aimm
ANTICIPATED IMPACT MEASUREMENT & MONITORING

AIMM Sector Framework Brief
Sector Economics and Development Impact Department
International Finance Corporation

POWER
March 2019

Development Impact Thesis – Developing countries face large power deficits, with important implications for economic growth and human development. The World Bank Group's engagement in the energy sector is designed to help client countries secure the affordable, reliable, and sustainable energy supply needed to end extreme poverty and promote shared prosperity. IFC provides financing and advisory services to firms in the power sector which:

→ Increases access to reliable, affordable power
→ Leads to concomitant direct, indirect, and induced effects on GDP and employment
→ Results in potentially significant environmental and social effects

→ Improves market structure and functioning
→ Improves sector resilience and quality of supply
→ Increases the spatial connectivity of the electricity systems
→ Leads to adoption of new sustainability, climate mitigation, and/or climate adaptation technology/processes, practices that can be replicated by other players
→ Introduces inclusive business models

⇨ Project Outcomes

⇨ Contributions to Market Creation

Development Gaps Addressed

- Low electricity access rates
- Unreliable supply
- High power generation costs and tariffs
- Growth and job creation
- Carbon intensity of power system

Rating Construct – All AIMM sector frameworks include detailed guidance notes that help define project outcomes and contributions to market creation, aggregating to an overall assessment of development impact.

- For project outcomes, stakeholders, economy-wide, and environmental effects are the key components for which industry-specific benchmarks define the context in which an IFC operation seeks to drive changes. This gap analysis is combined with a separate set of impact intensity estimates that specify the expected results using predefined indicators.

- For contributions to market creation, industry-specific market typologies define stages of development for five market attributes (or objectives): competitiveness, resilience, integration, inclusiveness, and sustainability. These market typologies, when combined with estimates of how much an intervention affects the development of a market attribute, provide the foundation for IFC's assessment of an intervention's market-level potential for delivering systemic changes.

PROJECT OUTCOME INDICATORS		CONTRIBUTION TO MARKET CREATION INDICATORS	
Stakeholders	Access • Energy delivered to off-taker(s) during the reporting period, GWh • New users reached, # … of which share of new users from underserved groups (rural, low income, etc.), % Quality • Number of power outages, #/month or SAIFI • Average length of power outages, hours or SAIDI • Average transmission & distribution losses, % of output Affordability • Average end-user tariff, USc/kWh • Average cost of generation, USc/kWh	Competitiveness	Market structure and functioning • Changes in market structure: composition, new entrant, • Price responses: liquidity, pricing regulation & instruments, price adjustments • Changes in product offering and innovation: quality, standards, new technology • Regulation changes: market regulatory frameworks, renewable energy support
		Resilience	Capacity to face shocks and stresses • Diversification of electricity generation sources • Effect on financial sustainability of the energy sector • Capacity of institutional bodies to regulate the sector • Adoption of technologies, planning, approaches that build resilience to shocks and stresses (e.g. climate)
		Integration	Connectivity (with external and other domestic sectors, including capital mobilization) • Changes in the spatial connectivity of electricity systems • Linkages within the power supply chain
Economy-wide	• Value added, $ • Indirect and induced employment, #	Inclusiveness	Market-wide focus and access for underserved groups • Adoption of inclusive business models targeting underserved groups • Better regulation to enhance access/affordability for underserved groups
Environmental	• GHG emission reduction/avoidance, tons	Sustainability	Environment and social practices and innovations, including availability of climate related technologies/product • Adoption of sustainability practices and standards (e.g. energy efficiency, climate mitigation & adaptation measures or processes, ESG standards) • Conducive legal/regulatory framework for sustainability • Broad institutional capacity for supporting practices, standards, technology • Innovations in instruments or incentives to support changes in market practice

IFC's Environmental and Social Performance Standards define IFC clients' responsibilities for managing their environmental and social risks. While for most IFC investments, meeting Performance Standards reflects improved environmental and social performance, effects from implementation of the standards are only claimed in the AIMM framework where a clear counterfactual can be established and where the investment intent is to improve environmental or social outcomes.

