G20 ENERGY EFFICIENCY ACTION PLAN

VOLUNTARY COLLABORATION ON ENERGY EFFICIENCY

16 NOVEMBER 2014

1. Executive summary

1.1 Energy efficiency is a priority for G20 members. As the world's leading economies, and consumers of more than 80 per cent of the world's energy, G20 members agree that increased collaboration on energy efficiency can drive economic activity and productivity, strengthen energy security and improve environmental outcomes. It can also cut costs for businesses and households. By sharing approaches and working towards harmonisation where appropriate, countries can drive business efficiencies.

1.2 The G20 Energy Efficiency Action Plan (the Action Plan) is a practical plan to strengthen voluntary energy efficiency collaboration in a flexible way. It allows countries to share knowledge, experiences and resources by choosing, on an opt-in basis, preferred activities that best reflect their domestic priorities.

1.3 In developing the Action Plan, G20 members have considered the significant work being done through existing international bodies and multilateral arrangements on energy efficiency. G20 members have focused on how they could add value, for example by addressing emerging challenges and gaps in existing work or adding momentum to existing collaboration.

1.4 The Action Plan documents six areas of energy efficiency work for ongoing collaboration and knowledge sharing among G20 members and other participating countries, as set out in the table below. Three areas will involve new G20-led work in which participating countries will address an emerging challenge or a gap in existing international collaboration. In the other three areas, participating countries will add value by expanding or enhancing existing international collaboration. The Action Plan also foreshadows other areas for possible future collaboration. G20 members and guest countries have selected, based on national priorities and capabilities, the specific areas of work in which they will participate.

1.5 The International Partnership for Energy Efficiency Cooperation (IPEEC) will support collaboration under the Action Plan. IPEEC will fully cooperate with expert organisations including the International Energy Agency (IEA), the International Energy Forum (IEF), the Organisation for Economic Development (OECD), the Organisation of the Petroleum Exporting Countries (OPEC) and the International Renewable Energy Agency (IRENA). In 2015, IPEEC will report to the G20, through the Energy Sustainability Working Group (ESWG), on collaboration under the Action Plan, and on possible next steps for G20 consideration. IPEEC will consult with such organisations in preparation of the report.

1.6 G20 members and other participating countries acknowledge the importance of providing sufficient resourcing to IPEEC and other participating international organisations, through voluntary financial and in-kind contributions, to enable them to support the Action Plan.

PRIORITIES AND KEY ACTIONS

Collaboration and knowledge sharing

PRIORITIES FOR NEW WORK	
Priorities	**Key Actions**
Vehicles: Improving vehicle energy efficiency and emissions performance	Participating countries will work together to improve vehicle energy efficiency and emissions performance, particularly for heavy duty vehicles. In 2015, this work will include developing recommendations, for G20 consideration, including for strengthened domestic standards in G20 countries in as many areas as possible related to clean fuels, vehicle emissions and vehicle fuel efficiency, and for green freight programs. Participating countries will work together with IPEEC and relevant expert international organisations to establish a new IPEEC Transport Task Group to support this work.
Products: Networked devices	Participating countries will work together to accelerate the development of new ways to improve the energy efficiency of networked devices. In 2015, this work will include consideration of options for goals for reducing the global standby mode energy consumption of networked devices.
Finance: Enhancing capital flows to energy efficiency investments	Participating countries will work together to establish a new IPEEC Energy Efficiency Finance Task Group to engage with the international finance community and develop options for promoting the flow of private and public capital to energy efficiency investments.
PRIORITIES FOR ACCELERATING EXISTING INTERNATIONAL WORK	
Priorities	**Key Actions**
Buildings: Improving metrics and performance	Participating countries will work together to take forward recent IPEEC Building Energy Efficiency Task Group (BEET) recommendations, including by furthering collaboration on best practices in national building codes, metrics, rating, labelling and disclosure.
Industrial energy management: Making industrial processes more energy efficient	Participating countries will cooperate to accelerate the work of the existing IPEEC Global Superior Energy Performance Partnership (GSEP) Energy Management Working Group and the Energy Management Action Network (EMAK) Task Group.
Electricity generation: Sharing high-efficiency, low-emissions technologies	Participating countries will work together, through the existing IPEEC GSEP Power Working Group, to develop a detailed implementation plan for sharing knowledge of high-efficiency, low emissions electricity generation technologies that are consistent with our climate activities and commitments.

