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Guidelines for Credit Procedures Development for Armenian Banks Financing Small Hydro Power Plants

FICHTNER in association with Frankfurt School of Finance & Management Bankakademie | HfB

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FICHTNER

Sarweystrasse 3
70191 Stuttgart ● Germany
Phone: +49 711 8995-0
Fax: +49 711 8995-459

www.fichtner.de

Please contact: **Dr. Patrick Schäfer**
Extension: **410**
E-mail: **Patrick.Schaefer@fichtner.de**

Frankfurt School of
Finance & Management
Bankakademie | HfB

Sonnemannstraße 9-11
60314 Frankfurt ● Germany
Phone: +49 (0) 69 154008 - 0
Fax: +49 (0) 69 154008 - 670

www.frankfurt-school.de

Please contact: **Mkrtich Tadevosyan**
Extension: **353**
E-mail: **M.Tadevosyan@int.fs.de**

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0	15.03.2013	First draft	M. Tadevosyan, B. Sonntag	T. Becker, Dr. P. Schäfer
1				
2				

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Attachments

Abbreviations

ACRA	Armenian Credit Register Agency
CBA	Central Bank of Armenia
CDM	Clean Development Mechanism
COGS	Cost of Goods Sold
DSC	Debt Service Coverage
EIA	Environmental Impact Assessment
FA	Fixed Assets
GAF-RE	German Armenian Fund (Renewable Energy)
IRR	Internal Rate of Return
MW	Megawatt
NPV	Net Present Value
O&M	Operation & Maintenance
PFI	Participating Financial Institution
PMU	Project Management Unit
PSRC	Public Service Regulatory Commission
RA	Republic of Armenia
RE	Renewable Energy
ROA	Return on Assets
ROE	Return on Equity
ROI	Return on Investment
SC	Supervisory Council
SHPP	Small Hydro Power Plant
TA	Total Assets
VAR	Value at Risk
WACC	Weighted Average Cost of Capital

1. Introduction

The guidelines presented in this document should help Participating Financial Institutions (PFIs) to develop or/and respectively improve their credit procedures for loans to Small Hydro Power Plants (SHPPs) – based on Armenian legislation, requirements of Central Bank of Armenia (CBA), and the PFIs existing policies for credit risk management and business practices.

The guidelines will enable PFIs (i.e. Armenian Banks) to adapt to SHPP lending procedures, quantitative and qualitative target criteria, and methods and measures to be integrated into the PFI's management structure. This will allow SHPP project assessment, risk identification and classification, as well as definition of the main terms, general provisions and loan disbursement procedures. The guidelines include the essential statements of questions that should be included in SHPP financing credit procedures adopted for each PFI. If the existing procedures and evaluation tools of some PFIs are already considered appropriate, these guidelines could be used for the enhancement and further improvement of the available procedures.

The **objectives of the guidelines** are the following:

- To help the Armenian Banks develop a set of instructions to follow for proper and sound lending to newly constructed and rehabilitated SHPPs;
- To provide different forms and templates (application, analysis, monitoring), to be modified by each bank to standardise and capture their crucial data;
- To make the banks familiar with tailor-made models for SHPP financial and creditworthiness analysis; both for stand-alone projects as well as consolidated (including affiliated business activities of the borrowers);
- To analyse the financial aspects of the SHPP and set the terms for each individual loan adequate to the risk management policy of the Bank.

SHPP lending procedures should define the framework and compliance requirements for SHPP projects to be financed, including:

- Eligibility criteria;
- Technical and financial screening guidelines;
- Essential documentation to be collected;
- Technical and financial analysis to be performed;
- Sensitivity and risk analysis to be carried out;
- Monitoring and control directions;
- Assessment of collateral sufficiency and pledging specifics;
- Describe all components related to SHPP lending;
- Particular actions of the authorised subdivisions and employees;
- Scope of delegation of authority.

The procedures for SHPP financing should cover the entire credit cycle including approval, disbursement, monitoring, portfolio management and management of non-performing loans.

2. Compliance Requirements

The **eligibility criteria for SHPPs** should include technically verifiable indicators and should cover the organisational, legal, financial and other aspects. One component of these criteria is mandatory requirements set by the Armenian legislation and applied by the regulations of CBA. Another component is defined by the financial institution's strategy and lending risk management policy. In case of lending within specific international donor programmes with pre-defined eligibility criteria (e.g. KfW, EBRD, World Bank, IFC), priority has to be given to those criteria, which can be more restrictive.

Eligibility criteria for applicants within the KfW Programme for the Promotion of Renewable Energy (RE) in Armenia include:

- **Shareholding**: Majority shareholding capital should be held in private hands throughout the project lifespan;
- **Maximum installed capacity**: 10 MW per SHPP project;
- **In case of rehabilitation projects**: Increased energy generation (not necessarily the generating capacity) compared to pre-project generation.
- **Expected operational life time:** 15 years after the project financing for expansion and rehabilitation projects; 30 years after the project financing for newly constructed SHPPs.
- **Expenses within project financing:** All expenses should be related to private ownership.
- **Essential documentation to be submitted (rights, ownership, licenses, permissions, etc.):** Clearly documented rights, ownership and other documents must be submitted to the bank. An example of the required documentation can be found in the list provided in the Attachment 1.
- **Financial and efficiency eligibility criteria:** Including risk exposure limits, financial ratios set in the credit risk management policy, and other related documents – provided they do not contradict the project requirements. An example is provided in Attachment 1, which could be adopted based on the acting risk management policy of the specific Bank.
- **Power Evacuation:** All SHPP plants are expected to be connected to the national grid. Internal load and off-grid projects will not be supported.
- **Plant factor:** The ratio of the average power produced by the SHPP over a year to its installed capacity is ≥ 0.3.
- **Affiliated businesses:** Detailed information may be provided on any affiliated businesses and available incomes that may support SHPP project implementation or serve the loan during the grace period.
- **Other:** Evidence of the justifications on the absence of any significant negative social or environmental impacts as a result of project implementation must be given.

3. SHPP Lending Process

SHPP lending procedures should cover the entire credit cycle, including screening enquiries, followed by application appraisal and credit approval, disbursement, credit monitoring of existing individual loans, their recovery, credit portfolio management and management of non-performing loans. For SHPP project lending it is recommended to form an authorised specialised subdivision, which has technical and financial experts (including hydraulic engineers and other specialists). Like the KfW RE programme, the majority of international programmes funding RE projects also provide technical consultancy services for SHPP project assessments. Various Armenian Banks are outsourcing these assessments either to an individual consultant or a company.

3.1 General screening enquiries

The purpose of screening enquiries is to ensure that, before time and resources are invested in the SHPP project appraisal, only applications of eligible projects and enterprises are considered.

When a potential borrower makes an initial enquiry about the possibility of obtaining credit funding for a SHPP project, the assigned specialist of the FI shall provide the prospective borrower with information regarding loan terms and conditions. This information should summarise at a minimum: the objectives of the credit, details of eligibility criteria, loan terms and conditions, any requested information and the required documentation to be submitted. It is important to ensure that potential borrowers understand that enquiring about eligibility does not in any way commit the FI to granting the loan. In understanding the loan terms and conditions, the prospective borrower wishes to proceed, the FI specialist shall provide guidance on satisfying the eligibility criteria.

If a prospective borrower intends to proceed with a loan application, they shall be interviewed to determine, in general terms, whether the enterprise and the project are eligible for financial assistance. In the case of a positive initial review, the applicant shall be requested to complete an Application Form. A sample application form has been provided in Attachment 2.

Using the authorisation of access to financial information in the Application form, the FI specialist shall make enquiries about the applicants, and any affiliates, credit history from the Armenian Credit Register Agency (ACRA) or/and the Credit Register of CBA (financial and trade reputation).
Where it is not possible to verify whether the eligibility criteria are satisfied, the FI specialist shall advise the prospective borrower what action is necessary to satisfy the criteria. For the correct information and documentation checking, a special checklist could be used. An example is given in Attachment 3.

The continuous verification process requires a series of actions and submissions by both the applicant and the FI specialist to fully complete the

requested documentation and information covered in the Checklist as well as , preferably, a pre-feasibility study. This process is important in the safeguarding of the FI's interests. The Checklist will assist in ensuring that no required documentation is overlooked.
During this step, the prospective borrower and SHPP project should be shortly reviewed for their eligibility and a preliminary assessment of project's technically feasibility and creditworthiness completed.

The enquiries covered this review build towards establishing the prospective borrower's capabilities (technical, financial managerial, etc.); the prospective borrower's ability to provide any equity required and their commitment to succeed and capacity for implementation of the project. This will also identify the existence of other affiliated businesses which will support the successful implementation of the SHPP project, provide the service of loan interest during grace period of loan and the ability to provide satisfactory collateral for the requested loan.

Where information or documentation is not immediately available, the FI specialist should advise the prospective borrower of any additional information required to complete the requested Checklist.

3.2 Technical and financial screening

The technical specialist (the Technical Consultant of the donor programme, the specialist of authorised specialised subdivision in the FI, or an external expert) makes a preliminary technical screening of the company and its proposed project. The technical specialist explains the results of the review and any deficiencies. The applicant (potential borrower) will be invited to prepare and present their SHPP project documents, comprising technical- and economic data. At least the business plan and drawings must be submitted. Drawings shall be submitted as electronic AutoCAD version (CD) as well as a printed version. A further evaluation follows including technical and environmental due diligence reviews. Again the technical specialist will give feedback to the Applicant. After the preliminary analysis of the project documents the financial specialists will analyse the creditworthiness of the project owner, before further technical reviews, assessments and site visits take place.

3.3 Technical due diligence

Any SHPP project that requires financing is subject to a detailed technical assessment. Within the GAF RE programme, any potential borrower first goes through the technical review and assessment procedure, receiving (free) technical assistance from the Technical Consultant for their project layout and engineering, and a cost and energy production estimate. In the period in which KfW finances the Technical Consultant for the Programme, the technical consultancy and assessment are professionally implemented by the Technical Consultant on a free of charge basis for clients and the PFI. Thus PFIs have access to reliable technical information in the form of

appropriate summaries, advised conditions and recommendations to base their lending decisions on.

The technical and environmental due diligence should include (but is not limited to) the following:

- Final eligibility check;
- Technical analysis of the input data, such as geological data, topographical data and hydrological data;
- Technical analysis of the design, such as, project layout, equipment selection, cost estimates, implementation schedules, construction and contracting arrangements, grid connection arrangements (if applicable) and energy estimates;
- Commercial analysis to assess the proposed contractual arrangements, including licensing and permitting, land use, grid connection, off-take, operating and maintenance arrangements etc.;
- Estimation of the greenhouse gas emissions reductions;
- Assessment of operational or management measures that should be implemented by the sponsor to ensure successful implementation and operation of the SHPP project;
- Review of Environmental and Social Impact Assessment;
- Assessment of potential borrower's compliance with national standards for environmental protection as well as health & safety, with recommendations for addressing any areas of non-compliance;
- Confirmation of technical eligibility under specific technical criteria.

The technical evaluation needs to be carried out by a hydropower expert. If such an expert is not available within the bank, an external expert has to be hired.

3.3.1 Review of project basis

Hydrology
A review of all the relevant available hydrological and meteorological data shall be performed. The hydrologic Study needs to present a flow duration curve, on which the design capacity is selected and the energy estimates are calculated. The data used for the study must be on daily basis, in order to provide sufficient reliability of the results. Design floods must be estimated for the construction flood and for the operation of the plant. The sediment characteristics need to be assessed (backed by measurements) and a review should be performed of the design assumptions regarding sediment volume, size, and distribution.

Geology and construction materials
The documentation must include all available information on regional and site geology including surface geological mapping and subsurface investigation data from boreholes, seismic refraction, and test pits. Emphasis shall be placed on the geological conditions and rock mass classifications for the underground works (if this is the case), penstock

supports, intakes, and powerhouse structures. An evaluation of the available sources of construction materials shall be performed.

Seismicity
A review of seismicity at the site and adequacy of seismic design provisions needs to be carried out. An evaluation of the maximum credible earthquake and the maximum ground acceleration adopted for design shall be compared with the adequacy of the design to accommodate loads.

Topography
The topographical maps need to be at a scale of no larger than 1:1000 with contour lines of no more than 1m for the sites of the structures. The quality and plausibility of the topographical data needs to be checked.

3.3.2 Review of project design

Basic design
A review shall be performed of all pertinent reports, drawings, and specifications that are part of the design prepared by the owners' engineer. The Engineer will review the project layout and the location of the main components, taking into consideration intake structures, maximum and minimum water velocities in the conveyance system, lining of conveyance system, hydraulic head losses, water transients, type, specific speed and rotational speed of the turbines specifically for sediment laden water if applicable, setting of the turbine units to prevent cavitations, etc.

Any inadequacies in the basic design shall be identified and recommendations provided for the appropriate corrective action that should be taken, in order to avoid the requirement of changes during the detailed design phase that may lead to cost overruns and construction delays.

Areas that will require special attention during the design review are as follows:

- Reliability of stream flow data;
- Meteorology;
- Design flow;
- Design flood;
- Sedimentation (if any);
- Groundwater;
- Water quality;
- Power plant output rating with respect to hydrology;
- Hydraulic design and stability of headwork;
- Hydraulic design and stability of desander;
- Hydraulic design of waterways;
- Hydro-mechanical equipment;
- Selection of equipment (type and manufacturer);
- Auxiliary Equipment;
- Level of automation;

- Network integration;
- Provisions for monitoring environmental impacts in a manner consistent with relevant project documents;
- Project implementation schedule;
- Power system requirements; and
- Safety of diversion structures and infrastructure.

Cost estimates
Investors may wish to receive more funds than allowed according to the KfW programme's conditions (max. 70% of project). Thus, there is the risk that the investor presents a plan and documents overstating the actual cost. It is the task of the bank specialist to find out whether the presented investment plan and later the purchase documents are correct and reasonable. Overstated cost is also a risk for the value of the collateral pledged to the bank.

In particular, the cost of the following items must be checked:

Civil Works
- Access road;
- Weir or dam;
- Spillway;
- Spillway gate;
- Intake;
- Trash rack and cleaning machine;
- Intake gate;
- Desander with hydro-mechanical works;
- Forebay with hydro-mechanical works;
- Forebay spillway;
- Penstock;
- Tail race channel;
- Power house civil works;
- Power house electrical, sanitary and other installations;
- Sub-station civil work.

Equipment
- Complete generating aggregate (turbine, regulator, generator, control system);
- Inlet valve(s);
- Control cabinet;
- Communication devices;
- Cables/cabling;
- Transformers.

3.3.3 SHPP energy yield forecast

A review of the energy estimates and proposed installed capacity including the number and type of units needs to be performed. This review shall consider:

- flow duration curve;
- net head = gross head - hydraulic losses;
- efficiency of equipment;
- availability of equipment (considering O&M times, which may be different depending on the manufacturer).

The review will include the energy production estimates for different levels of probability that they will exceed estimates, and the determination of the capacity of the project according to the Electricity Law.

3.4 Environmental and social aspects

The environmental and social impacts must be assessed according to the requirements of the Armenian law and other policies, such as The Equator Principles, World Bank's Safeguard Policies, IFC Performance Standards or the Hydropower Sustainability Assessment Protocol.

3.5 Legal due diligence

If required, a legal due diligence needs to be carried out, evaluating issues such as:

- permits;
- licenses;
- concessions;
- agreements;

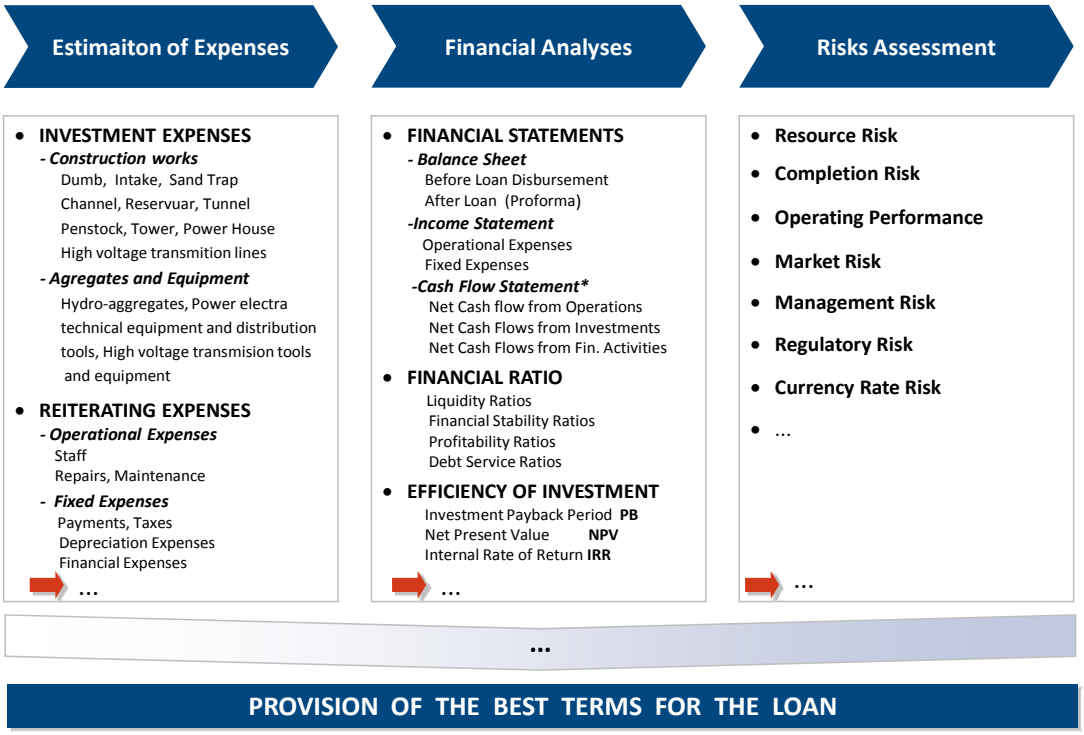
If the corresponding experts are not available within the bank, an external expert needs to be involved.

