I. Introduction

1. The Business and Advisory Committee (BIAC) to the OECD appreciates the opportunity to submit these comments to the OECD Competition Committee WP2 for its roundtable on renewable energy and smart grids and the new challenges those phenomena pose for competition policy.

2. To help meet increasing electricity demand in a sustainable way, the growing integration of renewable energy technologies to the grid, and the challenges this involves, will need to be given due consideration. While they will not entirely replace conventional power sources in the near future, renewable energy, such as hydroelectric, biomass, wind, and geothermal energy, has a role to play by increasing electricity supply and by reducing overall GHG emissions. The integration of renewable energies to the grid would help realise the potential of renewable energy sources and would contribute to lowering GHG emissions while boosting energy efficiency. BIAC outlines in this paper various considerations that need to be taken into account in designing and implementing grids that can accommodate increasing use of renewable energy technologies.

3. Recent years have witnessed dramatic innovation in technology associated with electricity networks. At the same time, large-scale renewable sources of energy (RES) and small-scale distributed generation (DG) has grown. The promotion of RES has become a key public policy goal in many countries. In Europe, this is espoused in the EU's Climate Change Package. If realised, these ambitions, could imply that 20—30% of electricity generated will be from RES facilities.

4. Transmission networks and network technology play a key role in delivering increased RES generated electricity. Most RES — generated electricity is highly
volatile – given that it is subject to varying climatic and atmospheric conditions. This has major implications for the future design and operation of transmission (high voltage) as well as distribution (low voltage) networks, including how the necessary investments in these networks are to be incentivised and financed. At the same time the potential to improve network capacity use and to link electricity demand and supply in real time has to be harnessed. It is widely believed that the collection of technologies referred to as 'smart-grid technologies' can offer the potential to change the interfaces between customer-retailer-generator-dispatcher-network owner/operator in the future. At the same time, the standards to be set for these new technologies and the regulations governing their introduction and use could have a dramatic impact on the nature of electricity (and indeed gas) markets in the future.

5. BIAC notes that in many, if not all OECD jurisdictions, electricity markets have undergone significant structural change in the last two decades as result of both privatisation and liberalisation strategies. Many countries have privatised their generation and retail sectors. Many countries have introduced so-called “unbundling” or functional separation requirements for vertically integrated companies, so that access to transmission/distribution networks for competing supplies of electricity can be guaranteed on fair and non-discriminatory terms. Unbundling or functional separation takes a variety of forms and may range from full or ownership unbundling requirements –so that key transmission (or distribution) assets are transferred to independent legal entities (TSOs or DSOs) who have no legal or commercial relationship with supply or trading functions in a vertically integrated company. Some jurisdictions only require legal unbundling, however – i.e. the creation of a separate legal entity to run the network while others may only require accountancy unbundling.

6. Incumbent electricity (and gas) companies – public or private – have seen many of their traditional privileges and obligations removed. Exclusive rights to import/export electricity, to generate electricity, and to supply certain categories of consumer have gradually been phased out. In the EU, the follow-up to the Commission's 2007 Sector Inquiry has had far-reaching consequences for the legality of long-term contracts between generators and customer-users, although the EC Commission does, to some extent, acknowledge that long term contracts may be necessary to underpin investments in new transmission and generation capacity.

7. Extensive sector-specific regulation has accompanied – if not driven – the changing market structures. Regulation is primarily focussed on network use – given their natural monopoly characteristics – and on the tariffs and conditions for connection and access to the networks. In general, the generation/trading functions are not subject to extensive ex ante regulation. Competition policy plays a key role here. The retail sector, however, is still closely regulated in order to maximise consumer protection, and to a certain extent, to promote active “switching” by consumers to new suppliers.

8. It follows that this market or sector is one in which regulatory frameworks and regulatory incentives and disincentives are crucial. Getting the regulatory framework to be a “smart” framework is key. An increasingly predictable and transparent
regulatory regime will be necessary for the much-needed investment in restructuring grids. BIAC calls on policy makers to consult closely with the private sector on new energy policy reforms, and emphasises that policy reforms must not inhibit innovation, obstruct competition, or undermine investment.

