

Cross-cutting policy assumptions by scenario for selected regions

	Current Policies Scenario	New Policies Scenario	450 Scenario
OECD			- Staggered introduction of CO₂ prices in all countries. \$100 billion financing provided to non-OECD countries by 2020.
United States	- State-level renewable portfolio standards (RPS) that include the option of using energy efficiency as a means of compliance. - Regional Greenhouse Gas Initiative (RGGI): mandatory cap-and-trade scheme covering fossil-fuel power plants in nine northeast states including recycling of revenues for energy efficiency and renewable energy investments. - State-wide cap-and-trade scheme in California with binding commitments.		17% reduction in greenhouse-gas (GHG) emissions by 2020 compared with 2005. - CO₂ pricing implemented from 2020.
Japan ¹			25% reduction in GHG emissions by 2020 compared with 1990. - CO₂ pricing implemented from 2020.
European Union	- EU-level target to reduce GHG emissions by 20% in 2020, relative to 1990. - EU Emissions Trading System. - Renewables to reach a share of 20% in energy demand in 2020.	- Partial implementation of the EU-level target to reduce primary energy consumption by 20% in 2020: - Partial implementation of the EU Energy Efficiency Directive. - National Energy Efficiency Action Plans.	30% reduction in GHG emissions by 2020 compared with 1990. - Emissions Trading System strengthened in line with the 2050 roadmap. - Full implementation of the EU Energy Efficiency Directive.
Australia and New Zealand	- Australia: Clean Energy Future Package - carbon prices through taxes/emissions trading scheme as of mid-2015. - New Zealand: emissions trading scheme from 2010.	- Australia: 5% reduction in GHG emissions by 2020 compared with 2000. - New Zealand: 10% cut in GHG emissions by 2020 compared with 1990.	- Australia: 25% reduction in GHG emissions by 2020 compared with 2000. - New Zealand: 20% reduction in GHG emissions by 2020 compared with 1990.
Korea	Cap-and-trade scheme from 2015 (CO₂ emissions reductions of 4% by 2020 compared with 2005).	30% reduction in GHG emissions by 2020 compared with business-as-usual.	30% reduction in GHG emissions by 2020 compared with business-as-usual. - Higher CO₂ prices.

¹ Japan is reviewing its basic policies on energy and climate change, some of which are expected to be announced by the end of 2013.

Cross-cutting policy assumptions by scenario for selected regions (continued)

	Current Policies Scenario	New Policies Scenario	450 Scenario
Non-OECD	Fossil-fuel subsidies are phased out in countries that already have policies in place to do so.	Fossil-fuel subsidies are phased out within the next ten years in all net-importing countries and in net-exporting countries where specific policies have already been announced.	- Finance for domestic mitigation. - Fossil-fuel subsidies are phased out within the next ten years in all net-importer and in net-exporters by 2035.*
Russia	- Gradual real increases in residential gas and electricity prices (1% per year) and in gas prices in industry (1.5% per year). - Implementation of 2009 energy efficiency legislation.	15% reduction in GHG emissions by 2020 compared with 1990. 2% per year real rise in residential gas and electricity prices. - Industrial gas prices reach export prices (minus taxes and transport) in 2020. - Partial implementation of the 2010 energy efficiency state programme.	25% reduction in GHG emissions by 2020, compared with 1990. - Quicker rise in residential gas and electricity prices. - CO₂ pricing from 2020. - More support for nuclear and renewables. - Full implementation of the 2010 energy efficiency state programme.
China	Implementation of measures in the 12th Five-Year Plan, including 17% cut in CO₂ intensity by 2015 and 16% reduction in energy intensity by 2015 compared with 2010.	40% reduction in CO₂ intensity compared with 2005 by 2020. - CO₂ pricing from 2020. - Share of 15% of non-fossil fuel in total supply by 2020. - Energy price reform including more frequent adjustments in oil product prices and Increase in natural gas price by 15% for non-residential users.	45% reduction in CO₂ intensity by 2020 compared with 2005; higher CO₂ pricing. - Reduction of local air pollutants between 2010 and 2015 (reduction of 8% for sulphur dioxide, 10% for nitrogen oxides).
India	- Trading of renewable energy certificates. - National solar mission and national mission on enhanced energy efficiency. 11th Five-Year Plan (2007-2012).	20% reduction in CO₂ intensity by 2020 compared with 2005.	25% reduction in CO₂ intensity by 2020 compared with 2005.
Brazil	Implementation of National Energy Efficiency Plan.	36% reduction in GHG emissions by 2020 compared with business-as-usual. - Strengthened implementation of National Energy Efficiency Plan.	39% reduction in GHG emissions by 2020 compared with business-as-usual. - CO₂ pricing from 2020.

