

# ANNEX I

## REGION DEFINITIONS<sup>1</sup>

### AFRICA

Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Djibouti, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libyan Arab Jamahiriya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mayotte, Morocco, Mozambique, Namibia, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Saint Helena, Sudan, Swaziland, United Republic of Tanzania, Togo, Tunisia, Uganda, Zambia, Zimbabwe.

### DEVELOPING ASIA

Afghanistan, American Samoa, Bangladesh, Bhutan, Brunei Darussalam, Cambodia, China, Chinese Taipei, Cook Islands, Democratic Peoples' Republic of Korea, Fiji, French Polynesia, Guam, Hong Kong (China), India, Indonesia, Kiribati, Lao Peoples' Democratic Republic, Macau (China), Malaysia, Maldives, Marshall Islands, Micronesia, Mongolia, Myanmar, Nauru, Nepal, New Caledonia, Niue, Northern Mariana Islands, Pakistan, Palau, Papua New Guinea, Philippines, Samoa, Singapore, Solomon Islands, Sri Lanka, Thailand, Timor-Leste, Tokelau, Tonga, Vanuatu, Viet Nam, Wallis and Futuna.

### LATIN AMERICA

Anguilla, Antigua and Barbuda, Argentina, Aruba, Bahamas, Barbados, Belize, Bermuda, Bolivia, Brazil, Cayman Islands, Chile, Colombia, Costa Rica, Cuba, Dominica, Dominican Republic, Ecuador, El Salvador, Falkland Islands (Islas Malvinas), Grenada, Guatemala, Guyana, Haiti, Honduras, Jamaica, Montserrat, Netherlands Antilles, Nicaragua, Panama, Paraguay, Peru, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Turks and Caicos Islands, Tuvalu, Uruguay, Venezuela, British Virgin Islands.

### MIDDLE EAST

Bahrain, Islamic Republic of Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Palestinian Administrative Areas, Qatar, Saudi Arabia, Syrian Arab Republic, United Arab Emirates, West Bank and Gaza, Yemen.

### OECD EUROPE

Austria, Belgium, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Luxembourg, Netherlands, Norway, Poland, Portugal, Slovakia, Spain, Sweden, Switzerland, Turkey, the United Kingdom of Great Britain and Northern Ireland.

### OECD NORTH AMERICA

Canada, Mexico, the United States of America.

### OECD PACIFIC

Australia, Japan, New Zealand, Republic of Korea.

### OTHER EUROPE

Andorra, Channel Islands, Faroe Islands, Greenland, Isle of Man, Liechtenstein, Monaco, San Marino.

### TRANSITION ECONOMIES

Albania, Armenia, Azerbaijan, Belarus, Bosnia and Herzegovina, Bulgaria, Croatia, Cyprus, Estonia, Georgia, Gibraltar, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Malta, Republic of Moldova, Montenegro, Romania, Russian Federation, Serbia, Slovenia, Tajikistan, The former Yugoslavia Republic of Macedonia, Turkmenistan, Ukraine, Uzbekistan.

### PARTIES INCLUDED IN ANNEX I TO THE CONVENTION

Australia, Austria, Belgium, Bulgaria, Canada, Croatia, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Latvia, Liechtenstein, Lithuania, Luxembourg, Monaco, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, Ukraine, the United Kingdom of Great Britain and Northern Ireland, the United States of America.

### PARTIES NOT INCLUDED IN ANNEX I TO THE CONVENTION

Afghanistan, Albania, Algeria, Angola, Antigua and Barbuda, Argentina, Armenia, Azerbaijan, Bahamas, Bahrain, Bangladesh, Barbados, Belize, Benin, Bhutan, Bolivia, Bosnia and Herzegovina, Botswana, Brazil, Burkina Faso, Burundi, Cambodia, Cameroon, Cape Verde, Central African Republic, Chad, Chile, China, Colombia, Comoros, Congo, Cook Islands, Costa Rica, Côte d'Ivoire, Cuba, Cyprus, Democratic Peoples' Republic of Korea, Democratic Republic of the Congo, Djibouti, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Eritrea, Ethiopia, Fiji, Gabon, Gambia, Georgia, Ghana, Grenada, Guatemala, Guinea, Guinea-Bissau, Guyana, Haiti, Honduras, India, Indonesia, Islamic Republic of Iran, Israel, Jamaica, Jordan, Kazakhstan, Kenya, Kiribati, Kuwait, Kyrgyzstan, Lao Peoples' Democratic Republic, Lebanon, Lesotho, Liberia, Libya, Madagascar, Malawi, Malaysia, Maldives, Mali, Malta,

Marshall Islands, Mauritania, Mauritius, Mexico, Micronesia, Moldova, Mongolia, Morocco, Mozambique, Myanmar, Namibia, Nauru, Nepal, Nicaragua, Niger, Nigeria, Niue, Oman, Pakistan, Palau, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Qatar, Republic of Korea, Rwanda, Samoa, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia and Montenegro, Seychelles, Sierra Leone, Singapore, Solomon Islands, South Africa, Sri Lanka, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Sudan, Suriname, Swaziland, Syrian Arab Republic, Tajikistan, Tanzania, Thailand, Timor-Leste, Togo, Tonga, Trinidad and Tobago, Tunisia, Turkmenistan, Tuvalu, Uganda, United Arab Emirates, Uruguay, Uzbekistan, Vanuatu, Venezuela, Viet Nam, Yemen, Zambia, Zimbabwe.