2. Priorities for new work

2.1 Vehicles, networked devices and financing are areas where G20 members can add value by addressing an emerging challenge or a gap in existing international collaboration.

VEHICLES

Improving vehicle energy efficiency and emissions performance

KEY ACTIONS

Participating countries will work together to improve vehicle energy efficiency and emissions performance, particularly for heavy duty vehicles. In 2015, this work will include developing recommendations, for G20 consideration, including for strengthened domestic standards in G20 countries in as many areas as possible related to clean fuels, vehicle emissions and vehicle fuel efficiency, and for green freight programs. Participating countries will work together with IPEEC and relevant expert international organisations to establish a new IPEEC Transport Task Group to support this work.

2.2 **The problem**: The transport sector is a major consumer of energy and source of related emissions. Globally, the transport sector is estimated to account for around 20 per cent of total energy use. The IEA estimates that transport energy use could increase by as much as 70 per cent globally by 2050 unless energy efficiency and other policies are significantly strengthened. The IEA also suggests that ambitious policy and technology development, and implementation, could mitigate much of this growth. Heavy duty vehicles – trucks, buses and other large vehicles – are one area of particular focus. Globally, heavy-duty vehicles only make up about 10 per cent of the vehicle fleet, but they consume around half of all transport fuels and emit even higher fractions of vehicular air pollutants. About 75 per cent of global HDV sales occur in G20 countries.

2.3 **G20's approach**: This work, which will be coordinated by the United States, will evaluate and promote opportunities for faster development and introduction of more stringent domestic vehicle fuel efficiency requirements and air pollution emissions standards for new vehicles, as well as related national fuel quality standards and green freight programs. The expertise of specialist international organisations, such as the International Council on Clean Transportation (ICCT), the Global Fuel Economy Initiative (GFEI), and the International Transport Forum (ITF), will be an important input to this work. While such standards are applied domestically, in accordance with differing national circumstances and priorities, international work can accelerate technical development of standards and testing regimes and facilitate voluntary harmonisation. Harmonisation of national standards helps reduce development costs for new vehicles and lessens the regulatory burden. This work will include collaboration and exchange of experiences and best practices on relevant national standards.

2.4 In 2015, there will be a focus on heavy duty vehicles, whose environmental impacts are disproportionately high and for which standards and technology are less developed. New collaborative work in this area could help participating countries to develop techniques for effectively measuring, comparing and controlling the fuel consumption and environmental impacts of heavy duty vehicles. This could in turn facilitate the development and implementation of common approaches and coordinated national standards. Recommendations could cover vehicle-based and fuel-based approaches for reducing the energy, environment and climate impacts of heavy duty vehicles. These include engine efficiency and performance improvements, aerodynamics and tyre improvements, the increased supply and use of complementary fuels including biofuels and natural gas and more.

2.5 With respect to light duty vehicles, participating countries may consider strengthening support for and participation in the GFEI. This collaborative activity is currently supported by the IEA, United Nations Environment Programme (UNEP), the Fédération Internationale de l'Automobile (FIA) Foundation, the ITF and the ICCT. Participating countries could support the GFEI to increase collaborative activity and research, better share knowledge and experiences with light duty vehicle fuel efficiency standards and programs (and on related air pollution and fuel quality issues), and achieve more rapid improvements in the fuel efficiency of vehicles internationally. Participating countries may also consider further action in support of GFEI's overall aim of improving fuel efficiency.

PRODUCTS

Networked devices

KEY ACTIONS

Participating countries will work together to accelerate the development of new ways to improve the energy efficiency of networked devices. In 2015, this work will include consideration of options for goals for reducing the global standby mode energy consumption of networked devices.

2.6 **The problem**: Networked devices are widely traded internationally. These devices include smart phones, computers, televisions, set top boxes, printers and other office equipment, and increasingly white goods, lighting equipment, kitchen appliances and heating and cooling products. International collaboration towards voluntary harmonisation of domestic product energy efficiency standards can reduce barriers to trade that arise from differing standards. This reduces compliance and regulatory burdens on industry and reduces product development costs. It can also facilitate pooling of resources in research and innovation. International collaboration around the energy efficiency of networked devices could be deepened, leading to more rapid realisation of benefits for all countries, including reductions in energy demand and peak load infrastructure requirements.