9. Against the backdrop of the extensive sector-specific regulation that now typifies this sector, competition law and policy principles and norms would seem - at first sight- to play a secondary role, although they are of undoubted importance. That said, as new issues arise in these markets and in so far as specific regulation is not (yet) in place, adherence to competition law principles – and to the objectives of competition policy - are of vital importance. Furthermore, suitable regulatory frameworks should always acknowledge and address actual as well as potential competition concerns in order to ensure the coherence of public policies. Among the many relevant points, the following are in BIAC’s view particularly relevant.

10. While BIAC supports the promotion of RES, it identifies four main potential concerns. First, there is a risk that the promotion of RES as a key policy objective threatens the role of economic analysis. The second concern is that the application of the standard tools and concepts of anti-trust policy to conventional fuel markets is already complex and there seems as yet little understanding of how a “state-sponsored shift” towards RES can further complicate this analysis. A third concern is of a procedural nature and relates to the need for appropriate guarantees for confidentiality in information flows. Finally, BIAC would like to draw attention to the potential for distortive effects as a result of ill-equipped national support measures for RES.

II. The promotion and treatment of RES as a key policy objective should not threaten the role of proper economic analysis

11. A first fundamental BIAC concern is that even if the promotion of RES is a key public policy objective, this should not threaten or eliminate the role of proper economic analysis in applying new norms or assessing the conduct of market players – whether ex ante or ex post. The following four points seem particularly relevant.

i. Recognise the ongoing importance of a clear analytical framework for the application of competition law: as sector-specific regulation in this sector seeks to achieve a number of public policy objectives (sustainability, security of supply, competitiveness) that are not necessarily aligned with the objectives of competition policy, it is particularly important to ensure that courts, antitrust agencies and other parties continue to apply a clear analytical framework based on the long term benefits of consumers. Generally, if the competition analysis of business conduct necessitates taking into account non-economic variables or requires solving trade-offs for which economic analysis is ill-equipped or ambiguous, the economic accuracy of decisions becomes uncertain, and so does judicial review. BIAC believes that particularly in the EU competition rules should not be used to promote policy objectives that do not belong to those traditionally pursued by EU competition law. Pursuant to recital 9 of Regulation 1/2003 articles 81 and 82 EC (now
101 and 102 TEU) serve to protect competition on the market. Those provisions do not serve to promote environmental objectives, unless these objectives translate into benefits for consumers. See in this respect paragraph 42 of the Article 81(3) EC Guidelines.

ii. Proper identification and trade-off between short and long term effects, including efficiencies: BIAC believes that there is a risk that – given the rapid developments in this sector and the associated uncertainty on future market developments and -structures- the antitrust analysis will be skewed towards an analysis of static, current effects (efficiencies and costs) that fails to appreciate dynamic efficiencies, as well as potential harm to competition. Therefore, when applying provisions of competition law BIAC favours an approach that allows for explicitly factoring in innovation-related claims. Traditional generation technologies are relatively mature and stable, whereas many RES technologies (off-shore wind, solar, CSS) are experiencing high rates of innovation. There is a clear need to take innovation and dynamic innovation into account, especially in the area of dominance.

iii. Proper evaluation of incentives brought about by ex-ante regulation: BIAC notes that ex-ante regulation may have a profound effect on market conduct and the incentives of market participants. As a result, a careful analysis of the practical means, as well as the financial incentives that market operators have, at their disposal should form an integral part of any ex-post evaluation of business practices under competition law (and indeed in any ex ante merger evaluation processes).

iv. Take account of the interrelationship between financial and physical markets: the significance of energy markets as trading place for financial products should not be overlooked. BIAC believes it is important to take account of the fact that energy markets are increasingly market places for trading in physical as well as financial products, such as Guarantees of Origin or Energy Certificates. As a result, externalities in one market may impact market conduct in other markets. Spill-over effects from physical into financial markets should be addressed.