#### LEAST DEVELOPED COUNTRIES<sup>2</sup>

Afghanistan, Angola, Bangladesh, Benin, Bhutan, Burkina Faso, Burundi, Cambodia, Cape Verde, Central African Republic, Chad, Comoros, Democratic Republic of the Congo, Djibouti, Equatorial Guinea, Eritrea, Ethiopia, Gambia, Guinea, Guinea-Bissau, Haiti, Kiribati, Laos, Lesotho, Liberia, Madagascar, Malawi, Maldives, Mali, Mauritius, Mozambique, Myanmar, Nepal, Niger, Rwanda, Samoa, Sao Tome and Principe, Senegal, Sierra Leone, Solomon Islands, Somalia, Sudan, Tanzania, Timor-Leste, Togo, Tuvalu, Uganda, Vanuatu, Yemen, Zambia.

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<sup>1</sup> The list of countries and territories was created based on World Bank World Development Indicator 2006 and OECD, Creditor Reporting System online database 2007. Regional groupings are primarily based on IEA World Energy Outlook 2006. For countries, territories and administrations not included in the World Energy Outlook regional groupings, the Central Intelligence Agency's World Fact Book was used.

<sup>2</sup> Based on United Nations classification, UNSTAT 2006.

## ANNEX II

# DESCRIPTION OF DATA AND DATA SOURCES

This annex describes the data and estimation procedures used to calculate current investment flows. All data are for 2000 unless otherwise specified.

### 2.1. GROSS DOMESTIC PRODUCT

Gross domestic product (GDP) at purchaser's prices is the sum of the gross value added by all resident producers in the economy plus any product taxes and less any subsidies not included in the value of the products. It is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources. Data are in current USD. USD figures are converted from domestic currencies using single year official exchange rates.

*Data sources:* World bank (2006a) and UNSTAT (2006). The UNSTAT data were used for those countries for which there was no data in the WDI report.

### 2.2. GROSS FIXED CAPITAL FORMATION

Gross fixed capital formation (GFCF) includes land improvements (fences, ditches, drains, etc.); plant, machinery and equipment purchases; and the construction of roads, railways, schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings. According to the 1993 System of National Accounts prepared by the Inter-Secretariat Working Group on National Accounts, net acquisitions of valuables are also considered capital formation. Data are in constant 2000 USD.

*Data sources:* World Bank (2006a) database and UNSTAT(2006). The UNSTAT data were used for those countries for which there was no data in the WDI report.

A total GFCF value was not available for 91 countries. Missing values were estimated using a regression equation. Regression analysis was conducted using the observed values of GFCF with GDP as the explanatory variable. The equation was estimated using data for countries comparable

in terms of GDP and population to the countries with missing GFCF values. The 90th percentile values for population (= 22 million) and GDP (= USD 18 billion) were determined for the 91 countries lacking data on GFCF. The sample of countries used to estimate the regression equation was limited to countries with a population of less than 22 million and GDP of less than USD 18 billion. The estimated regression equation is:

$$\text{GFCF}_i = 26.869 + 0.1959 \text{ GDP}_i$$

( $R^2 = .89$ , t-test = 27.242)

The median ratio of predicted GFCF: GDP is 0.2096.

The predicted GFCF values for Kiribati, Marshall Islands, Nauru and Tuvalu appeared to be implausible outliers. To estimate the GFCF for those countries the sample was restricted to nine very small countries (population no greater than 200,000) for which GFCF data were available. The ratio of observed GFCF: GDP for those nine countries has a median value of 0.2746 (75th percentile = 0.42) and no value greater than 0.493. Thus, the GFCF estimate for Kiribati, Marshall Islands, Nauru and Tuvalu is estimated at 27,46 per cent of GDP.

### 2.3. GROSS FIXED CAPITAL FORMATION BY ECONOMIC SECTOR

The economic sectors for which GFCF data are available are:

1. Agriculture, hunting and forestry; fishing;
2. Mining and quarrying;
3. Manufacturing;
4. Electricity, gas and water supply;
5. Construction;
6. Transport, storage and communications;
7. Financial intermediation; real estate, renting and business activities;
8. Wholesale retail trade, repair of motor vehicles, motorcycles, etc.; hotels and restaurants;
9. Public administration and defence; compulsory social security;
10. Education; health and social work; other community, social and personal services.

*Data source:* UNSTAT (2006). Data in the national currency were converted to USD using the 2000 exchange rates from the International Financial Statistics (IFS) database of the International Monetary Fund (IMF).

GFCF data by economic sector were available for only 53 countries, but they accounted for 87.8 per cent of total GFCF. GFCF by sector was estimated for the remaining countries as follows:

**Type 1 countries** provide a complete set of data for deriving the regression model. There are 35 countries in this category, representing 21.4 per cent of global GFCF. A best-fit model was derived by carrying out regression analyses for the share of GFCF for each sector ('sector share') against the corresponding sector value added (also in share terms), for 2000 and lagged values for 1998 and 1995, per capita GDP and per capita GDP squared. The estimation was constrained so that the sector shares add up to 1.0.

