ENABLING FRAMEWORK TO SCALE UP INVESTMENTS IN ENERGY EFFICIENCY

Commission on Environment and Energy

Highlights

Barriers to investments

Measures to scale up investments

INTERNATIONAL CHAMBER OF COMMERCE

Document No. 213/101

January 2014

Acknowledgements

ICC appreciates the key contributions received from members of the ICC Commission on Environment and Energy for this paper, especially Wolfram Haller, Siemens AG. We also thank the many ICC members and national committees from different regions who contributed their valuable comments and ideas.

Contact: Andrea Bacher, environment, energy, green economy policy, email: andrea.bacher@iccwbo.org.

Executive Summary

Despite the apparent business case for energy efficiency, a significant share of the potential to improve energy efficiency remains untapped with global investments being generally low compared to policy ambition. This paper will discuss a variety of factors and considerations that policymakers should bear in mind while developing policy and market frameworks that promote investments in energy efficiency.

USD 18 trillion *increase in cumulative economic output worldwide by 2035 by investing less than USD 12 trillion in more energy-efficient technologies (IEA, 2012).*

49% of the emissions savings *could be reached by adopting energy efficiency measures (4-for-2°C Scenario IEA, 2013)*

Barriers to energy efficiency investments are various and include for example high upfront and transaction costs, lack of delivery capabilities, low awareness or understanding, or structural problems such as the "principal-agent challenge". In addition, recent research has shown corporations' greatest concern is the lack of confidence over whether energy-efficient investments will deliver the promised savings in time.

One important step in scaling-up energy efficiency investments globally is to create and increase demand through long-term enabling policies and incentives combined with related business models. It is not only the availability of finance. Without large-scale demand for energy efficiency, all other elements of the puzzle (e.g. financing, technology, skills) are less effective. A combination of approaches will be needed. They include:

- *Increasing demand through models that are linked to long-term compliance policies and/or voluntary approaches:* Energy savings alone have so far not created the required demand to scale up energy efficiency investments. Long-term predictability of policies and incentives, cost-reflective pricing, and implementing skills are key success factors. A pioneering demand driven model is for example the so called "*Energy Service Company (ESCO)"*: a specialized commercial business that provides the full range of services, including design, implementation, and financing for energy efficiency projects.

- *Enabling innovative financing methods:* If demand increases, the large upfront costs (mainly for retrofit) still need to be integrated in business models. Covering these costs through energy saving is possible, but further innovative business models need to be tested and supported to bring them to the market. In the context of energy efficiency, innovative financing comes mainly in the form of "*performance contracting".* This method offsets the energy-efficiency investment cost against energy savings across the financing term, thus effectively providing a zero-net-cost investment technique. A recent avenue explored to support the growth of ESCOs is to leverage *bond markets*.

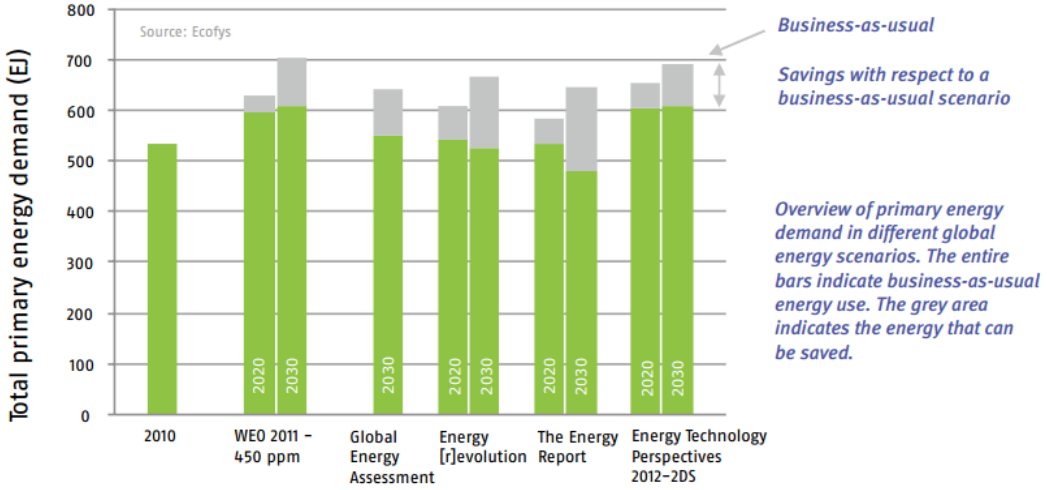
Despite the many barriers in implementing energy efficiency measures, many companies around the world have taken the lead and demonstrated the business case. Best practice examples are available at: "ICC energy efficiency with case studies" and "ICC Green Economy Roadmap best practices". However, more could be done with the right market and regulatory conditions in place.