III. The application of conventional tools and concepts of antitrust policy is especially complex in the area of RES

12. The second concern is that the application of the standard tools of anti-trust policy to conventional fuel markets is already complex and there seems as yet little understanding of how a 'state-sponsored shift' towards RES can further complicate this analysis. BIAC submits that particularly the following seven points merit attention.

i. Careful application of market definition, market power and other key concepts in competition law: BIAC notes that the expansion of RES, the evolutionary nature of the sector and the accompanying sector specific regulation imposes exceptionally strict requirements on the application of conventional
competition law concepts. False positive findings of antitrust liability may particularly result from incorrectly and over-narrowly defining the temporal and geographical dimension of the relevant market.

BIAC specifically draws attention to the challenges surrounding the application of conventional competition law concepts to completely new market settings, such as the "markets" for renewable energy. The main difficulty comes from the fact that conventional economic concepts, such as "relevant market" or "market power" must be applied in completely new market settings and antitrust agencies must fight anti-competitive practices without always being able to firmly rely on past case law, an intimate knowledge of the market or even definite insights from economic theory.

The problem raised by the definition of the relevant market for the purposes of assessing the abuse of a dominant position is only one of such examples. The definition of the relevant geographic market is complicated by the fact that these markets may be consistently moving in the new liberalized context, for instance because of the development of regional exchanges and market coupling initiatives in electricity or a structural reduction in long-term reservations of gas import capacity. State sponsored support for RES producers complicates this further, especially if RES is given favourable wholesale market access. The problem of defining the relevant product market is particularly complex. The emphasis on the definition of the relevant market already causes several problems for antitrust authorities for instance in the conventional generation market where market power might be exercised – temporarily- by non-dominant pivotal suppliers or by the dominant incumbent through portfolio effects. The impact of RES alongside conventional energy generation needs to be carefully thought through.

The case of abuse of dominance in generation is a good example of the limitations of economic theory itself for antitrust purposes. Economic analysis gives few useful insights for the enforcement of Art 82 EC in individual cases as the different strategies used to exercise market power are complex. Tracking abuse of market power in the generation market requires highly assumption-specific oligopoly modelling yielding results which may be too uncertain to firmly ground policy actions. It is sometimes similarly argued that the insights derived from these models on how market power is (or will be) exercised are too rough to base enforcement action on. From a practical point of view, it will indeed be difficult for antitrust authorities to differentiate between the exercise of market power and legitimate scarcity rents.

Overall, the main problem primarily lies in the speculative nature of economic analysis which might not provide straightforward answers to novel questions. Economic analysis suggests that antitrust enforcement is complex and requires a careful consideration of the market context in which the practices examined occur. A strong willingness to use the antitrust laws to fix the shortcomings of sector-specific regulation might thus lead to over-
enforcement in a sector that may be especially vulnerable for disincentives in relation to investments in new generation equipment.

ii. **Awareness of geographical market fragmentation**: Restrictive national policies which limit access of foreign RES to their markets could, if not properly taken into account, also distort market definition processes.: The promotion of nationally produced RES to the exclusion of imports may have repercussions for other (EC) policies. For instance, territorial restrictions under national renewable energy support schemes may raise concerns under the EC free movement provisions. Similarly, national support schemes may give rise to state aid movement concerns. See also below, Section V.

iii. **Proper interpretation of the signalling function of prices**: As a result of national support regimes or sector specific legislation, prices may not be cost-related or market driven. For instance, feed-in tariffs have been used to support very extensive renewable power generation investment programmes. As those tariffs are not market driven, they are in contrast to “conventional market prices”, no reliable indicator for e.g. market power.