**Type 2 countries** provide complete sector GFCF data but could not be used in the regression model because of missing data for some explanatory variables. There are 18 countries in this category, representing 66.4 per cent of global GFCF.

**Type 3 countries** are those for which the regression model was used to predict the sector shares. Predicted sector shares were then multiplied by the total GFCF to estimate the predicted sector GFCF. There are 69 countries in this category, representing 4.6 per cent of global GFCF.

**Type 4 countries** are those for which the regression model predicted some negative sector shares. Sector GFCFs in such instances were set equal to zero. Setting the negative sector shares to zero results in a sum for the remaining shares that is greater than 1.0. The remaining positive sector shares were scaled to equal 1.0. This resulted in a small adjustment to the GFCF sector values of those countries. There were 39 such countries in this category, representing 5.7 per cent of global GFCF.

**Type 5 countries** are those for which information on the explanatory variables is missing, making it impossible to predict sector shares using the regression model. Sector GFCFs for those countries were predicted by applying the mean sector share of countries for which such information is available. There were 51 countries in this category, representing 1.3 per cent of global GFCF.

Details of the statistical analysis will be made available upon request.

## 2.4. GROSS FIXED CAPITAL FORMATION BY SOURCE

The GFCF sources for which data were available are as follows:

1. Household (including non-profit institutions serving households);
2. Corporations (financial and non-financial);
3. Government.

*Data source:* UNSTAT (2006). Data in the national currency were converted to USD using the 2000 exchange rates from the IFS database of the IMF.

GFCF data by sources was available for only 48 countries, but they accounted for 89.1 per cent of total GFCF. GFCF by source was estimated for the remaining countries as follows:

**Type 1 countries** provide a complete set of data for deriving the regression model. There are 48 countries in this category, representing 89.1 per cent of global GFCF. A best-fit model was derived to estimate the unobserved values. GFCF by source was regressed against per capita GDP and a set of regional dummy variables (with the North America set as the base category). The estimation procedure was constrained to ensure that the total source shares add up to 1.0.

**Type 2 countries** have source GFCF data but were used in the regression model because of missing explanatory variables. Only six countries, representing 0.4 per cent of global GFCF, fell into this category.

**Type 3 countries** are those for which the regression model was used to predict source shares of GFCF. Predicted source shares were multiplied by total GFCF to determine predicted GFCF by source GFCF. This category included 77 countries representing 6.9 per cent of the world GFCF.

**Type 4 countries** are those for which the regression model predicted some negative source shares. The negative source shares were set to zero and the remaining positive values were scaled to add up to 1.0. The adjusted source shares were multiplied by total GFCF to determine GFCF by source. This category included 63 countries, representing 3.4 per cent of global GFCF.

**Type 5 countries** are those for which information on per capita GDP is missing, making it impossible to predict source shares using the regression model. Source GFCF for such countries was predicted by applying the mean source

share of countries for which such information was available. This category includes 18 countries, representing 0.1 per cent of global GFCF.

Details of the statistical analysis will be made available upon request.

## 2.5. POPULATION

*Data source:* World Bank (2006a).

## 2.6. FOREIGN DIRECT INVESTMENT, NET INFLOWS

Foreign direct investment (FDI) is the net inflows of investment to acquire a lasting management interest (10 per cent or more of voting stock) in an enterprise operating in an economy other than that of the investor. It is the sum of equity capital, reinvestment of earnings, other long-term capital and short-term capital as shown in the balance of payments.

*Data sources:* World Bank (2006a), World Bank (2006b) and ADB (2006).

## 2.7. FOREIGN DIRECT INVESTMENT BY ECONOMIC SECTOR

*Data source:* UNCTAD (2006a).

## 2.8. INTERNATIONAL DEBT SECURITIES BY RESIDENCE OF ISSUER BY SOURCE AND SECTOR, NET ISSUES

The Bank for International Settlements (BIS) definition of international securities (as opposed to domestic securities) is based on three major characteristics of the securities: the location of the transaction, the currency of issuance and the country of residence of the issuer. International issues comprise all foreign currency issues by residents and non-residents in a given country and all domestic currency issues launched in the domestic market by non-residents. In addition, domestic currency issues launched in the domestic market by residents are also considered international issues if they are specifically targeted at non-resident investors. However, due to the lack of information from commercial data providers, notes and money market instruments issued by non-residents in a domestic market in the currency of that market (foreign issues) are not included.

*Data source:* BIS (2007a).

The *country of residence of issuer* geographical classification distinguishes borrowers according to their geographical location; this is consistent with the approach taken in the BIS locational banking statistics and, more generally, with balance of payments methodology.

In the *sectoral breakdown*, “governments” comprise central governments, other governments and central banks. “Financial institutions” comprise commercial banks and other financial institutions. The international debt securities data include “repackaged securities”, for example the new global issues of Argentina, resulting from the April 2005 exchange offer. Repackaged securities that are exclusively domestically targeted are allocated to the domestic debt securities database. For the Republic of Korea, new data series have been taken into account.