3.6 Financial analysis

If results from previous analyses are found positive, the financial analysis report should initially be developed for the SHPP as a stand-alone business. In the case of existing affiliate businesses held by SHPP owners, a thorough combined analysis should be provided for all businesses, including SHPP forecasted operation results.

Having positive results from the SHPP financial analyses, the outcomes should be consolidated with the affiliated businesses analysis results of SHPP project owners. The impact of other businesses on the project should also be assessed. The final financial assessment should include the results of all affiliated businesses considered as one whole business, taking into account the positive or negative impact of any other ongoing businesses of SHPP owners.

THE CONCEQUENCES AND SPECIFICS OF SHPP FINANCIAL ANALYSES



3.6.1 Essential initial data for SHPP financial analysis

The minimum initial data for SHPP project financial analyses include the following information:

Data	Source of data	Recommended form to be used	How the requested information is used
Determination of investment capacity of the owner	Observation of partially completed works, existing cash, construction materials, equipment intended to be used in SHPP, analyses of affiliate businesses	Bank's internal methodology and forms	To clarify the funds and define the loan amount.
Monthly timetable for expenses broken down on types of expenses split on funds sources (e.g. own, credit)	From Budget, confirmed by the Technical Consultant	Attachment 4	To define the tranches (period and amount) of funding, grace period, and start of operation
The value of construction, equipment and intangible assets, excluding VAT, and their useful lifetime	Agreements, technical documentation from producer, Proforma of Invoices, etc.		To calculate the depreciation
Production of Electricity by month	Business Plan, confirmed by the Technical Advisers	Attachment 5	To calculate the monthly revenues
Water Source	Business Plan, confirmed by the Technical Advisers		To define the Tariffs and seasonality
Capacity and number of agreggates	Business Plan, confirmed by the Technical Advisers		For determination of main operational expenses (number of staff, maintenance cost, etc.)
Losses of Produced electricity	Business Plan, confirmed by the Technical Advisers		
Operational or recurring expenses: staff number and their wages, maintenance expenses, based on the capacity of SHPP, number of aggregates, location of SHPP.	Decision N275 of PRSC guidelines for SHPP exploitation and maintenance expenses calculation		To be used in Income Statement and Cash flow Statements.
Operational Fixed Expenses: Licence Fee, Land Rental, Property Tax, Land Tax, Profit Tax, etc.	Relative sources		To be used in Income Statement and Cash Flow Statements

3.6.2 Development of financial statements

Based on the projected power capacity and capacity factor, the forecasted Financial Statements for SHPP as a stand alone business should be developed: Income Statement, Cash Flow Statement and Balance Sheet for the whole useful life of SHPP fixed assets on an annual base:

Income statement - The Income Statement will be used to put together the total income of the SHPP received from exported electricity and relative expenses incurred during each year of project, to define the profitability of the project (excluding VAT). In the case of including a Term Sheet signed for the bundled CDM project under validation, additional income from the CDM could be included as an optimistic scenario. SHPP operations differ from other businesses as there are no variable costs (depending on the volume of generation), so special attention should be paid to Operating Expenses (staff remuneration, administrative and general expenses) and other fixed charges (property tax for constructions, insurance, auditing and consulting fees, depreciation expenses, etc.), the main part of which are occurred after commissioning the SHPP. The payment of some Fixed Expenses (licence annual fee, land rental, land tax etc.) should also be incurred during the construction period, when the construction works are ongoing (usually the grace period for loans).

For the development of an Income Statement it is recommended to use Form 6/1 (provided in Attachment 6), which presents the main possible expenses for SHPP operation in Armenia (depending on specific cases some lines may not be requested).

Cash flow statement - SHPP lending procedures must acknowledge that the methods of classical credit analysis are often not sufficient for assessing SHPP projects because they primarily rely on data from the Balance Sheet and Profit and Loss Statements. The appraisal of SHPP projects relies mainly on the Cash Flow analyses, which are extremely important in tracking the solvency of a project over each month, to meet its financial obligations. Even if a project is profitable, a shortage of cash in a short period may cause serious problems. This is why it is strongly recommend to use Cash Flow forecasts on a monthly basis at least for the first year of a project, after starting the exploitation of the SHPP. In Armenia, the payment SHPPs expect for exported electricity during one month is only received at the end of the next month. Therefore, sales revenue in the Income Statement differs from the actual Cash received in the same month. This can be a considerable difference during the seasonal changes of water flows. To perform the Cash Flow forecasts, an in-depth knowledge of cash flow analysis as well as expertise related to SHPP investments are necessary. For the development of a Cash Flow Statement it is recommended to use Form 6/2 (provided in Attachment 6), in which the main possible cash inflows and outflows for SHPP operation in Armenia are presented (depending on specific cases some lines may not be requested).

Balance sheet - the Balance Sheet should be developed for the SHPP before the loan disbursement or before the construction works begin, and should continue for the duration of the project, until after loan funds and other investments are incurred. The Balance Sheet gives information on assets used by the SHPP and on the funds that are related to those assets. Therefore, the analyses should give information at fixed intervals (mainly annually) for the useful life of the SHPP to see how the assets and funds change with the passage of time.
For development of the Balance Sheet it is recommended to use Form 6/3 (provided in Attachment 6), which presents the main assets, liabilities and equity which can change during the life of SHPP (depending on specific cases some lines may not be requested).

3.6.3 Financial viability analysis

On the basis of developed Financial Statements for SHPP financial forecasts, the main financial ratios should be calculated, for which there should be a set of acceptable intervals based on the Lending Risk Management Policy of the PFI. The financial analysis should be carried out in two strands:
1. Stability and creditworthiness analysis;
2. Investment efficiency and viability analysis.

The main financial ratio describing the stability and solvency of project should be based on the following ratios:

Ratio	Description	Based on	Indicates:	Reliable Frames
Liquidity Ratios				
Current Liquidity	Current Assets / Current Liabilities	Balance Sheet	ability to meet current obligations and avoid financial distress	1.1 – 1.5
Quick Ratio	(Current assets – Inventory) / Current liabilities		to meet short-term financial obligations and avoid immediate financial distress	0.8 - 1.1
Stability Ratios[1]				
Independence	Owners Equity / Total Assets	Balance Sheet	ability to avoid financial distress in the long run	0.3 – 0.6
Autonomy	(Owners Equity+Non Current Liability) / Total Assets			0.5 – 0.8
Financial Leverage	Total Liabilities / Owners Equity			2.3 – 0.7
Assets Management Ratios				
Fixed assets turnover	Sales / Net fixed assets	Income Statement; Balance Sheet	ability to manage fixed assets to generate sales	the higher the better
Total Assets turnover	Sales / Total Assets		ability to manage total assets to generate sales	the higher the better
Debt Service Coverage (DSC) Ratios				

[1] The reliable frames of ratios are represented exclusively for SHPPs as a stand alone business. For consolidated financial statements and/or other type of businesses the frames should be set based on PFIs currently operating lending risk management policies.

Ratio	Description	Based on	Indicates:	Reliable Frames
Net DSC (for period)	(Net Cash + [Principal + Interest])/ [Principal + Interest]	Cash Flow Statement	solvency for certain period	0.8 - 1.05
DSC (Cumulative)	Accumulated Cash + [Principal + Interest])/ [Principal + Interest]		Indicates overall Sovency	1.05 - 3.0

Investment efficiency and viability analyses include analysis of Profitability, Payback Period, Net Present Value (NPV), Internal Rate of Return (IRR), Benefit Cost, Energy production cost and based on the following indicators:

Ratio	Description	Based on	Indicates:	Reliable Frames
Profitability Ratio				
Profitability	Net Profit / Sales	Income Statement	Ability to generate profit, or indicates the level of return from sales	The higher the better
Return on Assets (ROA)	Net Profit / Total assets	Income Statement and Balance Sheet	how profitable a company is relative to its total assets	The higher the better
Return on Equity (ROE)	Net Profit / Owners Equity		net income returned as a percentage of equity	The higher the better
Break Even Point Sales	Fixed Expenses / Gross Margin X Sales	Income Statement	the minimum sales to avoid losses	The lower the better
Break Even Point Sales in %	Fixed Expenses / Gross Margin X 100%		the portion of sales to cover all the expenses	The lower the better
Break Even Energy Production	Break Even Point Sales / Tariff		the minimum production of energy to avoid losses	Lower than SHPP's projected production Capacity
Investment Efficiency Indicators				
Payback Period	Invested Amount / Average net Cash flow amount	Cash Flow Statement	The time period required to recover the amount of an investment	The shorter the better
Net Present Value (NPV)	$-C_0 + \sum_{t=1}^{n} \frac{C_t}{(1+r)^t}$	*C_0-initial investment C_n-annual net cash flows r-discount rate t-time periods*	The difference between the present value of cash inflows and the present value of cash outflows	NPV > 0
Internal Rate of Return (IRR)	Discount % where the NPV of yield Income = Investment , or the NPV =0	Cash Flow Statement	The rate of growth the project is expected to generate	The higher the better

For PFIs it is important to analyse the stability and creditworthiness of the project, which will provide repayment of loan within the proposed schedule. This is why the first priority for the first group of analyses include DSC, liquidity, financial stability, solvency, profitability, etc, rather than investment valuating criterions (IRR, NPV, Payback period), which will be taken into account in a comparison of different SHPP projects.

3.7 Sensitivity and risk analysis

3.7.1 Sensitivity analysis

The sensitivity analysis implies the examination of information regarding the relationship between the key parameters of the project and the important financial indicators, showing the parameters which have the greatest impact on the financial indicators. Based on tracking the change of one of the key parameters of financial viability by changing input parameters, (such as electricity production, costs, losses etc.) will provide an understanding of which factor should be paid most attention throughout the life of the project, and which other factors can be balanced if the first one changes unfavourably. The analysis includes a base case scenario and sensitivity analyses showing the impact of variations in the most crucial parameters and assumptions. The main concentration of a PFI's Financial Analyst should be focused on financial indices (debt service coverage, liquidity, solvency, financial stability, etc.), rather than on investment valuating criterions (IRR, NPV, Payback period). If these indicators are within the expected range, then programme approval should take place.

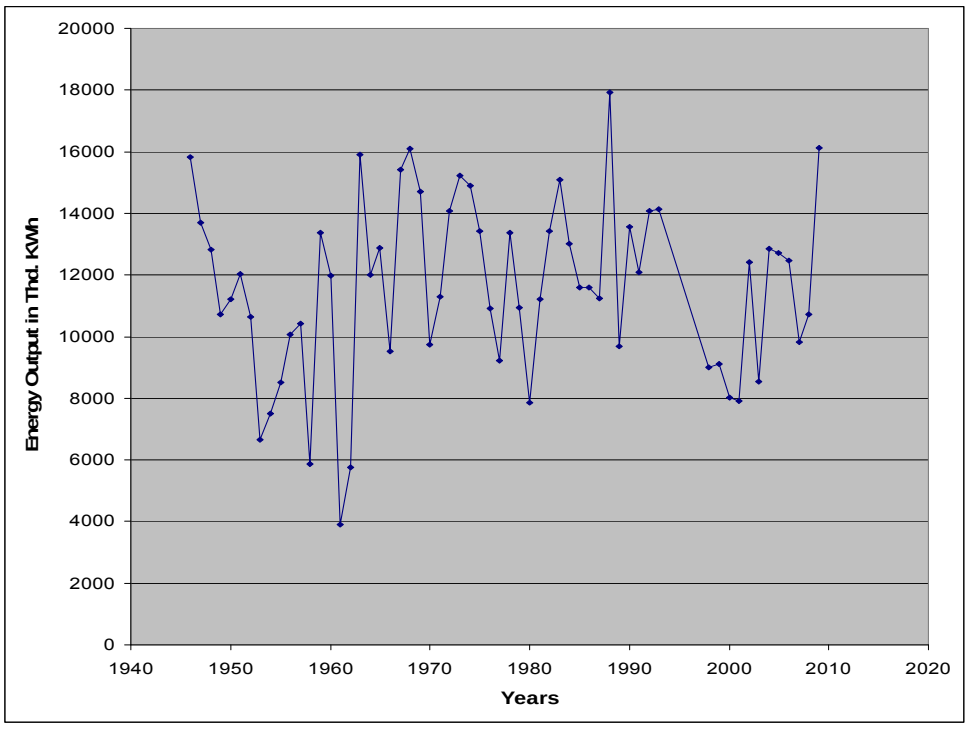
The minimum eligibility criteria should be provided for all scenarios of financial sensitivity analyses of projections. The scenarios should include at least: changes of project cost (up to ±10%), electricity production (up to ±10%), maintenance costs (up to ±10%), energy transfer losses (up to ±5%), wages of staff (up to ±10%). If there are loans in other currencies, also exchange rate changes (up to ±10%).

3.7.2 Value at Risk

Value at Risk (VaR) is a risk measure for portfolio management. The approach is also helpful to get an understanding of the specific energy output risk for a specific SHPP.

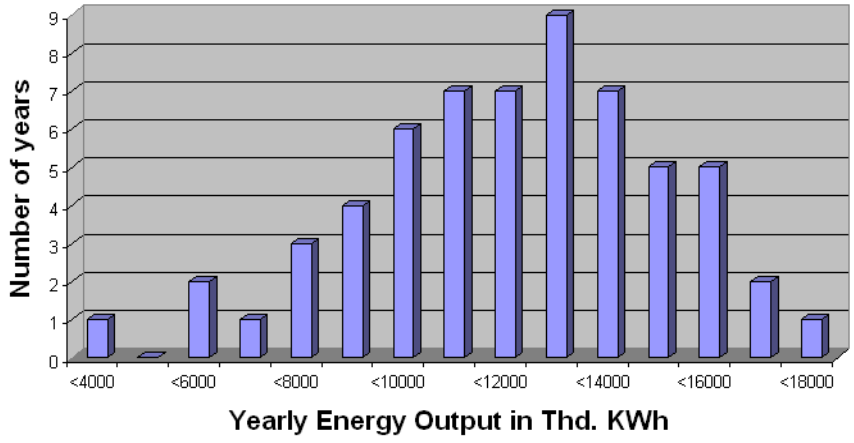
Each SHPP (due to its location) has an individual "hydrology", i.e. the water inflow and the resulting energy output. The energy output can be calculated in different ways and therefore the results may differ. The proper calculation method is calculating the energy output based on the daily water inflow but not based on monthly averages (reason: the inflow on a day can exceed the turbine's capacity and energy output is in reality lower than based on the average).

This empirical hydrology (usually required for 60 years), and with it the energy output, has an individual volatility. This volatility is not reflected in the base case of the financial projections which are based on the average of the yearly energy output. The following illustration shows the historical energy output volatility of a 3-MW-SHPP (with an average energy output of 11.6 Mio KWh):



The distribution of the annual energy output in this individual case is the following:

Distribution:														
Output	Output	Output	Output	Output	Output	Output	Output	Output	Output	Output	Output	Output	Output	Output
<4000	<5000	<6000	<7000	<8000	<9000	<10000	<11000	<12000	<13000	<14000	<15000	<16000	<17000	<18000
1	0	2	1	3	4	6	7	7	9	7	5	5	2	1
1	1	3	4	7	11	17	24	31	40	47	52	57	59	60



The volatility, i.e. the individual risk profile, is reflected and measured with the VaR. For a given probability (common parameters for VaR are 1% and 5% probabilities) VaR is defined as the threshold value such that the probability of the energy output (in our case) is lower with the given probability level. We suggest using the VaR with a confidence level of 95%, i.e. with a probability of 5% that the energy production will be lower than the threshold. We suggest using a time horizon period of 5 years. This is because dry and wet years can compensate each other and the SHPP's finances are under more pressure, so over 5 years the energy output is significantly lower than expected than for one year which could be survived more easily.

