

# FEASIBILITY INDEX FOR LNG REGASIFICATION PROJECTS

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## 1. BACKGROUND

Liquefied Natural Gas (LNG) regasification terminals **as market access points** are indispensable elements of the LNG/gas chain.

The **expansion of the LNG industry** and the increasing demand for gas are driving a growing number of new regasification projects. Some of these projects are in new countries, with innovative configurations, and with new business and operation models. Currently there are **90 terminal projects in development**. Others will be added in coming years. Nevertheless, for 2020 we estimate that **only about 35 projects** will be commissioned based on future demand projections.

These projects are studied by several institutions and companies (banks, promotion agencies, multilateral institutions, private and public companies, regulators, etc) for **different objectives** and from **different angles** and perspectives, including:

- Investment opportunities
- Capacity and utilization opportunity
- LNG sales opportunity
- Analysis of competitors

In most cases, the evaluations are **ad-hoc studies** using generic methods for investment projects, adapted to the LNG business. The level of detail and approach usually depends on the final objective and interest.

The industry **does not use an indicator** or measuring system that could enable the comparison of projects and the analysis of their progress and likely success, in a structured and repeatable way.

## 2. AIMS

This paper proposes a **method to evaluate the feasibility of an on-shore regasification project** during the development phase. The development phase runs from the initial concept up to the Final Investment Decision (FID).

Evaluating a regasification project involves answering questions including:

- Is the downstream gas market attractive?
- Are there competing or alternative projects?
- Is the technical approach sound?
- Does the sponsor have the skills and resources to develop the project?
- Can permits/licences be obtained?
- Is there social opposition to the project?

One of the challenges for these evaluations is that the **lifecycle of these developments** is long (could take from 3 to 10 years).

A formal evaluation method should cover the following objectives:

- Support review and tracking of regasification projects (analysis guide)
- Snapshot review of project maturity (time factor)
- Usable by professionals after short instructions
- Numeric results and comparability
- Facilitate training of new professionals in the evaluation of projects

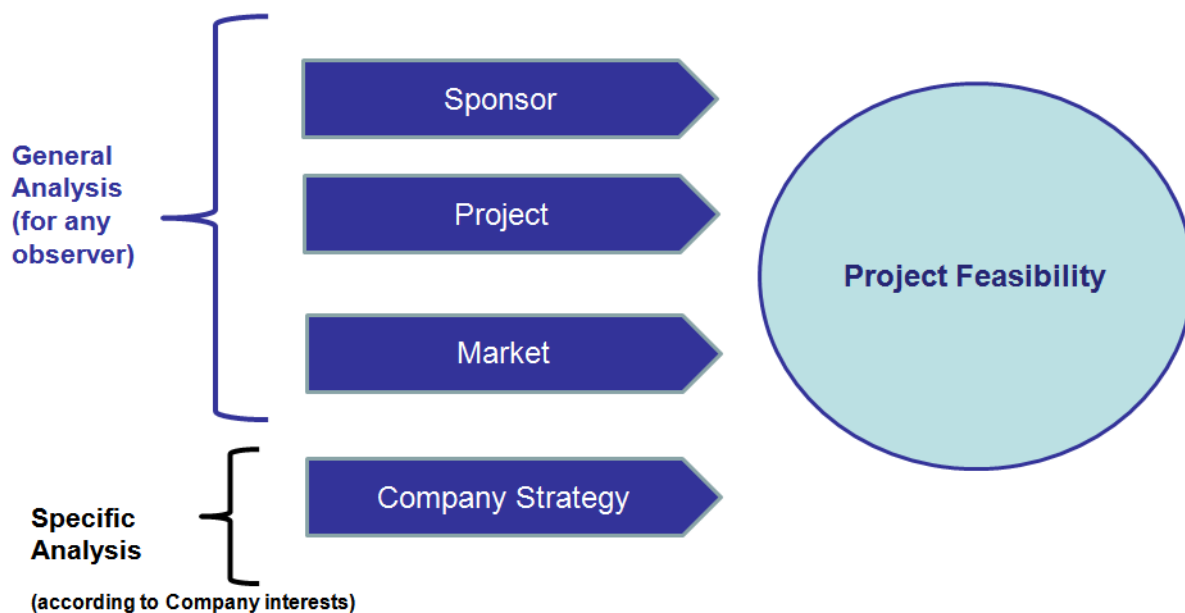
We define a formal, structured and repeatable method known as **Feasibility Index for LNG Regasification Projects (FIR © STREAM)**.

### 3. METHOD

The method analyses the most relevant aspects of the project according to the following lines:

- **Sponsor:** Are the project sponsors capable of managing, financing and leading the project?
- **Project:** Does the project have an efficient and robust technical design? Are budget and schedule feasible?
- **Market:** Does the project make sense commercially?
- **Company Strategy:** How does the project fit with the evaluating company's business strategy?

## Lines of Analysis



The method is based on a **multiple-choice** question structure for ease of use. **69 questions** in total have been defined for the 4 lines of analysis.

For each question, there are **six predefined answers**, rated **from 0** (minimum, no development) **to 5** (maximum, highly developed).

The importance of each question is categorized as **A, B, C, or D** and a Weighting Factor (multiplier) is applied as follows:

Weighting Factor	Multiplier Factor
<b>A:</b> Very important	<b>5</b>
<b>B:</b> Important	<b>3</b>
<b>C:</b> Medium	<b>2</b>
<b>D:</b> Low importance	<b>1</b>

The following is the complete list of questions and answers by line of analysis.