Sector Specific Principles or Issues – The following principles will be applied for projects rated under this framework:

Principle or Issue	Treatment Under Framework
Scope of assessment	Both project and market creation effects are measured annually over the monitoring period of the investment. These effects typically outlive the project's monitoring period. Effects that can be measured and monitored during the project's monitoring period are emphasized.
Normalization and benchmarking	Impact assessments are based primarily on the size of the deficit being addressed. This methodology gives greater weight to projects addressing large deficits and those creating missing markets. A secondary consideration is normalization to avoid disadvantaging small projects, e.g. impact per million dollars invested or percentage improvement.
Access benefits of power generation projects	Power generation projects are assessed based on the expected impact of electricity delivered to off-takers unless a clear link to end-users can be established. Besides distributed generation, the link to end-users is indirect and dependent on the actions and/or investments made by other stakeholders. To evaluate access effects of power generation projects, AIMM considers access deficits, the country's access expansion plans, and the project's potential contribution to meeting access objectives.
Treatment of negative effects	Negative externalities are taken into consideration in the assessment and highlighted when significant enough to mitigate the overall rating. Potential negative effects at the project level include: (i) large contingent liabilities, (ii) a significant increase in the subsidy bill, (iii) large negative balance of payments effects, (iv) significant gross GHG emissions, and (v) large-scale resettlement. Other potential negative environmental and social risks are addressed through IFC's Performance Standards. Operationally, potential negative effects at the market level include: possible negative effects on competition if solidifying the monopoly position of a client operating in a market that is not a natural monopoly, local content requirements that are assessed to have potential negative anti-competitive effects, negative effects on resilience if investing in an energy resource that is already dominant in the generation mix and is susceptible to supply / price shocks.
Qualitative benchmarks	The analysis of context in which a project is taking place may be either quantitative (through benchmarking of quantitative indicators to the performance of other emerging markets) or qualitative. Qualitative benchmarks typically comprise of a check list of market features that define market stages, optimality of observable outcomes (e.g. tariffs), and feasibility of alternative solutions (e.g. those determined by energy resource endowments). In cases where comparison across markets on a purely quantitative basis is not meaningful, a qualitative assessment is used instead.

Project Outcomes – Project gap analysis is used to classify project contexts according to the size of the deficit / gap being addressed. For each indicator, the size of the gap is measured in relation to development goals associated with the sector (e.g. universal access). Contexts are classified into very large, large, medium or low gap, for each performance dimension. Market gaps are defined using a combination of qualitative and quantitative benchmarks, which leaves room to consider context-specific attributes that drive investments in the sector. Moreover, for specific outcome indicators, such as average cost of generation and end-user tariffs, a global quantitative comparison is not feasible given limited tradability of both energy resources and electricity, i.e. a quantitative gap analysis would need to consider differences in resource endowments and purchasing power to be meaningful. In this methodology, the most relevant comparators can be chosen to benchmark performance.

COUNTRY CONTEXT	Low Gap	Medium Gap	Large Gap	Very Large Gap
Access	– National access near universal – No difference in access between rural/BOP, others – High per cap consumption; no short-term supply shortage; medium-term supply shortage possible	– High per cap consumption, above peers; some supply and access gaps; supply falls below national target – National access rate high; pockets of access gaps – Some access disparities; rural rates remain low	– National access below universal and country target – Underserved groups access lower; rural rate well below universal – Per cap consumption well below comparable markets; below country target	– National access well below universal and country target – Underserved groups' access significantly lower; rural rate well below universal – Per cap consumption sign. below comparable markets and country target
Quality	– Outages infrequent; modest grid quality issues or demand growth – Average T&D losses close to normal; access high, T&D	– Low, localized or seasonal outages; outages high in specific areas or seasons – T&D losses below MIC average but above normal losses for T&D firms	– Frequent outages; typically planned during peaks; unreliable supply significant constraint to doing business; generators used	– Frequent outages, mostly unplanned during peaks; long duration of power outages (high deficits); unreliable supply significant