How to calculate the VaR_{95} ?
The value could be calculated with the "variance-covariance-model" or the "historical simulation". The "variance-covariance-model" assumes a "normal distribution" of the energy output values. As displayed above, the distribution differs from a normal distribution ("Gaussian bell curve"). Therefore the variance-covariance-model should only be used when not enough historical data is available (95% confidence level = 1.64 times standard deviation).

The following explains how to calculate and use the VaR_{95}:

1. Take the historical values for the yearly energy output of the SHPP (for 60 years);
2. Summarise every 5 years of output (you get 56 figures);
3. Sort the sums in decreasing order;
4. Take out the 3 lowest figures (3/56=5.3%);
5. Use the 4^{th} lowest figure as VaR_{95} (in our example 43.4 Mio KWh);
6. Calculate the average of a 5year energy output (5 * AVG = 5 * 11.6 = 58 Mio KWh);
7. Now we know: In 5% of the 5-year-periods the energy output will be lower than 43.4 Mio KWh or at least 25% below the average (assuming that future will be similar to the past);
8. Use this figure as the input variable for the sensitivity test: Use for the first 5 years of the SHPP's operation a revenue figure of 75% of the average value. The simulated financials are a "negative case" for the situation when the SHPP is facing a dry period at the beginning of its operation.

3.7.3 Risk analysis

The sensitivity analysis will then enable an assessment of the variability of the financial indicator as acceptable or not by looking at the distribution of the possible outcomes. An unacceptable variability will be an indication of a need to put more effort into reducing the uncertainty associated with the input parameters that were identified as having the greatest impact on the financial indicator.

The Risk Analysis will include the important areas which are potentially likely for a SHPP project during its establishment and/or implementation (resource risk, completion risk, operating performance, management risk, regulatory risk, etc.).

The analysis will allow for a proper judgement of associated risk. As the benefit is dependent on the incremental cash flow of an investment, it is crucial to identify the basis for this cash flow as well. Following are the main sources of risks that can be identified in this context:

Risk Factor	Mitigation
Cost overruns in the construction/installation phase	To be checked: ▪ the reasonability of budget; ▪ ability of Investors to fund the overruns. ▪ Contracts with service provider on a fixed-fee basis.
Production Capacity	To be checked: ▪ water resources, ▪ available historical daily discharge values – the longer the better. ▪ Accuracy of calculations and design.
Technical performance of the efficiency measure	Use only proven technology with tested applications
Fluctuations in usage	Adequate projection techniques and business forecasts
Maintenance	Contract with a third party for maintenance services. Existence of minimum equipment and tools for first necessity repairs
Fluctuation in energy tariffs	Should not be a concern in Armenia, at least for the next 15 years, as energy prices are most likely to increase, making investments more profitable
Foreign exchange risk	Use sensitivity analyses, currency rate forecasts. Despite GAF-RE provides funding in Local Currency, there are other programmes in Armenia which are funding SHPPs in foreign currencies.
Warranty risks	Warranty Contracts
Affiliate businesses impact	When a sustained, strong affiliate business supports the SHPP project, a weak one can harm and in some cases destruct viable SHPP projects. To secure the negative impact of affiliated businesses, special consolidated financial analyses should be provided.

4. Methodology of financial analysis

The Financial Analysis could be successfully conducted when the essential initial data from technical assessment (see 3.6.1) is in place. Most of the PFIs do not have a special approach for SHPP project analysis, and use either appraisal models developed under other donor programmes (and not necessarily related to project finance, but rather SME finance), or regular

forms normally used for creditworthiness assessment of common commercial loan applications. In order to enhance the capacity of PFIs to assess the loan applications and to monitor and manage risks efficiently, a special tailor-made analytical mode is developed for SHPP financial analysis.

4.1 Excel-based model for financial analysis

Taking into consideration the specifics of SHPP projects, an MS Excel-based tool has been developed in order to enable PFIs to assess economic returns and associated risks. Screen shots of the model are presented in Attachments 7 to 13.

The developed model includes particular sections where the loan officer can insert the essential data related to legal status, shareholders, affiliates, availability of required documents, etc. See Attachment 7.

The second section is related to information on the project, where the following information should be inserted: the purpose of the loan, type and capacity of SHPP, projected number of aggregates, programme start and end dates, projected budget broken down into types of expenses on a monthly basis, etc. See Attachment 8.

The third section is reserved for the following information: existing and to be purchased assets, production of electricity on a monthly basis, investment amount, equity conditions and loan terms, requested staff, maintenance and other expenses (part of which are calculated automatically), etc. See Attachment 9.

Most of the information is selected from a drop-down list, making the model more user-friendly. Additional parameters are selected by the model itself, on the basis of initial data (e.g. the number of administrative and technical employees, depending on applied number of aggregates, their capacity, region, accessibility of roads based on norms set by PSRC, etc.).

Based on all the main initial parameters inserted into the model (such as: existing assets and liabilities, project cost, project life, equity and loan amounts, loan interest rate, term, taxes, depreciation, inflation rate, discount rate, loan repayment scheme etc.) the model will calculate the annual income on a monthly basis (based on power capacity and capacity factor), electricity exported to grid (based on electricity export tariff etc), and will produce the annual financial statements: Income and Cash flow Statements and Balance Sheet.

In doing so, the financials would be displayed on a monthly basis for the first 3 years, during the grace period (max. 2 years), and at least 1 year of SHPP operation. This ensures the consideration of seasonal changes in production and hence the financial situation (see Attachment 10).

On the findings of the data, the next step of the model is to complete the financial viability analysis. This analysis is facilitated though the use of the project's: liquidity, profitability, solvency, efficiency, Internal Rate of Return (IRR), Payback Period, Net Present Value (NPV) etc. The user can mobilise each financial statement, financial indices, and ratios in either local currency, USD or EUR (see Attachments 11/1 – 11/4). The calculated financial indices for the main scenario are compared against the set limitations and information given on the reliability, viability, and creditworthiness of the project (see Attachment 12/1). Using the same sheet, the loan officer can conduct sensitivity analyses mentioned above in section 3.7 for a vast variety of scenarios.

The model has constructed limitations: thresholds for each ratio, based on sound SHPP financing and operation practices, and the fulfilment of thresholds will give positive output. In case of exceeding the model's limitations, the relative indicators will give a warning on the risks of the project (see Attachment 12/2). An unacceptable variability indicates the need to reduce the uncertainty associated with the input parameters (that were identified as having the greatest impact on the financial indicator). This feature could be used for defining critical thresholds and – based on these thresholds – taking steps towards risk mitigation.

4.2 Consolidated analysis of SHPP forecasted financials with existing affiliated businesses

The owners of a SHPP often have other affiliated businesses, the impact of which also should be taken into account during the financial analysis. A weakly performing affiliated business can harm and – in the worst case – jeopardise viable SHPP projects. This is why a consolidated analysis of SHPP forecasted financials – including existing affiliated businesses – should be conducted.
This feature is also foreseen in the developed model. After the viability and creditworthiness of a SHPP project has been provided, the consolidated financial analysis should be completed. The initial data for each affiliated business should be inserted, including the credit history, current loans, assets and liabilities, historical data on all affiliated businesses, etc. (see Attachment 13/1). Based on the submission of initial information, the model will develop loan schedules for up to 15 ongoing credits and 8 different simultaneous businesses. The consolidated financial statements and related analyses should be used as basis for the final decision on project financing (see Attachment 13/2).

5. Assessment Report

Technical and financial assessment reports have to be prepared for loan approval of the bank's Credit Committee. Under the GAF RE programme, the assessment of the SHPP's civil works and financials is carried out by the SHPP Consultant (producing an Assessment Report). In general, the Assessment Report should include the following information:

INTRODUCTION

1.1 Short description
1.2 Main characteristics

TECHNICAL ASSESSMENT

2.1 Available data
2.2 Assessment of hydrology
2.3 Assessment of ecological flow
2.4 Assessment of power and energy production
2.5 Assessment of the civil and hydraulic structures
  2.5.1 Assessment of weir/dam
  2.5.2 Assessment of intake, sand trap, pressure chamber, fishpass
  2.5.3 Assessment of penstock
  2.5.4 Assessment of powerhouse and tailrace
2.6 Assessment of the electromechanical equipment
  2.6.1 Assessment of turbine
  2.6.2 Assessment of generator
  2.6.3 Switchyard
  2.6.4 Transmission line
2.7 Assessment of the project cost and implementation schedule
2.8 Conclusions of technical assessment / conditions
  2.8.1 Design
  2.8.2 Equipment
  2.8.3 Constructions
  2.8.4 Environment

FINANCIAL ANALYSIS

3.1 Main limitations and assumptions
3.2 Analysis of financial statements and indices
  3.2.1 Income statement
  3.2.2 Cash flow statement
  3.2.3 Balance sheet
  3.2.4 The main financial indices and ratios
3.3 Financial viability analysis
3.4 Sensitivity and risk analysis
3.5 Consolidation of SHPP financial analysis including affiliated businesses
  3.5.1 Loan parameters and debt service
  3.5.2 Profitability indicators
3.6. Conclusions of Financial Assessment

SUMMARY OF ASSESSMENT

6. Specifics of SHPP Collateral Pledging

In order to provide the security of a loan for SHPP financing, any valuable asset belonging to the applicant's or its affiliate company could be acknowledged as well as any property of shareholders, based on the pledging procedures of the FI. In this way, in the case of insolvency of the borrower, the bank can take possession of the assets, sell them and use the proceeds to repay the loan.
It is strongly recommended to pledge as collaterals the assets of the SHPP where the loan funds should be directed. Loans provided for SHPP are mainly disbursed in several tranches, each of which increases the value of pledged collateral – thus increasing security for the next portion of loan to be disbursed. Prior to each disbursement, the value of pledged assets should be evaluated by an independent evaluator.

The peculiarity of pledging the fixed assets of the SHPP results from the Armenian law on energetic (article 27); the ownership of a fixed asset can be transferred to a third person only by prior consent of PSRC. This is why it is strongly recommended to get prior permission from PSRC before pledging any SHPP assets.

It is not mandatory to register the pledge of equipment in Armenia. However, recent changes to the national legal framework have enabled the registration of rights to pledge equipment. Despite this, there is no possibility to restrict the future disposal of the pledged movable property by the owner, which renders the act to a formal step; registration is advisable due to the priority achieved by registration over unregistered and unsecured creditors.

7. SHPP Credit Disbursement

7.1 Approval, registration and disbursement

Credit approval should be conducted based on the acting procedures of the bank. If the bank does not have a specialist in SHPP analysis, technical experts should be consulted for the assessment and – if necessary – might be invited to participate in the credit committee.

According to international best credit practices, the disbursement of the loan should start only after the borrower has invested the equity forecast according to the investment and finance plan (under the KfW programme, equity is supposed to be at least 30% of the project amount). This ensures the borrower's commitment to the project, as well as safeguarding the value of the collateral and minimising the credit risk.

However, in fact, Armenian banks do not always follow this principle. It is quite common that the equity is paid into the project step by step – and in parallel with the loan funds. The borrowers have gotten used to this practice. They often generate cash in other businesses, which they plan to immediately invest in the SHPP. Obviously, problems in these other businesses can lead to delays in the SHPP construction schedule. A more

appropriate approach would be to first accumulate cash from other businesses, and start construction after enough equity is collected. In any case, it should be in the interest of the partner bank to encourage the investor to invest at least 10% of the overall project cost before the loan disbursements.

7.2 Credit refinancing

The following steps are required to secure GAF refinancing SHPP loans:

- Submit a written application (including loan package and repayment schedule in electronic form);

- Approval by GAF (requires that sub-loan is in line with eligibility criteria and the positive assessment by the consultant (if still available);

  There should be positive assessments for new loans, but also a positive monitoring assessment in case of a new tranche. For the latter, GAF will disburse loans only after the investor has made the parallel investment (30:70, or preferably starting with a higher share). In case the loan is approved in tranches, the PFI should present a preliminary schedule to GAF.

- Sign appendixes 1 and 3 to the Loan Agreement between CBA and PFI (containing amount, due date, interest rate and time schedule for repayment of the loan);

- PFI will receive the loan from GAF (usually within 2 banking days).

Within the framework of the GAF Programme, it is not allowed to refinance SHPP projects from other financial institutions or lending programmes. For further details please see the loan agreement between CBA and the PFI.

8. Project Monitoring

The purpose of monitoring is to regularly inspect and control the project progress, and hence to analyse information and formulate options (for dealing with identified or anticipated problems), thus to:

- ensure the successful project implementation, high quality and achievement of programme results;
- control the use of loan funds and assure the appropriate quality of performed works;
- confirm that funds released have been applied for the project purpose, and according to the SHPP's business plan and appraisal report.
- assure that the projected cash flows are soundly based
- check regularly the ongoing performance against pre-determined goals, conditions and standards.

Limited professional and management skills on the part of the borrower are a common issue of SHPP lending in Armenia. This is why the monitoring of SHPP projects should have not only have a controlling component, but also include supervision and mentoring, which will provide direction and assistance to investors and their engineers in all aspects of performed activities. Thus the supervision will:

- ensure that the SHPP construction and related financing is implemented as planned;
- provide the entrepreneur with guidance in the financial management of the business;
- improve the borrower's business skills, i.e. assisting the borrower in evaluating the past performance and planning future activities.

8.1 On-Site monitoring

On-site monitoring should be performed on a regular basis to ensure that the loan funds have been properly allocated to the planned purposes, and that project revenues meet the projected financial statements and ratios in the required frames.

8.1.1 Initial site visit

The initial site visit to the SHPP should be carried out by an assigned specialist (e.g. an external expert) to verify the scope and nature of the infrastructural work required under the SHPP's business plan. This includes an assessment of current status and efficiency of construction and maintenance activities as well as applied equipment and procedures. The specialist should also inspect the plant's security, fire control and safety installation. If necessary, it also includes an environmental due diligence.

This visit will help to verify the existence of Balance Sheet assets, to check for assets not shown on the Balance Sheet, to check existing equipment, to assess the age efficiency and state of maintenance of existing buildings and SHPP equipment, to examine business management information systems, to look at the debtors position and verify the overdue amount, to compare current levels of debtors with year end figures, to understand and assess the business management structure and determine the specific responsibilities of senior management, to assess the relative levels of personnel and finally to form a view of the management team, in order to assess communications links.

Based on received documentation and information received from the initial site visit, the specialist verifies the project eligibility for funding. The role of the specialist is to support the PFIs in setting up and streamlining appropriate procedures which allow the PFI to base their decision – whether or not to finance the SHPP – on objective and verifiable criteria. As the PFI is the ultimate credit risk taker, each bank has its own policy to make a final decision related to extending or rejecting the loan. The initial site visit should verify the technical feasibility of the project (both new construction

and rehabilitation), and assess the investment budget and annual periodic operational costs as submitted by the investor to the PFI. Based on this financial analysis the PFI specialist can verify the financial parameters, annual income, financial statements, and financial viability – in order to assess the financial viability of the project.

8.1.2 Site-visit after each portion of loan disbursement

To make sure that loan funds are only used for the purpose intended, and to limit the possibility for the diversion of funds to other activities, a subsequent site visit should be performed after each portion of loan disbursement to check the use of previous funds appropriate allocation.

Before on site supervisory visits, the PFI's monitoring specialist / loan officer should request a signed and sealed reference of expenses within the received funds, conducted by the owner/manager of SHPP with attached copies of all related documents (agreements with sellers or service providers, invoices, payment orders, receipts, assets entry documents into the Balance Sheet of the company, etc.). An evaluation of the documents (agreements) and owners/managers of the SHPP should be conducted to confirm the planned duration of equipment delivery and installation, the project's construction progress and other works to be completed within the framework of the received tranche.

The monitoring specialist / loan officer should also i) check the existence of equipment and their adequacy as laid out in the documentation, ii) make measures of volumes of construction works done and compare the calculated amounts with the budget for the current portion, as submitted by the owners/managers, before receiving the tranche. In case of cash payments, the monitoring specialist should also check the existence of procured assets, and request a list of wages paid in cash (including signatures of workers and employees).

