

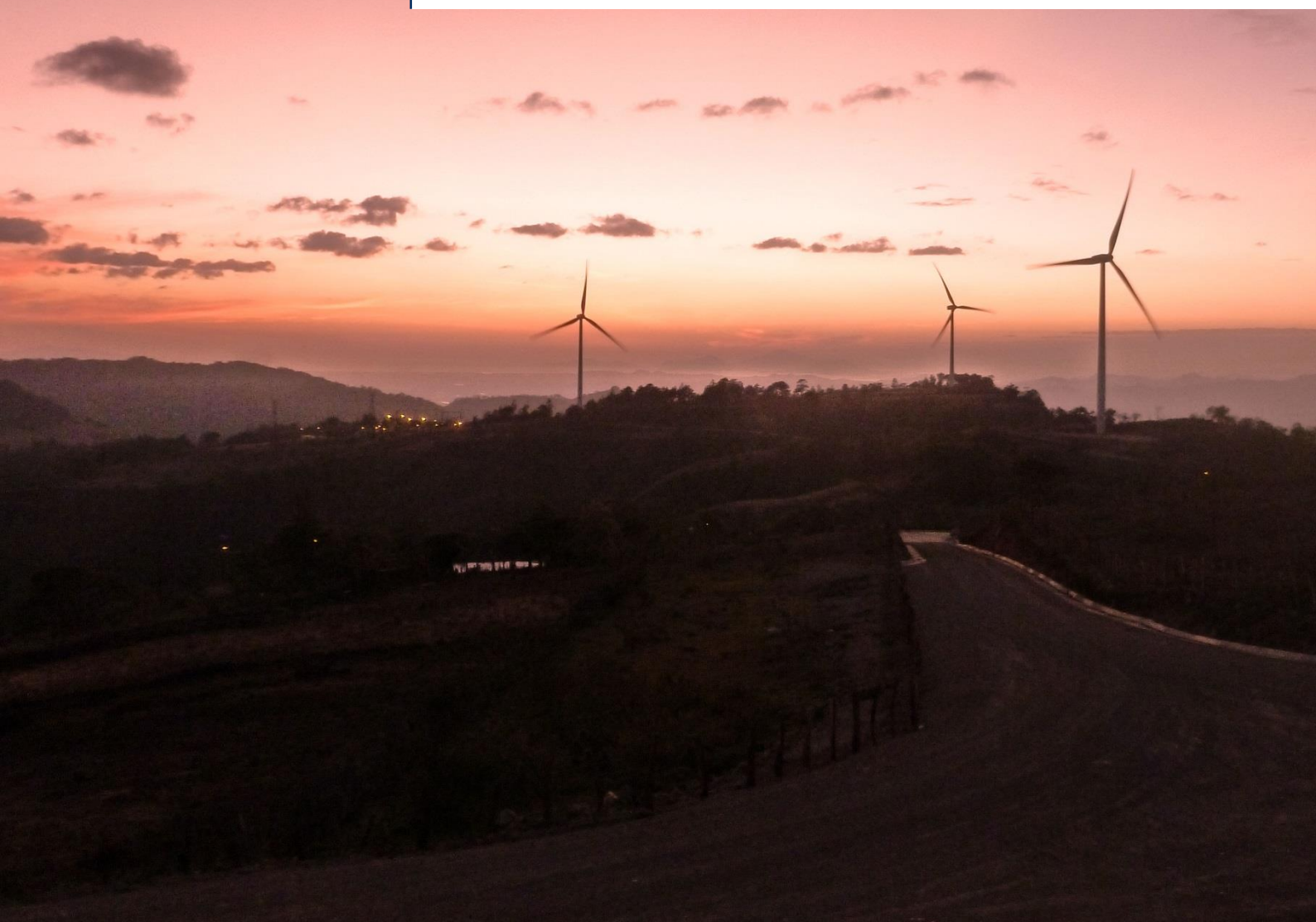
# FMO

Entrepreneurial  
Development  
Bank

# ANNUAL SECTOR EVALUATION 2015

## ENERGY

December 2015



## Executive Summary

FMO has the ambition to become the leading impact investor in 2020 by doubling its impact and halving its footprint. FMO has chosen two Key Performance Indicators (KPIs) that underpin this ambition: Impact is measured by the number of jobs supported and Footprint by the amount of GHG avoided. These two KPIs are for each project determined at the moment of contracting using an estimation based on the FMO Impact Model. The average expected results of the new commitments approved in 2010, 2011 and 2012 constitute the established baseline. FMO aims to double this baseline with the average expected results of the new commitments approved between 2018 and 2020.

This evaluation assesses how energy projects perform against these KPIs, three to five years after the contracting of the investment. This includes a preliminary assessment of the jobs supported, GHG avoided and (interim) investment outcomes of these transactions. Furthermore, it includes a reassessment of long-term production forecasts based on present knowledge. In order to contribute to FMO's accountability for development results, the research questions of this study are formulated as follows: *"How do ex-ante expectations of energy production, jobs supported and GHG avoided of FMO's energy projects compare to an interim re-assessment of these expectations? How do these indicators correlate with (interim) investment outcomes?"*

These questions are answered as follows. Based on present knowledge, the projects assessed are expected to realize an energy production of between 87% and 96% of what was expected at the time of contracting. This implies a realization of 84% to 90% of the ex-ante expected jobs and 84% to 95% of the ex-ante expected GHG avoidance. These forecasts are broadly consistent with the findings from our assessment of 16 projects in FMO's portfolio that were already producing energy in 2014. These projects have so far realized 90% of expected production. Based on the FMO Impact model, this energy production supports 106.000 jobs and 314.000 tCO<sub>2</sub>eq of GHG avoidance, which is respectively 87% of the jobs and 82% of GHG avoidance expected at contracting. Producing energy projects assessed contribute positively to FMO's investment outcome, as only one project has been rated as unsatisfactory on this metric. Since production drives Impact and Footprint results for Energy projects, this implies that in this sample good Impact and Footprint results consistently go hand in hand with good investment outcomes for FMO. However, outperformance on Impact and Footprint KPIs is not a prerequisite for good interim investment outcomes.

It is recommended that this research be repeated when significantly more projects in the sample have reached the production stage. To address the potential for internal learning, it is recommended that a more in depth evaluation be conducted on a limited number of individual energy projects. Hydro projects are amongst the largest contributors to energy production in the sample of this sector evaluation. In this light, a study focusing on a subset of hydro projects is considered to be a valuable complement to this sector evaluation.

## Energy Management Response

The Energy (EN) management team would like to thank the evaluation team for performing this first part of the EN evaluation. From an accountability point of view, the question whether the EN activities indeed contribute to a lasting development impact combined with a solid financial return is a relevant one. Relevant since the energy sector and its activities have been a key driver for FMO since 2008 and its contribution to FMO's overall strategy. Even more, in order to ensure that in 2020, FMO's ambition to become the leading impact investor by doubling its impact and halving its footprint can be realized, this has to be sustained by the activities FMO is undertaking in the global energy field.

The EN management team is satisfied with the first part results of the Annual Sector Evaluation. The management team agrees with the chosen methodology to define development impact as the extent to which projects realize their expected production for a sample of energy projects with production expectations and to subsequently assess the resulting jobs, GHG avoidance and financial performance. Extending the baseline sample of projects with 2009 projects to increase critical mass is considered logical.

Acknowledging the still limited sample of energy projects in operation which only allows a possible confirmation of a mid-term direction taken rather than a firm view on final outcomes, the evaluation's findings sustain the EN's department course of business and strategy going forward. The findings that the realized production of projects that are still in FMOs portfolio at the moment of evaluation (i) produce at 90% of the expected production and (ii) support 87% of the ex-ante estimated (attributed) jobs and 82% of the (attributed) GHG avoided is an encouraging conclusion although still leaves room for further improvement. Improvement that may or may not be within the control of the project or project promoters. In addition, nearly 80% of the projects that have produced a full year in 2014 are expected to have a beneficial investment outcome, shows that realizing development impact and financial return can go hand in hand. Going forward, it is estimated that expected production levels as well as impact indicators in terms of jobs supported and GHG avoided in the EN portfolio will only improve further. At the same time, the EN management notes that only after further maturing of the EN portfolio, more firm conclusions can be drawn on the developmental and financial effectiveness of the EN portfolio, its different technologies and the overall EN strategy for that matter.

