THE AHP APPLICATION FOR STRATEGIC AND TACTICAL MANAGEMENT OF RENEWABLE AND ALTERNATIVE ENERGY SOURCES PROJECTS

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ABSTRACT

The European Union's Operational Program "Environment", opened lot of initiatives concerning with the sustainable use of energy sources, particularly renewable and alternative energy sources (RAES). One of its long term objectives is to achieve a substantial increase in the use of renewable energy sources in electric power and heat generation and a greater use of waste heat. The major problem lies in the insufficient use of RAES and in the slow growth in energy conservation throughout the whole spectra of activities within a society. The system of investment support with regard to the availability of financial resources is also insufficient. Solutions may be difficult due to the limited experience with strategic and tactical management of RAES projects. Specifically, Project Portfolio management is very weak. To eliminate this weak point we developed a new approach to the Project Portfolio life cycle. This approach makes a distinction between strategic and tactical levels. AHP Method is applied at both levels but in different ways. The strategic level assumes the direct involvement of experts designing a criteria hierarchy and Project Portfolio investors prioritizing the project's objectives against these criteria. Criteria hierarchies are derived from the BMM and include External and Internal Influencers. Since we are dealing with a model that is based on future conditions, we must consider risk, i.e. the uncertainty of future events. The Strategic AHP Model incorporates the uncertainty of the general RAES business environment. This model has already been developed and tested in RAES Project Portfolio Management.

Keywords: AHP modeling, Enterprise management, Renewable Energy and Alternative Sources, Project Portfolio Management, Project Portfolios, Funding Optimization using the AHP Method.

1. Introduction

Renewable and Alternative Energy Sources (RAES) initiatives are becoming increasingly popular with the private sector as important alternatives to the limited supply of the fossil fuels. These initiatives are also supported by the public sector which helps entrepreneurs with reusable and alternative energy sources projects funding. The weak point of all these initiatives is an outdated management which is seriously harmful to the desirable acceleration of the RAES-based electricity production and this results in a low effectiveness and suboptimal Project Portfolio Management. It becomes clear that the most reasonable way how to optimize RAES project management is to apply unified Enterprise Project Management (EPM) approach.

Our paper consists of several sections. Firstly, we describe the current RAES landscape and argue why a new management approach is necessary. The next section presents a better understanding of the project-

driven environment and the reasons why we consider the Virtual Enterprise as the most appropriate organizational form for the new enterprise management approach development (Tolle et al, 2002). The Project Portfolio is then explained with its linkages to the Strategic and Tactical Management Levels.

While the AHP Method can be effectively applied to both the Strategic and Tactical Management Levels, this paper focuses on the AHP Method's application to the Strategic Management Level. We have developed three AHP models: the first one focuses on External Influencers, the second model on Internal Influencers and the third one captures the tracks concerning Investors' Objectives. The entire AHP modeling effort is divided into five steps.

In the conclusion we highlight specific significant improvements the AHP Method-based strategic management offers by combining the two types of inputs:

- INPUT 1: The Row Project Idea with limited information about External and Internal Influencers affecting Strategic Management Level
- INPUT 2: The Business Case with Information about the risks reflecting the uncertainty concerning future events that were taken into consideration during the optimizing stage.

2. The Renewable and Alternative Energy Sources Landscape and the Need for a New Management Approach

The rapidly increasing interest among the public and private bodies in using RAES-based electricity production has its roots in the need for solving a number of current problems, such as:

- Production of electricity from renewable energy sources (biomass, solar, wind)
- Production of electricity from alternative sources (waste plastics, tires, rubber parts of scrap cars, plastic-coated foil, etc.)
- Recycling of waste plastics
- A significant reduction of greenhouse gases (carbon oxides, methane) and the use of fossil fuels
- Creation of hundreds of new jobs
- Use of fallow land
- Etc.

To meet the objectives just described, new approaches have to be implemented. First of all, we need a better understanding of the RAES landscape as depicted in Figure 1. As we can see, the RAES market is established under the influence of mutually interactive areas capturing Investors, RAES Enterprise Builders, and Customers. RAES Enterprise Builders have a project idea or a proposal primarily motivated by their engineering background. They are also fully qualified to be Project Managers. The second key group of actors are Investors who have the money and who are interested in investing them in order to generate a profit with acceptable risks. But the Investors' and Enterprise Builders' perspectives are often very different from each other and this is one of the reasons why we put the RAES Project Portfolio mechanism into action. The third group of players are the Customers: they want to operate an electric power station in their municipality, region or a household but they don't have the Builders' capabilities to build an Electric Power Station (EPS) nor enough money to fully finance such project. The RAES market represents the right opportunity to all three groups of actors allowing them to achieve the common goal, i.e. a fully operational electric power station. At the same time, all actors are interested in having a stable, sustainable, and innovative RAES market. This kind of interest can be satisfied only if we are able to develop, implement and operate a new strategic and tactical management for the RAES landscape.