2.7 The growing energy consumption of networked devices when they are not in use – but are in standby mode is an emerging challenge. Networks routinely "wake" such devices, leading to additional and often unnecessary power consumption. Many devices use as much energy in standby mode as they do when they are in use. With the global trend towards an "internet of things", the IEA estimates that up to 50 billion devices may be connected to networks by 2020. Already, the annual standby power consumption of networked devices is estimated at over 600 TWh. This is greater than Canada's total annual electricity consumption in 2011. By 2025, global standby power consumption is projected to nearly double. However, the IEA estimates that wider uptake of today's best practice technologies could reduce this consumption by 65 per cent.

2.8 **G20's approach:** Participating countries will work with the IEA, to expand relevant research and information sharing, and to accelerate the development of product standards, particularly on technologies that would enable devices to power down and use less energy when in standby mode. This work could also include development of a policy framework to reduce energy consumption of networked devices when in standby mode. This could be achieved by intensifying international cooperation through inter alia the IEA's Energy Efficient End-use Equipment (4E) initiative and through the Super-efficient Equipment and Appliance Deployment (SEAD) initiative of the Clean Energy Ministerial (CEM) and IPEEC. The United Kingdom will coordinate G20 work on networked products.

2.9 In 2015, participating countries will consider options for goals for reducing the global standby mode energy consumption of networked devices.

FINANCE

Enhancing capital flows to energy efficiency investments

KEY ACTIONS

Participating countries will work together to establish a new IPEEC Energy Efficiency Finance Task Group to engage with the international finance community and develop options for promoting the flow of private and public capital to energy efficiency investments.

2.10 **The problem:** To realise the multiple benefits of energy efficiency, greater investment in energy efficiency is needed across G20 countries. Actions to improve energy efficiency – including making power generation cleaner and more efficient, retrofitting buildings, promoting uptake of more efficient appliances and equipment, and investing in public transport – are often costly and require access to affordable finance.

2.11 This need arises while G20 budgets are thinly stretched across many public policy priorities and are unlikely to be sufficient to realise all of the opportunities of improved energy efficiency. There is a need and opportunity to facilitate greater access to capital to finance energy efficiency activities: both private capital on commercially attractive terms, and public capital such as that arranged through multilateral development banks such as the World Bank as well as national development banks. However, energy efficiency is a different investment class to major infrastructure projects, as projects can be small and scattered across thousands of sites making estimates of revenue from energy savings harder to quantify. So financial institutions require reliable analytical tools to provide sufficient credit certainty and minimise risk premiums on credit facilities. Governments can generate confidence and provide certainty for private investors through well-informed policies and programs.

2.12 **G20's approach**: Participating countries will work with IPEEC to create an Energy Efficiency Finance Task Group, supported by the OECD and other relevant international organisations and initiatives (including the World Bank, the IEF, the Energy Efficiency Financial Institutions Group and the United Nations Environment Programme Finance Initiative), to facilitate a high-level dialogue with representatives of the international finance community. Mexico and France will coordinate this work. G20 members would also draw on the work of the G20 Investment and Infrastructure Working Group (IIWG) to ensure that the lessons learned by the IIWG are applied where appropriate.

2.13 The task group will contribute to best practice and capacity building by collecting and analysing case studies of successful financing initiatives on both the demand side (borrowers) and the supply side (banks and investors). Lessons learned will be disseminated through best practice toolkits, information packs, online tutorials and direct engagement. The dialogue between the energy efficiency community and financial institutions will be used to develop options for policy approaches that better facilitate the flow of private and public capital into energy efficiency investments. This will include identifying issues for energy efficiency investment finance from the perspectives of both demand (borrowers) and supply (banks and investors); and identifying appropriate policy and market approaches – such as financial instruments, standards and tools and services – to address these issues.

3. Priorities for accelerating existing international work

3.1 Buildings, industrial energy management and electricity generation are areas where G20 members can add value by expanding or enhancing existing international collaboration.

BUILDINGS

Improving metrics and performance

KEY ACTIONS
Participating countries will work together to take forward recent IPEEC Building Energy Efficiency Task Group (BEET) recommendations, including by furthering collaboration on best practices in national building codes, metrics, rating, labelling and disclosure.