Noteworthy is the confirmed development impact of financing hydro projects as not only having excellent operational performance (confirmed by the Credit/EN renewable energy evaluation) but also all having beneficial investment outcomes, despite some of the challenging environmental and social challenges around these projects. Challenges that DFIs such as FMO should be willing to pick up and address in tandem with capable developers. Subsequently, the EN management team looks forward to the second 'deep dive' part of the EN evaluation to provide further insight into the development impact and critical success factors hydro power transactions.

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## 1. Introduction

### 1.1. Mission and Vision

As a Development Finance Institution (DFI), FMO's vision is to contribute to a world in which nine billion people live well and within the means of the planet's resources in 2050. In pursuit of this vision, FMO's mission is to empower entrepreneurs to build this better world. FMO focuses on sectors where it believes it can contribute to these goals: Financial Institutions, Energy and Agribusiness, Food & Water. Besides the three FMO Focus Sectors, FMO sources transactions in Infrastructure, Manufacturing and Services (IMS) through partners and takes active participation in direct investments and funds through its Private Equity department.

### 1.2. Strategic Ambitions

FMO has the ambition to become the leading impact investor in 2020 by doubling its impact and halving its footprint. FMO has chosen two Key Performance Indicators (KPIs) that underpin this ambition: Impact is measured by the number of jobs supported and Footprint by the amount of GHG avoided. These two KPIs are for each project determined at the moment of contracting using an estimation based on the FMO Impact Model<sup>1</sup>. The average expected results of the new commitments approved in 2010, 2011 and 2012 constitute the established baseline. FMO aims to double this baseline with the average expected results of the new commitments approved between 2018 and 2020. This "Road to 2020" is illustrated in Figure 1.

#### Jobs supported



Defined as the sum of all direct and indirect jobs supported as estimated by the FMO Impact Model. Employment effects are attributed pro rata to FMO's investment as a share of total project size.

#### GHG avoidance

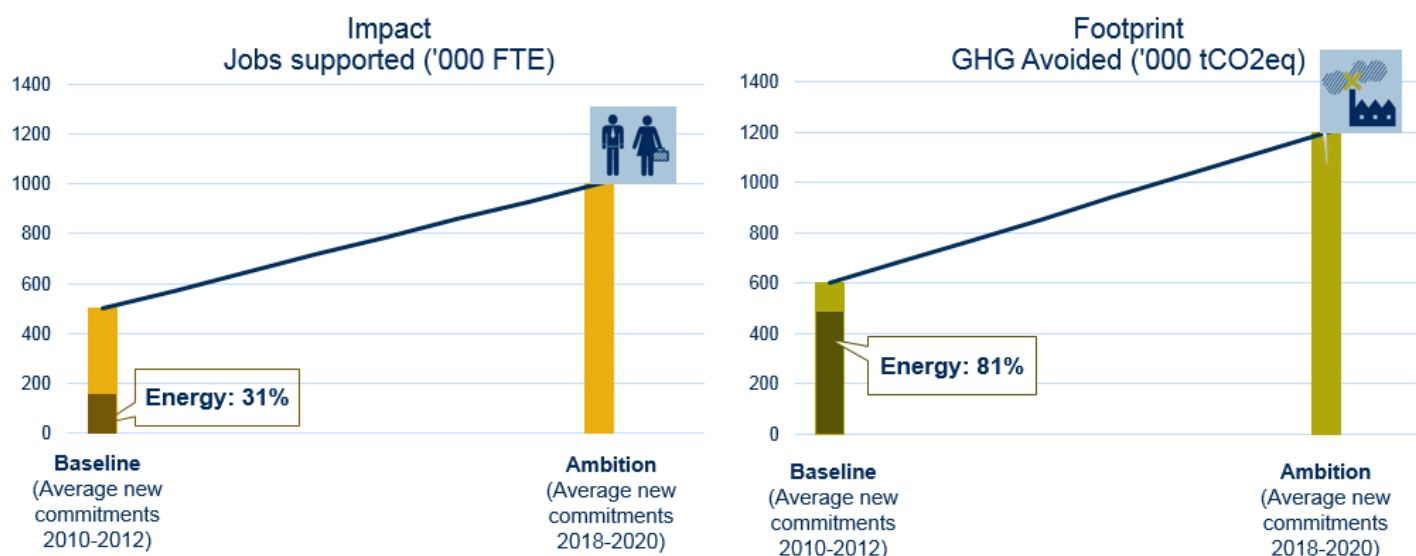


Defined as the Greenhouse Gas (GHG) emissions that projects 'prevent' by producing in a more sustainable way than the most likely alternative in that country (i.e. the industry average emission factor). GHG avoidance is attributed pro rata to FMO's investment as a share of total project size.

<sup>1</sup> FMO has introduced in 2015 the FMO Impact Model, which enables FMO to measure and track its progress towards the 2020 ambitions in terms of jobs supported and GHG avoided. For detailed information on the FMO Impact model, click [here](#).



*Figure 1: FMO's Road to 2020 – Doubling Impact and Halving Footprint by 2020*



Besides focusing on ex ante estimation of development results, FMO seeks to be accountable to its stakeholders for the results of its investments by monitoring and evaluating development results ex-post. While these ex-ante estimations can be used to manage for intended results, it is also needed to evaluate whether these results are actually achieved. FMO operates in a high risk environment, with a mandate to invest only when FMO is (financially) additional to commercial investors. Therefore, a proportion of FMO-supported projects could fail, or will be less successful than originally projected. This process also supports internal learning and continuous improvement of FMO's development effectiveness. Each year, FMO assesses the ex-post development impact of a different sector. In the study at hand, the energy sector is the subject of the evaluation.

### 1.3. Energy Evaluation

The energy sector is a focus sector for FMO, with a strong emphasis on the generation of renewable energy. FMO considers access to reliable and affordable energy essential for economic and social progress in the countries where FMO invests. For that reason, FMO finances projects that have the potential to boost economies, clear the way for low-carbon systems and that help safeguard and increase energy supplies.

Commitments to energy projects in the 2010-2012 baseline period represented 25% of FMO's total investments during that period, and were estimated to account for 31% of total jobs supported, and for as much as 81% of total GHG avoidance in the Baseline (as illustrated in Figure 1). Energy projects support employment mainly through indirect effects of energy production: generating additional energy in an energy scarce economy enhances the productivity and supports output growth and employment. The

high proportion of GHG avoidance accounted for by the energy sector is the result of FMO's focus on renewable energy projects.

FMO provides energy clients with long-term financing. Energy sector projects typically have long construction periods (between six months and five years) and long pay back periods. As a result, the evaluated projects are not yet sufficiently mature for a proper ex-post evaluation: their final development and financial outcomes are not yet known. Given this context, this evaluation assesses the early operations of energy projects included in the Baseline three to five years after the approval of the investment. This enables a preliminary assessment of the jobs supported, GHG avoidance and financial performance of these transactions. Furthermore, it enables an interim reassessment of the sample's long-term production forecasts based on present knowledge.

In order to contribute to FMO's accountability for realized development results, the main research questions of this study are formulated as follows: *"How do ex-ante expectations of energy production, jobs supported and GHG avoided of FMO's energy projects compare to an interim re-assessment of these expectations? How do these indicators correlate with (interim) investment outcomes?"*

We acknowledge the longer construction periods of energy projects, therefore we underline that this is only a preliminary assessment of ongoing developments (both on production and investment outcome). Moreover, we understand that the sample entails a limited number of projects and that we cannot identify any statistically robust correlations. This limits the conclusions that can be drawn from this approach.

## 2. Research approach

### 2.1. Research subjects and indicators

To assess the intermediate contribution of FMO's energy projects to the strategic objectives, a set of projects (the "Sample" as identified on page 9) has been assessed on two topics: Development Impact outcome and Financial Performance for FMO.

For projects that generate energy, development results are approximated by the extent to which projects realize their expected production: production is directly linked to the Impact and Footprint KPIs as defined in FMO's strategic objectives and drives as such the estimations of impact and footprint. Energy production may however differ from expectations for a variety of reasons. This research is therefore an attempt to validate the actual power production as compared to the expected production of FMO's energy projects. This study also assesses the financial performance of the selected projects and the contribution of the transactions to FMO's financial sustainability. Table 1 identifies the indicators to measure Development Impact and Financial performance.