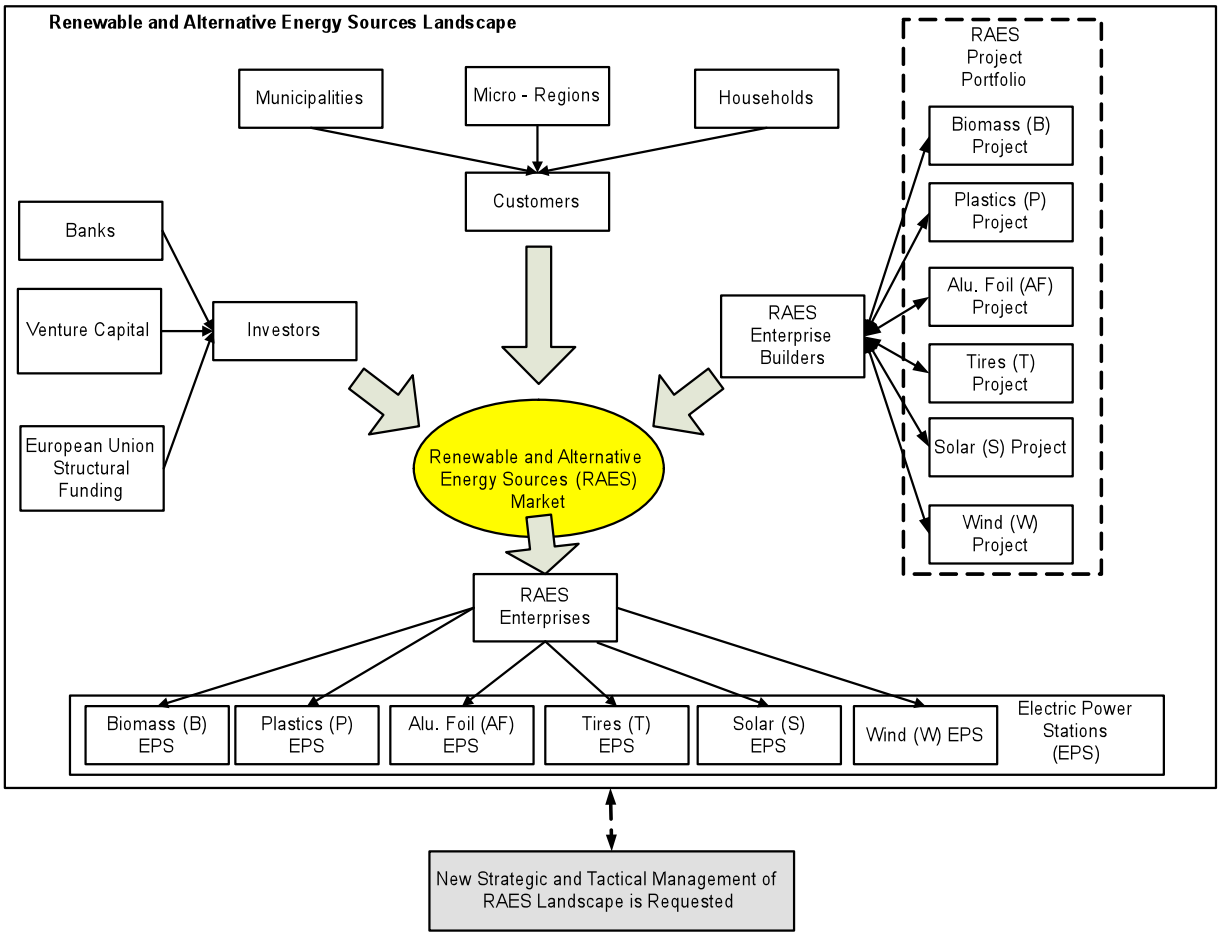


Figure 1. Renewable and Alternative Energy Sources Market requires new Strategic and Tactical Management.

3. Project Driven Business Environment – the Virtual Enterprise

All three groups of actors in Figure 1 are understood as independent enterprise entities within their own business processes. To achieve RAES market stability, sustainability and innovativeness we must pay a special attention to a new term – the Project Driven Enterprise. This term stresses a critical importance of the group of project processes in the life cycle management of each enterprise entity participating in the RAES market. A group of project processes is defined in the ISO Standard 15 288 and it includes the Planning Process, Assessment Process, Control Process, Decision Making Process, Risk Management Process, and Configuration Management Process (ISO 15 288, 2000). The enterprise entity also runs other groups of processes, namely the Enterprise Processes, Agreement Processes and Technical Processes.

The Enterprise Entities (organizations) are producers and customers of the systems, i.e. they trade products (EPS) and services (projects, Project Portfolio). One organization may act as an acquirer, another organization as a supplier of products and services, using a business contract. These relationships are defined by using the Agreement Processes (Figure 2). Figure 2 illustrates a situation where a municipality initially signs a contract with a bank securing the appropriate funds. Then the municipality starts an Agreement Process with a RAES Builder company for building a biomass-fueled EPS. Currently, this simple principle very quickly results in a rather cumbersome RAES market because:

- For the municipalities, it becomes more and more complicated to monitor all projects, to react in a timely fashion to projects' problems and to maintain control over the entire EPS life cycle including return of investment (ROI)
- Investors have information about the RAES projects at the beginning of a project but it becomes increasingly difficult to maintain visibility, as investments are spread over a longer period of time and multiple projects may be included within the given Project Portfolio
- The EPS Builders must generate a great number of preliminary project documents to help the Customers who are to receive the funding from the Investors. As a result, the Builders have very little time to develop a Project Portfolio as they are generating all documentation for every separate project instead of that. This in turn is harmful to strategic management as project documentation is developed primarily at the tactical management level (i.e. single project planning and management).