3.2 **The problem**: Worldwide, buildings account for over 30 per cent of total final energy consumption, much of which can be avoided through design, components (such as glazing), equipment, systems and control strategies, all of which can be cost-effective. In G20 countries experiencing rapid economic growth, energy efficiency opportunities for new buildings may be the focus. Other G20 members could retrofit a large stock of existing buildings to improve energy performance. While building designs and construction techniques can be localised, there are opportunities to share best practice policy models and design concepts. There are also opportunities to work towards voluntary harmonisation of domestic standards for building products, where international trade is significant.

3.3 Three examples of areas where best practices could usefully be shared are performance codes, building energy data and rating and disclosure. Performance codes remain the “workhorses” of the building energy efficiency world, and can bring about such benefits as reduced lifecycle operating costs for buildings, reduced peak electricity demand, and improved occupant health outcomes. Concerted action on building energy data can improve the availability, quality and utility of metrics. Rating and disclosure is a market-based approach that is not prescriptive of outcomes but makes building energy performance visible; and there is growing evidence that building owners and occupants act on information provided through rating and disclosure, even where not required to do so.

3.4 **G20’s approach:** Participating countries will work through the existing IPEEC Building Energy Efficiency Task group (BEET), co-ordinated jointly by the United States and Australia, together with the IEA and the Global Superior Energy Performance (GSEP) partnership. BEET has conducted work on building rating systems and, at the request of the Major Economies Forum on Energy and Climate (MEF), identified key areas for further international collaboration and developed options for metrics to gauge progress in building performance.

3.5 BEET’s focus in 2015 will be work to promote uptake of best practices in the field of building energy performance codes and to develop and track building energy efficiency metrics, working through the IEA. The work on codes could highlight the continuing importance of effective energy performance requirements in building codes, including reviewing national code outcomes and capacity building and support for countries wishing to strengthen their codes. This work could also consider national mechanisms to support compliance with building codes, as compliance is acknowledged to be a concern in many countries. Further work on metrics will help gauge progress and identify opportunities for improvement in building energy performance.

3.6 Previously BEET has identified priorities to promote awareness and take-up of building rating, labelling and disclosure tools. Further activities in this area could focus on documenting and information sharing on best practice national policy models, ratings and disclosure mechanisms, common metrics and methodologies, and capacity building.

INDUSTRIAL ENERGY MANAGEMENT

Making industrial processes more energy efficient

KEY ACTIONS
Participating countries will cooperate to accelerate the work of the existing IPEEC Global Superior Energy Performance Partnership (GSEP) Energy Management Working Group and the Energy Management Action Network (EMAK) Task Group.

3.7 **The problem:** As many industrial processes are energy-intensive, industrial energy efficiency improvement is a cost-effective strategy.

3.8 **G20's approach:** Participating countries will work to accelerate the uptake of industrial energy management systems through existing IPEEC working groups, the GSEP Energy Management Working Group (which is a joint IPEEC-CEM initiative) and the Energy Management Action Network (EMAK).

3.9 Expanded participation in the GSEP and EMAK will help to build capacity through wider sharing of tools and best practices on the use of energy management systems. Specifically, wider voluntary uptake of the ISO 50001 energy management protocol could deliver significant energy efficiency benefits in the industrial sector. The ISO 50001 energy management system respects the diversity of industrial and process systems across different countries, and is adaptable to a range of sectors and circumstances.

3.10 A number of G20 members are already involved in existing work of the GSEP and EMAK working groups, including Australia, Canada, China, the European Union, India, Japan, Korea, Mexico, South Africa and the United States.

ELECTRICITY GENERATION

Sharing high-efficiency, low-emissions technologies

KEY ACTIONS
Participating countries will work together, through the existing IPEEC GSEP Power Working Group, to develop a detailed implementation plan for sharing knowledge of high-efficiency, low- emissions electricity generation technologies that are consistent with our climate activities and commitments.

3.11 **The problem**: Global electricity generation expanded more than five-fold over the 20 years to 2011, with fossil fuels accounting for the largest share of this growth. Forecast rapid economic development in many countries in coming decades means electricity demand and generation growth will continue. This will require vast investments in electricity generation and transmission/distribution capacity.