In addition, during the site visit, the monitoring specialist / loan officer (if necessary together with technical advisers) should verify the following:

- Upon receipt of all shipped sampling equipment, parts and supplies, an inspection of equipment and accessories for completeness and/or damage. If a shortage or damage is found, immediately notify the GAF-RE Project Manager, and assist the SHPP Owner to apply to the equipment vendor to repair or replace damaged equipment or missing supplies;
- If all the works are completed: monitor and report the amount of energy produced by each turbine;
- Check if the installed capacity is still the same. The technology implemented in the project activity is the same proposed in the project as stated;
- Comparison between the actual produced energy for the monitoring period with the original estimates;

- Cross check the amount of electricity sales receipts obtained from the grid operator;
- Review budgets, annual plans, power contracts, standing operating procedures, power reviews.

8.1.3 Unscheduled site-visits

Scheduled site visits are convenient for monitoring specialists and SHPPs Owners. However, they may not be entirely representative of the actual situation, as they allow management to prepare the site, to ensure that the view presented to the visiting loan officers and consultants is satisfactory.

At random intervals, the monitoring specialists should take the opportunity to perform unannounced site visits. These visits should not be particularly long or extensive unless the visit reveals indications that there is a need to enquire more deeply into certain aspects of the business.

During the unscheduled site visits, the monitoring specialists on a random basis with all above mentioned examinations, should make a comparison with the earlier visit with regard to:

- Correction of previously identified remarks, mistakes and problems / breaches of loan conditions / covenants etc.;
- the project's construction progress;
- existence of equipment and vehicles;
- non-production personnel;
- environmental compliance;
- water flow and availability;
- energy produced (if SHPP is operational);
- production;
- Maintenance, etc.

8.1.4 Commissioning Visit

The purpose of a Commissioning visit is to ensure that the SHPP is set up and running to its projected optimum performance from day one, ensuring long term efficiency, safety and longevity.

8.1.5 Final Supervision Visit

When the loan has been fully paid, a final supervision visit should be made. The purpose of this visit is to assess the borrower's need for further assistance and to prepare a final evaluation report of the business and loan performance – to determine whether future support can be provided. If the evaluation is positive, portfolio considerations allow for, and the borrower is interested and eligible to obtain a further loan, the Credit Officer should advise the borrower to continue cooperation with the PFI.

8.2 Monitoring reports

During each monitoring procedure, it is recommended that a special form is used to record monitoring remarks. A sample can be found in Attachment 14. This provides an opportunity for the bank/specialist to declare their observed remarks for each part of the SHPP on-site. The document should summarise the main issues and remarks discussed during the site visit. It is suggested that the completed form is signed by the Owner and the observer while still on–site, for further use by both parties – by the owner to state that he is informed and agrees to correct the remarks and by the observer for following up on findings in the monitoring report (along with other findings). The copy of the document should be provided to the owner/s.

After each site visit, a special monitoring report should be prepared. The monitoring report should express the purpose of monitoring, and for each part of SHPP the quality of completed works, potential technical risks, design deviation, works invoiced and amount outstanding, and the actual and requested progress of project. An example can be found in Attachment 15.

During each of the next monitoring visits, starting from the second visit, a full evaluation of the correction of remarks and shortcomings stated in the previous monitoring report must be checked. In case significant errors or oversights are found (or deviation from the initial design) any further financing could be delayed until their correction. In some cases, the amount needed to correct the oversights could be deducted from the next tranche disbursement with the purpose of its reimbursement after fulfilment of remarks and shortages.

8.3 Controlling repayment schedule and debt service

Through subsequent loan supervision, the Credit Officer should control the repayment of the loan principal and the accumulated interest. Loan supervision should be proactive, aiming to identify potential business problems which will affect loan repayment performance, and to assist the borrower in avoiding or solving such problems. Proactive supervision is the primary means of avoiding a default once a loan has been disbursed. It is among the most important activities of the Credit Officer. In case of concerns, or having doubt or uncertainty in future debt service, a remedial supervision visit should be made, to avoid any future problems. The Credit Officer should review the variations that have occurred from the Business Plan. Almost all SHPP financing plans differ from actuality in Armenia. The key to a successful diagnosis of the business problems is the ability to identify characteristics which may significantly affect the business (making it unviable) and those which affect the business but have only a marginal effect on profitability. The borrower’s attention has to be drawn to these issues immediately.

The outcome of the remedial supervision always should be a set of recommendations for action. These may include: actions by the borrower to rectify the situation; possible change in loan status; recommendations as to whether or not the loan terms and conditions need to be reviewed.

It is not desirable to vary loan terms and conditions. However, PFIs need to respond to any unforeseen situations described in section 10 of this document (reasons for non-performing loans).

Therefore, there must be a mechanism for investigating variation proposals and for recommending and approving such changes. The variation investigations will be conducted in the same manner as an appraisal. An appropriate financial analysis should take place to replace the forecasted figures with actual figures as given in the financial model. Recommendations will be made by the investigator/s (see section 10.2). Where appropriate, a revised schedule of loan purpose, repayment strategies and supporting documentation (including pictures) should be attached to the recommendation. It is advisable to discuss all proposed variations with the borrower, prior to presenting recommendations. With the exception of the initiation and suspension of legal proceedings, the borrower should be required to sign a contract variation with the bank, so it is important to obtain agreement in advance if possible.

Approval of recommendations to vary loan terms and conditions may only be given by the PFI's Credit Committee. The Credit Officer making the recommendation must attend the variation meeting and will be expected to answer any questions that may be raised regarding the proposed variations.

If the recommendation is approved, the borrower should be advised of the variation in writing. The advice will set out any conditions the Credit Committee has attached (such as payment of all outstanding arrears of interest before rescheduling can be implemented, etc.). The Loan Contract Variation must give the full revised wording of each clause in the Loan Contract which has been modified. If the schedules are varied, these should also be prepared and initialled by both parties to the Agreement.

If a variation is declined, the Credit Officer must determine whether a remedial plan can be devised within the existing terms and conditions of the loan or whether it will be necessary to recommend foreclosure.

9. SHPP Credit Portfolio Management

The portfolio of SHPP loans has specific cluster risks. Cluster risks are risks which have an impact on the whole portfolio, and not only on individual loans. In the case of SHPP finance, the performance of this sector portfolio depends significantly on political decisions and weather conditions.

The energy tariff is the main profitability driver during the operational phase of the SHPP – a driver which usually cannot be influenced by the investor. The tariff is set by the PSRC, based on the following formula:

$$T = T_1 \left[K_1 \frac{PI}{100} + K_2 \frac{ER_1}{ER_2} + (1 - K_1 - K_2) \right]$$

According to this formula, the tariff is based on the purchasing power. The formula can be revised by the Armenian legislative body. Thus, the revenue of all SHPP borrowers and the portfolio's performance are dependent on political decisions. A hypothetical decision to – for instance – concentrate on nuclear power could lead to easing support for hydropower. Therefore, political developments on energy should be followed by the relevant banks.

Another political risk comes from the ecological impact of the SHPP. A SHPP can possibly have a strong negative impact on the fauna and flora. For instance, trees have to be cut, natural landscapes become construction sites, waste is possibly left around the plant, the fish population could suffer, less water could available at some points of the river basins etc. SHPP project developers sometimes have influence on political decisions and the execution of laws. KfW strongly supports the protection of Armenian fauna and flora, and will under no circumstance get involved in any form of corruption related to SHPP construction, rehabilitation and operation. Therefore PFIs should put a strong focus on ecological aspects. Besides checking loan application, business plan and other relevant documents, PFIs are encouraged to monitor the ecological impacts themselves (and together with the investor, respectively). It is furthermore recommended to inform the investor at the earliest possible stage that KfW puts great emphasis on environmental aspects.

Beside political risks, another cluster risk (similarly to agricultural finance) is that the portfolio performance is correlated to the weather. In case of dry year(s), the volume of energy produced by the SHPP decreases – and along with it the revenue of the project.

The degree of the shortfall depends on the individual parameters of the SHPP. To give an idea of the significance of this risk: according to experience and calculations made during the KfW/GAF RE project, within a five year time horizon, the energy production could fall easily by 25% (the probability of this shortfall is around 5% VaR, with a significance level of 95%). Although potential losses from weather changes depend highly on individual locations: this example illustrates that the change of weather conditions is highly relevant for the cash flow projection of SHPPs – and has to be considered for updates of the financial model. Simply basing cash flow projections on average weather/water values is not sufficient to assess the project's financial risk.

10. Non-Performing Loans

10.1 Reasons

For individual borrowers of SHPP loans, non-performing loans usually arise for the following reasons:

- Delays in construction or in obtaining aggregates from suppliers.

Like in other construction areas, the construction of a SHPP is often fraught with unexpected problems. Investors often develop such project for the first time. In practice, there are also often delays in delivering required aggregates, or delivery of defective aggregates. These delays (until the project becomes operational) can be attributed to technical reasons. In case the loan schedule is too tight (energy production is expected too early), there is a risk that the debt service cannot be achieved.

- The borrower's inability to make the previously agreed equity contribution.

The owners of a SHPP might have difficulties in their affiliated businesses and may have a shortfall to make the necessary injection of equity in a timely manner (and as agreed during the loan approval process).

- Underestimation of construction cost.

During the planning stage, cost items may sometimes be miscalculated. A well-known example is that geographical conditions are not reflected properly in the investment plan (e. g. road construction through rocky territory instead of sandy territory).

- The energy output is overestimated.

The calculation of the energy output is based on several assumptions and averages (e.g. water supply, equipment efficiency, energy transport losses). The reality, though, can deviate from the assumptions, and revenues may be lower than the projections (or higher, depending on what is considered a financial risk) – even when all assumptions are correct. The assumptions (especially water supply) are based on historic averages. This may lead to inaccurate assumptions because a) past events do not necessarily accurately predict future events and b) an average can be calculated using a lower energy output at the beginning and a higher output in following years. This would anyway lead to financial problems in the earlier years.

It is also possible, that the assumptions are incorrect. A SHPP is a complex system. The efficiency of the equipment may be lower than estimated. It may also come to unexpected failures resulting in several days without production.

10.2 Measures

What can the bank do in case of construction delays and/or underestimation of construction costs?[2] The continuation of the project, i. e. finalising the construction, would minimise the losses. However, the remaining losses (considering the overall project) could be distributed according to the following alternatives:

a) The investor can cover the negative cash flow of the project from other sources. They take all losses, but do not fall into insolvency. This alternative has to be analysed by the financing bank based on all sources of the borrower's income.

A restructuring of the loan (e.g. time extension) could decrease the yearly negative cash flow balance (although not increasing the project's profitability). This effect depends on the interest rate of the restructured loan (long-term rates from the bank's own sources are a precarious subject due to interest rate risk and lack of hedging means).

b) The investor is not able or willing to cover the negative cash flow of the project from other sources. In this case, for outstanding loans, the bank has the following alternatives:

ba) Reducing the debt service for the borrower by decreasing interest, writing off principal, or a combination of both;

bb) Encouraging the investor to sell the SHPP;

bc) Seizure of the project and further exploitation in form of sale or operation in the bank's interest.

Banks are recommended to mobilise other income sources of the investor (alternative a). This option could also include granting an additional loan under consideration of good credit risk management (additional collateral etc.). This is also valid for the case of overestimated revenues during the operation of the SHPP.

If there are no other sources of income, yet the investor seems capable and reliable, reducing the debt service and/or writing off the principle (alternative ba) is recommended in order to reduce the banks losses. Only if the investor seems incapable to manage the SHPP, the bank should encourage the investor to sell the plant (alternative bb) in order to – at least partly – cover the debt service. The enforcement of the collateral (bc) is considered as the most difficult and expensive way for the bank.

[2] It is assumed that the need for additional funds only becomes obvious at a later stage of the project.

11. Attachments

All forms and sheets provided in the following Attachments are subject for consideration and could be used for further enhancement, improvement and adaptation – based on acting risk management policies, relevant procedures and lending practice of individual PFIs.

Attachment 1: Selection Criteria based on Financial Analysis

Selection Criteria based on Financial Analysis

The main financial compliance requirements for project eligibility are as follows:

- Ability of applicant to provide at least 30% of the envisaged investment costs from its own resources, as the net leverage ratio (only related to the SHPP) should not exceed 70/30.
- Stable financial statements for the project, during the whole duration of the loan with an adequate liquidity ratio (both: current and quick liquidities > 1).
- Solvency of the SHPP within the produced electricity (excluding other incomes). The project should provide future income streams which enable the proper operation and maintenance of the plant plus provisions for depreciation in addition to proper debt services. The project should provide servicing of loan (principal and interest) having at least 5-10% reserves, i.e. DSC ratio should be 1.05 – 1.1 during the entire period of loan existence. Within seasonal difficulties, the net monthly DSC could be decreased till 0.8, but the accumulated cash should provide the above mentioned compliance.
- The profitability ratio should always be positive and the preference will be given to borrowers which have higher ROA and ROE within the SHPP (excluding other affiliate activities).
- The future revenues of produced electricity within the project must fully cover loan relevant to set schedule with maximum interest rates: 10.5%, maximum duration 12 years, including a possible grace period of maximum 2 years.
- The minimum number of O&M costs should include all the required expenses and their adequate amounts set by the Armenian Public Service Regulatory Committee (based on capacity of SHPP and number of aggregates).
- The minimum criteria set above are acting for all scenarios of financial sensitivity analyses of projections, which should include at least changes of: project cost (up to ±10%), electricity production (up to ±10%), maintenance cost (up to ±10%), losses (up to ±5%), wages of staff (up to ±10%).
- During the financial analysis, along with the technical indicators, preferences will be given to borrowers which have:
  - sufficient income from other sources for SHPP project and lower leverage ratio;
  - shorter grace and maturity period;
  - higher solvency ratio;
  - higher profitability ratio;
  - higher efficiency indicators.

The Consultant will first of all conduct financial analyses and compare the detected indices related only to the SHPP operation (excluding the affiliate activities). As a first priority, financial indices will be covered (debt service coverage, liquidity, solvency, financial stability), rather than investment valuating criterions (IRR, NPV, Payback period).

Attachment 2: Loan Application Questionnaire (sample)

Form of Application Questionnaire

Programme for the Promotion of Renewable Energies:

Please fill in this application questionnaire and submit to _____ Bank
which will guarantee the quickest way to get your application reviewed.

After receiving the application questionnaire, the Bank will send you a confirmation and review the application. If your project is eligible, you will be contacted for the next steps, which may require a visit to your company and the collection of more detailed information.

SHPP Name

_____

Company name _____

Address _____

Internet domain _____

Contact person

Name _____

Telephone _____

Email _____

Person responsible for technical information (Technical Director or similar)

Name _____

Telephone _____

Email _____

Company Profile:

Private ownership % _____

Public ownership % _____

Year of foundation: _____

Sector of operation and main products (Describe main activities of the Company):

_____

_____

_____

Number of Employees: _____

Total turnover (in 1,000 AMD)

2011 _____

2012 _____

Total assets (in 1,000 AMD)

2011 _____

2012 _____

Description of Proposed Project:

(a) Narrative description:

Please provide a brief description of your project with relevant technical data and information on technology, type and supplier of equipment, capacity / size, location, etc.

Project Location:

_____

__

Select the source of water:

drinking water: ☐ , irrigation water: ☐ , natural flows: ☐

Enter the name of water source (river / tunnel, other):

_____

_____

Information on Program[3]

Description of SHPP main Information	For existing SHPPs	Indices after Program	
		Rehabilitation	New Construction
Date of construction (only for rehabilitation)			
Duration of project - *months*			
Capacity: - *kWt*			
Annual Production of electricity - *thous. kWt h*.			

(b) Summary of Technical Data

Start of construction (planned date)		
Start of operation (planned date)		
Installed capacity (MW)		
Annual generation (MWh)		
Type of plant (run of river; storage)		
Is the existing hydrological data daily / monthly?		
Hydrology measuring period (start date / end date)		
Design discharge (m^3/s)		
Length / diameter of penstock (m / mm)		
Gross/net head (meter)		
Distance to interconnection grid (km):		
Voltage level of overhead line to interconnection point (kV)		
Is the water discharge constrained by irrigation or water supply purposes? (yes/no)		

Please provide description and drawings of Layout Planning and Design (as attachment), if available.

(c) Status of project development

Question	Yes	No
The project is still in its conceptual phase (we have only a project idea)?		
Technical design has started?		
Technical design is completed?		
Quotations / proposals from equipment suppliers have been received?		

[3] For a new construction complete only the last column, for rehabilitation programme complete only the second and the third columns (ignore the last column)

Project Costs and Financing

(a) Investment budget

Total project investment costs estimate	Foreign Costs (Euro)	Local Costs (AMD)	Total Costs (AMD)
Site installation / access road			
Civil / waterways and powerhouse			
Machinery and equipment			
Hydraulic steel structures			
Electro-mechanical equipment			
Interconnection and transmission system			
Engineering construction supervision			
Land			
Project development			
Financial charges (e.g. interest during construction)			
TOTAL:			

Give breakdown, if available; alternatively give only total investment cost.