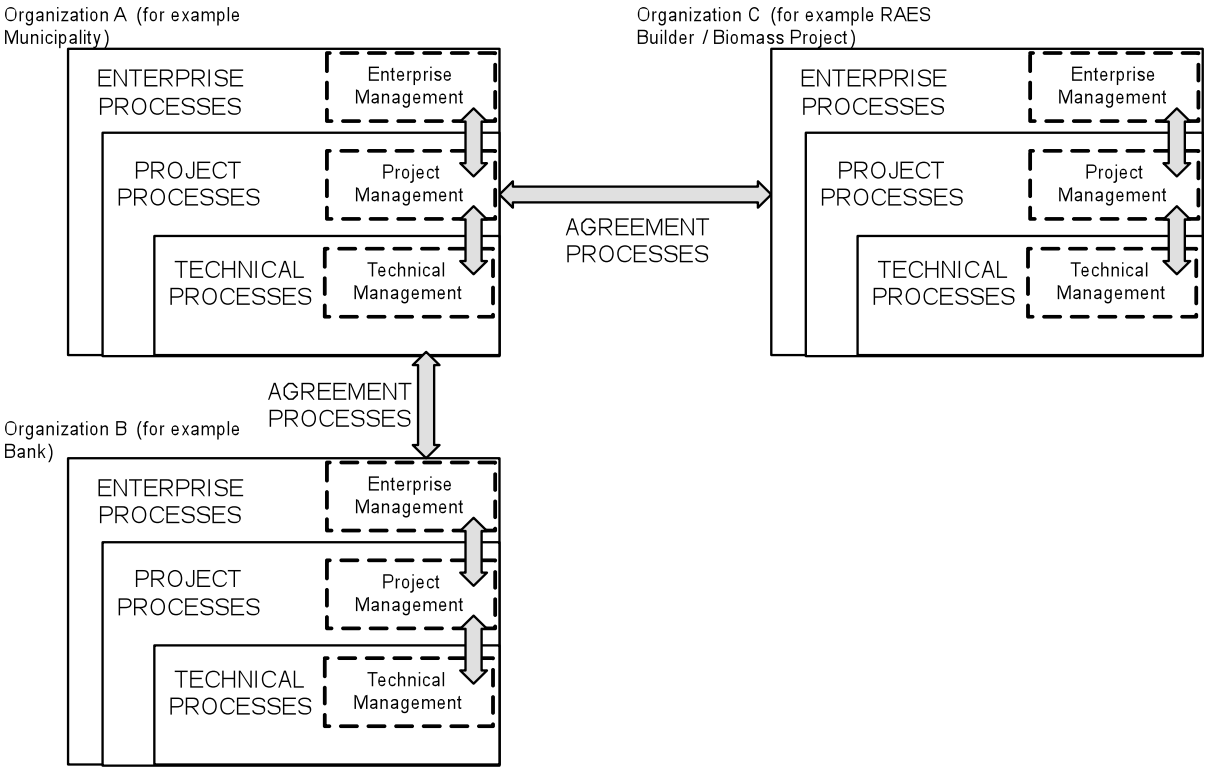


Figure 2. Enterprise, project and technical functions in cooperating organization (a current style of Strategic and Tactical Management).

To change the currently applied Strategic and Tactical Management of the RAES Landscape (see Figure 2) into the new Strategic and Tactical Management, we have developed a new enterprise entity – the Enterprise Management Center (Figure 3).

The EMC operates as an "Agreement Hub". The EMC is the only one enterprise entity running project processes. All other enterprise entities (Investors, RAES Builders and Customers) have access to project services on the basis of individual agreements. The EMC-based solution allows all participants to solve problems typical for the current situation as described above. This means:

- The Clients (the municipalities etc.) don't need to maintain a project office because they obtain all management-relevant information from the EMC according to a Service Level Agreement (SLA) (ITIL V3, 2007).