COUNTRY CONTEXT	Low Gap	Medium Gap	Large Gap	Very Large Gap
	losses not binding constraint – Performance may still fall short of global frontiers [≤0.2 outages per month in top 10 countries at 2016]		– T&D losses high, significant loss for T&D firms; subsidy used; losses affect rates	constraint to doing business; generators used – T&D losses very high, significant loss for T&D firms; subsidy used; losses affect rates
Affordability	– Electricity tariffs fall within national targets and are at par with (or lower than in) comparable markets in the region – No or limited evidence of efforts to further lower cost	– Cost of electricity to end-users is lower than in comparable markets in the region, but still considered a binding constraint to access – Evidence of active effort to lower costs (e.g. in competitive markets: innovation and price competition)	– Cost of electricity to end users is high and exceeds national targets – Evidence that cost restricts access to and/or utilization of services – If present, subsidies not large enough to facilitate full integration of low-income consumers – Unserved users pay more than grid connected users from alternative sources – May be a sector strategy to lower tariffs	– Cost of electricity to end users is high and significantly exceeds national targets – Evidence that cost restricts access to and/or utilization of services – If present, subsidies do not facilitate full integration of low-income consumers – Unserved users pay more than grid connected users from alternative sources – May be a sector strategy to lower tariffs

"Core outcomes" for power sector investments include effects on customers and associated economy-wide effects, as well as environmental outcomes. The key stakeholders are expected to be customers (households and firms) who are the primary consumers of electricity. The improvements in electricity access, reliability and affordability is expected to generate higher consumer welfare for households and job creation and growth effects within the economy. Often, IFC clients are path setters, demonstrating new power generation technologies, as well as innovation in transmission and distribution. Therefore, IFC plays an important role in the expansion of renewable energy and in energy efficiency, with positive environmental effects (e.g. reduction in GHG emissions) as well as other positive environmental effects (e.g. biodiversity conservation).

The AIMM system also takes into consideration other positive impact areas such as on suppliers and employees of the client firm, these are given less weight than the core outcomes, as they are typically secondary benefits associated with a power sector project, rather than a project's main development objective. The rating guidelines award a higher collective implicit weight to core outcomes and cross-cutting outcomes (e.g., gender, inclusive business, GHG emissions reduction) with clear project intentionality. Strategic indicators to be tracked and reported for power sector projects are a sub-set of the indicators measuring core effects reflecting a project's intended area of focus. An IFC operation's project-level outcomes are assessed based on the magnitude of its impacts in relative terms i.e. using a normalization rule that provides an indication of the intensity of impact (e.g. impact per dollar invested). Table below provides summary for the impact intensity assessment categories.

PROJECT INTENSITY	Below Average	Average	Above Average	Significantly Above Average
Access • New users reached, # • Energy delivered to off-taker(s) during the reporting period, GWh	— Yields positive access effects that are small relative to the size of the investment; this rating is issued for projects where access is a secondary objective, e.g. projects targeting to improve the carbon footprint of the grid with some access effects	— Yields positive access effects that are average relative to the size of the investment	— Leads to substantial increase in energy delivered (additional GWh) or T&D capacity (additional MW); the capacity/output increase is associated with a significant and quantified improvement in access; impact is delivered efficiently	— Leads to a significant increase in energy delivered (additional GWh) or T&D capacity (additional MW); the capacity/output increase is associated with a significant quantified improvement in access; impact is delivered efficiently, e.g. additional capacity per million USD invested is consistent with comparable projects/ technologies in the sector