(b) Operation and maintenance costs

Operation and maintenance costs	AMD / year
Staff	
Maintenance and consumables	
Land lease	
Royalties / water charges	
Taxes	
Other	
TOTAL (per year)	

(c) Target capital structure (apart from GAF-RE loan)

Developer's Equity (share in %)	
Developer's subordinated loans (share in %)	
Commercial loan (share in %)	
Currency of commercial loan	
Interest rate on commercial loan (%)	
Maturity of commercial loan (years)	

Note: a minimum of 30% of own financing contribution is compulsory.

Information on Environmental Impact Assessment (EIA)

Has EIA been completed? (yes/no)	
Has it observed any adverse environmental impacts? If yes, describe them shortly (on separate sheet).	
What are possible mitigation measures of adverse environmental impacts, if any?	
If EIA is not available, when will it be completed?	

Herewith I/we apply for the inclusion into the RE SHPP Financing Programme. I am aware that our project will be reviewed after submission of all requested economical and technical project data according to the list of required documents.

I certify the authenticity of information as of the date of submission:

Date: ……

Signature: ..... Seal

Name: ……

Position: …….

If you are not sure whether your project is eligible or in case you have additional questions please contact the_____; phone: _____

Attachment 3: Checklist of Received Documents

Checklist of received documents

Name of SHPP _____

No	Name of document	Received	Comments	Checked Appropriateness	Comments/remarks
	Land privatization certificate				
1	Headworks	☐		☐	
2	Penstock	☐		☐	
3	Powerhouse	☐		☐	
4	All certficates in place	☐		☐	
	Information about the SHPP Company / Owner				
5	Certificate of state registration of legal entity	☐		☐	
6	Director's registration protocol	☐		☐	
7	Taxpayer identification number	☐		☐	
8	Charter	☐		☐	
9	Water use permission	☐		☐	
10	SHPP construction license	☐		☐	
11	Power Purchase Agreement (PPA) (only for SHPP rehabilitation)	☐		☐	
12	Report on Environmental Impacts	☐		☐	
13	Report of the examination for the project	☐		☐	
14	Topographic survey report	☐		☐	
15	Geotechnical study report	☐		☐	
16	Hydrological study report	☐		☐	
	Data from the relevant hydrometrical station from the Hydrometerological Center				
17	Daily discharge values	☐		☐	
18	Information on water use for irrigation & drinking water from catchment area	☐		☐	
19	Environmental impact assessment report	☐		☐	
20	Energy yield forecast (energy production calculation)	☐		☐	
21	Detailed drawings (hard copy and digital version (AutoCAD or other versions))	☐		☐	

22	Detailed project description of layout and civil structures	☐		☐	
23	Detailed project description electrical and mechanical equipment	☐		☐	
24	Detailed Cost Estimation (updated version)	☐		☐	
25	Implementation Schedule	☐		☐	
26	Business plan	☐		☐	
27	Photos concerning site and other structures	☐		☐	
28	Technical specifications of equipment	☐		☐	
29	Purchase agreement for equipment	☐		☐	
30	Purchase agreement for penstock	☐		☐	
31	Technical details of the connection with the high-voltage network.	☐		☐	

Additional Documents

N	Name of document	Received	Comments	Checked	Comments/remarks
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					

Other

Date: …… Signature:.....

Name: ……

Position: ..……

Attachments 4/5: Timetables for Expenses and Produced Electricity (sample)

4: Sample of monthly timetable for expenses in 1000 AMD, broken down on types of expenses split on funds sources

Description	Source of Funding	Implemented Expenses					Planned Expenses									Total:	
		Apr-201..	May-201..	Jun-201..	Jul-201..	Aug-201..	Sep-201..	Oct-201..	Nov-201..	Dec-201..	Jan-201..	Feb-201..	Mar-201..	Apr-201..	May-201..		
Headworks	Own Investment	-	-	-	15,000	15,000	15,000	15,000	-	12,150	-	12,150	12,150	-	24,299	120,748	217,944
	Loan	-	-	-	-	-	-	24,299	24,299	-	24,299	-	-	24,299	-	97,196	
Power house	Own Investment	-	-	-	-	-	22,243	24,299	-	-	-	-	-	-	-	46,542	143,738
	Loan	-	-	-	-	-	-	-	24,299	-	24,299	-	24,299	-	24,299	97,196	
Pipeline procurement	Own Investment	-	-	-	-	-	-	-	-	-	-	-	-	-	-		1,020,561
	Loan	-	-	-	-	-	242,991	170,093	100,841	-	-	263,645	242,991	-	-	1,020,561	
Pipeline installation	Own Investment	-	-	-	-	-	-	-	12,150	-	12,150	-	24,299	-	-	48,598	48,598
	Loan	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Turbines	Own Investment	-	-	-	-	-	-	24,299	-	26,729	-	-	-	-	-	51,028	221,121
	Loan	-	-	-	-	-	-	-	72,897	-	24,299	24,299	24,299	-	24,299	170,093	
Generators	Own Investment	-	-	-	-	-	-	24,299	-	-	-	-	-	-	21,869	46,168	264,860
	Loan	-	-	-	-	-	-	109,346	-	-	24,299	-	24,299	-	60,748	218,692	
Transformer and other electric equipment	Own Investment	-	-	-	-	-	-	-	12,150	-	12,150	-	-	-	-	24,299	60,748
	Loan	-	-	-	-	-	-	-	-	36,449	-	-	-	-	-	36,449	
High voltage transformation line	Own Investment	-	-	-	-	-	-	-	12,150	-	-	12,150	12,150	-	36,449	72,897	72,897
	Loan	-	-	-	-	-	-	-	-	-	-	-	-	-	-		
Switchyard	Own Investment	-	-	-	-	-	-	-	-	-	-	-	-	-	-		109,346
	Loan	-	-	-	-	-	-	-	-	-	-	-	48,598	-	60,748	109,346	
Excavation and Earth filling	Own Investment		10,000	15,000	25,000	36,000	59,794	-	24,299	24,299	-	-	-	-	12,150	206,542	279,439
	Loan	-	-	-	-	-	-	-	-	-	-	24,299	24,299	24,299	-	72,897	
Design development, licenses, permissions…	Own Investment	48,598	-	-	-	-	-	-	12,150	-	-	-	-	-	-	60,748	60,748
	Loan	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
Other expenses	Own Investment	100,000	-	-	-	-	-	-	-	-	-	-	-	-	-	100,000	100,000
	Loan																
Total:	Loan+Investment	148,598	10,000	15,000	40,000	51,000	340,028	391,636	295,234	99,626	121,495	336,542	437,383	48,598	264,860	2,600,000	2,600,000

Total Project Cost:	**2,600,000**
Total Own Investment:	780,000
Total Requested Loan:	1,820,000

5: Production of Electricity by month

The Average Perennial Monthly Production of Electricity in million KWh

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Σ
0.341	0.326	0.85	1.952	1.98	1.401	0.806	0.493	0.454	0.551	0.593	0.441	**10.189**

Attachments 6: Recommended Financial Statement Forms

6/1: Income Statement

INCOME STATEMENT in thousand AMD)	0	1	2	3	4	5	6	7	8	9	…	…	30
Revenue from Sale of Electricity to ENA (net of VAT)													
Revenue from Sale of Electricity to ENA													
Income from CDM													
TOTAL REVENUE FROM OPERATIONS													
Operating expenses													
Operating and Maintenance Expenses													
Employee Remuneration													
Subtotal operating expenses													
Administration & General Expenses													
TOTAL OPERATING EXPENSES													
Profit before fixed charges (EBITDA)													
Fixed Charges for the Period													
Depreciation & Amortisation													
Depreciation of PP&E													
Amortisation of Intangible Assets													
Subtotal Depreciation and Amortisation													
Finance Charges													
Interest payment (OE-EB)													
Subtotal Finance Charges													
Taxes and Insurance													
Land Tax													
Property Tax													
Insurance of PP&E													
Subtotal Taxes and Insurance													
Audit and Consulting Fees													
External Auditor's Fee													
Technical Supervision Consultant's Fee													
Architectural ,Design & Engineering Expenses													
Subtotal Audit and Consulting Costs													
Total Fixed Charges for the Period													
PROFIT BEFORE PROFIT TAXATION													
Profit Tax													
PROFIT FOR THE PERIOD													
Dividend Payout													
RETAINED EARNINGS													

6/2: Cash Flow Statement

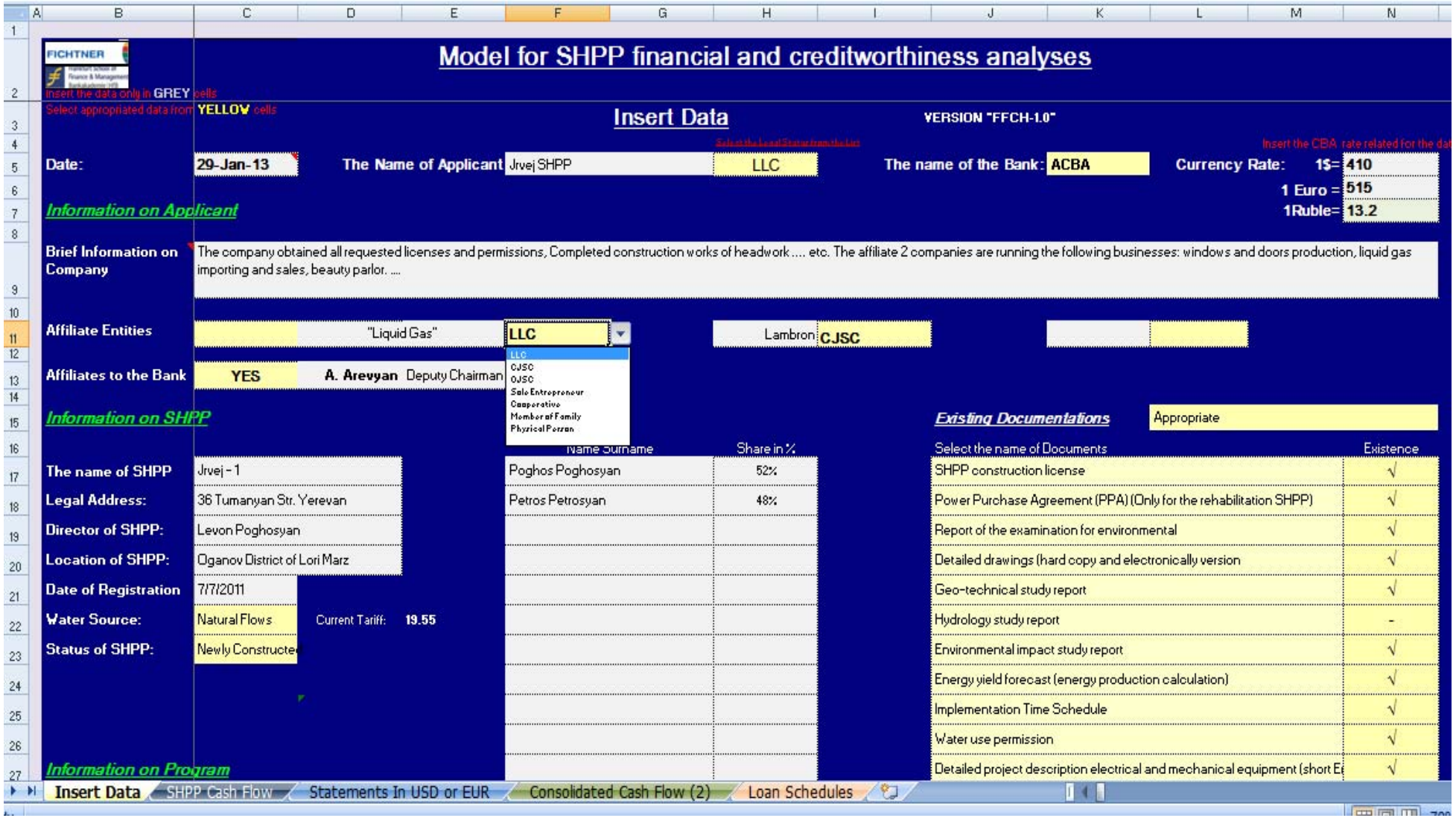
Cash Flow Statement (in thousand AMD)	0	1	2	3	4	5	6	7	8	9	…	30
Operating Cash Inflows, including												
Cash Inflow from Sale of Energy												
Cash Inflow from CDM												
Other Cash Inflow												
PSRC's Bank Pledge received												
Total Operating Cash Inflows												
Operating Cash Outflows; including												
Operating and Maintenance Expenses												
Employee Remuneration												
Subtotal operating expenses												
Administration & General Expenses												
Total Operating Cash Outflows												
Other Operating Cash Outflows												
Cash Outflow on Finance Charges												
Interest payment												
Subtotal Finance Charges												
Cash Outflow on Taxes and Insurance												
VAT paid												
Profit Tax paid												
Land Tax												
Property Tax												
Insurance of PP&E												
Subtotal Taxes and Insurance												
Cash outflow on PSRC Compliance												
PSRC's License payment												
Subtotal PSRC Compliance												
Cash outflow on Audit and Consulting												
Audit fees paid to the external auditor												
Consulting fees for technical supervision												
Architectural, Design & Engineering fees paid												
Subtotal Audit and Consulting fees												
Total Other Operating Cash Outflows												
CASH FROM OPERATIONS												
Cash Inflow from investing activities												
Cash inflow from sale of PP&E												
Cash Outflow from investing activities												
Cash Outflow for construction												
Cash Outflow for land acquisition												
CASH FROM INVESTING ACTIVITIES												
Cash inflow from financing activities												
Long-term loan proceeds received												
Issue of new shares												
Short-term borrowings proceeds												
Cash outflow from financing												
Repayment of long-term loan												
Repayment of short-term borrowings												
Dividends paid												
CASH FROM FINANCING ACTIVITIES												
Change in Cash												
Cash at the Beginning of the Period												
Cash at the End of the Period												

6/3: Balance Sheet

BALANCE SHEET	0	1	2	3	4	5	6	7	8	9	…	…	30
PP&E													
Construction in Progress													
Property, plant and equipment:													
Less: Accumulated depreciation													
Net Property, plant and equipment													
Land													
Subtotal PP&E													
Intangible Assets													
PSRC License:													
Less: Accumulated Amortisation													
Net Intangible Assets													
Subtotal Intangible Assets													
Other Non-Current Assets													
Deferred VAT													
PSRC's Bank Pledge													
Subtotal Other Non-Current Assets													
NON-CURRENT ASSETS													
Supplies Materials													
Cash and cash equivalents													
CURRENT ASSETS													
TOTAL ASSETS	-	-	-	-	-	-	-	-	-	-	-	-	-
NON-CURRENT LIABILITIES													
Long-term debt													
Total Non-Current Liabilities													
CURRENT LIABILITIES													
VAT Payable													
Property Tax Payable													
Insurance Payable													
Current portion of long-term debt													
Profit Tax Payable													
Total Current Liabilities													
TOTAL LIABILITIES													
SHAREHOLDER'S EQUITY													
Share capital													
Cumulative retained earnings													
Total Shareholder's Equity													
TOTAL LIABILITIES AND EQUITY	-	-	-	-	-	-	-	-	-	-	-	-	-

Attachment 7: Financial Model – Applicant Information

Section of model for completion of initial data related to legal status of the Applicant



Attachment 8: Financial Model – Project Information

Model for SHPP financial and creditworthiness analyses

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Insert the data only in GREY cells

Information on Program

Projected Capacity	3.33	MW	**The length of road to the SHPP**	15	km
Projected Agregates Numbe	4	<<Insert the number of Agregates	**Mountainous, snowy region**	YES	
Capacity of 1 Agragate	0.83	MW			
The Type of SHPP	Diversion				

Loan Purpose: The purpose of loan is to complete the construction works and procure the equipment ....