**Table 1: Indicators to measure Development Impact outcome and Financial Performance**

<b>A</b>	<b>Development Impact</b> <i>Assessment of ex-ante energy production</i>
<b>Indicator:</b>	<b>Ex-ante energy production (GWh/yr)</b> Verified ex-ante estimations of expected production at contracting. For debt transactions, this estimation is based on the P90 estimate for production, for equity transactions the estimations vary between P50 and P75 <sup>2</sup> . Ex-ante estimations of expected production are expectations for (on average) year 5 after the start of the tenor.
<b>Indicator:</b>	<b>Realized energy production (GWh/yr)</b> The intermediate realized production of the projects operating for a full year in 2014. For this measure, only producing projects are included in the analysis and comparison.
<b>Indicator:</b>	<b>Long term forecast of energy production (GWh/yr)</b> An estimation range of energy production after the construction phase is finalized as a proxy for structural contribution to Development Impact.
<b>B</b>	<b>Financial Performance for FMO</b> <i>Assessment of Investment outcomes</i>
<b>Indicator:</b>	<b>Investment outcome rating</b> This indicator measures to what extent FMO has realized or expects to realize, the loan or equity returns that were initially expected at the time of approval. It is an assessment of the investment outcome as per 2015. The production results of 2014 are therefore one of the considerations in the assessment of the rating.

### 2.2. Project Sample

The sample of this research consists of FMO contracted transactions that concern energy production. Considering the fact that some energy projects have longer construction periods, to be able to make any verifications of production numbers, the sample of the research needs to be large enough to include projects that are producing at this moment. Therefore, two groups of projects are included:

<sup>2</sup> P90 is a value to indicate the probability level of this production level. It implies that this estimate can be exceeded in 90% of the time, and can be expected to be under this value 10% of the instances. P90 provides a higher confidence level that the estimated production will be realized than for example P50. P90 is therefore a more conservative prediction of future production than P50.



**“Baseline Energy Projects”:** Energy projects included in the Impact & Footprint Baseline (the “Baseline Projects” contracted in 2010, 2011 and 2012), that contribute to FMO’s Baseline of the Impact and Footprint ambition.

**“2009 Projects”:** To be able to make an intermediate assessment on the realization of Impact claims and production numbers, the sample was extended to include more mature projects from 2009<sup>3</sup>.

The characteristics of the full sample of the 36 projects are described in Chapter 3. In Figure 2, a reader’s guide explains the various subsets in the sample. The icons are used in the graphs and tables to clarify on which sub-set the graph or data is based.

**Figure 2: Reader’s guide. Explanation of different sample sizes and the underlying projects.**



### 2.3. Research methods

FMO’s Development Impact and Sustainability team has conducted this research throughout 2015. The research is based on both desk research and interviews, executed between May and December 2015. In addition to the identified key indicators, the team also collected relevant project characteristics (country, type, sponsors, status, issues etc.) and transaction characteristics (status of transaction, Client Credit Rating etc.).

### 2.4. Data Sources

Data sources are both (financial) project documents (e.g. Price Purchase Agreements), technical reports and formal contracting and client monitoring documentation, as drawn from FMO financial and Client Reporting Management systems. Furthermore, 24 interviews and consultations with relevant stakeholders were conducted. Amongst them were members of the Deal Team, Portfolio Analysts, Environmental & Social Officers, all responsible for the contracting and monitoring of the different transactions. In addition, we consulted members of the Credit department,

<sup>3</sup> These projects were not included in the Baseline of FMO’s Impact and Footprint ambitions.

responsible for the assessment of the credit risk and Investment Outcome Rating and of Special Operations, responsible for the account management of poorly performing projects.

## 2.5. Research Activities

### 1) Intermediate assessment of realized production (2014)

The intermediate verification of production expectations entails the comparison of the ex-ante annual energy production numbers of each project on the one hand and the actual realized production numbers on the other. This comparison can be executed only for the 21 projects that are producing energy at year's end 2014. To be able to make fair comparisons, we only include projects for which full year production figures are available.



Ex-ante estimations (at contracting date) were drawn from the FMO Baseline, which was used to establish FMO's Impact and Footprint baseline. These data were collected and verified in 2014 from the official financial and technical documentation for contracting. The actual realized production numbers were sourced from recent client reporting.

### 2) Reassessment of long-term production forecast

For all projects in the sample it is expected that as time since contracting passes, circumstances and conditions could change, both on a project level, but also on the industry or national level. In the long run, more projects will be producing electricity than in 2014, but challenges to reach full expected production could arise or persist. Based on recent individual developments of the projects, we reassessed the long-term production forecast. This enables a more refined comparison between FMO's ex-ante Impact and Footprint expectations and potential impact in the long term. To define a range for long-term forecast of production, both a worst case (Minimum forecast scenario) and a best case (Maximum forecast scenario) have been identified.



For the case-by-case assessment, all projects were categorized in various groups by status, as is illustrated in Table 2 on page 13. The first level is the assessment of the extent to which FMO played an attributable role to the realization of the project. This is particularly relevant for those projects that have not been disbursed. If no attribution can be claimed, the long-term forecast is defined as zero production. For projects where FMO is still involved, the attributable impact is defined at 100% of FMO's proportion in the total project size.

Subsequently, it was assessed, whether a project is "under construction" or "producing" by the end of 2014, and whether the project is experiencing any issues, such as technical or ESG issues and how this may affect future production. For those producing projects that do not have any significant issues, it is assumed that no reason exists to expect significant differences from actual production. The long-term forecast

range is therefore defined to be at the 2014 level (worst case) or to improve towards the ex-ante expected production (best case).

For the projects that are experiencing issues, the scenarios have been identified based on client reporting, and in cooperation with the respective Investment Officer. The reassessments have been based on (extrapolations) of the most recent available production data, technical interventions and other relevant developments that could improve or limit production. Several projects are experiencing (severe) ESG issues while under construction. These issues may be politically sensitive and therefore we cannot make any assumptions on future production at this moment. Therefore, we defined the long- term forecast to be either 0% or 100% of ex-ante production.

**Table 2: Definition and assumptions for reassessment of the long term forecast of production**

Category	Definition	Attribution Factor	Long Term forecast MINIMUM	Long Term forecast MAXIMUM
<b>No disbursement</b>	Projects that have never been disbursed and thus FMO did not play a role in realization of the project	0%	0	0
<b>Producing</b>	Projects currently producing, for which no reason exists to expect significant differences from actual production.	100%	<i>Underproduction: 2014 production</i> <i>Overproduction: 100% expected production</i>	<i>Underproduction: 100% expected production</i> <i>Overproduction: 2014 production</i>
<b>Producing - Purpose change</b>	Projects that were initially intended to deliver baseload, but that is currently intended to keep providing peak load only	100%	2014 production	2014 production
<b>Producing - Technical issues</b>	Projects currently experiencing technical malfunctions that hamper production to reach full expected production. Estimates for long term production are determined on a case to case basis based conversations with experts.	100%	Worst case scenario	Best case scenario
<b>Under construction - As planned</b>	Projects currently under construction, and production is therefore 0, for which no reason exists to assume that production will be lower than assumed in the long run. These projects may be suffering from delays at the moment (#)	100%	100% of expected production	100% of expected production
<b>Under construction - Technical issues</b>	Projects under construction that are currently experiencing technical malfunctions that are very likely to hamper production. Estimates for long term production are determined on a case to case basis based conversations with experts.	100%	Worst case scenario	Best case scenario
<b>Under construction, ESG issues</b>	Projects that are currently experiencing significant delays in construction due to ESG issues, for which finalising construction (and FMO involvement) is not certain.	100%	0	100% expected production
<b>Prepaid</b>	Projects that have been prepaid	100%	Producing prepaid: 2014 production, or Under construction prepaid: 100% of expected production	Producing prepaid: 2014 production, or Under construction prepaid: 100% of expected production

### 3) Assessment of Impact and Footprint results

To establish the projects' potential contribution to FMO's Impact and Footprint KPIs, the projects have been assessed to their contribution to jobs supported and GHG avoided. First, all deals were processed by the FMO Impact model based on the ex-ante expectation and FMO's relative share in the total project finance. Subsequently, the actual 2014 production (subset of 16 projects) and the reassessment of the long-term forecasts (total sample of 36 projects) were processed in the model. This results in the intermediate realized impact and footprint of the producing projects. Furthermore, the long-term forecast reflects the long-term potential for impact and footprint for FMO.