3.12 Improvements in energy efficiency on the demand (consumption) side are an effective strategy to reduce the burdens associated with such rapid demand growth. Electricity generators that convert primary fossil fuels into electricity are likely to continue to be major consumers of such fuels due to the affordability and availability of fossil fuels. Therefore, improvements in the energy efficiency of (supply side) conventional power generation technologies, including by the introduction of high-efficiency, low-emission power plants, can help to reduce CO2 emissions.

3.13 **G20's approach***:* Participating countries will work together, through the existing IPEEC Global Superior Energy Performance Partnership (GSEP) Power Working Group coordinated by Japan, to increase understanding of high-efficiency, low emissions technologies that contribute to lowering of greenhouse gas emissions. A number of G20 members are involved in ongoing work of the GSEP Power Working Group.

4. Areas for future consideration

4.1 In addition to the priorities set out above, several other areas of work received support from G20 members and other participating countries and may, along with other possible areas, be considered further by the G20 in future years. These include the areas noted below.

4.2 **Network of implementing organisations:** This network, which Japan is establishing, is designed to build capability and support best practice knowledge sharing on energy efficiency implementation across several sectors and technologies. An expanded network would build on the work of existing institutions such as the Energy Conservation Center, Japan (ECCJ), which is also expected to function as the Energy Efficiency Facilitating Hub in Tokyo for the UN Sustainable Energy for All (SE4All) work. The G20 may in future consider how this network could be further enhanced.

4.3 **Energy efficiency data:** The IEA and France have proposed a Joint End Use Data Initiative (JEUDI) which could enhance data collection and indicator analysis on energy efficiency. This would provide governments with further evidence to help them realise significant energy efficiency opportunities. It would also help to develop shared techniques for measuring and projecting the benefits of energy efficiency and could support investment decision-making. Some elements of the proposed JEUDI work are being considered as part of work on buildings through the BEET 4 work plan, which will focus on developing metrics through the IEA. G20 members may in the future consider support for other elements and related work on data being conducted by the IEF.

5. Implementing the Action Plan

5.1 IPEEC will support collaboration under the Action Plan. In doing so, IPEEC will fully cooperate with relevant expert international organisations, including the IEA, IEF, OECD and OPEC. Officials from participating countries will play the primary delivery role, using IPEEC task groups, with support from expert organisations. In 2015, IPEEC will report to the G20, through the Energy Sustainability Working Group, on collaboration under the Action Plan, and on possible next steps for G20 consideration.

5.2 IPEEC is a partnership rather than an institution or organisation. Its work is undertaken by officials from IPEEC member countries and other participating countries, who exchange ideas and experiences and collaborate on specific projects. It coordinates activities among governments. It is funded entirely by members' voluntary contributions. The small secretariat oversees and coordinates the work of its task groups, and provides administrative services to IPEEC members. This model's advantages include significant flexibility and responsiveness to changing needs and priorities. This flexibility and openness extends to welcoming non-IPEEC members to participate in task groups.

5.3 IPEEC's membership overlaps with that of the G20, so it is well placed to support work under the Action Plan, working with other international organisations. It can help to minimise duplication of effort and realise synergies among existing collaborative initiatives. G20 members that are not members of IPEEC have been invited to join IPEEC and encouraged to join and participate in IPEEC task groups. Non-IPEEC G20 members have also been invited to attend IPEEC meetings as observers. A number of non-G20 member countries have indicated interest in joining the new taskgroups and their participation is welcome.

5.4 G20 members acknowledge that sufficient resourcing for IPEEC, and for the work set out in this Action Plan, will be critical to success. To support effective resourcing for the Action Plan, G20 members and other participating countries will aim to support and strengthen IPEEC through active participation in their selected areas of work, direct voluntary contributions to those areas of work (financial or in-kind) and, if they are IPEEC members, ongoing voluntary member contributions to IPEEC (financial or in-kind). Provided it has appropriate resourcing, the IPEEC secretariat will be able to facilitate committee and task group meetings, give strategic oversight, document and report on progress in G20 collaboration under the Action Plan, and plan and co-ordinate events.

5.5 G20 members and other participating countries also acknowledge the important role of participating expert international organisations in supporting collaboration under the Action Plan through provision of expertise and specialist resources. G20 members will take this additional G20 energy efficiency work into account when considering future financial contributions to these organisations.