*Except the Middle East where subsidisation rates are assumed to decline to a maximum of 20% by 2035.

Power sector policies and measures as modelled by scenario in selected regions

	Current Policies Scenario	New Policies Scenario	450 Scenario
OECD			
United States	- State-level renewable portfolio standards (RPS) and support for renewables prolonged over the projection period. - Mercury and Air Toxics Standard. - Clean Air Interstate Rule regulating sulphur dioxide and nitrogen oxides. - Lifetimes of most US nuclear plants extended beyond 60 years. - Funding for CCS (demonstration-scale).	- Extension and strengthening of support for renewables and nuclear, including loan guarantees. - Cautious implementation of carbon pollution standards on new power plants. - Shadow price of carbon assumed from 2015, affecting investment decisions in power generation capacity.	- CO₂ pricing implemented from 2020. - Extended support to renewables, nuclear and CCS. - Efficiency and emission standards preventing refurbishment of old inefficient plants. - Full implementation of the carbon pollution standards on existing power plants by 2030.
Japan	- Support for renewables generation. - Decommissioning of units 1-4 of Fukushima Daiichi nuclear power plant.	- Shadow price of carbon assumed from 2015, affecting investment decisions in power generation. - Lifetime of nuclear power plants limited to 40 years for plants built up to 1990 and 50 years for all others. - Increased support for renewables generation.	- CO₂ pricing implemented from 2020. - Share of low-carbon electricity generation to increase by 2020 and expand further by 2030. - Expansion of renewables support. - Introduction of CCS to coal-fired power generation.
European Union	- Climate and Energy Package: - Emissions Trading System. - Support for renewables sufficient to reach 20% share of energy demand in 2020. - Financial support for CCS. - Early retirement of all nuclear plants in Germany by the end of 2022. - Removal of some barriers to combined heat and power (CHP) plants resulting from the Cogeneration Directive 2004.	- Extended and strengthened support to renewables-based electricity generation technologies. - Further removal of barriers to CHP through partial implementation of the Energy Efficiency Directive.	- Emissions Trading System strengthened in line with the 2050 roadmap. - Reinforcement of government support in favour of renewables. - Expanded support measures for CCS.

Note: CCS = carbon capture and storage.

Power sector policies and measures as modelled by scenario in selected regions (continued)