### 4) Assessment of (Interim) Investment Outcome for FMO

To determine the financial performance of transactions, we have applied the Investment Outcome Rating. This reflects the expected investment outcome of the transaction to FMO at this moment. Each transaction is categorized by FMO's Credit department as "Excellent", "Satisfactory", "Partly unsatisfactory" or "Unsatisfactory" as defined in Table 3 on page 15. With this data, we can assess the intermediate relationship between financial performance of a transaction and its (potential) development impact.





**Table 3: Definition of Investment Outcome rating for debt and equity**

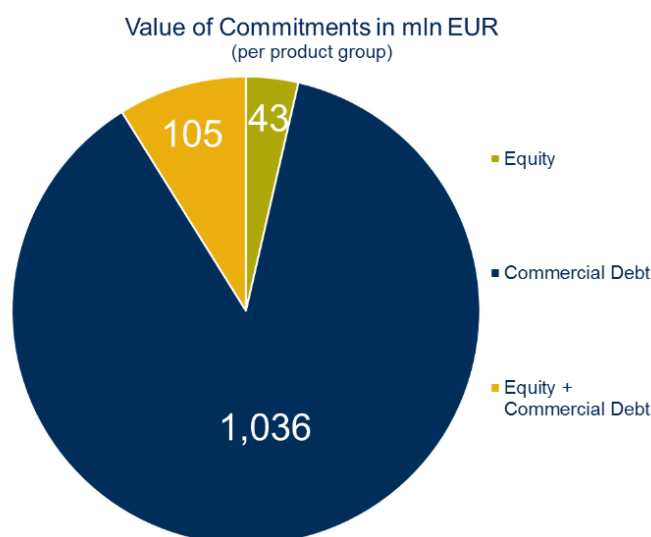
Definitions for Investment Outcome Rating		
Rating	Definition Debt	Definition Equity
<b>Excellent</b>	Fully performing loan and, through a sweetener (e.g. income participation), it is expected to earn significantly more than a loan priced “without sweetener” would have earned if paid as scheduled. There is no indication that debt service payments will not remain current in future.	Net IRR > 15%
<b>Satisfactory</b>	<ul style="list-style-type: none"> <li>(i) Loan is expected to be paid as scheduled; or</li> <li>(ii) Loan is prepaid in full; or</li> <li>(iii) Loan has been rescheduled and is expected to be paid as rescheduled with no loss of originally expected income. In the case of a guarantee, all fees are expected to be received, and guarantee is not called, or called but expected to be fully repaid in accordance with the terms of the guarantee agreement.</li> </ul>	Net IRR = 8% < 15%
<b>Partly unsatisfactory</b>	<ul style="list-style-type: none"> <li>(i) Loan has been rescheduled, or</li> <li>(ii) Guarantee is called</li> </ul> <p>and in either case FMO expects to receive sufficient interest income to recover all of its funding cost but less than the full dollar margin originally expected. If all payments to FMO are current, but there is doubt whether payments can remain current in future, then a partly unsatisfactory rating may be preferable. For example, FMO may establish/ “flag” losses reserves of modest size (no more than 10%) for reasons such as country conditions, which are not related specifically to FMO’s project. In these cases, a partly unsatisfactory rating may be used rather than unsatisfactory.</p>	Net IRR = 5% < 8%
<b>Unsatisfactory</b>	<ul style="list-style-type: none"> <li>(i) Loan is in non-accrual status; or</li> <li>(ii) FMO has established specific loss reserves; or</li> <li>(iii) Loan has been rescheduled but FMO does not expect to recover at least 100% of its loan funding cost; or</li> <li>(iv) Loan has been or is expected to be wholly or partially converted to equity in restructuring of a “problem” project; or</li> <li>(v) FMO experiences a loss on its guarantee.</li> </ul>	Net IRR < 5%

### 3. Characteristics of Sample

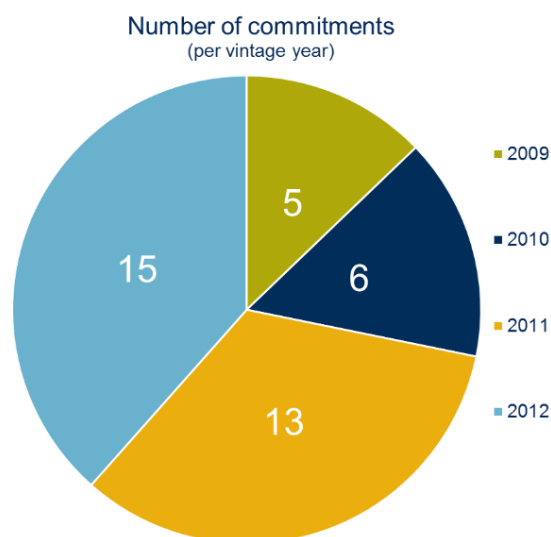
#### 3.1. Description of Scope

In the years 2009 to 2012, FMO has contracted 39 (equity and/or debt, Figure 3) investments with a total of EUR 1.18 bln in 38 individual projects that are intended to produce energy. As is illustrated in Figure 4, since 2009 the number of commitments on energy deals has tripled by 2012. One project has received two commitments, in 2009 and in 2010. In the document at hand, we will evaluate the performance of *projects* (and not of *commitments*).

**Figure 3: Total value in mln EUR of the Sample of Commitments (39) as categorized by Product Group**

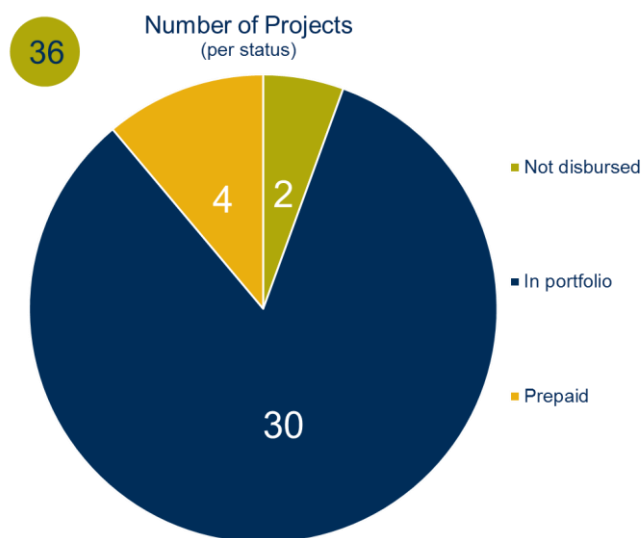


**Figure 4: Total Sample of Commitments (39) as categorized by Vintage year**



Two projects were excluded from the sample of this evaluation as exact contribution of the FMO financing to a multi project or holding company could not be identified and therefore individual expected production and realization of data could not be established. The total sample of the review therefore includes different 36 projects, as described in Figure 5. Two commitments were never disbursed and have been cancelled and four loans have been prepaid, therefore these projects are not considered to be in FMO portfolio any longer. Of the four prepaid loans, three projects are producing, and one is still under construction. As per December 31<sup>st</sup> 2014, 21 of the projects were producing energy and 13 were under construction as can be seen in Figure 6.