Projected budget: - **Please insert the Budget of Expenses Brocken down on time schedule (should be requested from applicant)**

Program Starting Date: 15-Jul-13 OK

Construction Works

Construction and/or reconstruction works and implementation Schedule:

Calendar Plan: the requested amounts for works and materials to be purchased, broken down on months of Project

Description of works and materials to be purchased	Total	Fulfilled	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14
Earthworks	205,030,000	40,260,000	28,990,000	28,140,000	-	19,570,000	19,570,000	-	19,570,000	19,570,000	9,570,000	9,790,000	5,000,000
Headwork	175,530,000	12,080,000	12,080,000	12,080,000	31,640,000	19,570,000	9,790,000	19,570,000	9,790,000	9,790,000	19,570,000	9,570,000	7,000,000
Power House	115,760,000	-	-	17,910,000	19,570,000	19,570,000	-	19,570,000	-	19,570,000	-	19,570,000	-
Penstock	587,454,082	-	-	65,620,000	120,940,000	81,190,000	-	-	130,650,000	189,054,082	-	-	-
Transportation of Pipes	39,150,000	-	-	-	-	9,790,000	-	9,790,000	-	19,570,000	-	-	-
Transmission Line	58,620,000	-	-	-	-	9,690,000	-	-	9,790,000	9,790,000	-	-	-
[illegible]	88,040,000	-	-	-	-	-	-	-	-	39,130,000	-	-	-
Design, Licenses, Permissions, documentation	50,720,000	39,130,000	-	-	-	9,090,000	-	-	-	-	-	-	-
Contingency Expenses	67,430,000	2,560,000	610,000	11,290,000	9,410,000	7,490,000	490,000	2,450,000	11,600,000	14,680,000	980,000	5,870,000	-
Total construction and renovation works:	**1,387,734,082**	**94,030,000**	**41,680,000**	**135,040,000**	**181,560,000**	**175,960,000**	**29,850,000**	**51,380,000**	**181,400,000**	**321,154,082**	**30,120,000**	**44,800,000**	**12,000,000**

Equipment to be purchased

			1	2	3	4	5	6	7	8	9	10	11
Name	Total:	**Completed**	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14
Turbines	178,051,887					19,570,000	58,690,000	21,520,000	19,570,000	19,570,000	19,570,000		
Generators	213,250,416					107,600,000	-	-	19,570,000	-	19,570,000		
Transformers and other Equipment	48,930,000					-	9,790,000	29,350,000	9,790,000	-	-		
Other Contingency Expenses	22,033,615					6,360,000	3,430,000	2,550,000	2,450,000	980,000	1,960,000		
Total Equipment to be purchased:	**462,265,918**	-	-	-	-	**133,530,000**	**71,910,000**	**53,420,000**	**51,380,000**	**20,550,000**	**41,100,000**	-	-
Total Project Cost:	**1,850,000,000**												

Attachment 9: Financial Model – Assets, Costs & Produced Electricity

Model for SHPP financial and creditworthiness analyses

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Insert the data only in GREY cells

EXISTING AND PROJECTED FIXED ASSETS

Constructions and Equipments	Cost to be Depreciated	
Dumb (concrete)	69,413,310	0.09%
Dumb (Soil)		0.09%
Intake, Outlet		0.09%
Sand Trap, aqueduct (concrete), Ducts		0.09%
Channel, Pressure Pond		0.09%
Tunnel		0.09%
Penstock and Search tang concrete tower		0.22%
Penstock and Search tang metallic tower	905,973,535	0.42%
Power House	136,589,732	0.14%
Hydro-aggregates and other Equipment	303,866,937	1.35%
Power and Elect. Technical Equipment and Distribution tools	64,156,486	3.63%
Other Electro technical Equipment		3.13%
Total Construction and Equipment	**1,480,000,000**	

OK

PROJECT COST:

Name	Amount (AMD)	
Constructions, Buildings:	1,387,734,082	
Equipment, Mechanisms:	462,265,918	
Total Project Cost:	**1,850,000,000**	
Investment of Owners:	600,000,000	32%
Duration of Project in Months	12	Month
Requested Loan:	1,250,000,000	68%
Annual Rate of Loan %	10.50%	
Grace Period of Loan	15	Month
Maturity of Loan in Years	12	Year
Loan Repayment of Schedule Type	Annuity Repayment	

Property to be Depreciated	Cost	Useful life in years
Cost of Depreciated Constructions	1,111,976,577	30
Cost of Depreciated Equipment	368,023,423	30

STAFF:

Position	Number of Employees	Average Month. Salary	Total Salaries	Soc.Sec. Employer pays
Administrative Staff	4	100,000	400,000	76,000
Production Staff	5	75,000	375,000	76,250
Other			-	-
Other			-	-

Taxes, Fixed Payments

Payment for Land Rental	140,000
Land Tax	60,000
Property Tax	120,000
Annual Payment for License	100,000
Losses of Electricity in %	5%

Maintenance and other Admin Expenses

Constructions, Buildings	338,232	AMD/Month
Equipment, Mechanisms	341,850	AMD/Month
Other Expenses	1,125	AMD/Month

Produced Electricity	Aug-14	Sep-14	Oct-14	Nov-14	Dec-14	Jan-15	Feb-15	Mar-15	Apr-15	May-15	Jun-15	Jul-15	Total: Year
Produced Electricity by months in Mln. KWt. H	1.60	1.40	1.10	1.00	1.60	1.80	2.00	3.33	3.33	3.32	2.00	1.7	24.2

Attachment 10: Financial Model – CF Forecast and Seasonality Changes

Cash Flow Forecasts with ability to display monthly seasonality of energy production for the first 3 years

To display on monthly bases

Microsoft Excel - Comleted Model GAF-RE Fin.Analyses English version

Cash Inflows	Total I Year	13 7 Jul-14	14 8 Aug-14	15 9 Sep-14	16 10 Oct-14	17 11 Nov-14	18 12 Dec-14	19 1 Jan-15	20 2 Feb-15	21 3 Mar-15	22 4 Apr-15	23 5 May-15	24 6 Jun-15	Total II Year	III Year
Produced Electricity in Mln. KWt		1.60000	1.400	1.10	1.00	1.60	1.80	2.00	3.33	3.33	3.32	2.00	1.70	24	24.18
The Minimum requested Cash	78,794,650		22,817,226	41,337,052	40,647,197	44,985,319	62,695,641	72,339,782	98,704,903	154,371,735	198,714,986	254,758,948	281,384,070		288,799,511
The Value of Produced Electricity		31,280,000	27,370,000	21,505,000	19,550,000	31,280,000	35,190,000	39,100,000	65,101,500	65,101,500	64,906,000	39,100,000	33,235,000	472,719,000	472,719,000
The Losses of Electricity		(1,564,000)	(1,368,500)	(1,075,250)	(977,500)	(1,564,000)	(1,759,500)	(1,955,000)	(3,255,075)	(3,255,075)	(3,245,300)	(1,955,000)	(1,661,750)	23,635,950	23,635,950
From Electricity Sold		29,716,000	26,001,500	20,429,750	18,572,500	29,716,000	33,430,500	37,145,000	61,846,425	61,846,425	61,660,700	37,145,000	31,573,250	449,083,050	449,083,050
Received VAT		5,943,200	5,200,300	4,085,950	3,714,500	5,943,200	6,686,100	7,429,000	12,369,285	12,369,285	12,332,140	7,429,000	6,314,650	89,816,610	89,816,610
CDM Sold															
Total Cash Inflow From Electricity															
Received Receivables															
Total Cash Inflow from Operation		35,659,200	31,201,800	24,515,700	22,287,000	35,659,200	40,116,600	44,574,000	74,215,710	74,215,710	73,992,840	44,574,000	37,887,900	538,899,660	538,899,660
Cash Outflows															
Administrative Staff		400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	400,000	4,800,000	4,800,000
Production Staff		375,000	375,000	375,000	375,000	375,000	375,000	375,000	375,000	375,000	375,000	375,000	375,000	4,500,000	4,500,000
Soc.Sec. Employer pays		152,250	152,250	152,250	152,250	152,250	152,250	152,250	152,250	152,250	152,250	152,250	152,250	1,827,000	1,827,000
Other Expenses		1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	1,125	13,500	13,500
Construction Maintenance and Services		338,232	338,232	338,232	338,232	338,232	338,232	338,232	338,232	338,232	338,232	338,232	338,232	4,058,786	4,058,786
Equipment Maintenance and Services		341,850	341,850	341,850	341,850	341,850	341,850	341,850	341,850	341,850	341,850	341,850	341,850	4,102,204	4,102,204
Property Tax	120,000	60,000						60,000						120,000	120,000
Payment for Land Rental	140,000	70,000						70,000						140,000	140,000
Land Tax	60,000	30,000						30,000						60,000	60,000
Annual Payment for License	100,000							100,000						100,000	100,000
Paid VAT for Maintenance and Services		136,017	136,017	136,017	136,017	136,017	136,017	136,017	136,017	136,017	136,017	136,017	136,017	1,632,198	1,632,198
Paid VAT for Sold Electricity															
Profit Tax				12,523,581			12,523,581			12,523,581			12,523,581	50,094,325	51,464,169
Total Cash Outflow for Operation	420,000	1,904,474	1,744,474	14,268,055	1,744,474	1,744,474	14,268,055	2,004,474	1,744,474	14,268,055	1,744,474	1,744,474	14,268,055	71,448,013	72,817,857
Net Cash From Operations	420,000	33,754,726	29,457,326	10,247,645	20,542,526	33,914,726	25,848,545	42,569,526	72,471,236	59,947,655	72,248,366	42,829,526	23,619,845	467,451,647	466,081,803
CASH FLOWS from INVESTING ACTIVITIES															
Construction, Reconstruction Works	1,387,734,082														
Equipment Purchase	462,265,918														
Transportation Purchase															
Other Intangible Assets															
Fixed Assets Sold															
Net Cash Flow from Investing Activities	1,850,000,000														
CASH FLOWS FROM FINANCIAL ACTIVITIES															
Cash Inflow from Investment	600,000,000														
Loan Received for SHPP	1,250,000,000														
Other Loans, Credits															
Repayment of Other Loans															
Other Loans Interests Payment															
SHPP Loan Principal Repayment					5,266,904	5,312,989	5,359,478	5,406,374	5,453,679	5,501,399	5,549,536	5,598,095	5,647,078	43,095,532	71,745,468
SHPP Loan Interest Payment	78,374,650	10,937,500	10,937,500	10,937,500	10,937,500	10,891,415	10,844,926	10,798,030	10,750,725	10,703,005	10,654,868	10,606,309	10,557,326	129,556,604	122,707,380
Dividends Received															
Net Cash Flow from Fin. Activities	1,771,625,350	10,937,500	10,937,500	10,937,500	16,204,404	16,204,404	16,204,404	16,204,404	16,204,404	16,204,404	16,204,404	16,204,404	16,204,404	178,652,136	194,452,849

Insert Data | SHPP Cash Flow | Statements In USD or EUR | Consolidated Cash Flow (2) | Loan Schedules

Attachment 11: Financial Model – Financial Indices and Ratios

11/1. Supplied tools financial information indication

	A	B	C	D	E	F	G	H	I	J
1	Select the currency to see the Statements in 1000 >>		AMD	FINANCIAL STATEMENTS AND MAIN FINANCIAL INDICES - Jrvej SHPP						
2	Select the Statement Below:	CF	EUR / USD / AMD	IS	BS	FIN .INDICES	FIN. RATIO	SENSITIVITY	BACK TO TOP	OK
3										
4	OPERATIONS YEARS			2	3	4	5	6	7	8
5	PROGRAM YEARS	1	2	3	4	5	6	7	8	9

11/2. Requested Cash Flow forecast expressed in EUR

B2 fx CF

	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U
1	Select the currency to see the Statements in 1000 >>		EUR	FINANCIAL STATEMENTS AND MAIN FINANCIAL INDICES - Jrvej SHPP																	
2	Select the Statement Below:	CF		IS	BS	FIN .INDICES	FIN. RATIO	SENSITIVITY	BACK TO TOP	OK											
4	OPERATIONS YEARS		1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
5	PROGRAM YEARS	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
6	CASH FLOWS FORECASTS in EUR																				
7	CASH INFLOWS FROM OPERATION																				
8	From Sold Electricity	-	872,006	872,006	872,006	872,006	872,006	872,006	872,006	872,006	872,006	872,006	872,006	872,006	872,006	872,006	872,006	872,006	872,006	872,006	872,006
9	Received VAT	-	174,401	174,401	174,401	174,401	174,401	174,401	174,401	174,401	174,401	174,401	174,401	174,401	174,401	174,401	174,401	174,401	174,401	174,401	174,401
10	*Cash Inflows from CDM*	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
11	*Requested Initial Minimum Amount*	152,999	-																		
12	**Total Cash Inflow from Operation**	**152,999**	**1,046,407**	**1,046,407**	**1,046,407**	**1,046,407**	**1,046,407**	**1,046,407**	**1,046,407**	**1,046,407**	**1,046,407**	**1,046,407**	**1,046,407**	**1,046,407**	**1,046,407**	**1,046,407**	**1,046,407**	**1,046,407**	**1,046,407**	**1,046,407**	**1,046,407**	**1,0**
13	CASH OUTFLOWS FOR OPERATION																				
14	Administrative Staff	-	9,320	9,320	9,320	9,320	9,320	9,320	9,320	9,320	9,320	9,320	9,320	9,320	9,320	9,320	9,320	9,320	9,320	9,320	9,320
15	Production Staff	-	8,738	8,738	8,738	8,738	8,738	8,738	8,738	8,738	8,738	8,738	8,738	8,738	8,738	8,738	8,738	8,738	8,738	8,738	8,738
16	Soc.Sec. Employer pays	-	3,548	3,548	3,548	3,548	3,548	3,548	3,548	3,548	3,548	3,548	3,548	3,548	3,548	3,548	3,548	3,548	3,548	3,548	3,548
17	Other Expenses	-	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26	26
18	Construction Maintenance and Services	-	7,881	7,881	7,881	7,881	7,881	7,881	7,881	7,881	7,881	7,881	7,881	7,881	7,881	7,881	7,881	7,881	7,881	7,881	7,881
19	Equipment Maintenance and Services	-	7,965	7,965	7,965	7,965	7,965	7,965	7,965	7,965	7,965	7,965	7,965	7,965	7,965	7,965	7,965	7,965	7,965	7,965	7,965
20	Property Tax	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233	233
21	Payment for Land Rental	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272	272
22	Land Tax	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117	117
23	Annual Payment for License	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194	194
24	Paid VAT for Maintenance and Services	-	3,169	3,169	3,169	3,169	3,169	3,169	3,169	3,169	3,169	3,169	3,169	3,169	3,169	3,169	3,169	3,169	3,169	3,169	3,169
25	Paid VAT for Sold Electricity	-	-	-	-	-	137,713	171,232	171,232	171,232	171,232	171,232	171,232	171,232	171,232	171,232	171,232	171,232	171,232	171,232	171,232
26	Profit Tax	-	97,271	99,930	103,001	106,410	110,194	114,396	119,061	124,240	129,989	136,372	143,459	147,584	147,584	147,584	147,584	147,584	147,584	147,584	147,584
27	**Total Cash Outflow for Operation**	**$16**	**138,734**	**141,394**	**144,464**	**147,873**	**289,371**	**327,091**	**331,756**	**336,935**	**342,684**	**349,067**	**356,154**	**360,279**	**360,279**	**360,279**	**360,279**	**360,279**	**360,279**	**360,279**	**360,279**
28	NET CASH FLOWS FROM OPERATING ACTIVITI	152,184	907,673	905,013	901,943	898,534	757,036	719,316	714,651	709,472	703,723	697,340	690,253	686,128	686,128	686,128	686,128	686,128	686,128	686,128	686,128
29	CASH FLOWS from INVESTING ACTIVITIES																				
30	From Fixed Assets Sold	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
31	Cash Outflow from investing activities																				
32	Construction, Reconstruction Works	(2,694,629)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
33	Equipment Purchase	(897,604)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
34	NET CASH FLOWS FROM INVESTING ACTIVITI	(3,592,233)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
35	CASH FLOWS FROM FINANCIAL ACTIVITIES																				
36	Cash Inflow from Investment	1,165,049	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
37	Loan Received for SHPP	2,427,184	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Insert Data | SHPP Cash Flow | Statements In USD or EUR | Consolidated Cash Flow (2) | Loan Schedules