Table of contents

The rationale for energy efficiency[1][2]

Energy efficiency improvements can play a key role in ensuring economic activity through extended energy supply, and advance social development and environmental protection. Energy efficiency measures present a strong business case for companies across sectors to save costs, improve their competitiveness, overall productivity and develop new businesses. Indeed, it is more economical to incorporate improved energy efficiency features when installing new capital than to retrofit at a later stage[3]. Catalyzing investments in energy efficiency in developing countries has the potential to allow leapfrogging to the most efficient technology options while meeting growing energy demands. The IEA has developed a set of 25 recommendations for energy efficiency implementation. If these were fully implemented by all 28 IEA government members, US$ 1 trillion could be saved in annual energy costs, as well as deliver incalculable security benefits in terms of energy supply and environmental protection.

Box 1: Energy efficiency saving potential – overview of different global energy scenarios



Source: Ecofys, 2012

These advantages and the general track record of energy efficiency have made it a policy priority in many countries and at several inter-governmental discussions, such as the G20, the United Nations climate negotiations (UNFCCC), Sustainable Energy For All (SE4A) or UN Post-2015 Development Agenda. Energy efficiency is often seen as a "low hanging fruit" – the least-costly option for achieving climate change targets. The World Energy Outlook 2012 has calculated that over 57% of the energy mix, to

[1] This paper looks into enabling frameworks to scale up investments on energy efficiency investments with a focus on buildings (mainly retrofit). "Buildings are the largest energy consuming sector in the world, and account for over one-third of total final energy consumption and an equally important source of carbon dioxide (CO2) emissions. In certain regions highly dependent on traditional biomass, energy use in buildings represents as much as 80% of total final energy use" (IEA, 2013, Transition to Sustainable Buildings).
It should be noted that a wide variety of funding sources and mechanisms and policies required to support to scale up energy efficiency investment exist; multiple market mechanisms will be required to move forward. This paper highlights particular two examples relevant for the building sector: ESCOs and Green Bonds.

[2] "Energy efficiency improvements refer to a reduction in the energy used for a given service (heating, lighting, etc.) or level of activity. The reduction in the energy consumption is usually associated with technological changes, but not always since it can also result from better organisation and management or improved economic conditions in the sector (non-technical factors)." (WEC,2013).

[3] The Climate Group. The Energy-Efficiency Opportunity : www.theclimategroup.org/_assets/files/Energy-Efficiency-Opportunity.pdf

move the world towards a 450ppm[4] scenario, could be reached through the introduction of *existing* energy efficiency technologies[5]. Furthermore, 70-80% of the opportunities to achieve large scale energy efficiency exist in only four technology groups – lighting, compressed air, motors and heating and cooling[6].

However, despite the apparent business case for energy efficiency having been made, global investment has been low compared to policy ambitions. As global energy demand continues to grow, actions to increase energy efficiency will be essential to move towards a more sustainable energy future. This has been on the business agenda for years with significant strides already made. In this paper the International Chamber of Commerce (ICC) builds on past work on energy efficiency[7] to describe international business' experience and innovation with a focus on implementation barriers and approaches to increase investments in energy efficiency. While this paper will showcase particular examples with the most efficiency potential, investments in energy efficiency can happen in all industry sectors and will in fact be important to meet growing demand for energy globally and to advance sustainable economic growth.

[4] 450 ppm Scenario**:** A scenario presented in the *World Energy Outlook* that sets out an energy pathway consistent with the goal of limiting the global increase in temperature to 2°C by limiting concentration of greenhouse gases in the atmosphere to around 450 parts per million of CO_2 (IEA, 2013).

[5] IEA (2009). Money matters - Mitigating risk to spark private investments in energy efficiency: http://www.iea.org/papers/efficiency/money_matters.pdf

[6] It should be noted that efficiency improvements do not always result in the full energy consumption reduction anticipated, as consumption may increase through "cheaper" energy services ("rebound effect").