**Figure 5: Total Sample of projects (36) as categorized by Investment status**



**Figure 6: Total Sample of projects (36) as categorized by Production status**

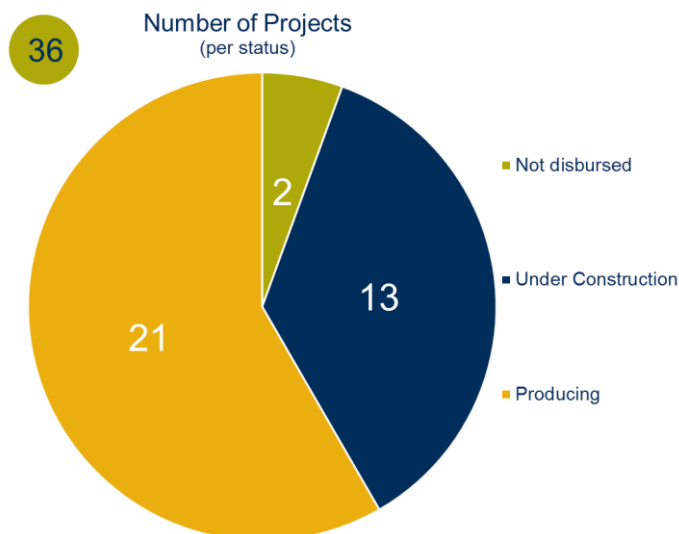
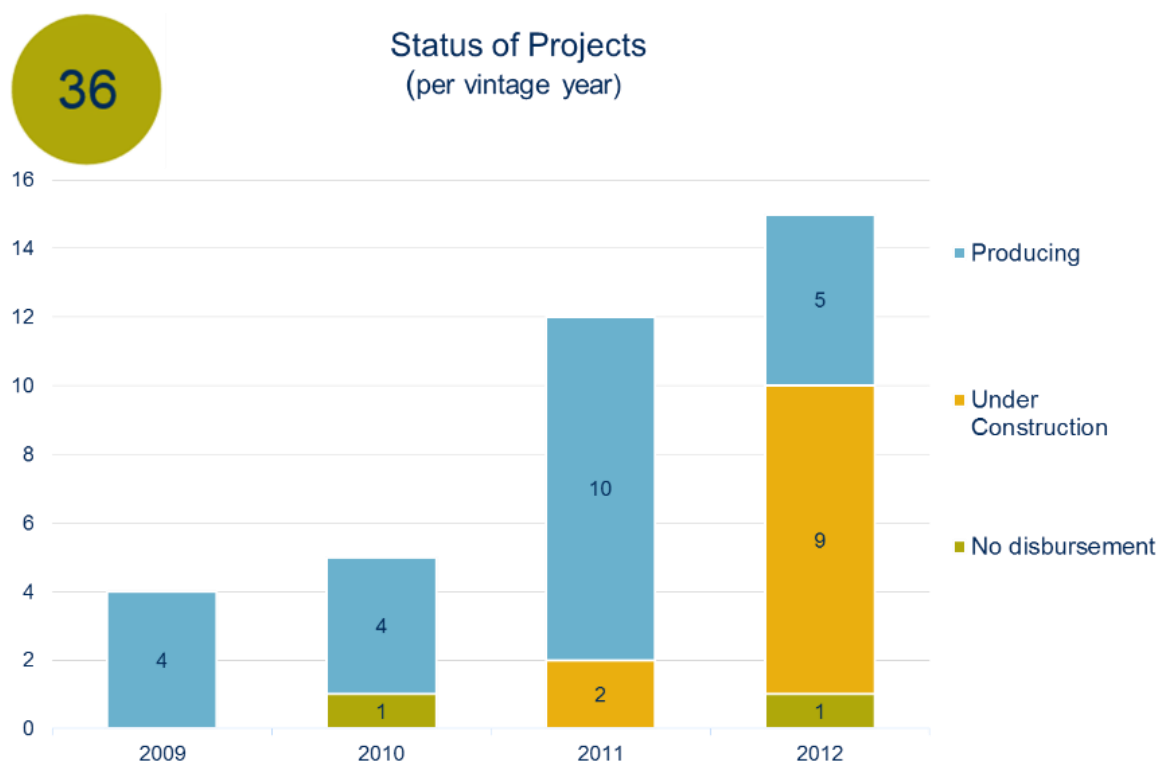


Figure 7 illustrates that the construction time of energy deals can be relatively long, as the more mature deals from 2009 and 2010 are now all in the producing stage. From the more recent deals from 2011 and 2012, more projects are still under construction.

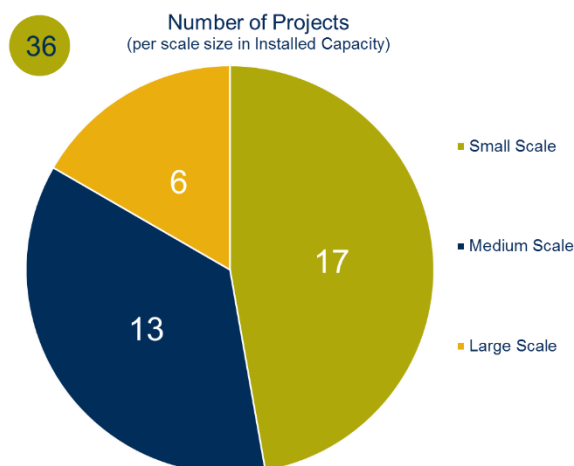
**Figure 7: Total Sample of Projects (36) as categorized by Production status and Vintage year**



## 3.2. Expected Production of Sample

Installed capacity is the intended full-load sustained output of a power generating facility. In Figure 8, all projects are categorized as small ( $\leq 50$  MW), medium ( $\leq 200$  MW) or large scale ( $> 200$  MW), based on the installed capacity. Nearly half of the projects is small in scale, with an installed capacity of 50 MW or lower.