<b>1</b>	<b>Line of Analysis: SPONSOR</b>
<b>1.1</b>	<b>Section: Structure and Capacities</b>
1.1.1	General experience of sponsor (Weighting Factor C)



	<p><i>0. New consortium (formed ad-hoc for the project, partners with no previous experience in LNG)</i></p> <p><i>1. New consortium (some of the partners with LNG experience)</i></p> <p><i>2. Consortium with experience in previous projects, partners without LNG experience</i></p> <p><i>3. New consortium, all partners with LNG experience</i></p> <p><i>4. Consortium with experience in previous projects, some partners with LNG experience</i></p> <p><i>5. Experienced consortium, all partners with LNG experience</i></p>
1.1.2	<p>Previous experience in LNG projects (as partnership or stand-alone) (Weighting Factor C)</p> <p><i>0. No experience in regasification projects, no experience in large-scale industrial projects</i></p> <p><i>1. No experience in regasification projects, experience in large-scale non-energy industrial projects</i></p> <p><i>2. No experience in regasification projects, partners with experience in energy projects</i></p> <p><i>3. Experience in regasification projects at a smaller scale than the current case</i></p> <p><i>4. Experience in regasification projects, experience in energy or LNG projects at a similar scale</i></p> <p><i>5. Experience in regasification and liquefaction projects</i></p>
1.1.3	<p>Sponsors as gas buyers (Weighting Factor B)</p> <p><i>0. Sponsors not active in downstream market and not planning to be</i></p> <p><i>1. Sponsors not active in downstream market but planning to enter the market</i></p> <p><i>2. Sponsors not active in downstream market but planning to enter the market; negotiating alliances with third parties</i></p> <p><i>3. Sponsors with minority positions in downstream market</i></p> <p><i>4. Sponsors with minority positions in downstream market with expansion plans or potential to grow</i></p> <p><i>5. Sponsors with significant position in downstream market with strong purchasing power and expansion plans</i></p>
1.1.4	<p>Financing capacity of sponsors (Weighting Factor C)</p> <p><i>0. Local companies with some financing capability</i></p> <p><i>1. Local companies with self-financing capability</i></p> <p><i>2. Local companies with access to public funds</i></p> <p><i>3. Local and international companies with no self-financing possibilities</i></p> <p><i>4. Local and international companies with self-financing possibilities</i></p> <p><i>5. Local and international companies with financing available</i></p>
1.1.5	<p>Corporate structure of the sponsors partnership (Weighting Factor C)</p> <p><i>0. No statutory structure. Individual personal sponsor</i></p> <p><i>1. Sponsor acting as agent or without power of executive decisions; technical sponsor or only with the purpose of business case definition</i></p> <p><i>2. Limited company with very simple management structure (one-person company, minimal corporate structure)</i></p> <p><i>3. Company with public or private investors; minimum transparency/information</i></p> <p><i>4. Private capital company; standard corporate structure</i></p> <p><i>5. Stock marked listed company; maximum level of transparency, third-party auditing, etc</i></p>
1.1.6	<p>Commercial agreements and contracts (tolling, merchant, etc.) (Weighting Factor B)</p>



	<p><i>0. No formal agreements in place to support the business case (according to industry standard practices for similar projects)</i></p> <ol style="list-style-type: none"> <li><i>1. Formal negotiations in progress under confidentiality agreements with relevant partners/customers</i></li> <li><i>2. Agreements in place with potential customers/providers (Memorandum of Understanding (MoU), Term Sheet, similar)</i></li> <li><i>3. MoU in place with a limited an sufficient number of potential customers/providers</i></li> <li><i>4. Binding MoU with selected and final counterparts</i></li> <li><i>5. Final agreements and contracts signed</i></li> </ol>
<b>1.2</b>	<b>Section: Social Support /Opposition</b>
1.2.2	<p>Links with government and lobbies (Weighting Factor C)</p> <p><i>0. No involvement or special support from government or energy sector</i></p> <ol style="list-style-type: none"> <li><i>1. Links only with the political party or movement in the opposition</i></li> <li><i>2. Links with the government or with the political party in power</i></li> <li><i>3. Professional links with the administration</i></li> <li><i>4. Very strong relationship with administration; fluid and positive interaction</i></li> <li><i>5. Very strong relationship with government, administration, regulators and energy sector</i></li> </ol>

<b>2</b>	<b>Line of Analysis: PROJECT</b>
<b>2.1</b>	<b>Section: Project definition and planning</b>
2.1.1	<p>Level of definition of the planning (Weighting Factor C)</p> <p><i>0: No formal plan available</i></p> <ol style="list-style-type: none"> <li><i>1: Principal milestones identified: Final Investment Decision (FID), Start Operation, etc</i></li> <li><i>2: Initial planning (10-15 linked activities)</i></li> <li><i>3: Basic planning (50-100 activities)</i></li> <li><i>4: Detailed plan available (500-1,000 activities)</i></li> <li><i>5: Detailed plan available including allocation of resources</i></li> </ol>
2.1.2	<p>Technical Design (Weighting Factor B)</p> <p><i>0: Engineering studies not planned</i></p> <ol style="list-style-type: none"> <li><i>1: Pre-conceptual studies without technical aspects</i></li> <li><i>2: Conceptual study completed</i></li> <li><i>3: At pre-FEED (Front End Engineering Design) stage or FEED in process</i></li> <li><i>4: FEED completed. Detailed engineering study in process</i></li> <li><i>5: Engineering, Procurement &amp; Construction (EPC) awarded</i></li> </ol>
2.1.3	External Consultants (legal, technical, etc.) (Weighting Factor C)