PROJECT INTENSITY	Below Average	Average	Above Average	Significantly Above Average
Quality • Number of power outages, #/month or SAIFI • Average length of power outages, hours or SAIDI • Average transmission & distribution losses, % of output	– Yields positive quality effects that are small relative to the size of the investment; this rating is issued for projects where quality is a secondary objective, e.g. projects targeting to improve the carbon footprint of the grid with some quality effects	– Yields positive quality effects that are average relative to the size of the investment	– Leads to substantial increase in energy delivered (additional GWh) or T&D capacity (additional MW); the capacity/output increase is associated with a significant and quantified improvement in quality of service. Impact is delivered efficiently	– Leads to a significant increase in energy delivered (additional GWh) or T&D capacity (additional MW); the capacity/output increase is associated with a significant quantified improvement in quality of service; impact is delivered efficiently, e.g. additional capacity per million USD invested is consistent with comparable projects/ technologies in the sector
Affordability • Average End User Tariff, US c/kWh • Average cost of generation, US c/kWh	– Yields positive affordability effects that are small relative to the size of the investment; this rating is issued for projects where quality is a secondary objective, e.g. projects targeting to improve the carbon footprint of the grid with some affordability effects	– Yields positive affordability effects that are average relative to the size of the investment	– Leads to substantial increase in energy delivered (additional GWh) or T&D capacity (additional MW); the capacity/output increase is associated with a significant and quantified improvement in affordability of service; impact is delivered efficiently	– Leads to a significant increase in energy delivered (additional GWh) or T&D capacity (additional MW); the capacity/output increase is associated with a significant quantified improvement in affordability of service; impact is delivered efficiently, e.g. additional capacity per million USD invested is consistent with comparable projects/ technologies in the sector
Economy-wide • Value added, $	– Multiplier per 1M USD of investment low vs. other projects in IFC project database	– Multiplier per 1M USD of investment average vs. other projects in IFC project database	– Multiplier per 1M USD of investment above average vs. other projects in IFC project database	– Multiplier per 1M USD of investment significantly above average vs. other projects in IFC project database
Economy-wide • Total employment, #	– Multiplier in bottom 35th percentile vs. other projects in IFC project database	– Multiplier in bottom 36th to 66th percentile vs. other projects in IFC project database	– Multiplier in bottom 67th to 90th percentile vs. other projects in IFC project database	– Multiplier in to 10th percentile vs. other projects in IFC project database

The AIMM methodology considers the uncertainty around the realization of the potential development impact being claimed, making a distinction between the potential outcomes that a project could deliver and what could be realistically achievable in the project's development context. Table below presents the key types of risks factors for power sector operations.

PROJECT LIKELIHOOD	Operational Factors	Sector Factors
Assessment Considerations	• Client track record of delivering impact in the focus area s • Client's market position and product offering • Sponsor's technical strength and support to project • Covenants assuring implementation of project components (e.g. commitments to extend of access to BOP populations) • Project likelihood of reaching financial close at targeted level of capitalization (mostly relevant to Funds) • Presence of funded plan for the development of complementary infrastructure • Public partner track record in meeting contractual obligations • Government track record in committing counterpart resources (e.g. financing for resettlement plan) • Realism of magnitude of anticipated impact (measured against industry standards, client/EPC contractor's experience, public partner's capacity)	• Extent of political support and social buy-in • Financial viability in the absence of subsidies • Affordability in the absence of subsidies • Resilience to exogenous shocks • Alignment of monetary policy risk (currency of trade, FX convertibility, FX transferability, taxation) with objectives • Exposure of project development effects to exogenous shocks e.g. FX risk (e.g. price or supply risk if project relies on imported fuel, contingent liability risk if tariff is USD-indexed)

PROJECT LIKELIHOOD	Operational Factors	Sector Factors
	• Client commitment to ESG standards and implementation track record	

Contribution to Market Creation – The electricity industry is comprised of four main parts: generation, transmission, distribution and retail. A market is defined as the industry / sub-sector in which the project is taking place (excluding markets affected by the project through economic linkages). For the electricity sector, two market segments are considered: the power generation (wholesale) and the power networks (distribution/transmission and retail) markets. In measuring a project's effect on financial integration, firms' capacity to mobilize capital from both local and global capital markets is assessed. AIMM assessments for both project outcomes and contribution to market creation places emphasis on development outcomes that are clearly attributable to the project, measurable, and monitorable, for contribution to market creation, attribution is established by identifying a clear channel linking the project to the anticipated effect and identifying measurable indicators of market creation effects that can be monitored.