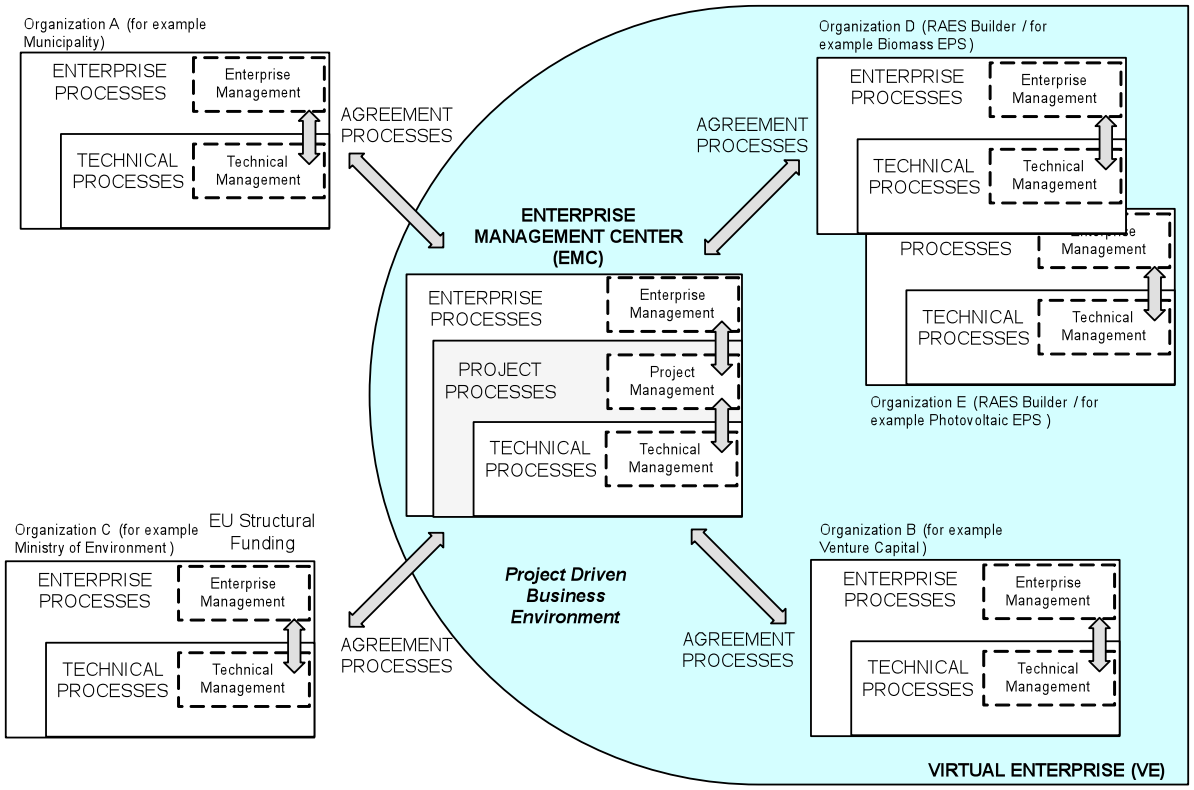


Figure 3. Enterprise, project and technical functions in Virtual Enterprise based on the Enterprise Management Center – EMC (a style of Strategic and Tactical Management to survive in a Project Driven Business Environment).

- The Investors (banks, venture capital, etc.) obtain investment scenarios, called FVC - Financial Value Chain – scenarios which offer different benefits, opportunities, costs and risks (EURADA 2007). These scenarios are outputs from the optimization phase of the EMC Project Portfolio Life Cycle.
- The EMC-based RAES market strategic and tactical management approach allows for the combining of various types of EPS into one multidisciplinary RAES solution.

Additionally, the EMC itself supports two new features – a capability to improve, on a regular basis, the project management maturity level (Kerzner 2001) and the VE - Virtual Enterprise (Tolle et al, 2002). The VE is a goal-oriented, project-focused cooperation among the enterprises or enterprise entities which are the VE's members. One enterprise entity's operation (project management of the EMC) covers certain life cycle activities of other enterprise entities (for example, the RAES Builders or the Investors).

4. Project Portfolio, Strategic and Tactical Management Levels

Estimated costs of a Renewable and Alternative Energy Sources (RAES) project proposal are usually much higher than the Investors are willing to invest in such projects. To limit their risks, Investors prefer a "step by step" strategy, waiting for their profits to come. If Investors are satisfied with such profit they might be ready to invest again. In such circumstances, it is especially important to select an optimal Project Portfolio.

To avoid or minimize misunderstandings or lack of transparency concerning investment portfolios, we define Project Portfolio as flows (Wysocki, 2003):

"Project Portfolio Management (PPM) includes establishing the investment strategy of the portfolio, determining what types of projects can be incorporated in the portfolio, evaluating and prioritizing proposed projects, constructing a balanced portfolio that will achieve investment objectives, monitoring the performance of the portfolio in order to achieve the desired results."

Project Portfolio Management in practice is significantly more complex than the management of a single project. The Project Management Institute (PMI), the leading authority on the subject, published "The Standard for Portfolio Management" to help portfolio managers overcome these difficulties (PMI, 2006). This standard explains the links between portfolio management and program and project management and describes portfolio management processes and organization (Figure 4).

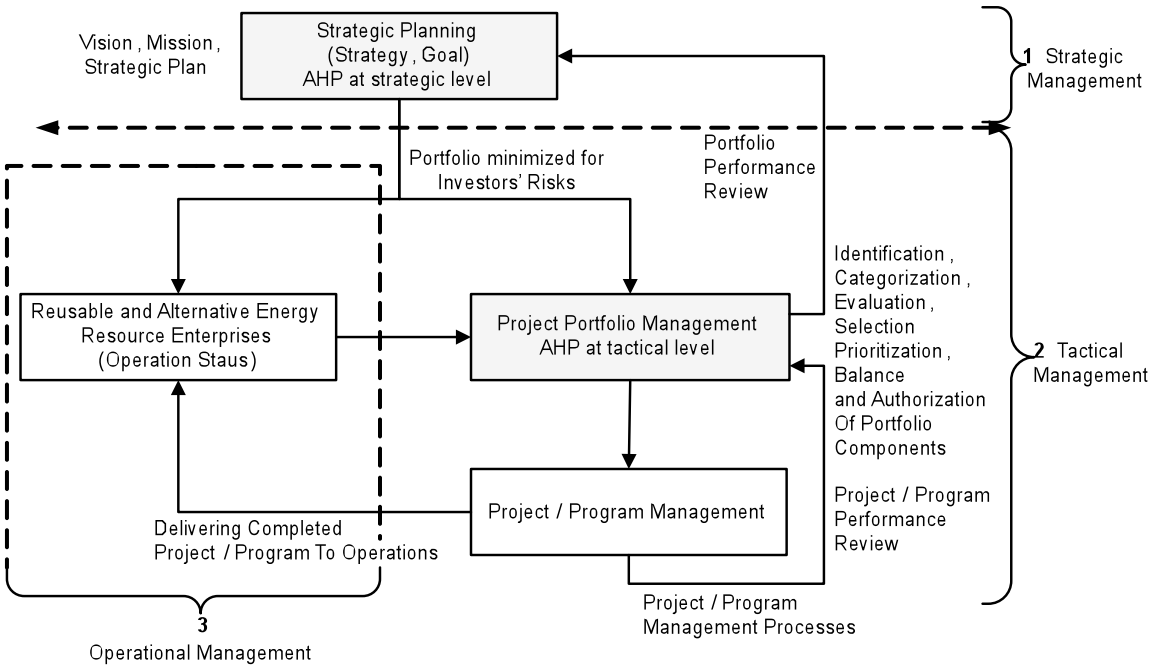


Figure 4. Links between Strategic and Tactical Management and between Project Portfolio, Programs and Projects.