	<p>0: No previous study available  1: Previous third party studies available (nearby area)  2: Previous third party studies available (for the site)  3: New studies available for the selected site  4: Main studies specifically for the project are available  5: All specific studies for the project completed</p>
2.1.4	<p>Feasibility of the plan (Weighting Factor C)</p> <p>0: Plan is not feasible or is not available  1: Insufficient time allocated for main activities  2: Too many activities in parallel  3: Tight schedule (no buffer for contingencies)  4: Realistic plan  5: Realistic plan based on previous similar projects by same developer</p>
2.1.5	<p>Technical risks (Weighting Factor B)</p> <p>0: No solution identified  1: Several solutions without previous industry utilization  2: One solution without previous industry utilization  3: New utilization of existing solutions  4: Standard technology with some modifications  5: Standard technology</p>
<b>2.2</b>	<b>Section: Capacity definition</b>
2.2.1	<p>Hypothesis for capacity definition (Weighting Factor B)</p> <p>0: Capacity not defined or based on similar projects without market references  1: Capacity based on generic market study  2: Capacity based on specific market study including consultation with main customers  3: Capacity based on detailed analysis of customer needs  4: Capacity based on detailed analysis of customers needs considering timing (seasonality, project schedule, etc)  5: Monthly balances of capacity based on detailed demand market studies (for a minimum period of 5 years)</p>
<b>2.3</b>	<b>Section: Site</b>
2.3.1	<p>Site selection (Weighting Factor B)</p> <p>0: Site selection not initiated  1: Site requirements defined  2: Site requirements defined and area identified  3: Possible sites pre-selected based on requirements (up to 5 locations)  4: Site selected  5: Site selected with all project stakeholders approval</p>
2.3.2	<p>Site preparation (Weighting Factor A)</p>



	<p>0: Site dimension insufficient; non-existing site or site with very serious maritime problems</p> <p>1: Site with very complex maritime or geophysical conditions or difficult connection between the site and waterfront</p> <p>2: Site with acceptable geophysics and difficult access to waterfront or port area requiring significant maritime works</p> <p>3: Site with acceptable geophysics and access to waterfront; port area requiring minor maritime works</p> <p>4: Site with good geophysics and access to waterfront; port area OK</p> <p>5: Site with good topography , geophysics and access to waterfront; port area OK</p>
2.3.3	<p>Connection to market (Weighting Factor C)</p> <p>0: Site to market distance more than 100 km with difficult connection (terrain difficulties, land expropriation problems)</p> <p>1: Site to market distance more than 100 km, pipeline connection feasible</p> <p>2: Site to market distance between 25 to 100 km, pipeline connection feasible</p> <p>3: Site to market less than 25 km, pipeline connection feasible</p> <p>4: Site close to market, pipeline connection feasible</p> <p>5: Site close to market, pipeline connection available</p>
<b>2.4</b>	<b>Section: Permits</b>
2.4.1	<p>Local rules for investment projects (Weighting Factor C)</p> <p>0: No rules/regulation for industrial investment projects</p> <p>1: Rules/regulation for generic industrial investment projects</p> <p>2: Regulatory framework for energy projects</p> <p>3: Regulatory framework for oil, fuels and gas projects</p> <p>4: Regulation covers LNG regasification partially (no detailed rules)</p> <p>5: Regulation for LNG regasification projects and services completely developed and implemented</p>
2.4.2	<p>Permit roadmap (Weighting Factor B)</p> <p>0: Permits not identified, not included in project plan. Roadmap not available</p> <p>1: Permits not identified, necessity considered in project plan</p> <p>2: List of required permits based on similar projects</p> <p>3: List of required permits based on similar projects. Roadmap available</p> <p>4: List of required permits based on detailed analysis of local regulation</p> <p>5: Complete list of required permits including terminal start-up. Roadmap documented</p>
2.4.3	<p>Permit planning (Weighting Factor C)</p> <p>0: No planning for license/permit process</p> <p>1: Basic planning for license/permit process</p> <p>2: Permit milestones identified</p> <p>3: Main activities for permit process identified</p> <p>4: Detailed plan available for permit process up to normal operation of the terminal</p> <p>5: Detailed plan available for permit process up to normal operation of the terminal, including allocation of resources</p>
2.4.4	<p>Permits granted (Weighting Factor B)</p>