Power market typologies provide the building blocks in the AIMM system to construct a narrative for how much an IFC intervention is advancing a market objective. These typologies provide a description of the market gap based on various stages of development for a given sector from least developed to most advanced and enable the location of the market before and after IFC's intervention. The table below summarizes the characterizations of the electricity market for three market attributes (competitiveness, resilience and integration).

MARKET TYPOLOGY	Highly Developed	Moderately Developed	Underdeveloped	Highly Underdeveloped
Competitiveness	– Sector is fully liberalized, free entry in generation, distribution, supply/retail – Wholesale market exists with day-ahead and intraday markets; balancing and ancillary markets fully functional – Most generation plants BAT high-efficiency – RE generation well developed and competitive – Regulatory rules promote efficient access to the transmission network	– Sector liberalizing with introduction of competition to some segments of the market (generation and retail) to facilitate competitive entry – IPP participation in generation increasing – Transmission network open and accessible to all	– Market is undergoing restructuring to clarify and redefine roles of market players – Command and control methods of planning and managing the sector still in place which result in inefficiencies due to inability to capture complex interdependencies in the market – Market centrally managed by system operator that purchases electricity through long term PPAs many of which are not competitively awarded – There is minimal IPP participation – Generation composed of mainly old thermal plants at low-levels of efficiency	– The sector is dominated by a vertically integrated utility that controls all activity – The company is not sensitive to customer needs and may lack incentives to improve service or engage in technology innovation – Government exercises direct regulatory and financial oversight of the utility company – Sector suffers from poor accountability with taxpayers bearing most investment risks – No clear pass-through mechanism of wholesale costs of generation to the end-user tariff

MARKET TYPOLOGY	Highly Developed	Moderately Developed	Underdeveloped	Highly Underdeveloped
Resilience	– Generation well diversified with mix of types and fuels – Full cost recovery; no reliance on subsidies – PPAs are fully bankable – Independent, competent energy regulator in place – Stakeholders have good awareness of potential climate change risks to generation. These considerations are regularly incorporated into project design	– Generation relatively diversified – Generation cost reasonable with some high-cost plants running occasionally; subsidies decreasing – Improved bankable PPA structures in place – Some shortage in capacity; occasional service disruptions – Generation plants susceptible to climate change risks which are being incorporated into new project designs or rehabilitation of existing generation plants	– Generation mix dominated by one or two sources – Generation cost high due to usage of rental units or low-efficiency high cost plants; heavily reliant on subsidies – PPAs not bankable due to non-creditworthy off-takers – Extensive baseload capacity shortage; disruptions occur regularly due to shortages – Generation plants susceptible to high climate change risks with limited consideration taken to these risks in designing new projects	– Generation dominated by one generation source susceptible to supply risks – RE share nearly zero despite viable potential – Fully reliant on subsidies; end-user tariffs detached from system costs – There is no energy law – There is no clear ministry responsible for regulation of the sector – Generation plants susceptible to high climate change risks. Firms do not incorporate resilience considerations, (e.g. climate information relevant for their operations and resilience measures, in their business planning and operations)
Integration	– Country connected to all neighboring networks and has market coupling – 100% electricity coverage – Generation fully integrated into economy, with a well-developed local supply chain as well as local EPC capacity – Projects easily financed through a mix of financing instruments and investors	– Country connected to most neighboring networks – Some linkages to domestic economy; has developed but incomplete supply chain – Project financing available but institutional investors have limited access to project finance	– Country connected to one neighboring country – Country has significant areas with no coverage – Limited local capacity in project development or EPC – Minimal loans to corporates from private banks or other intermediary investors	– No interconnection capacity with neighboring countries – No local capacity in project development or EPC contracting – All energy projects rely on state financing, state budgetary support or loans from state banks