**Figure 8: Total Sample of projects (36) as categorized by scale size of Installed Capacity (MW)**



**Figure 9: Total Expected production in GWh/yr of total sample of Projects (36) as categorized by type of energy**

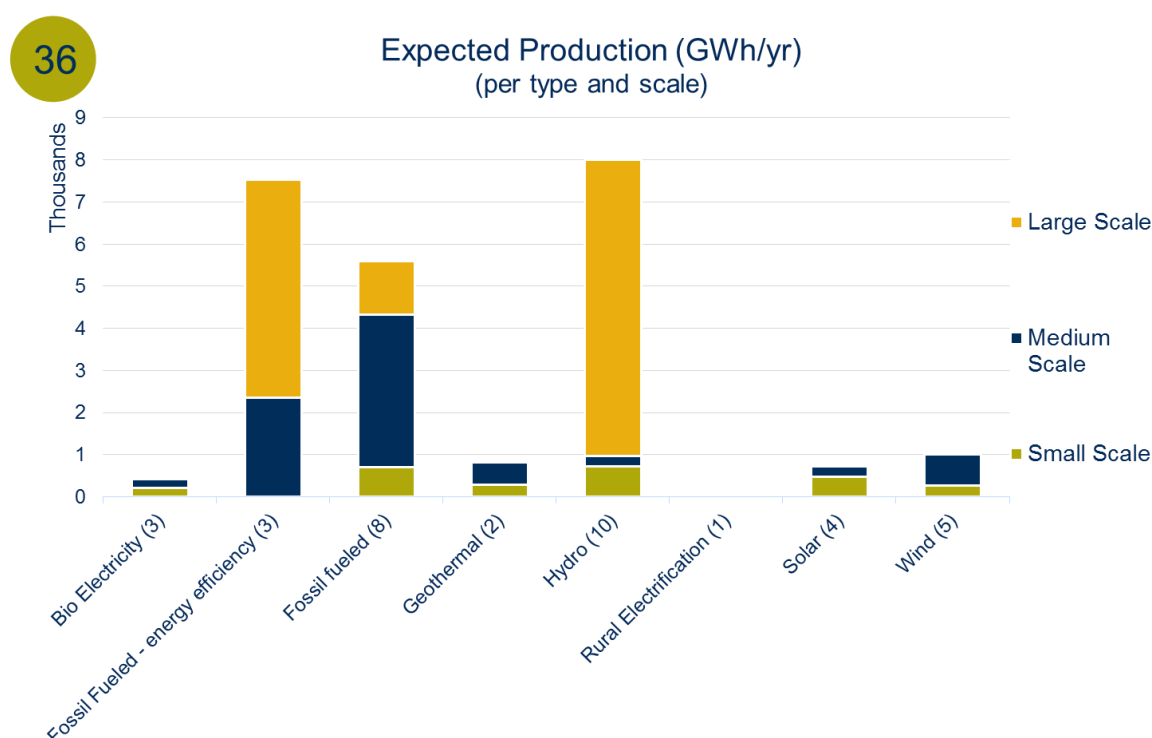


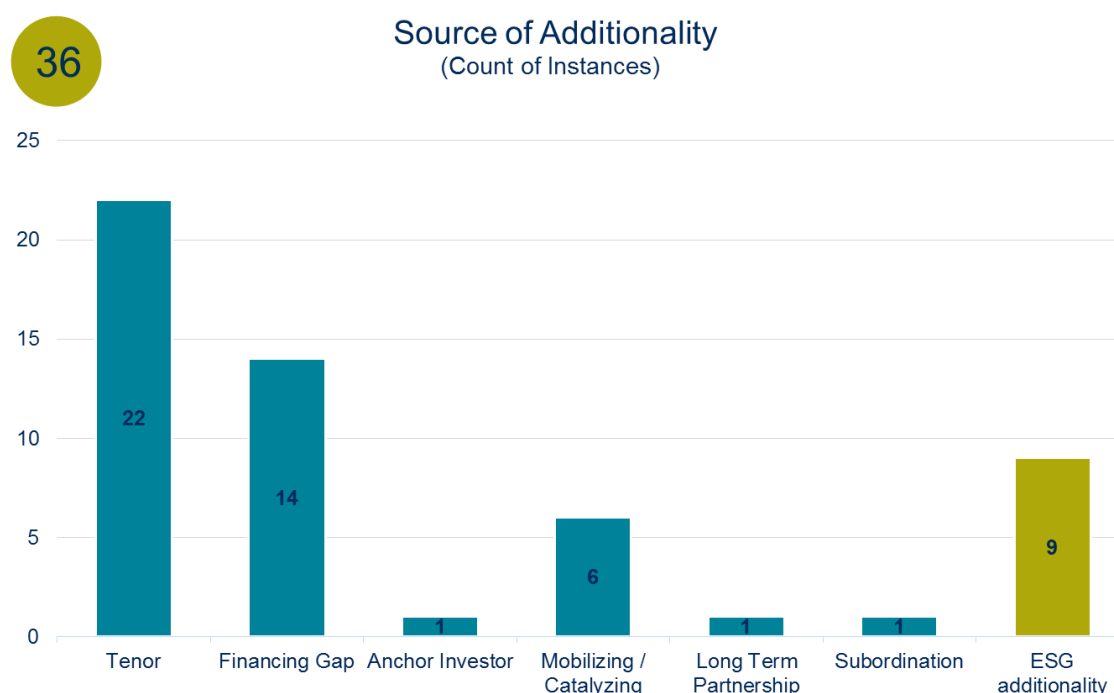
Figure 9 describes the expected production in GWh/yr per type of energy source, which reflects the amount of electricity expected to be generated by the project in one year, based on project specific conditions. For each different type, the number of projects in that category in the sample is mentioned in between brackets. The vast

majority of the expected production is sourced from hydro power (10 projects) and fossil fueled plants (3 + 8 projects). Fossil-fueled energy is generated both with green field and expansion projects (8) and energy efficiency improvement projects (3). Hydro and fossil-fueled projects represent not only the majority of the number of deals, but also entail the largest projects, resulting in the largest share of the annual expected production.

### 3.3. Additionality of Sample

FMO has the mandate to be additional to the commercial market in its financing. Additionality can imply financial additionality, when FMO provides financial products that are not readily available from commercial banks or other investors on workable terms and conditions, at the time of approval. Another form is ESG additionality, where FMO as a partner, provides Environmental, Social or Governance (ESG) inputs that other parties do not provide. In Figure 10, the various sources of additionality of the different transactions are presented for the sample projects as confirmed at the time of approval by FMO's Credit department<sup>4</sup>. For ten projects two sources of financial additionality are reported. "Tenor" and filling a "Financing gap" are the two main sources of financial additionality in this sample. In 25% of the transactions, FMO has an additional role in ESG input. In only one case ESG additionality was the sole source of additionality.

**Figure 10: Count of instances of source of additionality**



<sup>4</sup> For all but 9 (of which 4 prepaid) projects the source of financial additionality has been confirmed and documented in Scorecard by FMO's Credit department at the moment of approval. For the remaining projects, the archived Scorecard at approval did not document the additionality of FMO. For these projects, the source of additionality was collected from the Financial Proposal or from Scorecard archived at another moment than approval and is thus not confirmed by the Credit department.





## 4. Results

### 4.1. Intermediate assessment of realized production (2014)

At the end of 2014, 21 projects were producing energy. Two projects were connected to the grid during 2014, so no full year production figures are available. The remaining 19 projects were expected to produce a total of 12 thousand GWh per year.

**Table 4: Results of the intermediate assessment of realized production for all producing projects**

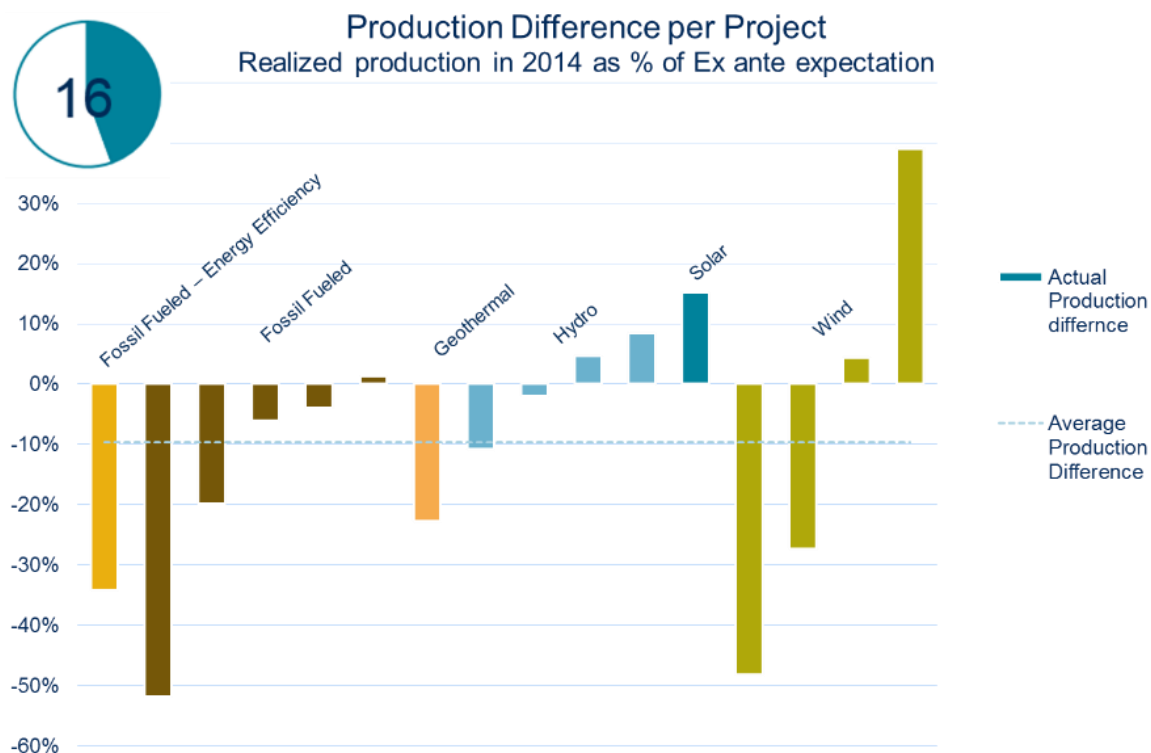
Producing projects	Expected production (GWh/yr)	Realized production 2014 (GWh/yr)	% of expected production
 <b>All projects in portfolio (N=16)</b>	<b>10.870</b>	<b>9.769</b>	<b>90%</b>
Prepaid Projects (N=3)	1.222	584	
 <b>All Producing projects (N=19)</b>	<b>12.092</b>	<b>10.353</b>	<b>86%</b>

The 19 producing projects have produced a total of 10.353 GWh/yr. This aggregate production number includes three projects that were prepaid before the end 2014 and are no longer in FMO portfolio. Two of which were financed by FMO after construction. A third project was prepaid before the production stage was reached. This project ceased production after only one year and will not resume production. All three prepaid projects produced less than expected before they were repaid by the borrower<sup>5</sup>, but the reason for prepayment varied: for example, the client could refinance the project more cheaply, or could not comply to non-financial requirements. Realized production of projects that are still in FMO's portfolio at the moment of evaluation is therefore 9.769 GWh/yr, or 90% of the expected production of this sub-set of projects (10.870 GWh/yr). In terms of Impact and Footprint, these projects support 87% of the ex-ante estimated (pro-rata attributed) jobs and 82% of the (pro-rate attributed) GHG avoided. This is the equivalent of 106.000 direct and indirect jobs supported and 314.000 tCO<sub>2</sub>eq avoided.