	<p>0: No permit requested  1: No permit obtained but some permit applied fir on a preliminary basis  2: Preliminary authorizations or rights obtained  3: Some general permits obtained (definitive or firm)  4: Necessary permits obtained for the construction of the terminal  5: All necessary permits obtained for the construction and operation</p>
<b>2.5</b>	<b>Section: Budget and costs</b>
2.5.1	<p>Level of definition of the budget (Weighting Factor C)</p> <p>0. No budget or cost estimation  1. No budget study; cost estimation without ad-hoc study  2. No budget study. Cost estimation based on similar project and extrapolating figures considering capacity factors, production, site, timing, etc.  3. Budget obtained from previous conceptual study adapted with conversion factors  4. Budget as result of FEED study  5. Detailed budget defined and supported by firm offers of project supplier (equipment, constructions, EPC offer, etc)</p>
2.5.2	<p>Budget certainty (Weighting Factor C)</p> <p>0. No budget estimation  1. Budget precision in the range +200% / -100%  2. Budget precision in the range +120% / -60%  3. Budget precision in the range +60% / -30%  4. Budget precision in the range +30% / -15%  5. Budget precision in the range +10% / -5%</p>
2.5.3	<p>Availability of funds (Weighting Factor C)</p> <p>0. No available budget for the project  1. Sponsor funds available to cover preliminary analysis  2. Sponsor funds available to cover partially development costs pre-FID  3. Sponsor funds available to cover all development costs pre-FID  5. Funds available to cover sponsor capital contribution up to operational start-up.</p>
2.5.4	<p>Financing structure (Weighting Factor B)</p> <p>0. No financing structure studied  1. Financing included as project activity without analysis and development.  2. Financing structure partially defined, financial advisor contracted  3. Financing structure defined, no players/entities identified.  4. Financing structure defined, non binding agreements.  5. Financial close completed, signed agreements</p>
<b>2.6</b>	<b>Section: Project management</b>
2.6.1	<p>In-house technical capacity (Weighting Factor C)</p>





	<ul style="list-style-type: none"> <li>0. No experience in industrial projects</li> <li>1. Technical and management experience in generic industrial projects</li> <li>2. Experience in energy industry projects (but not LNG)</li> <li>3. Experience in Oil &amp; Gas projects (but not LNG)</li> <li>4. Technical experience in part of the LNG chain.</li> <li>5. Wide experience in LNG infrastructure projects.</li> </ul>
2.6.2	<p>External Consultants (legal, technical, etc.) (Weighting Factor C)</p> <ul style="list-style-type: none"> <li>0. No external consultants/advisors, no plans to contract them</li> <li>1. No external consultants/advisors, plan to contract them</li> <li>2. External consultants/advisors in previous phases (not currently active)</li> <li>3. External consultants/advisors for certain areas, no new contracts planned</li> <li>4. External consultants/advisors for certain areas, considering more external support</li> <li>5. All necessary areas covered by external consultants/advisors</li> </ul>
2.6.3	<p>Supply contract strategy for the project (Weighting Factor C)</p> <ul style="list-style-type: none"> <li>0. Supply strategy not defined</li> <li>1. Possible EPC strategy or private negotiation under analysis</li> <li>2. Expression of interest launched or advanced negotiations for pre-selection</li> <li>3. Potential suppliers pre-selected</li> <li>4. Tender instructions launched or in negotiation process.</li> <li>5. EPC offers available</li> </ul>
2.6.4	<p>Special restrictions and condition precedents (Weighting Factor C)</p> <ul style="list-style-type: none"> <li>0. Several condition precedents make the project unfeasible</li> <li>1. Some condition precedents make the project highly improbable</li> <li>2. Condition precedents in progress.</li> <li>3. Standard condition precedents for a regasification project (environmental licence, financing, FID, etc)</li> <li>4. Standard condition precedents for a regasification project at an advanced stage for approval</li> <li>5. No condition precedents.</li> </ul>
2.6.5	<p>Risk analysis (Weighting Factor C)</p> <ul style="list-style-type: none"> <li>0. Risk analysis study not available</li> <li>1. Preliminary risk analysis available, no mitigation actions identified</li> <li>2. Risk analysis available, including mitigation actions</li> <li>3. Risk analysis available, including feasible mitigation actions in progress</li> <li>4. Risk analysis available, probabilities &amp; impact manageable for FID under expected scenarios</li> <li>5. Risk analysis available, probabilities &amp; impact totally favourable for FID</li> </ul>
<b>2.7</b>	<b>Section: Resources in area</b>
2.7.1	<p>Level of technical development and resources in the area (Weighting Factor C)</p> <ul style="list-style-type: none"> <li>0. No local resources available for the project.</li> <li>1. No local resources available for the project, but facilities for importing them</li> <li>2. Limited resources in the area require major investments/adaptation for the project</li> <li>3. Resources available in the area but investment required to optimize their utilization</li> <li>4. Resource available requiring minor investment for utilization</li> <li>5. Optimal availability of sufficient technical capabilities and skilled resources in the area</li> </ul>