[7] ICC (2009). Energy efficiency with case studies: http://www.iccwbo.org/Advocacy-Codes-and-Rules/Document-centre/2009/ICC-discussion-paper-on-energy-efficiency-with-case-studies-%282009%29/

Barriers to investments into energy efficiency measures

There is a common misconception that the biggest challenge for energy efficiency is solely financing. *Yet, experience by business leads to the conclusion that one important and recurring issue is "demand" and lack of confidence over whether energy-efficient investments will deliver the promised savings in time.*

Barriers holding back energy efficiency investments are two-fold:

▶ Barriers to deployment of energy efficiency measures

- **PERCEIVED MARGINAL BENEFITS**: The benefits of energy efficiency investments are seen as marginal in the context of unfamiliar complexity and the effort required. This is especially true in the case of households and small- and medium-sized companies (SMEs) where take-up rates for energy efficiency programmes are well below expectations in many markets. Manufacturing businesses, for example, often say they would rather invest available capital or resources in improving their manufacturing lines than in energy efficiency investment - an area of cost saving outside their usual expertise and seen as risky and requiring effort. Therefore, improving energy efficiency is currently not a key priority for any particular sector, actor or economy[3], apart from certain government policy-makers and environmental lobbying. But it is in fact the untapped giant in comparison to other measures that could be taken to extend energy supply while reducing carbon emissions.

- **UNCERTAINTY AND RISK:** The fluctuation of energy prices and intangible calculations of future energy savings add to a perceived risk and uncertainty to investigate and invest time and resources. This is a challenge in measuring and evaluating energy savings, compounded by a lack of standardization and protocols to assess energy savings.

▶ Barriers to scaling up energy efficiency measures

- **HIGH UPFRONT COSTS**[8]: The initial outlay is a challenge for parties that may not have ready access to capital or who are not willing or able to access funds. This does not just apply to capital-poor companies or individuals. Internal hurdle rates for companies (e.g. 20%) may require higher rates of return on the use of capital than are available for energy efficiency improvements (8-15%).

- **MANY SMALL MEASURES AND HIGH TRANSACTION COSTS**: Energy efficiency opportunities are in many cases small in size, scattered across sectors, regional geographies and building types. The small nature of individual opportunities means high transaction costs.

- **INCENTIVES SPLIT**: Structural problems such as the "principal-agent challenge[9]" contribute to the impediments of energy efficiency scale-up: incentives split between owners and occupants of

[8] High upfront cost challenge pertains mainly to retrofit projects.

[9] The "principal–agent problem" in energy efficiency tends to refer to this problem of goal conflict as split incentives (landlord/tenant or more generally equipment-purchaser / energy-bill-payer). For energy efficiency, the "principal agent problem" refers to (IEA, 2007, Mind the Gap. Quantifying Principal-Agent Problems in Energy Efficiency):

- a principal (for example, tenant or shareholder) and an agent (for example, landlord or manager);
- the problem of goal divergence between a principal and agent (for example, a landlord wanting to minimize capital cost and a tenant wanting to minimize energy cost);
- the problem of asymmetric information (where, for example, the appliance salesperson knows the energy efficiency of the refrigerator and does not share this with the purchaser);
- The consequent adverse selection and moral hazard problems.

For an overview table please see annex 1; for further information: IEA (2007). Mind the Gap. Quantifying Principal-Agent Problems in Energy Efficiency: http://www.iea.org/publications/freepublications/publication/mind_the_gap.pdf

buildings illustrate the potential market failures that may impede investments in improving residential energy efficiency. Building managers in New York for example estimate that apartments where the tenants do not pay for electricity expend at least 30 percent more electricity year-round than their counterparts. The concern here is that apartment occupants face a zero marginal cost for the energy used to provide cooling and/or heating. Differing incentives may also occur when a prospective occupant misjudges the owner's choice of energy efficiency of the dwelling, reducing the owner's incentive to properly insulate the dwelling.[10]

- **AWARENESS**: There is a lack of understanding and communication on efficient technologies available.

- **DELIVERY CAPABILITY**: A lack of capability of delivery means that otherwise extremely attractive investment prospects may not be developed because there are no local organizations skilled in executing projects.

Box 2: Energy efficiency barriers at a glance

- There is either no effective business case to energy efficiency investment or investors/ decision-makers do not believe there is a business case.
- Even if the business case is clear, systems are inadequate to implement properly (e.g. lack of staff, skills, technologies and finance).
- Even if there is both, a business case and the required systems for implementation, there is a lack of financing capacity to fund the project, especially but not only in developing markets.