Ready 70%

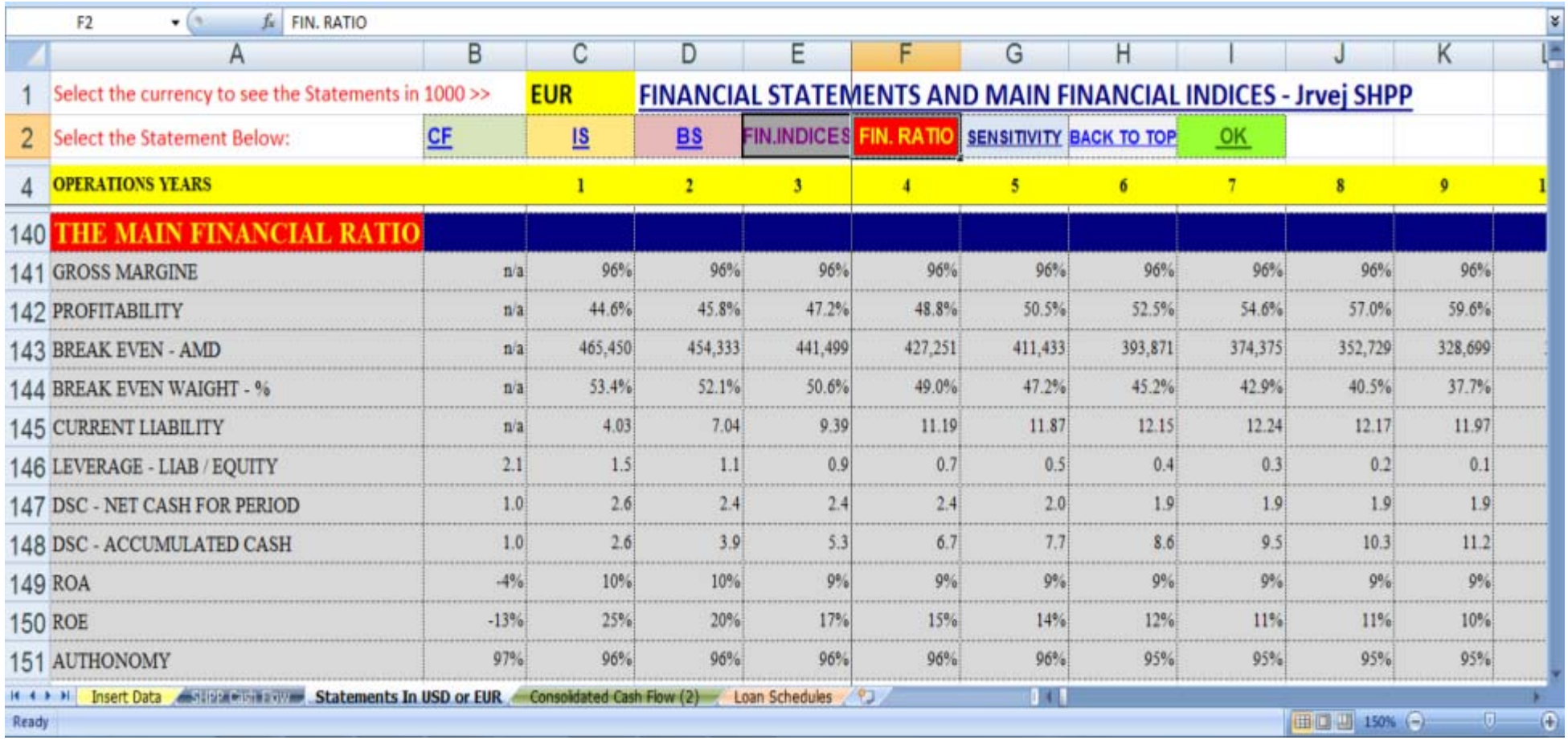
11/3. Requested Main Financial Indices in USD

C1 fx USD

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Select the currency to see the Statements in 1000 >>		USD			NANCIAL STATEMENTS AND MAIN FINANCIAL INDICES - Jrvej SHPP							
2	Select the Statement Below:		CF		IS	BS	FIN .INDICES	FIN. RATIO	SENSITIVITY	BACK TO TOP	OK		
4	OPERATIONS YEARS			1	2	3	4	5	6	7	8	9	10	11
116	THE MAIN FINANCIAL INDICES	1	2	3	4	5	6	7	8	9	10	11	12
117	INCOME STATEMENT	in 1000USD											
118	TOTAL SALES	-	1,095,325	1,095,325	1,095,325	1,095,325	1,095,325	1,095,325	1,095,325	1,095,325	1,095,325	1,095,325	1,095,325
119	Direct costs		(47,077)	(47,077)	(47,077)	(47,077)	(47,077)	(47,077)	(47,077)	(47,077)	(47,077)	(47,077)	(47,077)
120	Gross Margin	-	1,048,248	1,048,248	1,048,248	1,048,248	1,048,248	1,048,248	1,048,248	1,048,248	1,048,248	1,048,248	1,048,248
121	Indirect Costs	(192,182)	(437,341)	(420,636)	(401,352)	(379,942)	(356,173)	(329,784)	(300,488)	(267,963)	(231,853)	(191,764)	(147,258)
122	Net Profit	(192,182)	488,725	502,089	517,517	534,645	553,660	574,771	598,208	624,228	653,115	685,187	720,792
123	Profitability	n/a	45%	48%	49%	51%	53%	55%	57%	60%	62%	65%	69%
124	BALANCE SHEET												
125	Cash		704,389	1,366,899	2,025,551	2,679,922	3,156,559	3,585,814	4,009,210	4,426,101	4,835,771	5,237,422	5,630,172
126	Receivables	902,439	687,355	472,271	257,187	42,103	-	-	-	-	-	-	-
127	Fixed Assets	3,609,756	3,489,431	3,369,106	3,248,780	3,128,455	3,008,130	2,887,805	2,767,480	2,647,154	2,526,829	2,406,504	2,286,179
128	TOTAL ASSETS	4,512,195	4,881,175	5,208,276	5,531,519	5,850,481	6,164,689	6,473,619	6,776,690	7,073,256	7,362,600	7,643,926	7,916,351
129	Short Term Liabilities	119,745	174,989	194,273	215,683	239,452	265,840	295,137	327,662	363,771	403,860	448,367	-
130	Long Term Liabilities	2,929,035	2,754,046	2,559,773	2,344,090	2,104,638	1,838,798	1,543,661	1,215,999	852,227	448,367	0	-
131	Equity	1,463,415	1,952,140	2,454,229	2,971,746	3,506,391	4,060,051	4,634,821	5,233,029	5,857,257	6,510,372	7,195,559	7,916,351
132	TOTAL LIABILITIES AND EQUITY	4,512,195	4,881,175	5,208,276	5,531,519	5,850,481	6,164,689	6,473,619	6,776,690	7,073,256	7,362,600	7,643,926	7,916,351
133	Unequal	-	-	-	-	-	-	-	-	-	-	-	-
134	CASH FLOW STATEMENT												
135	Net CF from Operational Activities	191,158	1,140,126	1,136,785	1,132,928	1,128,646	950,912	903,531	897,671	891,166	883,944	875,927	867,025
136	Net CF from Investment Activities	(4,512,195)	-	-	-	-	-	-	-	-	-	-	-
137	Net CF from Financial Activities	4,321,037	- 435,737	- 474,275	- 474,275	- 474,275	- 474,275	- 474,275	- 474,275	- 474,275	- 474,275	- 474,275	- 474,275
138	NET CASH FLOWS:	-	704,389	662,510	658,653	654,371	476,636	429,255	423,396	416,891	409,669	401,651	392,750

Insert Data | SHPP Cash Flow | Statements In USD or EUR | Consolidated Cash Flow (2) | Loan Schedules

11/4. Requested Main Financial Ratios



F2 fx FIN. RATIO

	A	B	C	D	E	F	G	H	I	J	K
1	Select the currency to see the Statements in 1000 >>		EUR	FINANCIAL STATEMENTS AND MAIN FINANCIAL INDICES - Jrvej SHPP							
2	Select the Statement Below:	CF	IS	BS	FIN.INDICES	FIN. RATIO	SENSITIVITY	BACK TO TOP	OK		
4	OPERATIONS YEARS		1	2	3	4	5	6	7	8	9
140	THE MAIN FINANCIAL RATIO										
141	GROSS MARGINE	n/a	96%	96%	96%	96%	96%	96%	96%	96%	96%
142	PROFITABILITY	n/a	44.6%	45.8%	47.2%	48.8%	50.5%	52.5%	54.6%	57.0%	59.6%
143	BREAK EVEN - AMD	n/a	465,450	454,333	441,499	427,251	411,433	393,871	374,375	352,729	328,699
144	BREAK EVEN WAIGHT - %	n/a	53.4%	52.1%	50.6%	49.0%	47.2%	45.2%	42.9%	40.5%	37.7%
145	CURRENT LIABILITY	n/a	4.03	7.04	9.39	11.19	11.87	12.15	12.24	12.17	11.97
146	LEVERAGE - LIAB / EQUITY	2.1	1.5	1.1	0.9	0.7	0.5	0.4	0.3	0.2	0.1
147	DSC - NET CASH FOR PERIOD	1.0	2.6	2.4	2.4	2.4	2.0	1.9	1.9	1.9	1.9
148	DSC - ACCUMULATED CASH	1.0	2.6	3.9	5.3	6.7	7.7	8.6	9.5	10.3	11.2
149	ROA	-4%	10%	10%	9%	9%	9%	9%	9%	9%	9%
150	ROE	-13%	25%	20%	17%	15%	14%	12%	11%	11%	10%
151	AUTHONOMY	97%	96%	96%	96%	96%	96%	95%	95%	95%	95%

Insert Data | Statements In USD or EUR | Consolidated Cash Flow (2) | Loan Schedules

Ready 150%

Attachment 12: Financial Model – Sensitivity Analysis

12/1. Sensitivity Analysis for different scenarios

1	Select the currency to see the Statements in 1000 >	AMD	NANCIAL STATEMENTS AND MAIN FINANCIAL INDICES – Jrvej SHPP												
2	Select the Statement Below:	CF	IS	BS	FIN .INDICES	FIM. RATIO	SENSITIVITY	BACK TO TOP	OK						
154	SENSITIVITY ANALYSES														
155						MAIN SCENARIO									
156															
157	Description of indices	Average	1	2	3	4	5	6	7	8	9	10	11	Appraisal	Limitation
158	Profitability	54%	45%	46%	47%	49%	51%	52%	55%	57%	60%	63%	66%	OK	10%
159	Min.Break Even production Mi	10.1	12.26	11.97	11.63	11.25	10.84	10.38	9.86	9.29	8.66	7.96	7.18	OK	24.2
160	Break Even Sales in % Revenu	44%	53.4%	52.1%	50.6%	49.0%	47.2%	45.2%	42.9%	40.5%	37.7%	34.6%	31.2%	OK	90%
161	Debt service coverage (net)	2.1	2.62	2.40	2.39	2.38	2.00	1.91	1.89	1.88	1.86	1.85	1.83	OK	0.80
162	Debt service coverage (cumul.	8.2	2.62	3.88	5.27	6.65	7.66	8.56	9.45	10.33	11.20	12.04	12.87	OK	1.05
163	ROE	14%	25.04%	20.46%	17.41%	15.25%	13.64%	12.40%	11.43%	10.66%	10.03%	9.52%	9.11%	OK	5.0%
164	ROA	9%	10.01%	9.64%	9.36%	9.14%	8.98%	8.88%	8.83%	8.83%	8.87%	8.96%	9.11%	OK	3.0%
165	IRR within the whole useful life	38%					37.6%							OK	6.5%
166	Pay back	2					2							OK	20
167	NPV = Accumulated PV	2.90					2.9 Mln.AMD							OK	>0
168															
169	on of Electricity Decreased by:	10%				10% Scenario - 1									
170															
171	Description of indices	Average	1	2	3	4	5	6	7	8	9	10	11	Appraisal	Limitation
172	Profitability	51%	41%	42%	44%	45%	47%	49%	52%	54%	57%	61%	64%	OK	10%
173	Min.Break Even production MilkWt	18.8	22.99	22.42	21.76	21.03	20.21	19.31	18.31	17.20	15.96	14.59	13.07	OK	24.18
174	Break Even Sales in % Revenues	47%	57.3%	55.8%	54.2%	52.4%	50.4%	48.1%	45.6%	42.8%	39.8%	36.3%	32.5%	OK	90%
175	Debt service coverage (net)	1.9	2.37	2.17	2.16	2.15	2.00	1.72	1.71	1.69	1.68	1.66	1.64	OK	0.80
176	Debt service coverage (cumulative)	7.1	2.37	3.42	4.58	5.73	6.73	7.45	8.16	8.85	9.53	10.20	10.84	OK	1.05
177	ROE	13%	21.51%	18.19%	15.87%	14.16%	12.87%	11.86%	11.05%	10.41%	9.88%	9.46%	9.11%	OK	5.0%
178	ROA	8%	8.37%	8.23%	8.16%	8.13%	8.14%	8.19%	8.28%	8.42%	8.60%	8.83%	9.11%	OK	3.0%
179	IRR within the whole useful life of SHPP	31%					31.4%							OK	6.5%
180	Pay back	3					3							OK	20
181	NPV = Accumulated PV	4.72					4.7 Mln.AMD							OK	>0
182															
197	tal Project Cost increased by:	10%					Scenario - 3								
198															
199	Description of indices	Average	1	2	3	4	5	6	7	8	9	10	11	Appraisal	Limitation
200	Profitability	51%	41%	43%	44%	46%	48%	50%	52%	55%	58%	61%	65%	OK	10%
201	Min.Break Even production MilkWt	20.7	25.29	24.67	23.95	23.14	22.25	21.27	20.17	18.95	17.60	16.10	14.43	OK	24.18
202	Break Even Sales in % Revenues	46%	56.7%	55.3%	53.7%	51.9%	49.9%	47.7%	45.2%	42.5%	39.5%	36.1%	32.4%	OK	90%

Insert Data | SHPP Cash Flow | Statements In USD or EUR | Consolidated Cash Flow (2) | Loan Schedules

12/2. Indicators of warning

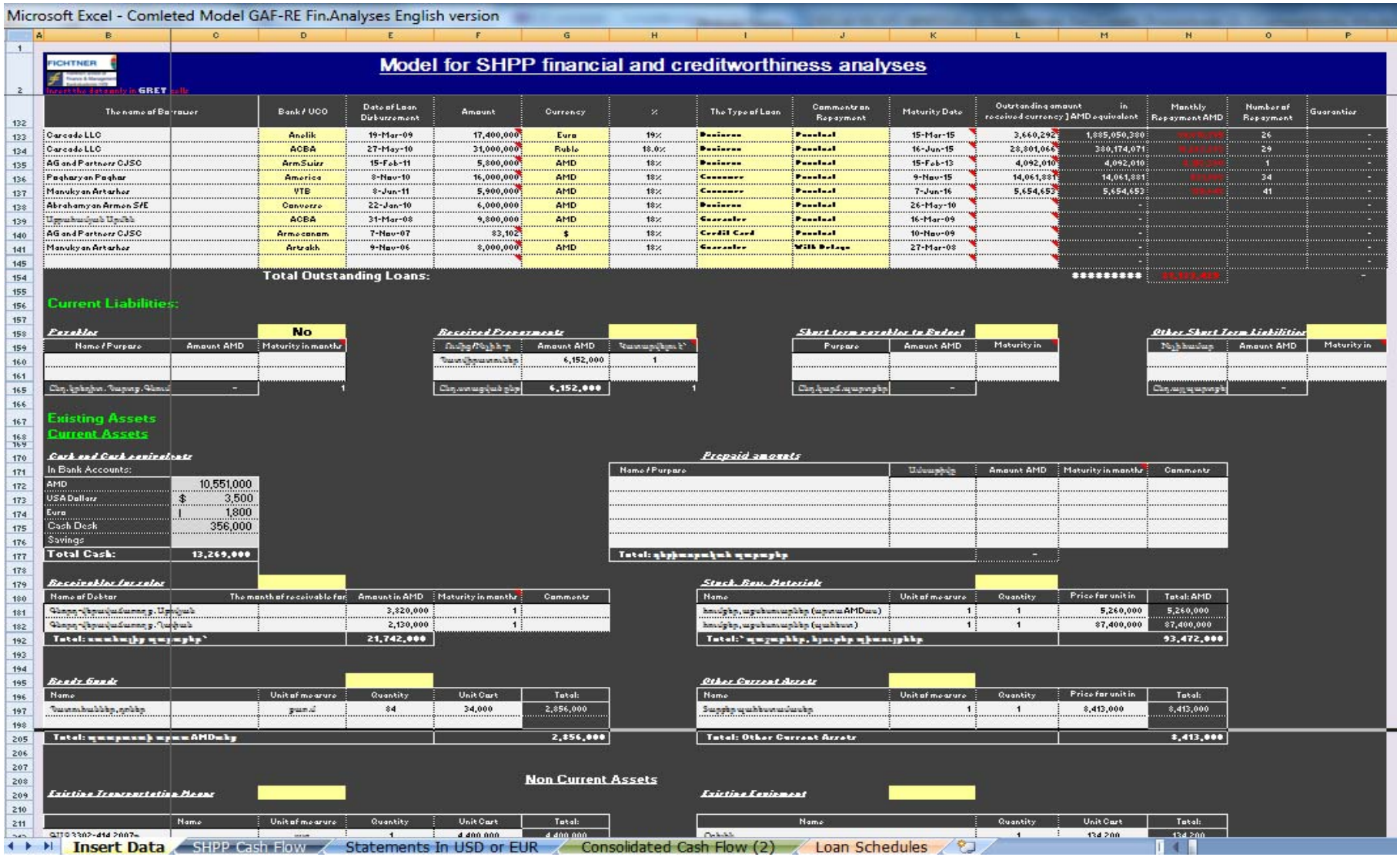
	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
1	Select the currency to see the Statements in 1		EUR	FINANCIAL STATEMENTS AND MAIN FINANCIAL INDICES - Jrvej SHPP											
2	Select the Statement Below:		CF	IS	BS	FIN .INDICES	FIN. RATIO	SENSITIVITY	BACK TO TOP	OK					
154	SENSITIVITY ANALYSES														
155							MAIN SCENARIO								
156															
157	Description of indices	Average	1	2	3	4	5	6	7	8	9	10	11	Appraisal	Limitation
158	Profitability	54%	45%	46%	47%	49%	51%	52%	55%	57%	60%	63%	66%	OK	10%
159	Min,Break Even production Mil.kWt	19.6	23.81	23.24	22.58	21.85	21.05	20.15	19.15	18.04	16.81	15.45	13.93	OK	24.2
160	Break Even Sales in % Revenues	44%	53.4%	52.1%	50.6%	49.0%	47.2%	45.2%	42.9%	40.5%	37.7%	34.6%	31.2%	OK	90%
161	Debt service coverage (net)	2.1	2.62	2.40	2.39	2.38	2.00	1.91	1.89	1.88	1.86	1.85	1.83	OK	0.80
162	Debt service coverage (cumulative)	8.2	2.62	3.88	5.27	6.65	7.66	8.56	9.45	10.33	11.20	12.04	12.87	OK	1.05
163	ROE	14%	25.04%	20.46%	17.41%	15.25%	13.64%	12.40%	11.43%	10.66%	10.03%	9.52%	9.11%	OK	5.0%
164	ROA	9%	10.01%	9.64%	9.36%	9.14%	8.98%	8.88%	8.83%	8.83%	8.87%	8.96%	9.11%	OK	3.0%
165	IRR within the whole useful life of SHPP	38%					37.6%							OK	6.5%
166	Pay back	2					2							OK	20
167	NPV =Accumulated PV	5.64					5.6	Mln.AMD						OK	>0
168															
169	Production of Electricity Decreased by:	50%				10%	Scenario - 1								
170		Paste Value here													
171	Description of indices	Average	1	2	3	4	5	6	7	8	9	10	11	Appraisal	Limitation
172	Profitability	14%	-11%	-7%	-2%	2%	6%	11%	17%	22%	29%	36%	45%	Concerning	10%
173	Min,Break Even production Mil.kWt	15.1	19.95	19.19	18.31	17.44	16.57	15.61	14.54	13.35	12.03	10.57	8.94	OK	24.18
174	Break Even Sales in % Revenues	85%	111.8%	107.6%	102.6%	97.7%	92.9%	87.5%	81.5%	74.8%	67.4%	59.2%	50.1%	OK	90%
175	Debt service coverage (net)	1.0	1.09	1.00	1.00	0.99	0.98	0.97	0.96	0.95	0.93	0.91	0.86	Concerning	0.80
176	Debt service coverage (cumulative)	1.0	1.09	1.08	1.08	1.07	1.06	1.03	0.99	0.94	0.87	0.78	0.64	Insolvent	1.05
177	ROE	3%	-3.27%	-2.13%	-0.75%	0.64%	1.97%	3.35%	4.72%	6.03%	7.23%	8.30%	9.22%	Inefficient	5.0%
178	ROA	2%	-1.07%	-0.71%	-0.26%	0.24%	0.79%	1.48%	2.35%	3.46%	4.87%	6.73%	9.22%	Inefficient	3.0%
179	IRR within the whole useful life of SHPP	7%					6.7%							OK	6.5%
180	Pay back	8					8							OK	20
181	NPV =Accumulated PV	0.05					0.1	Mln.AMD						OK	>0