<b>3</b>	<b>Line of Analysis: MARKET</b>
<b>3.1</b>	<b>Section: Macroeconomic data</b>
3.1.1	Gross Domestic Product (GDP) growth (Weighting Factor C)  <ul style="list-style-type: none"> <li>0. <i>Decrease in GDP</i></li> <li>1. <i>No GDP growth</i></li> <li>2. <i>GDP growth less than 2%</i></li> <li>3. <i>GDP growth from 2% to 5%</i></li> <li>4. <i>GDP growth from 5% to 10%</i></li> <li>5. <i>GDP growth &gt; 10%</i></li> </ul>
3.1.2	Country risk (risk agency or other rating) (Weighting Factor C)  <ul style="list-style-type: none"> <li>0. <i>Economical and political environment has very high risks, high risk of failure to pay</i></li> <li>1. <i>Economical and political outlook uncertain</i></li> <li>2. <i>Some uncertainties in the economical and financial environment</i></li> <li>3. <i>Some volatility in the economical and political environment, acceptable level of risk of failure to pay</i></li> <li>4. <i>Favourable political and economical environment</i></li> <li>5. <i>Low risk, very stable political and economical environment</i></li> </ul>
3.1.3	Geopolitical aspects (Weighting Factor B)  <ul style="list-style-type: none"> <li>0. <i>High level of geopolitical risk (high insecurity and instability)</i></li> <li>1. <i>Insecure country</i></li> <li>2. <i>Unstable country</i></li> <li>3. <i>Moderately secure and stable country</i></li> <li>4. <i>Moderately secure and stable country with positive tendency</i></li> <li>5. <i>Safe country and historically stable</i></li> </ul>
3.2.1	Structure of the primary energy matrix (Weighting Factor C)  <ul style="list-style-type: none"> <li>0. <i>Country needs significantly less than current energy production</i></li> <li>1. <i>Country with sufficient natural resources, diversified matrix</i></li> <li>2. <i>Country with sufficient natural resources</i></li> <li>3. <i>Country with natural resources, energy matrix not diversified</i></li> <li>4. <i>Country with some natural resources, net importer of hydrocarbon fuels</i></li> <li>5. <i>Country highly dependent on imports of primary energy, without natural resources</i></li> </ul>
<b>3.2</b>	<b>Section: Energy market</b>
3.2.2	Size of the energy market (Weighting Factor C)  <ul style="list-style-type: none"> <li>0. <i>Very small energy market (project equivalent to more than 50%)</i></li> <li>2. <i>Small energy market (project equivalent to 30%-50%)</i></li> <li>3. <i>Medium energy market (project equivalent to 10%-30%)</i></li> <li>4. <i>Significant energy market (project equivalent to 2%-10%)</i></li> <li>5. <i>Large energy market (project equivalent to 2%)</i></li> </ul>



3.2.3	<p><b>Gas storage and pipelines (Weighting Factor C)</b></p> <ul style="list-style-type: none"> <li>0. No gas pipelines, no gas storage</li> <li>1. Small gas network, no gas storage</li> <li>2. Some gas storage, no gas pipelines</li> <li>3. Small gas network and storage</li> <li>4. Developed pipeline network (ratio capacity/demand &lt; 2) and storage available</li> <li>5. Large pipeline network (ratio capacity/demand &gt; 2) and storage available</li> </ul>
3.2.4	<p><b>Gas &amp; electricity forecast (gas needs) (Weighting Factor C)</b></p> <ul style="list-style-type: none"> <li>0. No new demand or negative outlook</li> <li>1. No growth in demand expected for gas / electricity</li> <li>2. Expected growth in demand for gas/electricity 0%-2%</li> <li>3. Expected growth in demand for gas/electricity 3%-5%</li> <li>4. Expected growth in demand for gas/electricity 6%-10%</li> <li>5. Expected growth in demand for gas/electricity &gt;10%</li> </ul>
3.2.5	<p><b>LNG competitiveness against alternative fuels (Weighting Factor A)</b></p> <ul style="list-style-type: none"> <li>0. LNG not competitive (by a margin of 70%+)</li> <li>1. LNG not competitive (by a margin of 50%+)</li> <li>2. LNG not competitive (by a margin of 40%+)</li> <li>3. LNG not competitive (by a margin of 20%+)</li> <li>4. LNG not competitive (by a margin of 10%+)</li> <li>5. LNG competitive with alternative fuels</li> </ul>
3.2.6	<p><b>Seasonality of the demand (Weighting Factor C)</b></p> <ul style="list-style-type: none"> <li>0. Demand concentrated in a 2 month period or less</li> <li>1. Demand concentrated in a 3-6 month period</li> <li>2. Very high seasonal demand (ratio winter/summer &gt; 10)</li> <li>3. High seasonal demand (ratio winter/summer from 6 to 9)</li> <li>4. Medium seasonal demand (ratio winter/summer from 2 to 6)</li> <li>5. No seasonal demand</li> </ul>
3.2.7	<p><b>Counter-seasonality in relation to traditional markets (Weighting Factor D)</b></p> <ul style="list-style-type: none"> <li>0. Traditional market</li> <li>1. Seasonal market with &lt; 2 months counter-seasonality against traditional markets</li> <li>2. Seasonal market with &lt; 3 months counter-seasonality against traditional markets</li> <li>3. Seasonal market with &lt; 4 months counter-seasonality against traditional markets</li> <li>4. Seasonal market with &gt; 4 months counter-seasonality against traditional markets</li> <li>5. Counter seasonal market against traditional markets</li> </ul>
3.3	<p><b>Section: Market maturity</b></p>
3.3.1	<p><b>Existing gas market (size) (Weighting Factor B)</b></p>