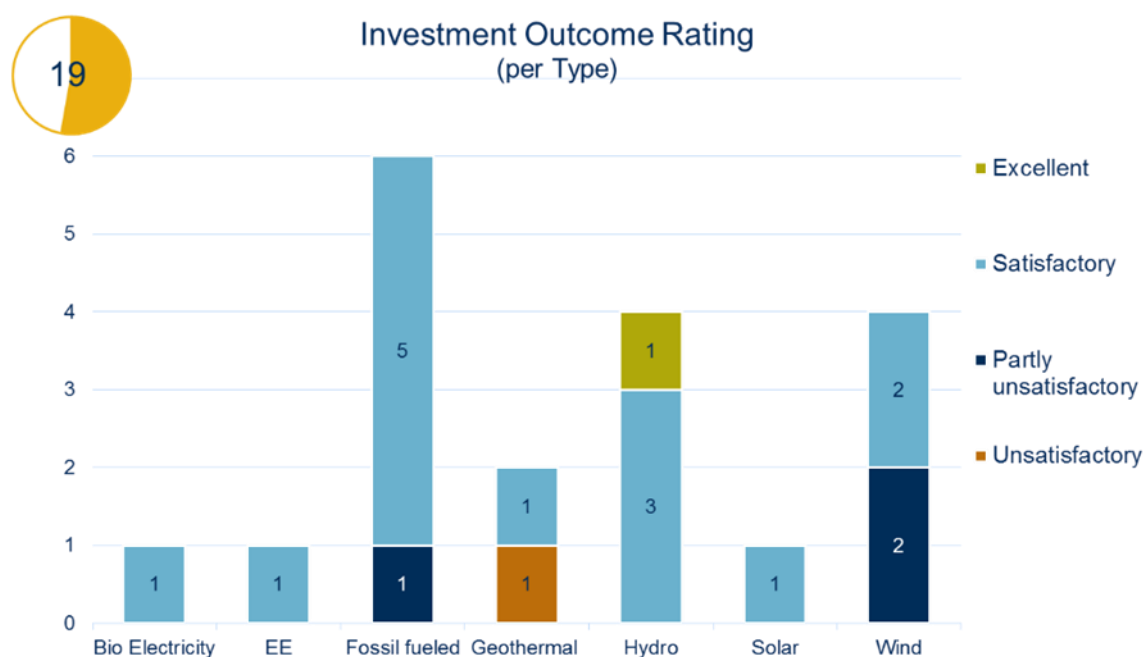
This overall production difference of 10% is caused by ten producing projects producing less energy than expected in 2014. The average production gap per project is 23% but negative gaps are more concentrated at smaller projects, leading to a 10% average gap across the sample. Six projects have a production gap that is 20% or larger. Figure 11 suggests that at the end of 2014, fossil fueled (and energy efficiency) projects are not reaching their expected production. However, some projects will still be undergoing technical optimization and fine-tuning. These considerations are included in the reassessment of the long-term production forecast at page 23.

<sup>5</sup> Since these projects are no longer in FMO portfolio as per December 31<sup>st</sup> of 2014, FMO has no data on full year production of 2014. For one (fossil fuelled) project (which was prepaid after Q3) the 2014 production thus far was extrapolated to a full year. For the two other prepaid projects the last full year of production while in portfolio was used as proxy for 2014 production.

**Figure 11: Production difference per project (Producing projects in Portfolio for full year 2014)**



**Figure 12: Investment Outcome Rating as categorized per type (Producing projects in Portfolio full year 2014)**



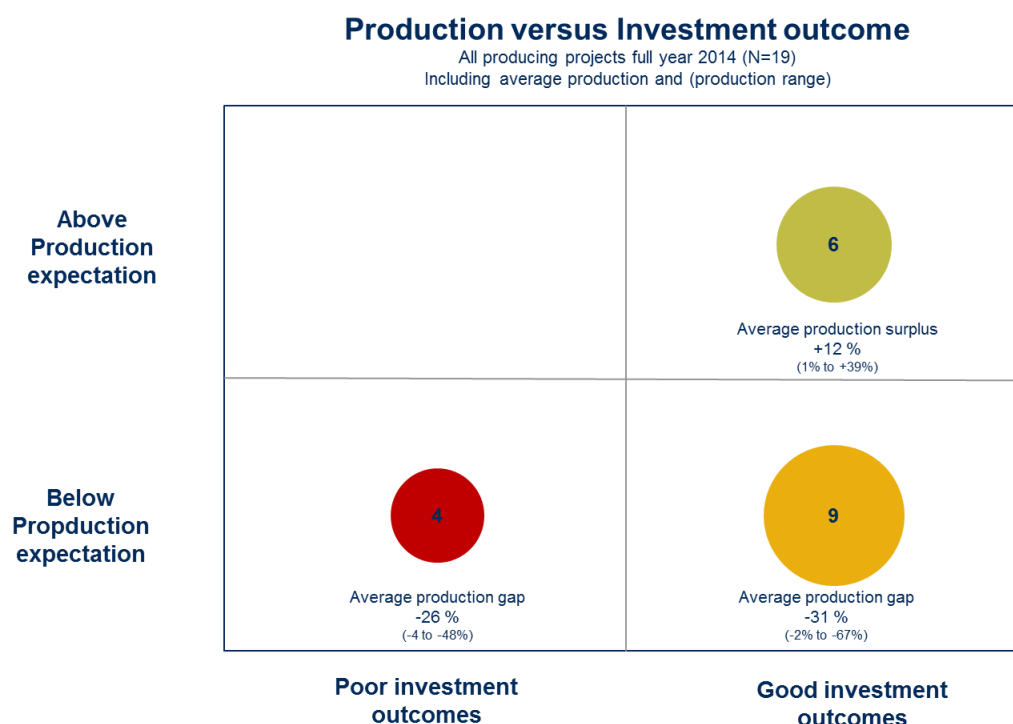
#### 4.2. Assessment of (interim) financial performance

In Figure 12, it can be found that nearly 80% of the projects that have produced a full year in 2014 are expected to have a beneficial investment outcome: 15 projects are rated as either “Excellent” or “Satisfactory”, amongst which are all producing hydro plants. Furthermore, all but one fossil fueled plant (including the plant with the improved energy efficiency) result in beneficial investment outcomes for FMO.

In Figure 13, development outcome in terms of realized production of the producing projects is plotted against the investment outcome for FMO. A good investment outcome is defined as an investment rating of “Satisfactory” or “Excellent”.

All projects producing as expected or above expectation have a beneficial investment outcome. Nine projects that underperform on production (see Table 5 below) do result in a beneficial investment outcome for FMO of which four projects have limited production gaps of -2% to -20%. Three projects have larger production gaps, but these do not deteriorate FMO’s investment outcome as they are prepaid and the return has already materialized for FMO. One project experiences some technical issues causing severe underproduction, but the client is able to meet its obligations and it is expected that production can be improved in the near future. Finally, one project produces less than 50% of the expected production as the plant changed from base load supply to peak load supply. Despite the lower revenues from lower power production, this plant is able to serve its obligations to FMO as it receives a fixed operations and maintenance fee from the government.

**Figure 13: Production outcome versus Investment outcome (Producing projects in Portfolio for full year 2014)**



**Table 5: Sub-set of under-producing projects that have beneficial investment outcomes**

Type	Actual Production difference	Status	Investment outcome
Hydro	-2%	Producing	Satisfactory
Fossil fueled	-6%	Producing	Satisfactory
Hydro	-11%	Producing	Excellent
Fossil fueled	-20%	Producing	Satisfactory
Bio Energy	-67%	Prepaid	Satisfactory
Fossil fueled	-58%	Prepaid	Satisfactory
Geothermal	-29%	Prepaid	Satisfactory
EE	-34%	Producing – Technical issues	Satisfactory
Fossil fueled	-52%	Producing – Purpose change	Satisfactory

The 19 projects analyzed in this section suggest that outperformance in terms of production results in a beneficial investment outcome for FMO. However, it is not a sole prerequisite for a good investment outcome. In case the underperformance is limited or expected to be temporary this does not automatically affect the client's ability to repay its obligations or the internal rate of return of the investment. Furthermore, other sources of revenue may ensure that the client is able to meet its financial obligations.

#### 4.3. Reassessment of long-term production forecast

Of the 36 projects in the sample, 13 projects are still under construction at the end of 2014. One project under construction has been prepaid by the borrower. For eight projects it can be expected that they will produce as planned in the long run despite the fact that some of them are experiencing delays in construction. Four more projects are currently experiencing challenging technical or ESG issues which may have implications for future production. The underlying factors causing production differences for the producing projects can change or be mitigated. Based on the interviews conducted also with the Credit Department, it is expected (but not guaranteed) that current production results will on average improve in the future.