[10] IAEE (2012). Split Incentives in Residential Energy Consumption: http://bwl.univie.ac.at/fileadmin/user_upload/lehrstuhl_ind_en_uw/lehre/ws1213/SE_Energy_WS12_13/Split_Incentives_in_Residential_Energy_Consumption.pdf

Measures to scale up investments in energy efficiency

For significant scale to be achieved, the following areas are important, and should work together:

- ***DEMAND**: For scaling up energy efficiency investments, demand is needed – even with innovative financing models we can expect only modest improvements in take up without more effective steps being taken to stimulate demand. Both, policy driven and demand driven models, including voluntary approaches, can serve as accelerator for energy efficiency investments.*

- ***FINANCING**: If demand increases, a barrier still remains, with regard to potentially large upfront costs. Innovative financing methods can allow for large upfront costs to be paid back through energy savings. Such innovative models need to be further developed and tested to break down this barrier.*

▶ Increasing demand

Innovative financing solutions and new energy efficiency technology, although important, are not enough in themselves to drive the necessary scale-up in investment. Multiple *policy frameworks* and *demand driven models* can drive energy efficiency investment:

- **POLICY DRIVEN FRAMEWORKS:** One way to support the scale-up of energy efficiency investments that governments can use are market-oriented incentive schemes, government led standards and instruments, and partnership approaches to increase market certainty. Examples include:

  - *Incentives* to support the economic benefits of energy efficiency, e.g. global pricing for carbon.
  - *Reporting*, e.g. New York City's Greener, Greater Buildings Plan[11].
  - *Consumer information about energy consumption through labels and certificates.*
  - *Government efficiency standards and building codes* for new homes, e.g. United Kingdom (UK) Code for Sustainable Homes[12].
  - *Voluntary agreements and public private partnerships* as an effective flexible alternative to mandatory minimum energy efficiency standards as they have the built-in support of manufacturers and can be implemented more rapidly than regulations. Examples include the Finnish or Austrian sectoral voluntary agreement, the US Environmental Protection Agency (EPA) Climate Leaders Partnership, the Mexican GHG Program[13], and the National Business Initiative in South Africa[14].

[11] New York City's Greener, Greater Buildings Plan: http://www.nyc.gov/html/planyc2030/html/about/ggbp.shtml
[12] UK Code for Sustainable Homes: http://www.planningportal.gov.uk/buildingregulations/greenerbuildings/sustainablehomes
[13] ICC (2009). Energy efficiency with case studies, case study No 3: http://www.iccwbo.org/Advocacy-Codes-and-Rules/Document-centre/2009/ICC-discussion-paper-on-energy-efficiency-with-case-studies-%282009%29/
[14] ICC (2009). Energy efficiency with case studies case study No 6: http://www.iccwbo.org/Advocacy-Codes-and-Rules/Document-centre/2009/ICC-discussion-paper-on-energy-efficiency-with-case-studies-%282009%29/

- **DEMAND DRIVEN MODELS:** Energy Service Companies (ESCOs). Energy Service Agreements (ESAs[15]) and opt-out schemes are some forms of demand creation that may help contribute to positive results.

  Energy Service Companies (ESCOs) are specialist commercial businesses which provide a full range of energy solutions, including designs of energy savings projects, energy conservation, infrastructure services and power generation. They perform in-depth analyses of physical properties, design energy efficient solutions, install equipment and systems, and maintain the systems to ensure energy savings[16].

  In recent years, the ESCO models have broadened and now include financing methods relating to energy projects. Many ESCOs have revenue models with incentives tied to performance outcomes.

  ESCO models have traditionally been involved in the municipalities, universities, schools and hospitals (MUSH) markets given their willingness to take on longer investment payback horizons and lower return requirements[17]. Involvement has been limited in the commercial and residential sectors. This is primarily due to the shorter investment horizons in commercial and residential sectors, the split-incentive problem (where the landlord pays for the retrofit but the tenant receives the benefit of lower energy bills) and the fact that mortgage holders are rarely able to assume additional debt.

  The ESCO model has yet to achieve significant scale in the residential and commercial markets. One new model proposition to move towards scale is the formation of a "supplier ESCO".

  Several international platforms and initiatives are actively engaged to promote energy efficiency scale-up and respectively ESCOs and work on recommendations for pioneers in this field, which include:
  - Identify the positive elements which should be incorporated into future models.
  - Highlight the pitfalls and how they may be avoided.
  - Find ways for the model to be expanded to incorporate new and different ideas.
  - Identify where/if mandatory compliance regimes may be appropriate for any of the demand models.
  - Engage a wider coalition of experts and stakeholders for advice and expertise.