iv. **Take account of the position of large industrial users and potential monopsony issues**: The analysis of business conduct involving large industrial energy users that export back to the grid may be complex in light of their dual role as users and suppliers of electricity and possible monopsony (and resulting fair compensation) issues that these firms may face. BIAC also notes that the price charged for energy to large users, in particular as a result of compulsory renewable energy quotas, represents a major cost-factor and may therefore have an impact on their international competitive position. Addressing potential monopsony power over electricity purchasing for customer-produced electricity is not only an important issue for regulators and antitrust authorities, but also offers opportunities for efficiencies. The TSO/DSOs are in effect the monopoly purchasers of excess energy exported to their grids by large users. Too often, energy intensive customers/CHP plant operators are confronted with the choice to either supply or export excess capacity and pay a penalty, or not to produce at all, and obtain some compensation. In contrast, RES producers may however be allowed to produce and export excess at no cost— and are not required to shut down (because this may be technically impossible). This seems discriminatory as well as economically inefficient. BIAC takes the position that any system of regional balancing to maximise the efficient use of the local networks should ensure fair rewards to all concerned.

v. **Market entry and participation**: BIAC notes that market entry and participation rules, including access terms and rules of prices and bidding and despatch rules will be crucially important in the future environment. This applies both to sector regulation and the application of competition law. These issues may involve a detailed analysis of the position of non-traditional utility suppliers and the possible emergence of intermediaries, aggregators and other new
parties. BIAC notes that there is an inherent possibility that general provisions of competition law will be relied on to secure (additional) market access and advocates a strict application of general principles of competition law in this respect. Indeed, what matters in these cases is whether access to grids and to ancillary services, such as balancing power and system services, will increase the long-term economic efficiency in general; the position of individual market participants is in of secondary interest only. In other words it should not be forgotten that competition policy is directed to maintaining healthy competition – and not to protecting particular competitors.

vi. A well-defined evaluation of vertical and conglomerate effects: BIAC notes that it is likely that industry participants will increasingly be active on multiple horizontally and vertically related “markets.” In particular, it can be expected that energy suppliers will have combined renewable and conventional portfolios. It is important to take account of these activities as they may have an impact on the incentives of firms to enter into pro- or anticompetitive conduct.

vii. Take account of the interrelationship between different levels of the market: The future market structure in energy markets will likely be characterised by the existence of market participants that are (simultaneously) active on different levels of the market. It is important to take account of this phenomenon when reviewing business conduct under competition law provisions.

IV. Procedural concerns: RES and smart grids prompt the need to ensure guarantees for confidential information flows

13. Thirdly, the design and construction of smart grids gives rise to a great number of complex issues. Smart grids will have the potential to continuously communicate with each customer/ generator connected to it. The presence of smart meters would support the potential for two-way communication. BIAC is supportive of this development, but notes that many issues remain unanswered. Key issues are likely to be who owns/installs these meters – should this be a ‘market’ subject to competitive tendering and light-handed regulation? Or should TSOs/DSOs have exclusive rights to install and maintain such meters? Is this necessary to achieve a rapid roll-out of the technology? If so, should closer regulation be required? This in turn raises important questions about ownership of data and information and who should have access to those data. BIAC notes that this debate should not be limited to data produced or stored in the meters: an equally important aspect of smart grid management is congestion management.

14. The generation of (customer and supplier) data and the communication of these data prompt the following additional observations. Under the “Third Package” TSOs shall publish relevant data on aggregated forecasts and actual demand, on availability and actual use of generation and load assets, on availability and use of the networks, and on balancing and reserve capacity. Particularly in concentrated markets there is a
risk that such data may facilitate anticompetitive collusion. Thus, while transparency may improve marketing functioning by creating a level playing field and enhance trust in markets, it may also deteriorate market functioning by facilitating anticompetitive practices. BIAC is of the opinion that companies should be adequately shielded from any antitrust liability in the event of communication of data pursuant to the Third Package rules.

V. The potential for distortive effects as a result of state intervention / public policy support for RES

15. BIAC’s fourth concern relates to the effects that state intervention and public policy may have. In particular in the EU, governments are allowed and do in fact use a range of instruments to support RES, including investment aid, capital grants, tax exemptions, or reductions on the purchase of goods and operating aid in the form of price subsidies, green certificates, tender schemes and tax exemptions and reductions on the production of renewable energy.