The definitions and assumptions applied to estimate the long-term production are included in Table 2 on page 13. The aggregated estimated production numbers (ex-ante and reassessed long-term forecasts) per project category are illustrated in Table 6. In the fifth and seventh column, the production of each category is expressed as share of total expected production of the total of portfolio projects (excluding the prepaid projects).

In the long run it is estimated that FMO will realize with its portfolio projects 87% to 96% of expected production in GWh/yr (as is shown in Table 6). In terms of Impact and Footprint, this would lead to 84% to 90% of the pro rata attributed jobs supported and 84% to 95% of the pro rata attributed GHG avoided. For jobs supported this estimate is lower than the production estimate because the projects that are expected to experience shortages in the long run are located in poor countries, where the

additional job effects per unit of produced electricity are relatively large. The estimate for GHG avoidance is lower because renewable energy projects are over-represented in the population of projects expected to produce less than expected.

**Table 6: Reassessment of the long-term production forecast**

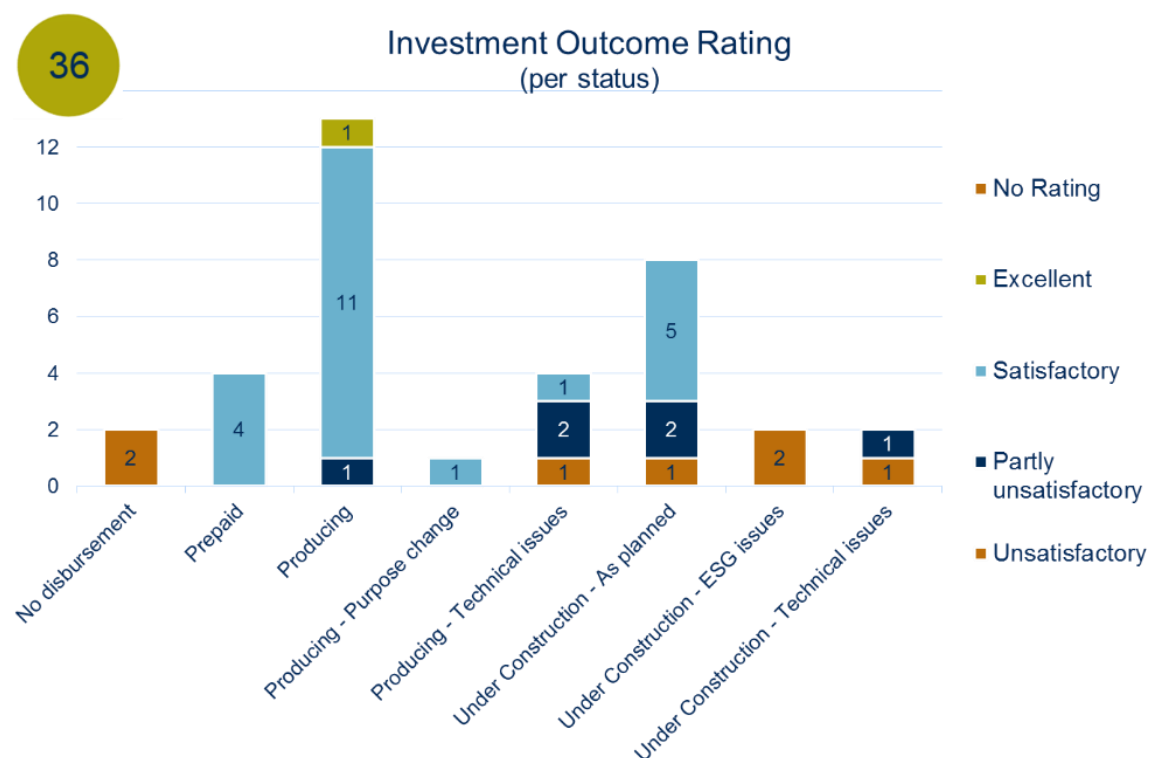
36	Number of Transactions	Expected annual production (GWh/yr)	Forecast expected production (GWh/yr) Minimum	As share of total Portfolio expected annual production (Minimum)	Forecast expected production (GWh/yr) Maximum	As share of total Portfolio expected annual production (Maximum)
No disbursement	2	845	-	0%	-	0%
Producing	13	7.875	7.506	33%	8.249 <sup>6</sup>	36%
Producing - Purpose change	1	323	156	1%	156	1%
Producing - Technical issues	4	3.226	2.150	9%	3.108	14%
Under Construction - As planned	8	10.030	10.030	44%	10.030	44%
Under Construction - ESG issues	2	222	-	0%	125	1%
Under Construction - Technical issues	2	294	43	0%	213	1%
<b>TOTAL PORTFOLIO</b>	<b>32</b>	<b>22.815</b>	<b>19.884</b>	<b>87%</b>	<b>21.881</b>	<b>96%</b>
					-	
Prepaid	4	1.268	974		974	
<b>TOTAL</b>	<b>36</b>	<b>24.083</b>	<b>20.858</b>	<b>87%</b>	<b>22.855</b>	<b>95%</b>

<sup>6</sup> Projects that are currently producing more than expected are expected to be able to perform at the same level. This means that this overproduction may compensate for other projects' production gaps.



Figure 14 shows the investment outcome of the full sample of projects (including the two projects producing in 2014 that did not produce for a full year). This graph illustrates that projects currently under construction that experience either ESG or technical issues, are not expected to financially perform satisfactory for FMO.

**Figure 14: Full Sample Investment Outcome Rating per current Production status**



## 5. Main findings and recommendations for further research

The main questions to be answered with this research are: *“How do ex-ante expectations of energy production, jobs supported and GHG avoided of FMO’s energy projects compare to an interim re-assessment of these expectations? How do these indicators correlate with (interim) investment outcomes?”*

To answer this question, the performance of a sample of projects was assessed on two dimensions: firstly, the intermediate realized energy production compared to the ex-ante expectations and secondly, the expected financial investment outcome rating of the projects. As energy projects may have a longer construction period than other projects in FMO’s portfolio, the outcome of this assessment does not reflect a final development result. Instead, this evaluation serves as an intermediate verification of ex-ante expectations. To this end, the long-term forecasts of production expectations have been reassessed based on current developments.

From the assessment of the 16 producing projects in FMO’s portfolio in 2014, it can be concluded that these projects have so far realized 90% of their total expected production. This production supports 87% of the jobs (equivalent of 106.000 jobs) and 82% (equivalent to 314.000 tCO<sub>2</sub>eq) of the GHG avoidance expected for FMO. Producing energy projects in this sample contribute to FMO’s investment outcome as only one project is rated as unsatisfactory on this metric.

Despite the fact that the assessment of the expected development results in terms of energy production compared to the financial outcome encompasses only a selective sample of producing projects, a good performance on production and implied performance on the Impact and Footprint KPIs consistently goes hand in hand with good investment outcomes for FMO. However, outperformance on Impact and Footprint KPIs is not a prerequisite for good interim investment outcomes, as half of the sample produces less than expected but still has a beneficial interim investment outcome.

The reassessment of the long-term production expectations of the full sample in light of new developments since contracting results in a forecast of between 87% and 96% realization of ex ante expected production. Considering the fact that the actual realized production level in 2014 of projects that are already producing is at 90%, which is in the middle of this range, this forecast is considered to be sufficiently conservative. Based on the reassessed production expectations, 84% to 90% of the ex-ante expected jobs and 84% to 95% of the ex-ante expected GHG avoidance would be realized.

In case a significant correlation could be identified between the type of energy project and the structural level of realized production, this information could lead to a correction of the input data on ex-ante production in the FMO Impact model. A hypothetical example could be: solar plants financed by FMO realize in the long term

on average 80% of the ex-ante expected production. However, the sample size of this study is too small and results are too early stage to draw hard conclusions, or even to identify a strong correlation between different types of energy and performance. Therefore, it is too early to use the results of the research in this evaluation to make adjustments in the FMO Impact Model. It is recommended to execute more ex-post research of realized production when more projects in the sample have reached and matured in the production stage.

It is recognized that whilst this sector evaluation contributes to FMO's accountability for its impact claims, the potential for drawing lessons at this stage is limited. To address this gap, it is recommended that a more in depth evaluation is conducted on a limited number of individual energy projects. In light of both the significance of hydro projects being the largest contributor to energy production in the sample of this sector evaluation, as well as considering some of the ESG challenges involved in several projects, a study focusing on a subset of hydro projects is considered a valuable complement to this sector evaluation. This study could assess success factors and determine lessons for internal learning purposes.