	Current Policies Scenario	New Policies Scenario	450 Scenario
Non-OECD			
Russia	Competitive wholesale electricity market.	State support to the nuclear and hydropower sectors; a support mechanism for non-hydro renewables introduced from 2014.	- CO₂ pricing implemented from 2020. - Stronger support for nuclear power and renewables.
China	- Implementation of measures in 12th Five-Year Plan. - Start construction of 40 GW of new nuclear plants by 2015. - Reach 290 GW of installed hydro capacity by 2015. - Reach 100 GW of installed wind capacity by 2015. 35 GW of solar capacity by 2015. - Priority given to gas use to 2015.	12th Five-Year Plan renewables targets for 2015 are exceeded. 70 to 80 GW of nuclear capacity by 2020. 200 GW of wind capacity by 2020. 30 GW of bioenergy capacity by 2020. - CO₂ pricing implemented from 2020.	- Higher CO₂ pricing. - Enhanced support for renewables. - Continued support to nuclear capacity additions post 2020. - Deployment of CCS from around 2020.
India	- Renewable Energy Certificate trade for all eligible grid-connected renewable-based electricity generation technologies. - National solar mission target of 20 GW of solar PV capacity by 2022. - Increased use of supercritical coal technology.	- Renewable energy support policies and targets, including small hydro. - Coal-fired power stations energy efficiency mandates.	- Renewables (excluding large hydro) to reach 15% of installed capacity by 2020. - Expanded support to renewables, nuclear and efficient coal. - Deployment of CCS from around 2020.
Brazil	- Power auctions for all fuel types. - Guidance on the fuel mix from the Ten-Year Plan for Energy Expansion.	Enhanced deployment of renewables technologies through power auctions.	- CO₂ pricing implemented from 2020. - Further increases of generation from renewable sources.

Note: CCS = carbon capture and storage.

Transport sector policies and measures as modelled by scenario in selected regions

	Current Policies Scenario	New Policies Scenario	450 Scenario
OECD			All OECD
United States	• CAFE standards: 35.5 miles per gallon for PLDVs by 2016, and further strengthening thereafter. • Renewables Fuel Standard. • Truck standards for each model year from 2014 to 2018 reduce average on-road fuel consumption by up to 18% in 2018.	• CAFE standards: 54.5 miles per gallon for PLDVs by 2025. • Renewables Fuel Standard. • Truck standards for each model year from 2014 to 2018 reduce average on-road fuel consumption by up to 20% in 2018, and further strengthening thereafter. • Support to natural gas in road freight. • Increase of ethanol blending mandates.	• On-road emission targets for PLDVs in 2035: 60 g CO₂/km • Light-commercial vehicles: full technology spill-over from PLDVs. • Medium- and heavy-freight vehicles: 45% more efficient by 2035 than in New Policies Scenario. • Aviation: 50% efficiency improvements by 2035 (compared with 2010) and support for the use of biofuels. • Other sectors (e.g. maritime and rail): national policies and measures. • Fuels: retail fuel prices kept at a level similar to New Policies Scenario. • Alternative clean fuels: enhanced support to alternative fuels.
Japan	• Fuel economy target for PLDVs: 16.8 kilometres per litre (km/l) by 2015 and 20.3 km/l by 2020. • Average fuel economy target for road freight vehicles: 7.09 km/l by 2015. • Fiscal incentives for hybrid and electric vehicles; subsidies for electric vehicles.	• Target share of next generation vehicles 50% by 2020.	
European Union	• CO₂ emission standards for PLDVs by 2015 (130 g CO₂/km through efficiency measures, additional 10 g CO₂/km by alternative fuels). • Support to biofuels.	• Climate and Energy Package: Target to reach 10% of transport energy demand in 2020 by renewable fuels. • More stringent emission target for PLDVs (95 g CO₂/km by 2020), and further strengthening after 2020. • Emission target for LCVs (147 g CO₂/km by 2020), and further strengthening post 2020. • Enhanced support to alternative fuels.	

Note: CAFE = Corporate Average Fuel Economy; PLDVs = passenger light-duty vehicles; LCV = light-commercial vehicles.

Transport sector policies and measures as modelled by scenario in selected regions (continued)