*Data source:* BIS (2007b).

## 2.9. INVESTMENT IN INFRASTRUCTURE PROJECTS BY COMMERCIAL BANKS

Only projects with financial closure during the specified year were considered.

*Data source:* Dealogic Ltd (2007).

## 2.10. CROSS-BORDER MERGERS AND ACQUISITIONS BY SELLER/PURCHASER

FDI is a balance-of-payments concept involving the cross-border transfer of funds. Cross-border merger and acquisition (M&A) statistics shown in the paper are based on information reported by Thomson Financial. In some cases, these include M&A between foreign affiliates and firms located in the same host economy. Such transactions conform to the FDI definition as far as the equity share is concerned. However, the data also include purchases via domestic and international capital markets, which should not be considered FDI flows. Although it is possible to distinguish types of financing used for M&A (e.g. syndicated loans, corporate bonds and venture capital), it is not possible to trace the origin or source countries of the funds used. Therefore, the data used in the paper include the funds not categorized as FDI.

FDI flows are recorded on a net basis (capital account credits less debits between direct investors and their foreign affiliates) in a particular year. In contrast, M&A data are expressed as the total transaction amount of particular deals, rather than differences between gross acquisitions

and divestment abroad by firms from a particular country. Transaction amounts recorded in the UNCTAD M&A statistics are those at the time of closure of the deals, not at the time of announcement. The M&A values are not necessarily paid out in a single year. Cross-border M&A is recorded in both directions of transactions; that is, when cross-border M&A takes place, it is registered as a sale in the country of the target firm and as a purchase in the home country of the acquiring firm (see for example Annex tables B.4 and B.5 in UNCTAD 2006b). Data showing cross-border M&A activities on an industry basis are also recorded as sales and purchases. Thus, if a food company acquires a chemical company, this transaction is recorded in the chemical industry in the columns on M&A by industry of seller and in the food industry in the columns on M&A by industry of purchaser.

*Data source:* UNCTAD (2006b).

#### 2.11. PRIVATE INVESTMENT IN ENERGY, TRANSPORT AND WATER

Private investment in energy covers infrastructure projects in energy (electricity and natural gas transmission and distribution) that have reached financial closure and directly or indirectly serve the public. Movable assets and small projects such as windmills are excluded. The types of project included are: operations and management contracts; operations and management contracts with major capital expenditure; greenfield projects (in which a private entity or a public-private joint venture builds and operates a new facility); and divestitures. Data are in current USD.

*Data source:* World Bank (2007).

#### 2.12. OFFICIAL DEVELOPMENT ASSISTANCE

Net official development assistance (ODA) consists of disbursements of loans made on concessional terms (net of repayments of principal) and grants by official agencies of the members of the Development Assistance Committee (DAC) of the Organisation for Economic Co-operation and Development, by multilateral institutions and by non-DAC countries. The aim of ODA is to promote economic development and welfare in countries and territories in part I of the DAC list of recipients.<sup>3</sup> It includes loans with a grant element of at least 25 per cent (calculated at a rate of discount of 10 per cent). Net official aid refers to aid flows (net of repayments) from official donors to countries and territories in part II of the DAC list of recipients: more advanced countries of Central and Eastern Europe, the

countries of the former Soviet Union, and certain advanced developing countries and territories. Official aid is provided under terms and conditions similar to those for ODA.

Only infrastructure-related ODA flows in different sectors defined in the Creditor Reporting System database of the OECD were considered for capital investment analysis.

*Data source:* OECD (2007).

#### 2.13. TOTAL RESERVES (FOREIGN EXCHANGE)

Total reserves comprise holdings of monetary gold, special drawing rights, reserves of IMF members held by the IMF and holdings of foreign exchange under the control of monetary authorities. The gold component of these reserves is valued at year-end (December 31), London prices. Data are in current USD.

*Data source:* World Bank (2006a).

<sup>3</sup> The list is available at: <[http://www.oecd.org/document/45/0,3343,en\\_2649\\_34447\\_2093101\\_1\\_1\\_1\\_1,00.html](http://www.oecd.org/document/45/0,3343,en_2649_34447_2093101_1_1_1_1,00.html)>.