▶ Innovative financing methods: some examples

- **PERFORMANCE CONTRACTING** is the main form of innovative financing in the context of energy efficiency. Such financing methods offset the energy-efficient investment cost against energy savings across the financing term thus effectively providing a zero-net-cost investment technique. In some cases, financing arrangements can be applied where monthly payments are less than the energy cost savings, making the situation cash positive from day one.

  - *"Equipment financing arrangement"* (leasing arrangements) where the energy savings offset the cost of the investment.

    An example for zero-net-cost leases for energy-efficient equipment exists for example in the UK, where the Carbon Trust - a non-for-profit company set up by the government - has created an

[15] ESA - a service contract that permits building owners to pay energy efficiency retrofits back through energy savings, and requires usually no or minimal upfront cost to the owner. It is an alternative to using equity or a traditional loan.
[16] ESCOs – Enabling Energy Efficiency, An Introduction to Energy Service Companies ("ESCOs") (Harris & Willimas, 2010): http://www.harriswilliams.com/sites/default/files/industry_reports/HW%26Co.ESCOWhitePapeFinal.pdf
[17] ESCOs – Enabling Energy Efficiency, An Introduction to Energy Service Companies ("ESCOs") (Harris & Willimas, 2010): http://www.harriswilliams.com/sites/default/files/industry_reports/HW%26Co.ESCOWhitePapeFinal.pdf

energy efficiency financing scheme[18]. The Scheme is designed to provide organizations of all sizes with financing for energy-efficient equipment where the energy savings pay for the equipment investment. Where possible, the scheme wraps everything into a single financing package, including energy efficiency assessment, the equipment itself, installation etc. - all via a loan, lease or hire purchase arrangements. Payments are designed to be equal to, or lower than, the energy savings and in many early cases deliver savings and net positive cash flow immediately.

- *"Energy performance contracting"* where the facilities management of e.g. a plant room or building is financed through energy cost savings – guaranteed within the financing agreement.

  Performance contracting solutions allow facility and capital improvements to be made and funded through energy savings achieved within the facility, typically for facilities with a baseline annual energy consumption of over €100,000-€150,000 per annum.

  A typical approach would go through several stages:
  - A preliminary analysis to determine the organization's energy use and identify areas to maximize energy savings.
  - A detailed energy analysis (known as an Investment Grade Audit) to determine the improvement measures that make the most impact on the facility and the organization's bottom line.
  - Construction and installation of new equipment and the implementation of facility improvement measures.
  - Regular measurement and verification to ensure savings are achieved.

  The provider guarantees that energy savings will cover the costs of equipment and service over time, to the extent that they contractually have to make up any financial gap between the two.

  Unlike leasing, where payments commence once the component technology has been acquired, energy performance contracting will usually arrange the finance to cover the set-up and installation period, starting payments from the point when the enhanced facility generates energy cost savings.

  Both forms of financing are important, given that recent research has shown corporations' greatest concern to be lack of confidence over whether energy-efficiency investments will deliver the promised savings.

- **BOND MARKETS** could be leveraged to increase energy efficiency investments. ESCO balance sheets are typically limited in terms of the extent of vendor finance they can offer. This is especially the case where ESCOs are using service models with compensation tied to capturing a portion of energy bill savings.

  To support the growth of ESCOs the Climate Bonds Initiative (CBI) for example has proposed the development of a securitization market for ESCO cash flows. This would involve bundling established ESCO loans or leasing agreements into asset-backed securities at a scale and ratings levels suitable to the needs of institutional investors. Developing such a market could allow the rapid growth of ESCOs that policy targets around energy efficiency suggest is required.

  To kick-start such a market, CBI also suggests that national and international development banks become involved in establishing special purpose vehicles for buying mature loans from multiple ESCOs and securitizing them, and that they provide a modest level of credit enhancement in the early years to ensure bonds find a market.

[18] SFS Research Study/ Siemens Financial Services (2012). Green Gain, investing in energy efficiency: http://finance.siemens.com/financialservices/global/en/press/studies/documents/whitepaper_2012_green-gain.pdf

Conclusion

ICC is convinced that energy efficiency makes good business sense and enhances competitiveness; and that deliberations on climate change and sustainability must prioritize enabling conditions and policies to scale up investments in energy efficiency. Actions to increase energy efficiency can make a significant impact in squaring the circle between an increased demand for energy and environmental protection ensuring a move towards a sustainable energy future.