Current Policies Scenario		New Policies Scenario	450 Scenario
Non-OECD			All non-OECD
China	- Subsidies for hybrid and electric vehicles. - Promotion of fuel-efficient cars. - Ethanol blending mandates 10% in selected provinces. - Upper threshold on PLDV sales in some cities. - Enhance infrastructure for electric vehicle in selected cities.	- Fuel economy target for PLDVs: 6.9 l/100 km by 2015, 5.0 l/100 km by 2020. - Extended subsidies for purchase of alternative-fuel vehicles. - Complete fossil fuel subsidy phase-out within the next ten years.	- On-road emission targets for PLDVs in 2035: 80 g CO₂/km - Light-commercial vehicles: full technology spill-over from PLDVs. - Medium- and heavy-freight vehicles: 45% more efficient by 2035 than in New Policies Scenario. - Aviation: 50% efficiency improvements by 2035 (compared with 2010) and support for the use of biofuels. - Other sectors (e.g. maritime and rail): national policies and measures. - Fuels: retail fuel prices kept at a level similar to New Policies Scenario. - Alternative clean fuels: enhanced support to alternative fuels.
India	Support for alternative fuel vehicles.	- Extended support for alternative-fuel vehicles. - Proposed automobile fuel efficiency standards to reduce average test-cycle fuel consumption by 1.3% per year between 2010 and 2020. - Increased utilisation of natural gas in road transport. - National Electric Mobility Mission Plan 2020. - All fossil-fuel subsidies are phased out within the next ten years.	
Brazil	- Ethanol blending mandates in road transport between 18% and 25%. - Biodiesel blending mandate of 5%.	- Increase of ethanol and biodiesel blending mandates. - Local renewable fuel targets for urban transport. - Concessions to improve port, road, rail and air infrastructure, as per the Accelerated Growth Programme 2011-2014. - Long-term plan for freight transport (PNLT), developed by the Ministry of Transport. - National urban mobility plan (PNMU), developed by the Ministry of Cities	

Note: PLDVs = passenger light-duty vehicles.

Industry sector policies and measures as modelled by scenario in selected regions

Current Policies Scenario		New Policies Scenario	450 Scenario
OECD			All OECD
United States	- Better Buildings, Better Plants programme. - Energy Star Program for Industry. - Climate Voluntary Innovative Sector Initiatives: Opportunities Now. - Boiler maximum achievable control technology rule to impose stricter emissions limits on industrial and commercial boilers and process heaters.	- Tax reduction and funding for efficient technologies. - R&D in low-carbon technologies. - Energy Savings and Industrial Competitiveness Act.	- CO₂ pricing introduced from 2025 at the latest in all countries. - International sectoral agreements with energy intensity targets for iron and steel, and cement industries. - Enhanced energy efficiency standards. - Policies to support the introduction of CCS in industry.
Japan	- Mandatory energy efficiency benchmarking. - Tax credit for investments in energy efficiency. - Mandatory energy management for large business operators. - Top Runner Programme setting minimum energy standards, including for lighting, space heating, and transformers.	- Maintenance and strengthening of top-end/low carbon efficiency standards by: - Higher efficiency CHP systems. - Promotion of state-of-the-art technology and faster replacement of aging equipment.	
European Union	- Emissions Trading System. - Eco-Design Directive (including minimum standards for electric motors, pumps, fans, compressors and insulation). - Voluntary energy efficiency agreements in several countries.	- Partial implementation of Energy Efficiency Directive: - Mandatory and regular energy audits for large enterprises. - Incentives for the use of energy management systems. - Encouragement for SMEs to undergo energy audit. - Technical assistance and targeted information for SMEs. - Training programmes for auditors.	

Note: R&D = research and development; CHP = combined heat and power; CCS = carbon capture and storage.

Industry sector policies and measures as modelled by scenario in selected regions (continued)