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## ANNEX III

### WORLD HEALTH ORGANIZATION REGIONS

Region grouping used for the analysis of the climate change impact on health	WHO Region and mortality stratum	Description	Broad grouping	Member states
<b>Africa</b>				
Africa	Afr-D	Africa with high child and high adult mortality	High-mortality developing	Algeria, Angola, Benin, Burkina Faso, Cameroon, Cape Verde, Chad, Comoros, Equatorial Guinea, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Liberia, Madagascar, Mali, Mauritania, Mauritius, Niger, Nigeria, San Tome and Principe, Senegal, Seychelles, Sierra Leone, Togo
	Afr-E	Africa with high child and very high adult mortality	High-mortality developing	Botswana, Burundi, Central African Republic, Congo, Cote d'Ivoire, Democratic Republic of Congo, Eritrea, Ethiopia, Kenya, Lesotho, Malawi, Mozambique, Namibia, Rwanda, South Africa, Swaziland, Uganda, United Republic of Tanzania, Zambia, Zimbabwe
<b>Americas</b>				
America-A	Amr-A	Americas with very low child and very low adult mortality	Developed	Canada, Cuba, United States of America
America-B	Amr-B	Americas with low child and low adult mortality	Low-mortality developing	Antigua and Barbuda, Argentina, Bahamas, Barbados, Belize, Brazil, Chile, Colombia, Costa Rica, Dominica, Dominican Republic, El Salvador, Grenada, Guyana, Honduras, Jamaica, Mexico, Panama, Paraguay, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Suriname, Trinidad and Tobago, Uruguay, Venezuela
<b>South-East Asia</b>				
South-East Asia-A	Sear-B	South-East Asia with low child and low adult mortality	Low-mortality developing	Indonesia, Sri Lanka, Thailand
South-East Asia-B	Sear-D	South-East Asia with high child and high adult mortality	High-mortality developing	Bangladesh, Bhutan, Democratic People's Republic of Korea, India, Maldives, Myanmar, Nepal, Timor-Leste

(continued)

Region grouping used for the analysis of the climate change impact on health	WHO Region and mortality stratum	Description	Broad grouping	Member states
<b>Europe</b>				
Europe	Eur-A	Europe with very low child and very low adult mortality	Developed	Andorra, Austria, Belgium, Croatia, Cyprus, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Israel, Italy, Luxembourg, Malta, Monaco, Netherlands, Norway, Portugal, San Marino, Slovenia, Spain, Sweden, Switzerland, United Kingdom
	Eur-B	Europe with low child and low adult mortality	Developed	Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Georgia, Kyrgyzstan, Poland, Romania, Serbia and Montenegro, Slovakia, Tajikistan, The former Yugoslav Republic of Macedonia, Turkey, Turkmenistan, Uzbekistan
	Eur-C	Europe with low child and high adult mortality	Developed	Belarus, Estonia, Hungary, Kazakhstan, Latvia, Lithuania, Republic of Moldova, Russian Federation, Ukraine
<b>Eastern Mediterranean</b>				
Eastern Mediterranean	Emr-B	Eastern Mediterranean with low child and low adult mortality	Low-mortality developing	Bahrain, Islamic Republic of Iran, Jordan, Kuwait, Lebanon, Libyan Arab Jamahiriya, Oman, Qatar, Saudi Arabia, Syrian Arab Republic, Tunisia, United Arab Emirates
	Emr-D	Eastern Mediterranean with high child and high adult mortality	High-mortality developing	Afghanistan, Djibouti, Egypt, Iraq, Morocco, Pakistan, Somalia, Sudan, Yemen
<b>Western Pacific</b>				
Western Pacific-A	Wpr-A	Western Pacific with very low child and very low adult mortality	Developed	Australia, Brunei Darussalam, Japan, New Zealand, Singapore
Western Pacific-B	Wpr-B	Western Pacific with low child and low adult mortality	Low-mortality developing	Cambodia, China, Cook Islands, Fiji, Kiribati, Lao People's Democratic Republic, Malaysia, Marshall Islands, Micronesia (Federated States of), Mongolia, Nauru, Niue, Palau, Papua New Guinea, Philippines, Republic of Korea, Samoa, Solomon Islands, Tonga, Tuvalu, Vanuatu, Viet Nam

## ANNEX IV

# POSSIBLE SOURCES OF EXPANDED FUNDING

### 4.1. EXTENSION OF THE SHARE OF PROCEEDS TO THE JOINT IMPLEMENTATION AND INTERNATIONAL EMISSIONS TRADING MECHANISMS

The Adaptation Fund receives a 'share of proceeds' equal to 2 per cent of the number of certified emission reductions (CERs) issued for a clean development mechanism project. These are to be used to assist non-Annex I Parties that are particularly vulnerable to the adverse effects of climate change in meeting the costs of adaptation.

The idea of expanding the same concept to other Kyoto Protocol mechanisms (joint implementation and international emissions trading) was tabled by some Parties during negotiations on the Marrakesh Accords and recently considered further in some proposals for a post-2012 agreement, including the São Paulo Proposal and the Future Actions Dialogue from the Centre of Clean Air Policy.

TABLE 1-ANNEX IV presents estimates of applying 2 per cent of the share of proceeds to international transfers of emission reduction units (ERUs), removal units (RMUs) and assigned amount units (AAUs) for different periods based on the projections for the carbon markets presented in CHAPTER VII of the paper.

During the Kyoto Protocol commitment period, the share of proceeds is projected to contribute annual revenue of 2006 USD 80–200 million to the Adaptation Fund. If the revenue from extending the share of proceeds is projected to contribute annual revenue of 2006 USD 80–200 million to the Adaptation Fund. If the revenue from extending the share of proceeds to international transfers of ERUs, AAUs and RMUs were contributed to the Adaptation Fund, its revenue would be increased by 10–25 per cent.

The estimate of the revenue raised by the existing share of proceeds after 2012 depends on the number of Parties that adopt commitments, the types of commitment adopted and the stringency of the commitments. The international sales of CERs could be worth 2006 USD 5–25 billion (low estimate) or 2006 USD 90–125 billion (high estimate) per year, and the corresponding revenues generated by a 2 per cent share of proceeds could be 2006 USD 100–500 million or 2006 USD 1.8–2.5 billion per year.