	<p>0. No gas/LNG market</p> <p>1. Small gas/LNG commercialization (very small scale)</p> <p>2. Small gas/LNG infrastructure, low gas consumption</p> <p>3. Existing gas market. Significant demand growth expected. New infrastructure needed</p> <p>4. Medium gas penetration. Existing infrastructure to be expanded. Moderate demand growth</p> <p>5. High gas penetration. High percentage of population with access to natural gas, Significant infrastructure available for import/export. Stable demand, no significant growth expected</p>
3.3.2	<p>Existing LNG regulation (Weighting Factor C)</p> <p>0. No LNG regulation</p> <p>1. Government plans to develop LNG regulation</p> <p>2. Regulation at development stage</p> <p>3. Regulation at approval stage</p> <p>4. Regulation defined but pending implementation</p> <p>5. Sufficient LNG regulation in place</p>
3.3.3	<p>Existing natural gas regulation (Weighting Factor C)</p> <p>0. No natural gas regulation</p> <p>1. Government plans to develop natural gas regulation</p> <p>2. Regulation at development stage</p> <p>3. Regulation at approval stage</p> <p>4. Regulation defined but pending implementation</p> <p>5. Sufficient natural gas regulation in place</p>
3.3.4	<p>Market liberalization (prices, third party access (TPA), etc.) (Weighting Factor C)</p> <p>0. Highly controlled market</p> <p>1. Price control, no TPA</p> <p>2. Market with reference prices</p> <p>3. Market liberalization in process (new regulation to liberalise prices, TPA, etc)</p> <p>4. Open market in theory but with restrictions in practice</p> <p>5. Completely open market (market prices, TPA)</p>
3.3.5	<p>Level of competition in the market (Weighting Factor C)</p> <p>0. Market monopoly</p> <p>1. Market oligopoly (3-4 players controlling the market). Strong entry barriers</p> <p>2. More than 80% of the market in the hands of few operators. Entry barriers</p> <p>3. 50% of the market in the hands of few operators. Tough competition</p> <p>4. Many companies in the market. Few entry barriers</p> <p>5. Many companies in the market. No entry barriers</p>
3.3.6	<p>Competing or alternative projects (Weighting Factor B)</p> <p>0. Competing or alternative projects in construction phase</p> <p>1. Competing or alternative projects with high probabilities of construction (FID)</p> <p>2. Competing or alternative projects with high level of progress (site, FEED, permits, etc)</p> <p>3. Competing or alternative projects in pre-FEED status</p> <p>4. Rumours about possible competing or alternative projects</p> <p>5. No competing or alternative projects</p>



<b>3.4</b>	<b>Section: LNG specifications</b>
3.4.1	<p>LNG quality specifications (Weighting Factor D)</p> <p><i>0: Specification not defined but potentially limited (ex.: single utilization, spec without tolerance)</i>  <i>1: Specification not defined but potentially not limited</i>  <i>2: Specification defined exclusively by composition limits</i>  <i>3: Specification defined by non strict or tight composition limits (PCS, Wobbe Index)</i>  <i>4: Specification defined with tight characteristics ranges (PCS, I Wobbe)</i>  <i>5: Specification defined with wide range to be defined by supplier (PCS, Wobbe)</i></p>
<b>3.5</b>	<b>Section: Project demand</b>
3.5.1	<p>Identification of project demand (Weighting Factor B)</p> <p><i>0. Project demand not identified</i>  <i>1. Demand to be created</i>  <i>2. Potential demand but not sufficient to justify project (too small)</i>  <i>3. Existing firm demand but insufficient</i>  <i>4. Potential demand to justify the project</i>  <i>5. Firm demand to support the project</i></p>
3.5.2	<p>Firmness of demand (Weighting Factor A)</p> <p><i>0. No interaction/contacts with potential consumers/clients</i>  <i>1. Preliminary contacts with potential customers</i>  <i>2. Confidentiality agreement or similar with potential customers</i>  <i>3. Non-binding agreements covering 50% throughput</i>  <i>4. Preliminary agreements covering 70% throughput</i>  <i>5. Agreements/contracts with condition precedents covering 100% of the throughput</i></p>
<b>3.6</b>	<b>Section: Logistics</b>
3.6.1	<p>Proximity of the demand to the terminal (Weighting Factor C)</p> <p><i>0. No physical connection possible. Long distance and adverse topography</i>  <i>1. Long distance but favourable terrain</i>  <i>2. Average distance in unfavourable terrain preventing construction of pipelines</i>  <i>3. Average distance in favourable terrain allows pipeline construction of pipelines</i>  <i>4. Short distance, favourable connection</i>  <i>5. Terminal and demand area close</i></p>
3.6.2	<p>LNG secondary distribution (Weighting Factor D)</p> <p><i>0. No secondary distribution system possible. Isolated terminal (consumption close to the terminal)</i>  <i>1. No secondary distribution system but possibility of constructing distribution network</i>  <i>2. No secondary distribution system; programme for constructing it</i>  <i>3. Secondary distribution system in construction phase</i>  <i>4. Existing secondary distribution system</i>  <i>5. Several secondary distribution systems available</i></p>



3.6.3 Distance to LNG supply sources (Weighting Factor C)

0. Far from any LNG supply source
1. Close to a potential LNG supply source
2. Close to an LNG supply source
3. Close to several LNG supply sources
4. Very close to an LNG supply source
5. Very close to several LNG supply sources