Figure 4 consists of four blocks, one at the Strategic Management Level, two at the tactical level and one at the operational management level. The AHP Method is integrated within the Strategic Planning (SP) and Project Portfolio Management (PPM) modules. The AHP Method implementation in these modules respects the specific features of each module. The Strategic Planning module focuses on a time horizon of three years and decision period (at strategic level) of one year. Inputs into this module include project ideas that are described with a limited number of attributes and with limited precision, based primarily on an estimation of project owners. The Project Portfolio Management module focuses on two horizons, depending on the type of activities (tactical management). The one year horizon and time period of three are typical for Project Portfolio redesign and time horizon of three months and decision period of one week are more typical for project assessment and correction (Feglar, 2004). In addition, the tactical level is tightly coupled with the Project / Program Management (P/PM) and PPM module processes of various events generated by the P/PM module. Information generated by the P/PM module and input into the PPM module (which contains numerous attributes and values) is then delivered to the strategic input (based on the given project ideas).

Strategic management involves three types of stakeholders: Investors, Strategic Management, and Topic Experts. Investors and Strategic Management actively participate in a pairwise comparison of portfolio projects. Topic Experts in Photovoltaic, Plastics, and Biomass and Solar areas are responsible for design of the AHP criteria and their weighting. Later in this paper we introduce a sample that demonstrates the Project Portfolio selection process at the strategic level.

Tactical Management focuses on the Project Portfolio life cycle which consists of the following five phases: Define, Use metrics, Identify the optimal set of projects, Create, and Track. Figure 5 shows the changing status of a project as it moves through this life cycle. There are five different stages in which a project may be during this life cycle: Stage 1 - Define project ideas in complete and standardized ways, Stage 2 - Use metrics that will become the baseline for project funding approval, Stage 3 – Identify the optimal set of projects for portfolio funding approval based on prioritized business drivers and constrains (AHP), Stage 4 – Create a thorough project plan and identify resources, and Stage 5 – Track project success against its baseline. Leverage portfolio expertise to preserve the business value of the investment.

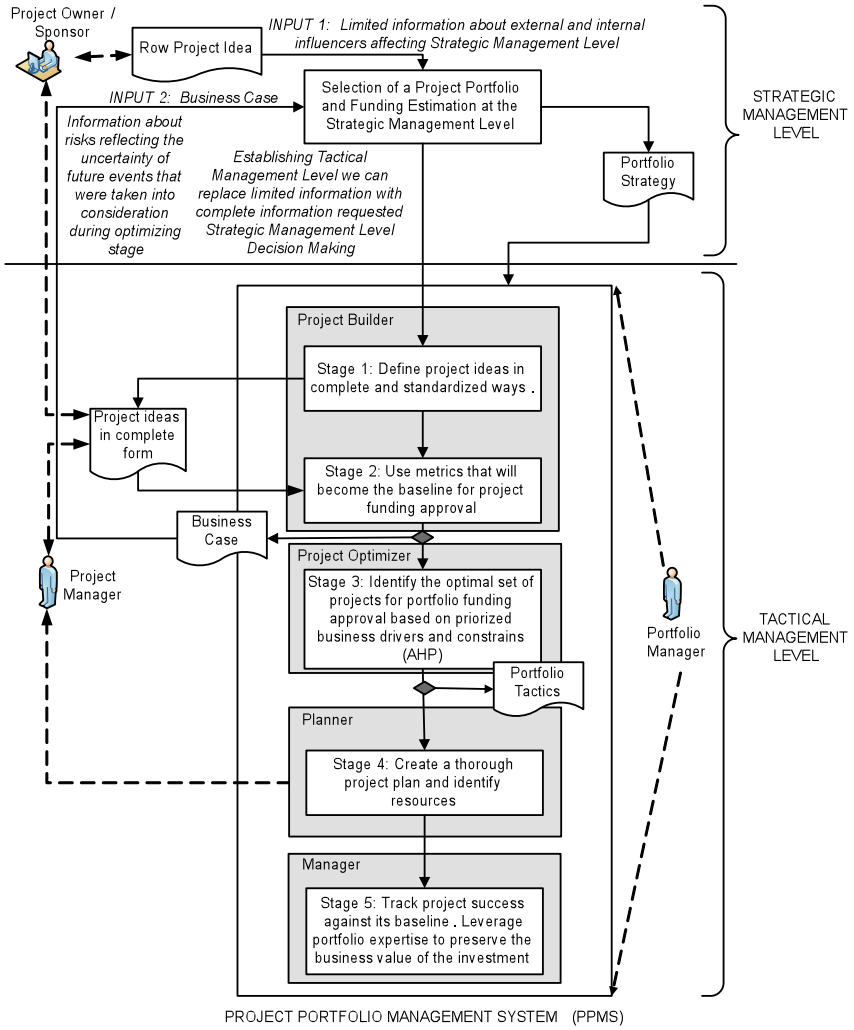


Figure 5. Project Portfolio Life Cycle, the Strategic and Tactical Management Levels.