Trade among Parties with commitments depends on the commitment adopted by each country relative to the cost-effective mitigation measures available domestically. The post-2012 commitments of Parties would necessarily be arbitrary assumptions, so the revenue generated by extension of the share of proceeds is not estimated.<sup>4</sup>

<sup>4</sup> For background information please refer to the literature from the Centre for Clean Air Policy (2007) and BASIC (2006).

Table 1. Possible levels of funding for a 2 per cent share of proceeds

Period	Share of proceeds of CERs issued	Potential share of proceeds of international transfers of ERUs, AAUs and RMUs
<b>2010</b>		
Units (million/year)	300 – 450	40 – 100
Market value (2006 USD million/year)	4,000 – 15,000	500 – 2,250
Share of proceeds (2006 USD million/year)	80 – 300	10 – 50
<b>2030</b>		
<b>Low estimate</b>		
Market value (2006 USD million/year)	5,000 – 25,000	Not available. Depends on commitments adopted relative to cost-effective mitigation measures
Share of proceeds (2006 USD million/year)	100 – 500	
<b>High estimate</b>		
Market value (2006 USD million/year)	50,000 – 250,000	Not available. Depends on commitments adopted relative to cost-effective mitigation measures
Share of proceeds (2006 USD million/year)	1,000 – 5,000	

Abbreviations: AAUs = assigned amount units, CERs = certified emission reductions, ERUs = emission reduction units, RMUs = removal units.

#### 4.2. AUCTION OF ALLOWANCES FOR INTERNATIONAL AVIATION AND MARINE EMISSIONS

The European Commission has proposed including CO<sub>2</sub> emissions from international aviation in the European Union emissions trading scheme. The São Paulo Proposal suggests that allowances for international bunkers could be auctioned.

Greenhouse gas emissions associated with international air and marine transport are rising rapidly and are currently not regulated. CO<sub>2</sub> emissions from fuel used for international air and marine transport could be regulated by the Conference of the Parties (COP) in conjunction with relevant agencies, such as the International Civil Aviation Organization and the International Maritime Organization. Aircraft and ship operators would need to provide allowances equal to their CO<sub>2</sub> emissions. An allocation of AAUs or equivalent allowances could be established by the COP to cover these emissions. The allowances could be sold by auction.

Emissions from international aviation are projected to grow at a rate of 4.5 per cent per year from 2000 through 2030 and those from international marine transport are projected to grow at a rate of 2.4 per cent per year. A requirement to hold allowances for the emissions would promote the adoption of emission reduction measure by aircraft and ship operators and encourage development of more energy efficient aircraft and vessels, which could reduce aviation emissions by about 15 per cent and marine emissions by about 20 per cent by 2030 (Kahn and Kobayashi, 2007).

The total allowance allocation for each sector should be less than the projected emissions after implementation of the reduction measures. Participants would purchase CERs, ERUs or other units to cover the balance of their emissions. Auctioning allowances equal to the projected international aviation and marine emissions could generate revenue of USD 22 billion in 2010, rising to USD 35 billion in 2030. The COP can decide how to use the revenue from the auctioned allowances.

**Table 2. Estimate of potential revenue from an auction of greenhouse gas emission allowances for international aviation and marine bunkers**

	2010	2020
BAU international aviation emissions (Mt CO <sub>2</sub> )	450	725
Potential emission reductions (Mt CO <sub>2</sub> )	–	75
<b>Total (Mt CO<sub>2</sub>)</b>	<b>450</b>	<b>650</b>
BAU international marine emissions (Mt CO <sub>2</sub> )	500	625
Potential emission reductions (Mt CO <sub>2</sub> )	–	75
<b>Total (Mt CO<sub>2</sub>)</b>	<b>500</b>	<b>550</b>
Price (2006 USD/t CO <sub>2</sub> eq)	23.60	23.60
Aviation revenue (2006 USD billion)	10	15
Marine revenue (2006 USD billion)	12	13
<b>Total revenue from international bunkers (2006 USD billion)</b>	<b>22</b>	<b>28</b>

Sources: Den Elzen *et al.*, 2007; Kahn and Kobayashi, 2007.  
Abbreviation: BAU = business as usual.

#### 4.3. INTERNATIONAL AIR TRAVEL LEVY

As mentioned above, emissions associated with international air transport are rising rapidly and are currently not regulated. Müller and Hepburn (2006) suggest that these emissions be addressed through an international air travel adaptation levy (IATAL) or an emissions trading scheme with auction revenues hypothecated for adaptation. Here the focus is on the amount of revenue that might be raised rather than how the funds would be used.

The IATAL is a charge based on the (per capita) flight emissions levied on the flight ticket price. IATAL would reduce emissions where demand is price elastic<sup>5</sup> and raise revenue where demand is not elastic. Müller and Hepburn estimate that a low levy (such as the charges introduced by France of 5 per cent on first and business class tickets to raise funds for fighting HIV/Aids and other pandemics) would yield EUR 3–6 billion annually; they estimate the social cost of aviation emissions at EUR 25 billion annually.