<b>4</b>	<b>Line of Analysis: COMPANY STRATEGY</b>
4.1.1	<p>Presence in the country (Weighting Factor B)</p> <p><i>0: Company with no presence in the country</i>  <i>1: Company with minor presence in the country (business not related to gas/LNG)</i>  <i>2: Company with minor/medium presence in the country, business related to energy</i>  <i>3: Company with medium presence in the country, business related to gas/LNG/electricity</i>  <i>4: Company has a significant activity in the country, with a stable structure/organizations</i>  <i>5: Company has a significant activity in the country, with business activities in gas and electricity. Very good local image, excellent links with stakeholders (government, regulation, community, etc), large resources and good growth perspectives</i></p>
4.2.1	<p>Strategic interest in the market (Weighting Factor B)</p> <p><i>0: Project located in country not included in company strategic plans</i>  <i>1: Project located in country whose market is 3<sup>rd</sup> priority for company growth</i>  <i>2: Project located in country whose market is 2<sup>nd</sup> priority for company growth. Company with some knowledge and studies about the country</i>  <i>3: Project located in country whose market is 2<sup>nd</sup> priority for company growth. Company with sufficient knowledge and studies about the country, and contacts at several business levels</i>  <i>4: Project located in country whose market is of high interest for company growth. Company with good knowledge and updated studies about the country, and contacts at relevant business levels</i>  <i>5: Project located in country whose market is of top priority for company strategy. Company with relevant knowledge and updated strategic and commercial plan about the country, contacts at relevant government and business levels</i></p>
4.3.1	<p>Interest in the gas business in the country (Weighting Factor B)</p> <p><i>0: Company has not defined a specific interest in developing gas business in this country/market</i>  <i>1: Company has pre-defined the possibility of developing gas business in this country/market depending on the business opportunity</i>  <i>2: Company has defined the possibility of developing gas business in this country/market, available studies support this project</i>  <i>3: Company has defined the possibility of developing gas business in this country/market, available studies support this project, intention to evaluate this opportunity in greater depth</i>  <i>4: Company has defined specific interest in developing commercial activities related to natural gas in this country/market. The project under study could contribute to these objectives</i>  <i>5: Company has defined specific interest in expanding its current commercial activities related to natural gas in this country/market. Objective included in medium-long term company business plan</i></p>
4.4.1	<p>Distance to company's own LNG supply sources (Weighting Factor C)</p>



	<p>0: Company LNG supply sources very far from the project (different basins, in disadvantaged position compared to competitors)</p> <p>1: Company LNG supply sources very far from the project (different basins, similar to other competitors)</p> <p>2: Company LNG supply sources at intermediate distance from the project (same basins)</p> <p>3: Company with LNG supply produced at liquefaction plant at intermediate distance from the project, with commercial routes near the project</p> <p>4: Company with future supply from a liquefaction plant competitive (in distance) from the project</p> <p>5: Company with LNG produced at a liquefaction plant located at a very competitive distance from the project (plant significantly closer than any other, allowing a very reduced transportation cost)</p>
4.5.1	<p>Gas customer base (generation / distribution / etc) (Weighting Factor A)</p> <p>0: Company does not have either current customers to commercialise gas or industrial activities that could demand a significant amount of gas (CCGT, self generation, refineries, petrochemicals, etc)</p> <p>1: Company has a reduced gas commercialization activity in the country or minor self consumption</p> <p>2: Company has a medium industrial or generation self consumption. New gas/LNG could optimize this consumption position</p> <p>3: Company has a medium industrial or generation activity with expansion plans. New gas/LNG could help this expansion</p> <p>4: Company has a significant distribution gas business or electricity generation business (with natural gas as fuel) in the country. Its consumed/commercialized gas volume is significant and the project will help in optimizing and expanding it</p> <p>5: Company has very important gas distribution or electricity generation (gas fuelled) in the country. Its consumption of gas is significant and the project will contribute strongly in expanding and optimizing it</p>
4.6.1	<p>Impact on domestic gas production prices (Weighting Factor C)</p> <p>0: Company is not developing gas exploration and production business in the country</p> <p>1: Company is developing oil &amp; gas exploration and production activities in the project country, in association with other partners (JV), with gas production in limited volumes</p> <p>2: Company is developing exploration and production activities in the project country, in association with other partners, with medium gas production volumes</p> <p>3: Company is developing independent exploration and production activities in the project country, with medium gas production volumes. Gas/LNG importation could improve the conditions for local production</p> <p>4: Company produces significant gas volumes in the country. Gas/LNG importation could contribute in improving well-head gas price</p> <p>5: Company produces significant gas volumes in the country. Gas/LNG importation will contribute strongly in improving well-head gas price</p>
4.7.1	<p>Limitations and restrictions (negative aspects) (Weighting Factor C)</p>



*0: There is a very important limitation or barrier for the company to participate in the project (significant litigations in the country, litigation or opposition with the sponsor company, country excluded for business purposes, etc)*

*1: There are important limitations or barriers for the company to participate in the project (regulatory impediments, unbundling issues, investments in other countries with geopolitical conflicts with the project country, negative commercial antecedents with the sponsor, etc)*

*2: Medium limitations (country/project in exclusion area with current partners, etc)*

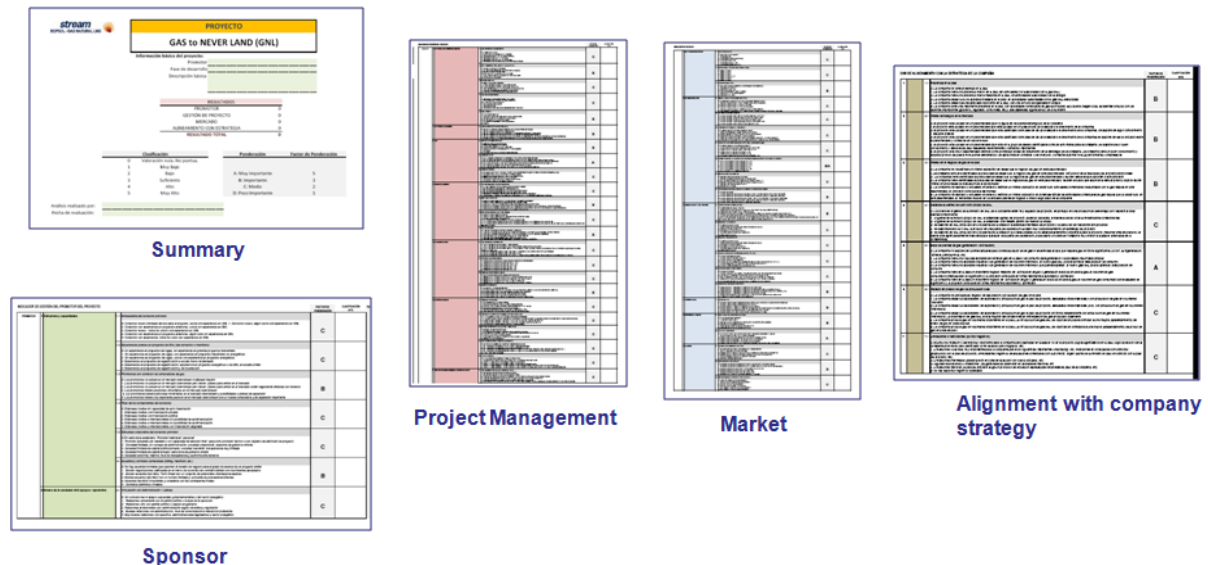
*3: Some restrictions and limitations (obligation to divest in minor activities, etc)*