Insert Data | SHPP Cash Flow | Statements In USD or EUR | Consolidated Cash Flow (2) | Loan Schedules

Ready

Attachment 13: Financial Model – Affiliated Businesses

13/1. Information on affiliate businesses



13/2 SHPP operation's Cash Flow Forecasts, consolidated with the affiliate businesses

d Model GAF-RE Fin.Analyses English version

	1	2	3	4	5	6	7	8	9	10	11	12					
Cash Inflows	Jul-13	Aug-13	Sep-13	Oct-13	Nov-13	Dec-13	Jan-14	Feb-14	Mar-14	Apr-14	May-14	Jun-14	Total I Year	Total II Year	Total III Year	IV Year	V Year
Produced Electricity in Mln. KWh														24.18	24.18	24.18	24.18
Cash at the Beginning	13,269,000	216,118,608	119,181,611	13,499,450	122,962,668	48,648,201	37,344,214	231,446,871	11,701,756	78,983,917	37,219,958	14,100,260	13,269,000	129,290,907	136,192,610	487,206,027	1,399,332,486
From Electricity Sold														472,719,000	472,719,000	472,719,000	472,719,000
Received VAT														94,548,300	94,548,300	94,548,300	94,548,300
Liquid Gas Sale	45,317,599	49,314,332	52,263,999	55,443,509	56,988,572	40,669,640	41,397,478	43,686,982	44,442,914	45,764,518	46,543,434	46,099,069	587,982,049	539,636,443	612,568,871	488,830,738	492,684,201
Hair Cutting, Dressing	4,217,850	4,217,850	4,526,850	5,129,400	5,422,950	5,422,950	4,217,850	6,025,500	3,615,300	3,615,300	4,217,850	6,025,500	58,666,150	59,487,908	68,067,182	68,067,182	68,067,182
Aluminum Doors	1,428,000	1,428,000	1,463,700	1,713,600	1,713,600	1,713,600	1,896,400	1,953,500	2,213,400	2,463,300	1,213,800	535,500	19,709,400	20,891,720	21,106,554	21,316,610	21,529,779
Aluminum Windows	1,470,000	1,596,000	2,394,000	2,772,000	2,940,000	3,108,000	3,696,000	3,108,000	2,226,000	3,108,000	798,000	420,000	27,594,000	28,973,700	29,663,174	29,848,706	30,147,193
Received Cash From Sold Product																	
Received Receivables																	
Total Cash Inflows:	52,483,449	56,556,182	60,648,549	65,058,509	67,066,122	60,914,190	61,167,728	64,788,982	62,467,914	64,961,118	62,781,084	63,080,069	671,887,696	1,216,961,571	1,198,687,281	1,198,687,281	1,198,687,281
Cash Outflows																	
Direct Costs of Affiliate Businesses	37,346,618	40,407,185	43,303,311	46,331,207	47,719,110	35,694,200	36,225,678	38,340,243	37,439,051	39,181,906	37,636,551	37,419,460	477,044,621	468,843,597	440,709,589	421,973,388	404,194,790
Administrative Staff														4,800,000	4,800,000	4,800,000	4,800,000
Production Staff														4,600,000	4,600,000	4,600,000	4,600,000
Soc. Sec. Employer pays														1,827,000	1,827,000	1,827,000	1,827,000
Other Expenses														13,500	13,500	13,500	13,500
Construction Maintenance and Services														4,068,786	4,068,786	4,068,786	4,068,786
Equipment Maintenance and Services														4,102,204	4,102,204	4,102,204	4,102,204
Property Tax	60,000						60,000						120,000	120,000	120,000	120,000	120,000
Payment for Land Rental	70,000						70,000						140,000	140,000	140,000	140,000	140,000
Land Tax	30,000						30,000						60,000	60,000	60,000	60,000	60,000
Annual Payment for License							100,000						100,000	100,000	100,000	100,000	100,000
Paid VAT for Maintenance and Services														1,882,198	1,882,198	1,882,198	1,882,198
Paid VAT for Sold Electricity																	187,718
Utilities	62,000	62,000	62,000	62,000	62,000	62,000	62,000	62,000	62,000	62,000	62,000	62,000	744,000	744,000	744,000	744,000	744,000
Communication	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	15,000	180,000	180,000	180,000	180,000	180,000
Advertisement	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	12,000	144,000	144,000	144,000	144,000	144,000
Research	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	150,000	1,800,000	1,800,000	1,800,000	1,800,000	1,800,000
Office Expenses	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	720,000	720,000	720,000	720,000	720,000
Transportation	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	49,500	594,000	594,000	594,000	594,000	594,000
Renovation	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	35,000	420,000	420,000	420,000	420,000	420,000
Transportation	85,000	85,000	85,000	85,000	85,000	85,000	85,000	85,000	85,000	85,000	85,000	85,000	1,020,000	1,020,000	1,020,000	1,020,000	1,020,000
Fixed Wages	350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	350,000	4,200,000	4,200,000	4,200,000	4,200,000	4,200,000
Travel	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	120,000	1,440,000	1,440,000	1,440,000	1,440,000	1,440,000
Indirect Costs (Administration)	895,000	895,000	895,000	895,000	895,000	895,000	895,000	895,000	895,000	895,000	895,000	895,000	10,740,000	10,740,000	10,740,000	10,740,000	10,740,000
Soc. Security Pmt	182,250	182,250	182,250	182,250	182,250	182,250	182,250	182,250	182,250	182,250	182,250	182,250	2,187,000	2,187,000	2,187,000	2,187,000	2,187,000
Profit Tax for SHPP Profits														60,094,226	61,494,169	63,046,439	64,801,076
Profit Tax for Other Affiliate Businesses			5,507,873			5,507,873			5,507,873			5,507,873	22,031,490	16,100,967	20,164,170	20,441,868	20,168,463
Paying off Payables																	
Total Cash Outflows - Operation	39,622,368	42,422,936	50,826,833	48,346,867	49,734,880	43,217,822	38,601,428	40,266,998	44,862,874	41,197,868	39,862,301	44,943,082	523,685,011	569,281,566	567,870,817	119,029,833	120,849,939
Net CF from Operational Activities	12,911,081	14,133,247	9,821,816	16,711,662	17,330,262	7,696,367	12,566,300	14,427,989	7,634,940	13,763,462	13,078,783	8,136,986	148,202,634	646,670,006	636,666,765	1,074,607,648	1,072,887,443
Investment Activities																	
Construction, buildings	136,710,000	135,040,000	181,560,000	175,950,000	29,850,000	51,380,000	181,400,000	321,154,082	30,120,000	44,800,000	12,000,000	88,760,000	1,387,794,082				
Equipment Purchased				133,530,000	71,910,000	53,420,000	51,380,000	20,550,000	41,100,000			90,375,918	462,266,918				
Transportation Means Purchased																	
Other Non-Current Assets Purchased																	
Sales of Non Current Assets																	
Net CF from Investment Activities	136,710,000	135,040,000	181,560,000	309,480,000	101,760,000	104,800,000	232,780,000	341,704,082	71,220,000	44,800,000	12,000,000	179,135,918	1,850,000,000				
Financial Activities																	
Shareholders Investment	44,014,054	43,796,757	58,884,324	100,375,135	33,003,243	33,989,189	75,496,216	110,822,945	23,098,378	14,529,730	3,891,892	58,098,136	600,000,000				
SHPP Loan Received	305,614,865			348,682,432			436,286,542			159,416,161			1,250,000,000				
Other Loans, Credits																	
Repayment of Other Loans	15,188,567	11,263,101	11,432,145	11,603,726	11,777,882	11,954,652	12,134,076	12,316,192	12,501,042	12,688,555	12,879,106	13,072,405	148,811,682	178,047,187	84,896,219	887,890	
Payment of Interests of Other Loans	6,117,694	5,889,770	5,720,726	5,549,145	5,374,969	5,198,218	5,018,795	4,836,679	4,651,829	4,464,205	4,273,765	4,080,456	61,176,279	82,787,214	4,304,080	40,362	
Repayment of SHPP Loan Principals														49,096,532	71,746,468	79,662,067	88,429,999
Payment of Interest of SHPP Loan	2,674,130	2,674,130	2,674,130	2,674,130	5,725,101	5,725,101	5,725,101	9,542,609	9,542,609	9,542,609	10,937,500	10,937,500	78,374,660	129,556,604	122,707,230	114,800,782	106,022,849
Dividends Payment																	
Net CF from Financial Activities	326,648,528	26,989,756	39,067,328	429,230,687	10,126,271	11,511,217	488,904,788	84,127,499	3,697,101	147,260,411	24,198,879	39,007,766	1,561,837,608	384,486,583	283,663,247	196,381,090	194,452,849
[illegible]	202,849,608	96,936,997	132,681,061	136,452,118	74,304,467	85,992,416	268,791,085	243,148,627	67,282,161	116,203,873	23,119,696	140,991,167	140,169,907	262,083,417	352,018,917	878,126,458	878,434,594
Total [illegible]	216,118,608	119,181,611	13,499,450	122,962,668	48,648,201	37,344,214	231,446,871	11,701,756	78,983,917	37,219,958	14,100,260	126,890,907	129,290,907	136,192,610	487,206,027	1,399,332,486	2,244,767,080
DSC for Cash Flows of Period	76.86	(35.25)	(48.62)	52.03	(11.98)	(14.02)	47.95	(24.48)	(6.05)	13.18	(1.11)	(11.89)	3.06	2.48	2.81	5.52	5.52
DSC for Accumulated Cash Flows	81.82	45.57	(4.05)	45.98	9.50	(5.52)	41.43	(0.23)	(7.28)	4.90	2.29	(10.60)	17.07	-0.26	17.71	8.03	12.54

Attachment 14: Monitoring Remarks

Monitoring Remarks

Project	
Purpose of Monitoring	
Project Developer	
Site Location	

	Remarks
Dam, Spillway	
Intake Structure	
Headrace Canal	
Decender	
Penstock	

Powerhouse	
Tailrace Canal	
Switchyard,	
Enviroment	
Work Safety	
Other	

Informed: Signature _____

Name and Surname _____

Date:

Position: _____

Attachment 15: Monitoring Report

Purpose of Monitoring	
Project Developer	
Site Location	
Installed Capacity	
Annual energy production	
PFI	
Project Cost	

	Activities									
	Item	Quality of Completed Works	Potential Technical Risk	Design Deviation	Works Invoiced	Remaining Budget	Total Works Scheduled	Actual Progress *in %*	Required Progress in %	Comment
Dam, Spillway	Excavation									
	Concrete Works									
	Reinforcement									
	Earth fill Works									
	Hydraulic Steel Structures									
	Grouting									
	Other									
	Total									
Intake Structure	Excavation									
	Concrete Works									
	Reinforcement									
	Earth fill Works									
	Hydraulic Steel Structures									
	Grouting									
	Other: fish pass etc.									
	Total									
	Item	Quality of Completed Works	Potential Technical Risk	Design Deviation	Works Invoiced	Remaining Budget	Total Works Scheduled	Actual Progress *in %*	Required Progress in %	Comment
Headrace Canal	Excavation									
	Concrete Works									
	Reinforcement									
	Earth fill Works									
	Grouting									
	Other									
	Total									
Sand Trap	Excavation									
	Concrete Works									
	Reinforcement									
	Earth fill Works									
	Hydraulic Steel Structures									
	Fish pass									
	Total									
Penstock	Excavation									
	Concrete Works									
	Penstock pipes									
	Earth fill Works									
	Other									
	Total									
Powerhouse	Excavation									
	Concrete Works									
	Architectural Works									
	Earth fill Works									
	Grouting									
	Hydraulic Steel Structures									
	Mechanical Equipment									
	Electrical Equipment									
	Commissioning									
	Other									
	Total									
	Item	Quality of Completed Works	Potential Technical Risk	Design Deviation	Works Invoiced	Remaining Budget	Total Works Scheduled	Actual Progress *in %*	Required Progress in %	Comment
al	Excavation									
	Concrete Works									

	Item	Quality of Completed Works	Potential Technical Risk	Design Deviation	Works Invoiced	Remaining Budget	Total Works Scheduled	Actual Progress *in %*	Required Progress in %	Comment
Tailrace Canal	Excavation									
	Concrete Works									
	Reinforcement									
	Earth fill Works									
	Rip-rap									
	Other									
	Total									
Switchyard,	Excavation									
	Concrete Works									
	Electrical equipment									
	Earth fill Works									
	Other									
	Total									
Other	Custom payment for Aggregates									
	VAT Taxes									
	Project design and permissions									
	Procurement of SHPP's land									
	Total									
	Grand Total:									

	Loan Reconciliation Report			
	Item	[AMD]	Comment	
	Approved Loan Amount			
	Previously Disbursed Loan			
	Outstanding part of Loan			
	Approved Other Loan Amount			
	Disbursed other Loan			
	Outst.part of Other Loan			
	Total Received Loans			
	Total Oustanding part			

	Comments and Recommendations	
	Item	Description / Comment
Technical Nature		
Health, Safety, Environment		

	Comments and Recommendations	
	Item	Description / Comment
Financial Nature		
Time Schedul		
Other		

	Annexes
	Description / Comment
Item	Updated Activity Schedule
	Photos