Müller and Hepburn suggest that the IATAL levy reflect a combination of revenue-raising and emission-reducing objectives and be set at an average EUR 5 (USD 6.5) per passenger per flight, to generate EUR 10 billion (USD 13 billion) annually.

#### 4.4. FUNDS TO INVEST FOREIGN EXCHANGE RESERVES

In the *Report of the Eminent Persons Group to The President of the Asian Development Bank* (ADB, 2007) it is suggested that Asian countries consider alternative strategies for investing their foreign exchange reserves since their current strategies could be costing them revenue.

Currently, most foreign exchange reserves are invested in government, mainly American, treasury bills with low yield and significant exchange risk. “Some analysts estimate that in local (appreciating) currency terms, the returns from these reserves are close to zero. Given the large reserves-to-GDP ratio of many Asian countries, the current investment strategies could be costing the countries between 1.5 and 2 per cent of GDP each year.” (ADB, 2007)

Countries could transfer a small part of their foreign exchange reserves to the care of funds, similar to carbon funds, which would invest in energy efficiency, renewable energy and other mitigation measures. As in the case of carbon funds, a fund could invest reserves contributed by a single country or by several countries. The investor(s) would establish the policies of the fund such as eligibility of investments and target return on investment.

With an appropriate mix of investments it should be possible to maintain the value of the reserves contributed and earn a small return. A fund would provide some diversification in the foreign exchange reserve investments, but would be less liquid than treasury bills. Liquidity is important for foreign exchange reserves, so only a small part of the total, less than 5 per cent, could prudently be contributed to such funds.

Global foreign exchange reserves at the end of 2004 totalled 2004 USD 3,941 billion. Contributing 5 per cent of the reserves to funds would provide capital of 2004 USD 197 billion.<sup>6</sup>

<sup>5</sup> Demand for a good or service is ‘elastic’ if it declines by more than 1% due to a 1% price increase. Demand is inelastic if it declines by less than 1% due to a 1% price increase. A price increase for a good or service with an inelastic demand increases the total revenue.

<sup>6</sup> For background information, please refer to World Development Indicators 2006 (World Bank, 2006).

#### 4.5. ACCESS TO RENEWABLES PROGRAMMES IN DEVELOPED COUNTRIES

A number of developed countries have programmes to promote renewable energy, including feed-in tariffs, renewables obligations and targets with renewable energy certificates. One motivation for these programmes is the environmental benefits of renewable energy. Reduction of GHG emissions is one such benefit.

Recognizing that the climate change mitigation benefits of GHG emissions reductions do not depend on the location of reductions, such programmes could allow a share, say 5 per cent, of the renewable energy supply to be met by sources in developing countries that meet the programme requirements. Specifically verified deliveries of power by eligible renewable sources in developing countries would receive certificates. Entities with compliance obligations under a renewables programme could purchase certificates to a maximum of 5 per cent of their compliance obligation. A five per cent share of the renewable energy programmes in Annex I Parties in 2005 would have provided approximately USD 500 million for renewable energy technologies in non-Annex I Parties.

Eligibility could be extended to include coal- or gas-fired generation with carbon dioxide capture and storage.

Further research is needed to estimate the value of the different renewable energy programmes.

#### 4.6. TOBIN TAX

James Tobin proposed a currency transaction tax as a way to enhance the efficacy of national macroeconomic policy and reduce short-term speculative currency flows. Owing to the large volume of international currency transactions, even a low tax would generate substantial revenue.

Whether such a tax would reduce or increase exchange rate volatility has been debated in the literature. While this issue is not resolved, there appears to be consensus that the tax rate should be 0.1 per cent or lower to minimize the loss of liquidity and adverse impacts on the trade volume and market structure.

Although a currency transaction tax is widely accepted as being technically feasible, how it could best be implemented and enforced is still debated. However, the biggest barrier to implementation of a currency transaction tax is the global political consensus needed for universal adoption.

There are numerous estimates of the revenue that a currency transaction tax could generate. They vary widely owing to differences in the assumed tax rate, in the proposals for how the tax would be implemented (e.g. all transactions or end-of-day open positions) and in the estimated change in trade volumes due to introduction of the tax. The estimates range from less than USD 50 billion to almost USD 200 billion.

Nissanke (2003) assumes that the tax rate would need to be low for both political reasons (i.e. to achieve universal adoption) and technical reasons (i.e. to minimize market disruption and tax evasion). She estimates that a tax of 0.01 per cent applied to wholesale transactions would generate revenue of 2003 USD 15–20 billion while a tax of 0.02 per cent would generate annual revenue of 2003 USD 30–35 billion.

#### 4.7. SPECIAL DRAWING RIGHTS

In the run-up to the 2002 United Nations International Conference on Financing for Development, George Soros of Soros Fund Management and Joseph Stiglitz of Columbia University proposed that the International Monetary Fund (IMF) authorize a new form of special drawing rights (SDRs) to meet a share of the estimated USD 50 billion needed for the United Nations Millennium Development Goals (MDGs). SDRs are a form of intergovernmental currency provided by the IMF to serve as a supplemental form of liquidity for its member countries.