16. BIAC is concerned that, despite the – as such laudable- objective of stimulating renewable energy, state intervention and support may have distortive effects in the market place. In this respect BIAC believes first that (i) sufficient policy attention should be given to the implications of the different types of national support for solar, wind, etc, for the wider dynamics of competitive energy markets, (ii) regulators should ascertain whether certain forms or methods of public support can be considered less distortive in the short or longer term, or whether better alternatives be devised and (iii) pay sufficient attention to the “accumulation” of preferential rights and privileges for RES – production. For example, a RES generator may receive a fixed price, or “green bonus”, as well as lower connection tariffs, and priority grid access. Grid tariffs may also be adjusted. In particular many countries do not require RES generators to bear ‘balancing costs’ – i.e. the costs incurred by the TSO for maintaining the network in balance despite fluctuations in supply and demand. BIAC takes the view that although state support measures may generate short-term efficiencies, or help to achieve environmental standards, this should not be at the expense of long-term efficiency considerations.

17. BIAC also notes that the leadership role, which the EU asserts in tackling climate change and setting targets for renewable energy consumption - the ‘20-2020’ targets - could become unrealistic, if policymakers fail to adopt more market-based mechanisms to help achieve those targets. It is an anomaly in an increasingly integrated European wholesale energy market to perpetuate national support schemes and hence contribute to continued geographical market fragmentation. BIAC is concerned that efficiency gains and technological progress cannot be realised optimally across the EU, if renewable energy markets remain sheltered and split according to national boundaries. In this respect, it is noted that a number of companies have recently lodged complaints with the Commission about territorial restrictions under national RES support schemes. The Commission also opened proceedings against several Member States for failing to recognise green certificates.
of origin of renewable energy generated in other Member States. BIAC is supportive of measures leading to mutual compatibility of national support mechanisms and, more ambitious, the accommodation of trade flows across national borders.

18. In this respect BIAC notes that current national schemes diverge widely; the UK, Sweden, Poland and Belgium apply Green Certificates/ renewable portfolio standards; while feed-in tariffs have been used to support extensive renewable power generation investment programmes in Denmark, Germany and Spain. The network operating companies, into whose grid windmill operators “feed” their “green” power, pay the feed-in tariff. Feed-in tariffs are however not target driven and the schemes typically place no limits on the amount of capacity installed, since any plant that qualifies as renewable under the scheme is eligible for the tariff. It is argued that his method has achieved volume growth in renewable electricity generation at the price of cost-effectiveness, especially in Germany, where no market adjustment is normally made to the tariff payable and no re-dispatch by the grid operator is allowed. In exceptional cases the energy production by renewable energy generators may give rise to (non-commercial) energy flows, non-transparent network congestion and false price signals, that may cause distortions in the European wholesale power market, especially on a cross-border basis.

19. Hence, players in the industry are arguing for an eventual uniform market-based support scheme at European level, which reflects this reality and would allow (i) competition between different mature technologies and locations of renewable power generation, in order to optimise efficiency, create wider choices and minimize overall cost, (ii) competition between generators and suppliers of both conventional and renewable electricity across Europe on a level playing field, (iii) continuing liquidity in cross-border wholesale power markets and (iv) a well functioning and transparent new European market for instruments evidencing renewable output, probably as Guarantees of Origin (a “financial” product, hereafter “GoO”). BIAC agrees with this position and takes the view that, where possible and practical, these market-based alternatives are preferable.

20. The creation of a specific market at EU level for GoOs offers the potential advantage that (i) new renewable generation investments are triggered by the market in a more natural and economically rational way, rather than artificially only by national authorities, (ii) the market price of the EU-wide GoO will reflect the incremental cost of additional renewable production in a given technology and (iii) the impact of the EU renewable consumption target on the end consumer power price is harmonized and overall reduced, since investors and technologies are competing on a level playing field over a much wider geographical market.