Energy efficiency policies are already a policy priority in many countries and inter-governmental discussions. However, despite policy ambitions and the business case for energy efficiency, several barriers remain to scale up energy efficiency investments.

In order to overcome these barriers, governments should support a policy environment that rewards energy-efficient choices and encourages investment and innovation. To capitalize on possible energy efficiency improvements, a combination of approaches is necessary: market approaches are as important as incentives for voluntary efforts. Demand models need to be further developed as well as innovative financing methods. ICC and its members are prepared to share experiences in energy efficiency implementation and the benefits of modern energy management systems[19].

*** *** ***

[19] ICC (2009) Energy efficiency with case studies : http://www.iccwbo.org/Advocacy-Codes-and-Rules/Document-centre/2009/ICC-discussion-paper-on-energy-efficiency-with-case-studies-%282009%29/

Annex 1: Summary of aspects of Agency Theory applied to energy efficiency[20]

Dimension	Standard application of Agency Theory (Owner-Manager)	Energy efficiency context (Landlord-Tenant example, Case 2)
Unit of analysis	Relationship (and contract) between owner (principal) and manager (agent)	Relationship between tenant (principal) and landlord (agent)
Problem domain	Relationships in which the principal and agent have different levels of information and partly differing goals	Relationships in which the principal and agent have different levels of information, and partly differing goals
Goal orientation of the actors	Goal conflict between principal and agent. Owner's goal is to maximise returns. Manager's goal may be to limit work levels required	Goal conflict. Landlord's goal is to minimise capital cost (*e.g.* of energy using technology) and maximise rent return. Tenant's goal is to minimise their own costs including energy
Key objective	Principal-agent relationships should reflect efficient organisation of information to maximise economic efficiency	Principal-agent relationships should maximise both economic and energy efficiency of the system
Human assumptions	Self-interest Bounded rationality Individual autonomy	Self-interest Bounded rationality Individual autonomy
Organisational assumptions	Partial goal conflict Economic efficiency as the criterion Information asymmetry Agent delegated tasks by owner (principal)	Partial goal conflict Economic and energy efficiency as the criteria Information asymmetry Agent delegates use of capital to principal
Assumption about the source of problem	Contract inadequate	Contract inadequate Goal differences, imperfect, and/or asymmetric information (about technology or energy price/energy cost)
Implications of inefficient relationship/ contract	Adverse selection moral hazard	Adverse selection moral hazard inefficient energy use

[20] IEA (2007). Mind the Gap. Quantifying Principal-Agent Problems in Energy Efficiency: http://www.iea.org/publications/freepublications/publication/mind_the_gap.pdf

The International Chamber of Commerce (ICC)

ICC is the world business organization, a representative body that speaks with authority on behalf of enterprises from all sectors in every part of the world.

The fundamental mission of ICC is to promote open international trade and investment and help business meet the challenges and opportunities of globalization. Its conviction that trade is a powerful force for peace and prosperity dates from the organization's origins early in the 20th century. The small group of far-sighted business leaders who founded ICC called themselves "the merchants of peace".

ICC has three main activities: rule setting, dispute resolution, and policy advocacy. Because its member companies and associations are themselves engaged in international business, ICC has unrivalled authority in making rules that govern the conduct of business across borders. Although these rules are voluntary, they are observed in countless thousands of transactions every day and have become part of the fabric of international trade.

ICC also provides essential services, foremost among them the ICC International Court of Arbitration, the world's leading arbitral institution. Another service is the World Chambers Federation, ICC's worldwide network of chambers of commerce, fostering interaction and exchange of chamber best practice. ICC also offers specialized training and seminars and is an industry-leading publisher of practical and educational reference tools for international business, banking and arbitration.

Business leaders and experts drawn from the ICC membership establish the business stance on broad issues of trade and investment policy as well as on relevant technical subjects. These include anti-corruption, banking, the digital economy, marketing ethics, environment and energy, competition policy and intellectual property, among others.

ICC works closely with the United Nations, the World Trade Organization and intergovernmental forums including the G20.

ICC was founded in 1919. Today its global network comprises over 6 million companies, chambers of commerce and business associations in more than 130 countries. National committees work with ICC members in their countries to address their concerns and convey to their governments the business views formulated by ICC.

International Chamber of Commerce
33-43 avenue du Président Wilson, 75116 Paris, France
Telephone +33 1 49 53 28 28 Fax +33 1 49 53 29 42
Website www.iccwbo.org E-mail icc@iccwbo.org