A project need not result in market-level effects. Typically, it takes multiple coordinated and well-planned interventions (more than one project, repeat clients, investment plus advisory, some WB/MIGA activity, etc.) to have market impact. Market-level impact implicitly considers past and ongoing WBG investments that affect the likelihood or magnitude of market creation impact expected from the project. The scope is restricted to WBG interventions directly linked to the IFC investment being evaluated. Market creation impacts represent systemic/catalytic shifts in the structure or functioning of a market whose lifetime is not necessarily linked to the project's. Effects that can be measured and monitored during the project's monitoring period are emphasized.

MARKET MOVEMENT	Marginal	Meaningful	Significant	Highly Significant
Competitiveness	Competitiveness in electricity markets creates incentives for efficiency and innovation while providing affordable transparent prices consistent with long-term investments. Competitive markets also protect against inefficient costs that are otherwise simply passed through to captive consumers. IFC projects can support market competitiveness through enabling improvements in the market structure and regulation as well as via catalytic effects through introduction of innovative technologies and processes. Highly significant impact is associated with projects that create a "missing market", support a first mover, or operationalize significant regulatory reforms undertaken in the sector, with strong replication potential. The project contributes to competitiveness marginally when there is limited scope for market-wide adoption, weak attribution of market creation impacts to the project, or the channel for delivering impact is not well established.			

MARKET MOVEMENT	Marginal	Meaningful	Significant	Highly Significant
Resilience	Robustness of the electricity system and the continuity of electricity supply is critical to the sustainable development of countries as well as to the standard of living of the population. A disruption to the delivery of energy can lead to major socio-economic and environmental consequences. A resilient power system that is subject to a stress can continue to operate by shifting to an altered state that is far from its normal conditions. In this sense, the concept of energy resilience includes the element of adaptability. IFC projects can enhance energy resilience through systemic effects on diversification of electricity generation mix and improve resilience of electricity infrastructure to enhance the sector's adaptability to potential shocks including climate risks. A resilient energy system is also largely an outcome of the way the energy system navigates phases of reorganization in response to shocks and changing circumstances. The regulatory framework and capacity of the stakeholders within the energy system are key drivers of ensuring resilience. Both IFC projects and WBG advisory/policy efforts that support regulatory reform, enhance regulatory capacity, and improve cost-recovery will also contribute to this market attribute.			
Integration	Both the physical and financial integration of the electricity system are key features to enhance the development and deepening of the power market. Projects can contribute to market integration by introducing new or expanded physical infrastructure that addresses shortcomings or bottlenecks and materially improve spatial connectivity of electricity infrastructure between regions (i.e. connecting regional grids within the country), as well as between countries. In addition, projects that promote integration of domestic supply chains and integration of capital markets through mobilizing institutional investors or introduce innovative financing products such as green bonds will contribute to this market attribute.			

The market likelihood adjustment follows the principles for the likelihood adjustment for project outcome potential. In general, the likelihood assessment includes sector-specific, as well as broad country risks that may prevent potential catalytic effects from occurring, plus political economy or policy/regulatory risks that may constrain market systemic change. Due to the diversity of market creation attributes and channels, most of the likelihood factors are expected to be sector, or intervention specific.

MARKET LIKELIHOOD	Sector Factors	Political / Regulatory / Policy Factors
Assessment Considerations	• Public partner track record in meeting contractual obligations • Presence of funded plan for the development of complementary infrastructure • Extent of political support and social buy-in • Financial viability in the absence of subsidies • Track record of regional power exchange • Coherence of specific policies and standards across borders	• Presence of established and well-tested regulatory and legal framework • Existence of a capable and independent energy regulator • Government track record in upholding new policies (measuring risk of policy reversals) • Regulatory scope and capacity • Collaboration track record of participating countries/entities