VI. Conclusions

Renewable energy sources have a significant role to play by increasing electricity supply and by reducing overall GHG emissions.
An increasingly predictable and transparent regulatory regime will be necessary for the much-needed investment in restructuring electricity grids. BIAC calls on policy makers to consult closely with the private sector on new energy policy reforms, and emphasises that policy reforms must not inhibit innovation, obstruct competition, or undermine investment.

Even if the promotion of RES is a key public policy objective, this should not compromise the role of proper economic analysis in applying new norms or assessing the conduct of market players – whether ex ante or ex post.

Competition rules should not be used to promote policy objectives that do not belong to those traditionally pursued by competition law and the use of the antitrust laws to fix the shortcomings of sector-specific regulation might lead to over-enforcement in a sector that may be especially vulnerable for disincentives in relation to investments in new generation equipment.

The application of standard tools of anti-trust policy (such as the “relevant market” and “market power”) to conventional fuel markets is already complex and a ‘state-sponsored shift’ towards RES can further complicate this analysis. Particular attention should be given to the still nationally fragmented nature of energy markets, large industrial users, monopsony issues, market entry, non-horizontal effects and the significance of energy markets as trading place for financial products.

Companies should be shielded from antitrust liability in connection with the supply and communication of (customer and supplier) data required by smart grid technologies.

BIAC is concerned that, despite the - as such laudable - objective of stimulating renewable energy, state intervention and support may have distortive effects in the market place. Long-term efficiency considerations should not suffer as a result of state support measures that may concentrate on short-term efficiencies. Where possible and practical, uniform market-based support scheme at European level are preferable.
I. Introduction

The IEA estimates that, unless new policies are put in place, world electricity demand will grow at an annual rate of 2.5% from 2007 to 2030, which would be met to a large extent by increasing energy production from coal\(^1\). In this scenario, however, greenhouse gas (GHG) emissions would rise by approximately 1.5% per year, possibly resulting in a 6ºC increase in global average temperature and “irreparable damage to the planet”\(^2\).

To help meet increasing electricity demand in a sustainable way, the growing integration of renewable energy technologies to the grid, and the challenges this involves, will need to be given due consideration. While they will not replace conventional power sources in the near future, renewable energy, such as hydroelectric, biomass, wind, and geothermal energy, has a role to play by increasing electricity supply and by reducing overall GHG energy emissions. The advantages of integration of renewable energies to the grid would help realise the potential of renewable energy sources and would contribute to lowering GHG emissions while boosting energy efficiency.

In designing and implementing a grid that can accommodate increasing use of renewable energy technologies, BIAC outlines in this paper various considerations that need to be taken into account, such as investment costs, energy security and regulatory issues.

\(^1\) International Energy Agency (IEA), World Energy Outlook 2009.

\(^2\) Ibid.
II. Investment Requirements

Creating grids that hold enough flexibility to accommodate variable energy inputs from certain renewable energy sources would entail significant investment costs. In terms of connecting grids to renewable energy sources, such as offshore wind farms, tidal energy locations or solar energy sites, investment will be necessary for the transmission and distribution lines from these often geographically-dispersed sites. Investment will also be needed to upgrade the existing grids with the necessary hi-tech devices and sensors to be able to respond to variable inputs from renewable energy sources.

In the United States alone, for example, the introduction of additional infrastructure, whether smart or not, could require investment totalling as much as USD 1.5 trillion between 2010 and 2030\(^3\), and that figure does not include the customers’ share in paying for new technology outlays. Even in a country such as the United Kingdom, which has a far smaller land area, smaller population and much higher average population density than the United States, a significant sum of £4.7 billion by 2020 will be necessary for new investment in transmission lines (both maintenance and expansion), while a further £8.6 billion will be necessary to simply replace the current 47 million gas and electricity meters in the country\(^4\).