Under the proposal, the IMF would allocate new SDRs to all member countries. Under the assumption that developed countries do not need the additional liquidity, they would be expected to make their new SDRs available to approved international non-governmental organizations (NGOs) to distribute to meet specific MDGs. For the first time, these pre-approved international NGOs would be permitted to hold SDRs that they could convert to hard currencies. They would be responsible for distributing the hard currencies to other NGOs to implement MDG projects at the local and national levels. The proposal received considerable attention during the conference, prompting a number of OECD (Organisation for Economic Co-operation and Development) countries to commission studies and policy papers on the idea.

A modification of the proposals from Soros and Stiglitz (2002) might be envisaged to incorporate climate mitigation and adaptation. The IMF board could propose to member states that a new issuance of SDRs to recognized NGOs, particularly in concert with a post-2012 agreement, would

be consistent with the requirements for stability in the international economic markets. The proposal could be implemented in two stages. First, a special SDR issue of USD 27 billion authorized by the IMF in 1997 would be released, of which approximately USD 18 billion would be donated. The second stage is annual issues of SDRs, of which some would be donated.

**4.8. DEBT-FOR-EFFICIENCY SWAP: CONVERTING NON-PERFORMING DEBT TO RENEWABLE ENERGY AND ENERGY EFFICIENCY INVESTMENT**

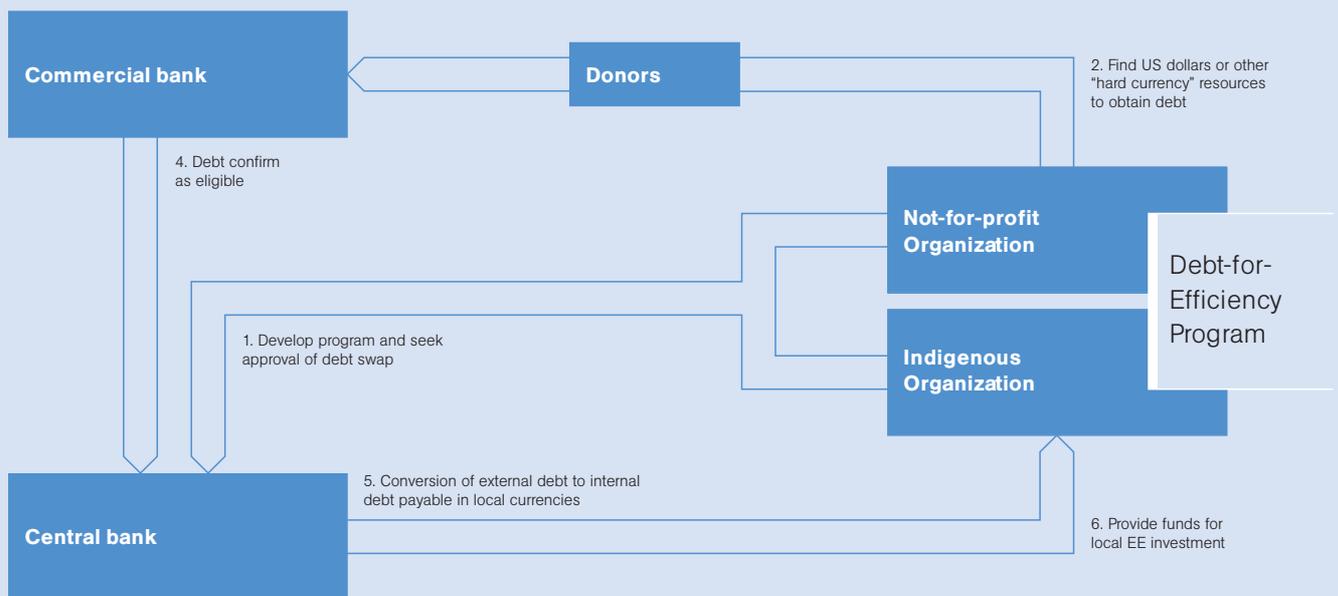
The development by the multilateral development banks (MDBs) of debt swap programmes between donor countries and developing countries could become an important new source of funding for public or semi-public renewable energy (RE) and energy efficiency (EE) projects, as shown in [FIGURE 1-ANNEX IV](#).

Under debt swap programmes, creditors negotiate agreements whereby a portion of the debt owed to them is cancelled in exchange for a commitment by the debtor government to convert the cancelled amount into local currency for investment in clean energy projects. The

positive impact of debt reduction at low cost, combined with increased investment in priority sectors such as RE and EE, makes such debt conversion programmes attractive. Since proceeds from debt swaps are in local currencies, they would not qualify for payment of imported products.

Where other sources of financing can be found to pay for imported clean energy technologies, proceeds from debt-swap programmes implemented by MDBs could potentially be used to finance recurring local costs, such as salaries, project operation and maintenance, or costs associated with locally-produced hardware. Likewise, proceeds could be used as collateral to secure domestic bank financing of clean energy projects, thus increasing available sources of funding to undercapitalized project developers.

Figure 1. Structure of a Debt Swap for Energy Efficiency or Renewable Energy



Source: Pratt, 2007.

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