*4: Minor limitations (project country demands special procedures for company country, etc)*

*5: No special limitations or restrictions*

An **Excel spreadsheet** implements the method. By **selecting** the answer to the respective question, the spreadsheet calculates and shows the **total result**.

### Support tool



The image displays five screenshots of an Excel spreadsheet tool used for project analysis. The sections shown are:

- Summary:** A high-level overview of the project, titled "GAS to NEVER LAND (GNL)".
- Project Management:** A detailed table of project management tasks and their status.
- Market:** A table detailing market-related data and analysis.
- Alignment with company strategy:** A table showing how the project aligns with the company's strategic goals.
- Sponsor:** A table detailing the sponsor's requirements and expectations.

The following example shows a question with its multiple-choice answers:

<b>Line of Analysis:</b> 2. Project <b>Section:</b> 2.1 Project Definition and planning <b>Question:</b> 2.1.2 Technical Design (Weighting Factor = B , multiplier is 3)		
<b>Possible Answers:</b>	<b>Mark</b>	<b>Weighted Mark</b>
0: Engineering studies not planned	0	0
1: Pre-conceptual studies without technical aspects	1	3
2: Conceptual study completed	2	6
3: At pre-FEED (Front End Engineering Design) stage or FEED in process	3	9
4: FEED completed. Detailed engineering study in process	4	12

5: Engineering, Procurement & Construction (EPC) awarded	5	15
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#### 4. RESULTS

Each project is different, leading to **diverse results**. The numeric result is an **indication of the feasibility and progress** of the project, and, in that sense, helps in comparing different projects that may be connected to the same markets. The maximum total mark is **715 points**.

A theoretical exercise is to evaluate a **standard project** with the method. By **standard project** we mean a project that ends in FID and that progress consistently according to a typical development plan.

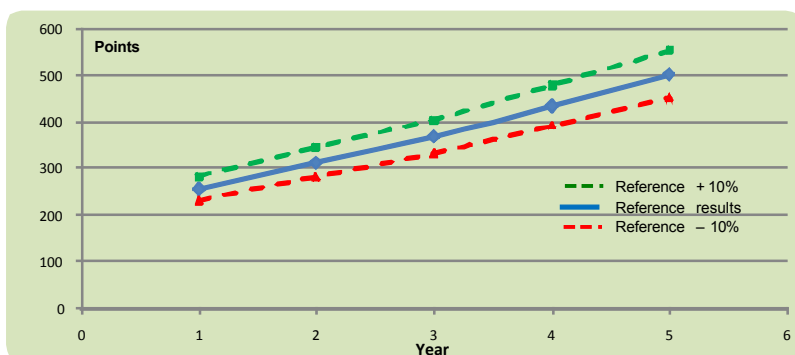
The following table describes the results of a **standard project**.

#### Reference values for a Standard Project

YEAR 1 - RESULTS	
SPONSOR	18
PROJECT MANAGEMENT	93
MARKET	113
ALIGNMENT	32
<b>TOTAL RESULT</b>	<b>256</b>

YEAR 3 - RESULTS	
SPONSOR	25
PROJECT MANAGEMENT	162
MARKET	135
ALIGNMENT	45
<b>TOTAL RESULT</b>	<b>367</b>

YEARS - RESULTS	
SPONSOR	44
PROJECT MANAGEMENT	221
MARKET	167
ALIGNMENT	69
<b>TOTAL RESULT</b>	<b>501</b>



MAXIMUM VALUES		
SPONSOR	80	11%
PROJECT MANAGEMENT	280	39%
MARKET	255	36%
ALIGNMENT	100	14%
<b>TOTAL RESULT</b>	<b>715</b>	<b>100%</b>

#### 5. CONCLUSIONS

- The **FIR ©STREAM** indicator serves as a formal evaluation and analysis guideline.
- It allows a **structured comparison of feasibility** of projects with different levels of development for similar markets.
- Companies with different business orientation (banks, regulators, etc) could **customize** the method for their own purposes.
- A customized version of **FIR** could be defined to evaluate **floating or off-shore** regasification projects.
- A particular evaluation should be completed with **records and explanatory notes** (sources, interpretation, etc).



*The following colleagues contributed to the method described in this paper: Pablo Quiroga, Eduardo Castillo, María Eugenia Suardiaz, Ramiro Pereda and Alvaro Balbás.*