While returns in the long-term may be high, policies for smart grid deployment in countries should carefully consider how to strategically finance the investment costs, particularly in the context of the current economic crisis (and thus reduced credit and liquidity). At the same time, sound analysis is needed on the expected economic returns on investment in smart grids and infrastructure for integrating renewable energies. Integrating renewable energies into the grid should make increasing use of public-private partnerships (PPPs) where possible, in order to encourage investment.

III. Security of Electricity Supply

Presently, the electric grid is tailored for the use of conventional, consistent power sources. The challenge with several renewable energies is their reliance on variable natural phenomena, such as wind and sunlight, which results in variable voltage input. Updates to the grid must therefore be able to accommodate inconsistent energy inputs, and it will be important to line up conventional base-load generating capacity and more peak power plants for use during periods of reduced inputs from renewable energy sources. At the same time, affordable and effective power storage mechanisms should be employed to capture any excess production. Ensuring that the grid has capacity to accommodate the varying input

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from renewable energies will require significant restructuring, improved forecasting of energy production, and mathematical models to predict grid behaviour with higher integration of renewable energies.

We can also expect to see a rise in small-scale energy production from renewable energy sources at local levels, potentially adding thousands of generating sources to electrical grids. Grids must therefore be able to continuously calculate increasingly complex and variable supply and demand to ensure reliable and secure electricity supply on a scalable, real-time and per-need basis. Moreover, due to the computerised nature of a smart grid, the potential for technical disruption, or even sabotage, should be addressed in development.

IV. Regulatory Challenges

An increasingly predictable and transparent regulatory regime will be necessary for the much-needed investment in restructuring grids. BIAC calls on policy makers to consult closely with the private sector on new energy policy reforms, and emphasises that policy reforms must not inhibit innovation, obstruct competition, or undermine investment.

It will thus be important to achieve greater policy coherence and consistency between all levels of government in cases where grids span more than one provincial or national jurisdiction, thus facilitating investment and expansion by the industry. This becomes particularly relevant in the case of integrating often geographically-remote renewable energy sources, such as offshore wind farms or tidal energy, where long-distance transmission lines could potentially cross several regional or national boundaries.

Administrative simplification will also play an important role, as currently it is often highly time-consuming and difficult in many countries to seek rights-of-way and to gain regulatory approvals for new transmission lines. Administrative obstacles for siting and permitting would therefore need to be addressed to ensure that grid updates are implemented as effectively and efficiently as possible.

Furthermore, public opposition to new transmission and distribution lines in remote, local and pristine areas can make it difficult to build much-needed new infrastructure. Policy makers at national and local levels should do more to help inform the public and garner public support for new transmission lines and installation of renewable energy technologies.

Policy makers should also help to support further research and development for the integration of renewable energies into the grid. For example, it would be valuable to carry out data collection and analysis to help understand in practice the impacts of increasing integration of renewable energies into the grid. At the same time, research into enhanced forecasting techniques would be useful. Furthermore, the demand-side of grid integration practices and burden-sharing require further consideration, as well as the further analysis into the potential environmental benefits to be reaped by implementation of smart grids.
V. Conclusion

BIAC is supportive of restructuring energy grids in cost-effective ways to improve energy security and address climate change by greater integration of renewable energy technologies, where appropriate. Consultation with the private sector will be fundamental to the success of this endeavour.

In our view, the OECD and IEA have key roles to play in informing the upgrading of electricity grids. They hold several comparative advantages vis-à-vis other international organisations, including close cooperation with BIAC and other stakeholders, a whole-economy perspective, and a wealth of technical and economic expertise to help guide policy makers.

We therefore encourage more OECD and IEA analysis into issues surrounding the integration of renewable energies into the grid. It would be particularly useful to examine the costs and benefits associated with increasing integration of renewable energies, as well as further research into modelling and forecasting. The OECD and IEA can also work to provide guidance to policy makers on such issues to ensure policy coherence and administrative simplification for a sound investment environment. BIAC looks forward to providing input to OECD and IEA activities on these issues where possible.