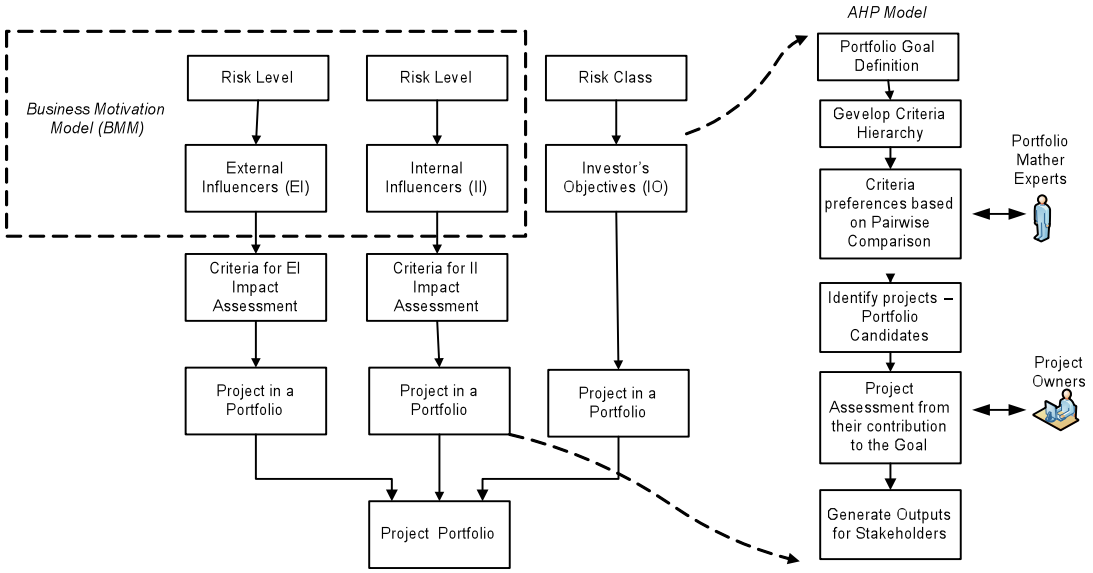
Due to the flexibility and responsiveness of this approach (time necessary for Project Portfolio actualization), the whole tactical management level is solved as a Project Portfolio Management System

(PPMS). This system consists of four blocks: Project Builder (Stage 1, 2), Project Optimizer (Stage 3), Planner (Stage 4), and Manager (Stage 5).

Before a Project Portfolio Management is started we'll need a strategy for it. This strategy is an investment strategy, i.e. how will the enterprise's funding be spread across the portfolio? Once this investment strategy is in place, the enterprise will have a structure for selecting the investment opportunities that will be presented in the form of a Portfolio Strategy. This is a type of strategic phase in which the Portfolio Manager decides how s/he will allocate his/her portfolio budget into the various categories of project investment.

5. The AHP model applied to Strategic Management Level

The AHP Method is a very powerful tool for selecting a Project Portfolio at the Strategic Management Level. We start synthesizing our AHP model with the "Selecting a Portfolio" framework described by Thomas Saaty in his book "Decision Making for Leaders" (Saaty, 2001) modifying each of the three framework hierarchies. The modification is based on the Business Motivation Model (BMM) and ensures that the criteria and the content of a Project Portfolio are focused and relevant to the requirements of the RAES projects (Feglar et al, 2006)) (Figure 6).



Identify Project Portfolio Candidates

P1: EPS-AGT (BIOMASS, Alu. Foil, Plastics, Tires)	Electric Power Station – A production of electricity by burning of biomass , alu. foil, plastics, and tires
	Development of Small Pyrolysis Stations (SPS)
P3: FACTORY (Alu. Foil, Plastics)	Production of PET binder from alu . foil and plastics.
P4: FARM (EPS / BIOMASS, FUEL PLANTATION)	Electric Power Station – A production of electricity by burning of biomass ; growing biomass on plantations
P5:INDUSTRY PARK (EPS / PHOTOVOLTAIC , EMC)	Electric Power Station – A production of A solar electricity; operate Enterprise Management Center services

Figure 6. AHP based DSM for a Selection of a Project Portfolio at the Strategic Management Level.

First, the hierarchy in our model is based on external Influencers, then on Internal Influencers and finally on Investor's Objectives. The portfolio projects being considered are weighted relative to the criteria in each hierarchy. The weights are then combined to get an overall preference list of projects in a portfolio. The various Influencers and objectives which affect the selection of projects for the portfolio include (Figure 6):

- External Influencers (EI): These are the outside Influencers that affect portfolio performance. These Influencers include economic, political, infrastructural Influencers as well as the suppliers and customers.
- Internal Influencers (II): They may be considered a measure of portfolio effectiveness in achieving the desired results (goals, objectives) through the right choice of a course of action (strategy, tactic). These Influencers are profitability, size, infrastructure, availability of resources, and technological control.
- Investor's Objectives (IO): These are the values that motivate investors to fund the Project Portfolio. Investors' motivation can have a great variety of objectives. We focus on the following: profitability, security, excitement, and control.

As we are taking into consideration the influence of an ever-changing business world in our decision model, we must also account for the risks reflecting the uncertainty of future events. The model incorporates the uncertainty of the general business environment, the maturity of a Project Portfolio management (high, medium, low risk), and the risk tolerance of an Investor (high, medium, low). Unfortunately, this risk tolerance information is not a part of the Row Project Idea (see Figure 5). The Project Portfolio established at the Strategic Management Level, however, can be regularly updated using risks-relevant information generated during the optimization stage at the tactical management level. Our template – the "AHP Application for Strategic Management of Renewable and Alternative Energy Sources (RAES) Projects" - starts with a row project's ideas and, therefore, does not include risk calculations.

