J. van Vliet. 2008. *IMAGE and MESSAGE Scenarios Limiting GHG Concentration to Low Levels*. Laxenburg, Austria: International Institute for Applied Systems Analysis.

REN21. 2008. *Renewables 2007 Global Status Report*. Paris and Washington: Renewable Energy Policy Network for the 21st Century Secretariat and Worldwatch Institute.

Riahi, K., A. Grubler, and N. Nakicenovic. 2007. "Scenarios of Long-Term Socio-Economic and Environmental Development under Climate Stabilization." *Technological Forecasting and Social Change* 74 (7): 887–935.

Rubin, E. 2008. "Financing Carbon Capture and Sequestration." Presentation at the World Bank Clean Coal Initiative, June 2008.

Sarkar, A., and J. Singh. 2009. "Actions to Scale up Energy Efficiency Implementation in Developing Countries: Compendium of Ideas."

Shalizi, Z., and F. Lecocq. 2008. "Economics of Targeted Mitigation Programs in Sectors with Long-lived Capital Stock." Background paper for *World Development Report 2010*. World Bank.

Sorrell, S. 2008. "The Rebound Effect: Mechanisms, Evidence and Policy Implications." Paper presented at the Electricity Policy Workshop, Toronto.

Stern, N. 2006. *Stern Review on the Economics of Climate Change*. Cambridge University Press.

Sterner, T. 2007. "Fuel Taxes: An Important Instrument for Climate Policy." *Energy Policy* 35: 3194–202.

Taylor, R.P., C. Govindarajalu, J. Levin, A.S. Meyer, and W.A. Ward. 2008. *Financing Energy Efficiency: Lessons from Brazil, China, India and Beyond*. World Bank.

United Nations. 2007a. *State of the World Population 2007: Unleashing the Potential of Urban Growth*. New York: United Nations Population Fund (UNFPA).

______. 2007b. "World Population Prospects: World Urbanization Prospects. The 2007 Revision." ECOSOC (Department of Economic and Social Affairs of the United Nations Secretariat), Population Division. New York. http://esa.un.org/unup

WBCSD (World Business Council for Sustainable Development). 2008. *Power to Change: A Business Contribution to a Low-Carbon Economy*. Geneva.

Weber, C.L., G.P. Peters, D. Guan, and K. Hubacek. 2008. "The Contribution of Chinese Exports to Climate Change" *Energy Policy* 26: 3572–77. London: Elsevier.

WEF (World Economic Forum). 2009. *Green Investing: Toward a Clean Energy Infrastructure*. Geneva.

World Bank. 2006a. Indonesia Poverty Assssment

______. 2006b. *Renewable Energy Toolkit: A Resource for Renewable Energy Development*.

______. 2008a. *The Development of China's ESCO Industry, 2004–2007*.

______. 2008b. *Mid-term Evaluation of China's 11th Five-Year Plan*.

______. 2008c. *An Evaluation of World Bank Win-Win Energy Policy Reforms*.

______. 2008d. *Energy Efficiency in Middle East and North Africa*.

______. 2008e. *Accelerating the Development and Commercialization of Advanced Energy Technologies in Developing Countries*.

———. 2009a. *World Development Report 2010: Development and Climate Change.*

———. 2009b. *Beyond Bonn: World Bank Group Progress on Renewable Energy and Energy Efficiency in Fiscal 2005–2009.*

———. 2009c. *World Development Indicators.*

———. 2009d. *Battling the Forces of Global Recession.*

———. 2009e. *Indonesia Low Carbon Study.*

———. 2009f. *Expanding Opportunities for Improving Energy Efficiency in Vietnam.*

———. 2009g. *Coal Power Technology Country Study China and India.*

———. 2009h. "Eco2 Cities: Ecological Cities as Economic Cities."

Worldwatch Institute. 2009. *State of the World 2009: Into a Warming World*. New York and London: W.W. Norton.

WRI (World Resource Institute). 2005. Climate Analysis Indicators Tool (CAIT) vers. 3.0. Washington, DC. http://cait.wri.org

Zhang, X. 2008. *Observations on Energy Technology Research, Development and Deployment in China*. Beijing: Tsinghua University Institute of Energy, Environment and Economy.