Current Policies Scenario		New Policies Scenario	450 Scenario
Non-OECD			All non-OECD
Russia	- Competitive wholesale electricity market price. - Mandatory energy audits and energy management systems for energy-intensive industries. - Complete phase-out of open hearth furnaces in the iron and steel industry.	- Industrial gas prices reach the equivalent of export prices (minus taxes and transportation) in 2020. - Very cautious implementation of the "Energy saving and increase of energy efficiency for the period till 2020" programme. - Limited phase-out of natural gas subsidy.	- CO₂ pricing introduced as of 2020 in Russia, China, Brazil and South Africa. - Wider hosting of international offset projects. - International sectoral agreements with targets for iron and steel, and cement industries. - Enhanced energy efficiency standards. - Policies to support the introduction of CCS in industry.
China	- Top 10 000 energy-consuming enterprises programme. - Small plant closures and phasing out of outdated production capacity. - Partial implementation of Industrial Energy Performance Standard. - Ten Key Projects. - Mandatory adoption of coke dry quenching and top-pressure turbines in new iron and steel plants / Support non-blast furnace iron making. - Priority given to gas use to 2015 (12th Five-Year Plan).	- Contain the expansion of energy-intensive industries. - CO₂ pricing implemented from 2020. Partial implementation of reduction in industrial energy intensity by 21% during the 12th Five-Year Plan period (2011-2015). - Full implementation of Industrial Energy Performance Standard. - Enhanced use of energy service companies and energy performance contracting. - All fossil-fuel subsidies are phased out within the next ten years.	
India	- Perform Achieve and Trade (PAT) mechanism, targeting a 5% reduction in energy use by 2015 compared with 2010 through a trade system with plant-based efficiency levels. - Energy Conservation Act: - Mandatory energy audits, appointment of an energy manager in seven energy-intensive industries.	- Further implementation of National Mission for Enhanced Energy Efficiency recommendations including: - Enhancement of cost-effective improvements in energy efficiency in energy-intensive large industries and facilities through tradable certificates (extension of PAT). - Financing mechanism for demand-side management programmes. - Development of fiscal instruments to promote energy efficiency. - All fossil-fuel subsidies are phased out within the next ten years.	
Brazil	- PROCEL (National Program for Energy Conservation). - PROESCO (Support for Energy Efficiency Projects).	- Partial implementation of the National Energy Efficiency Plan: - Fiscal and tax incentives for industrial upgrading. - Invest in training efficiency. - Encourage the use of industrial waste. - Extension of PROESCO.	

Note: CCS = carbon capture and storage.

Buildings sector policies and measures as modelled by scenario in selected regions

	Current Policies Scenario	New Policies Scenario	450 Scenario
OECD			
United States	• AHAM-ACEEE Multi-Product Standards Agreement. • Energy Star: federal tax credits for consumer energy efficiency; new appliance efficiency standards. • Energy Improvement and Extension Act of 2008. • Budget proposals 2011 - institute programmes to make commercial buildings 20% more efficient by 2020; tax credit for renewable energy deployment. • Weatherization program: provision of funding for refurbishments of residential buildings.	• Extensions to 2025 of tax credit for energy-efficient equipment (including furnaces, boilers, air conditioners, air and ground source heat pumps, water heaters and windows), and for solar PV and solar thermal water heaters. • Mandatory energy requirements in building codes in some states. • Introduction of the Energy Savings and Industrial Competitiveness Act of 2013 strengthening building codes, creating a financing initiative and incentivising the use of efficient motors. • Tightening of efficiency standards for appliances.	• Mandatory energy requirements in building codes in all states by 2020. • Extension of energy efficiency grants to end of projection period. • Zero-energy buildings initiative.
Japan	• Top-Runner Programme. • Long-Term Outlook on Energy Supply and Demand (2009): energy savings using demand-side management.	• Extension of the Top Runner Programme to include windows and insulating materials; high-efficiency lighting: 100% in public facilities by 2020; 100% of lighting stock by 2030. • Voluntary buildings labelling; national voluntary equipment labelling programmes. • Net zero-energy buildings by 2030 for all new construction. • Increased introduction of gas and renewable energy. • High-efficiency lighting: 100% in public facilities by 2020; 100% of all lighting by 2030.	• Rigorous and mandatory building energy codes for all new and existing buildings. • Net zero-energy buildings by 2025 for all new construction. • Strengthening of high-efficiency lighting for non-public buildings.
European Union	• Energy Performance of Buildings Directive. • Eco-Design and Energy Labelling Directive. • EU-US Energy Star Agreement: energy labelling of appliances.	• Partial implementation of the Energy Efficiency Directive. • Implementation of regulations for vacuum cleaners and computers within the framework of the Ecodesign Directive. • Building energy performance requirements for new buildings (zero-energy buildings by 2021) and for existing buildings when extensively renovated. 3% renovation rate of central government buildings. • Mandatory energy labelling for sale or rental of all buildings and some appliances, lighting and equipment. • Further product groups in EcoDesign Directive. • Phase-out of incandescent light bulbs.	• Zero-carbon footprint for all new buildings as of 2015; enhanced energy efficiency in all existing buildings. • Full implementation of the Energy Efficiency Directive. • Accelerated phase-out of incandescent light bulbs. • Mandatory energy conservation standards and labelling requirements for all equipment and appliances, space and water heating and cooling systems by 2020.