6. Template: AHP Application for Strategic Management of Renewable and Alternative Energy Sources (RAES) Projects

Environmental protection and quality of environment became the essential themes in implementing the EU economic and social cohesion policy in the programming period 2007 – 2013. The strategic objective of the OP Environment is environmental protection and quality improvement as the basic principle of a sustainable development, with a focus on meeting the EU legislative requirements in the environmental field (the European Parliament, 2004)). The EU environmental protection initiatives led the governments to establish their operational programs reflecting the regional specifics. Each operational program has a priority axis. Renewable and Alternative Energy Sources projects in the Czech Republic are addressed under priority axes numbers three (Sustainable use of energy sources) and four (Improvement of waste management and rehabilitation of old ecological burdens) (Czech Ministry of Environment, 2007).

Both axes mentioned above opened a broad range of RAES projects targeting different renewable energy domains: Wind, Water, Geothermal energy, Solar energy, Biomass, and Waste. Each domain can be split into more specific subsections such as photovoltaic (Solar energy), plastic waste (Waste), etc. To cover such a broad spectrum of projects within one Project Portfolio is not possible. This is the reason why we have started with Project Portfolio templates.

Each template has the same general structure depicted in Figure 6. Specific features of the templates are primarily derived from the specific projects.

Project Portfolio template was designed as a combination of three AHP models which reflect different criteria:

- AHP model for Internal Influencers
- AHP model for Internal Influencers
- AHP model for Investors' Objectives

6.1. Template / Step 1: Weighting of External Influencers

External and Internal Influencers mentioned above are primary influencers that can be split into the criteria at the second hierarchical level. Criteria influencing External Influencers can be summarized as follows:

Table 1. AHP Criteria Hierarchy for Weighting of external influencers.

External Influencers and Criteria	
External Influencer	Criteria Name
Economic	E1:Elasticity of Demand E2: Elasticity of Supply E3: Interest Rates E4: EU Structural funding
Political	P1: Government regulation P2: International Exposure
Technological	T1: State of Technology T2: Goverment Involvement
Suppliers	S1: Depended S2: Independed S3: Single S4: Many S5: Competition
Customer	C1: Primarily on Grid C2: Combined C3: Only Off Grid

The external influences are pairwise compared (Table 2). The comparisons are based on answering a question: Which External Influencer has more impact on portfolio project performance and by how much?

Table 2. Pairwise comparison of external influencers.

External Influencers					
	E	P	T	S	C
Economic (E)		2	0,5	2	0,5
Political (P)			0,33	0,5	0,5
Technological (T)				2	2
Suppliers (S)					0,5
Customers (C)					

As a result of pairwise comparison local weights for External Influencers are obtained:

Table 3. Local weights for External Influencers.

Economic	Political	Technological	Suppliers	Customers
0,209	0,096	0,344	0,141	0,209

Similarly to the pairwise comparison of External Influencers local weights for all criteria are generated.

Table 4. Local Weights for external influencers and criteria.

Local Weights for External Influencers and Criteria			
Level 1		Level 2	
Criteria Name	Local Weight	Criteria Name	Local Weight
Economic	L:,209	E1:Elasticity of Demand	L:,180
		E2: Elasticity of Supply	L:,082
		E3: Interest Rates	L:,539
		E4: EU Structural funding	L:,200
Political	L:,096	P1: Government regulation	L:,750
		P2: International Exposure	L:,250
Technological	L:,344	T1: State of Technology	L:,750
		T2: Goverment Involvement	L:,250
Suppliers	L:,141	S1: Depended	L:,090
		S2: Independed	L:,411
		S3: Single	L:,083
		S4: Many	L:,240
		S5: Competition	L:,176
Customer	L:,209	C1: Primarily on Grid	L:,297
		C2: Combined	L:,540
		C3: Only Off Grid	L:,163

6.2. Template / Step 2: Identification and assigning row project ideas (projects) to the Project Portfolio template

Project Portfolio Template in Figure 6 includes five Row Project Ideas (projects):

- P1: EPS-AGT (BIOMASS, Aluminum Foil, Plastics, Tires). Project goal: Electric Power Station – A production of electricity by burning of biomass, aluminum foil, plastics, and tires.
- P2: PYROLYSIS (SPS Development). Project Goal: Development of Small Pyrolysis Stations (SPS)
- P3: FACTORY (Aluminum Foil, Plastics). Project Goal: Production of PET binder from aluminum foil and plastics
- P4: FARM (EPS / BIOMASS, FUEL PLANTATION). Project Goal: Electric Power Station – A production of electricity by burning of biomass; growing biomass on plantations
- P5: INDUSTRIAL PARK (EPS / PHOTOVOLTAIC, EMC). Project Goal: Electric Power Station – A production of solar electricity; Operation of Enterprise Management Center services.

6.3. Template / Step 3: Weighting of Internal Influencers

Weighting of Internal Influencers goes through the same process, i.e. Construct a two-level hierarchy of Influencers and criteria and obtain the weights for Influencers. Criteria which affect Internal Influencers can be summarized as follows (BRG, 2007).

The Internal Influences are pairwise compared (Table 5). The comparisons are based on answering the following question: Which External Influencer has more impact on Portfolio Project performance and by how much?

Table 5. AHP Criteria Hierarchy for Weighting of Internal Influencers.