Notes: ACEEE = American Council for an Energy-Efficient Economy; AHAM = Association of Home Appliance Manufacturers.

Buildings sector policies and measures as modelled by scenario in selected regions (continued)

	Current Policies Scenario	New Policies Scenario	450 Scenario
Non-OECD			
Russia	- Implementation of 2009 energy efficiency legislation. - Voluntary labelling program for electrical products. - Restriction on sale of incandescent light bulbs.	- Gradual above-inflation increase in residential electricity and gas prices. - New building codes, meter installations and refurbishment programmes. Information and awareness on energy efficiency classes for appliances. - Phase-out of incandescent >100 Watt light bulbs. - Limited phase-out of natural gas and electricity subsidies.	- Faster liberalisation of gas and electricity prices. - Extension and reinforcement of all measures included in the 2010 energy efficiency state programme; mandatory building codes by 2030 and phase-out of inefficient equipment and appliances by 2030.
China	- Civil Construction Energy Conservation Design Standard. - Appliance standards and labelling programme.	- Energy efficient buildings to account for 30% of all new construction projects by 2020. - Civil Construction Energy Conservation Design Standard: heating energy consumption per unit area of existing buildings to be reduced by 65% in cold regions; 50% in hot-in-summer and cold-in-winter regions compared to 1980-1981 levels. New buildings: 65% improvement in all regions. - Building energy codes for all buildings to improve building envelope and HVAC system efficiencies in place (applies to cold climate zones); mandatory codes for all new large residential buildings in big cities. - Energy Price Policy (reform heating price to be based on actual consumption, rather than on living area supplied). - Mandatory energy efficiency labels for appliances and equipment. - Labelling mandatory for new, large commercial and governmental buildings in big cities. - Introduction of energy standards for new buildings & refurbishment of existing dwellings. - Phase-out of incandescent light bulbs production over the next ten years. - All fossil-fuel subsidies are phased out within the next ten years.	- More stringent implementation of Civil Construction Energy Conservation Design Standard. - Mandatory energy efficiency labels for all appliances and also for building shell. - Faster Energy Price Policy reform to set stronger incentives for energy savings. - Partial Implementation of the Building Conservation Plan, which foresees that 95% of new buildings achieve savings of 55%- 65% in space heating compared to 1980, depending on the climate zone.
India	- Measures under national solar mission. - Energy Conservation Building Code 2007, with voluntary requirements for commercial and residential buildings.	- Mandatory standards and labels for room air conditioners and refrigerators, voluntary for five other products. (More stringent minimum energy performance standards for air conditioners). - Phase-out of incandescent light bulbs by 2020. - Voluntary Star Ratings for the services sector. - National Action Plan in Climate Change: Measures concerning building sector in the National Mission on Enhanced Energy Efficiency. - Energy Conservation in Building Code made mandatory in eight states and applies among others to building envelope, lighting and hot water. - All fossil-fuel subsidies are phased out within the next ten years.	- Mandatory energy conservation standards and labelling requirements for all equipment and appliances by 2025. - Increased penetration of energy efficient lighting.
Brazil	Labelling programme for household goods, public buildings equipment.	Implementation of National Energy Efficiency Plan.	