Internal Influencers and Criteria	
Internal Influencer	Criteria Name
Size	S1: Sales S2: Labor Force S3: Assets S4: Market Structure
Infrastructural	I1: Facility / Location I2: Accessibility I3: Maintainability I4: Production Flexibility
Resources Availability	R1: Whole Year R2: Seasonally
Profitability	P1: ROI P2: Cash - Flow P3: Financial Obligation Period P4: Liabilities
Technological Control	TC1: R&D Quality TC2: Operational Age TC3: Pollution Effect

Table 6. Pairwise Comparison of Internal Influencers.

Internal Influencers					
	S	I	R	P	T
Size (S)		0,5	0,25	0,167	0,2
Infrastructural (I)			0,5	0,33	0,4
Resources Availability(R)				0,06	0,07
Profitability(P)					1,2
Technological Control (T)					

As a result of pairwise comparison we obtain local weights for Internal Influencers:

Table 7. Local Weights for Internal Influencers.

Size	Infrastructural	Resources Availability	Profitability	Technological Control
0,056	0,111	0,222	0,333	0,278

Similarly to the pairwise comparison of Internal Influencers we calculate local weights for all criteria.

Table 8 shows the result of this calculation.

Table 8. Local Weights for Internal Influencers and Criteria.

Local Weights for Internal Influencers			
Level 1		Level 2	
Criteria Name	Local Weight	Criteria Name	Local Weight
Size	L:,056	S1: Sales	L:,489
		S2: Labor Force	L:,113
		S3: Assets	L:,125
		S4: Market Structure	L:,272
Infrastructural	L:,111	I1: Facility / Location	L:,444
		I2: Accessibility	L:,222
		I3: Maintainability	L:,111
		I4: Production Flexibility	L:,222
Resources Availability	L:,222	R1: Whole Year	L:,750
		R2: Seasonally	L:,250
Profitability	L:,333	P1: ROI	L:,375
		P2: Cash - Flow	L:,375
		P3: Financial Obligation Period	L:,125
		P4: Liabilities	L:,125
Technological Control	L:,278	TC1: R&D Quality	L:,545
		TC2: Operational Age	L:,182
		TC3: Pollution Effect	L:,273

6.4. Template / Step 4: Weighting of Investors Objectives

Table 9. Local Weights for Investors' Objectives.

Profit	Control	Security	Minimal Excitement
0,056	0,111	0,222	0,333

6.5. Template / Step 5: Final Weights of the Project Portfolio and Funds Allocation

To obtain the final priority of the Project Portfolio, we weight each criterion (external, internal, objectives) and perform the multiplication and addition. The table 9 shows the final weights for the four Weighting Schemes for the criteria (1:1:1, 1:1:2, 2:1:1, and 1:2:2). We note that the project P5 - INDUSTRIAL PARK (EPS / PHOTOVOLTAIC, EMC) ranks first in all Weighting Schemes.

Table 10. Final Weights of the Project Portfolio.

Portfolio Project Priorities (Inv. Risks, External Influencers)	Ext. Infl.	Int. Infl.	Inv. Obj.	1:1:1	1:1:2	2:1:1	1:2:2
Portfolio Project	Priority	Priority	Priority				
P1: EPS-AGT (BIOMASS, Alu. Foil, Plastics, Tires)	0,253	0,203	0,152	0,33	1,46	0,21	0,46
P2: PYROLISIS (SPS Development)	0,205	0,178	0,188	0,49	2,56	0,32	0,67
P3: FACTORY (Alu. Foil, Plastics)	0,2	0,215	0,164	0,40	1,90	0,27	0,52
P4: FARM (EPS / BIOMASS, FUEL PLANTATION)	0,174	0,268	0,228	0,52	2,33	0,37	0,64
P5: INDUSTRY PARK (EPS / PHOTOVOLTAIC, EMC)	0,168	0,136	0,268	0,88	5,80	0,57	1,22

For better understanding the modeling power of Weighting Schemes we demonstrate an example describing various possibilities to allocate funds to portfolio projects. Total funds are 140.5 million EUR. Table 10 illustrates three possibilities of funding that are derived from the Weighting Schemes.

Table 11. Investment scenarios derived from the Project Portfolio Weighting Schemes.

Various investment scenarios derived from Weighting Schemes						
Weighting Scheme	1:1:1		1:1:2		2:1:1	
	Weights	Founds [mil EUR]	Weights	Founds [mil EUR]	Weights	Founds [mil EUR]
	0,33	17,7	1,46	14,6	0,21	16,76
	0,49	26,27	2,56	25,6	0,32	25,84
	0,4	21,45	1,9	19	0,27	21,6
	0,52	27,89	2,33	23,3	0,37	29,67
	0,88	47,19	5,8	58	0,57	46,03
SUM		140,5		140,5		140,5

For example, Weighting Scheme 1:1:2 stresses the importance of project‘s contribution to Investor’s Objectives. Project P5 is a project with the highest contribution to Investors’ Objectives and, therefore, we allocate to this project 58 millions EUR instead of 47.19 million (Weighting Scheme 1:1:1). Graphical representation of Tables 10 and a Table 11 is depicted in the Figure 7. Investment Scenario Graph and Final Weights Graf. Especially Investment Scenario Graph clearly shows how sufficiently each scenario can influence amount of money that is finally approved for each portfolio project. For example project P5 can have 58 millions in accordance with weighting scheme 1:1:2 but only 46 millions accordance with weighting scheme 2:1:1.

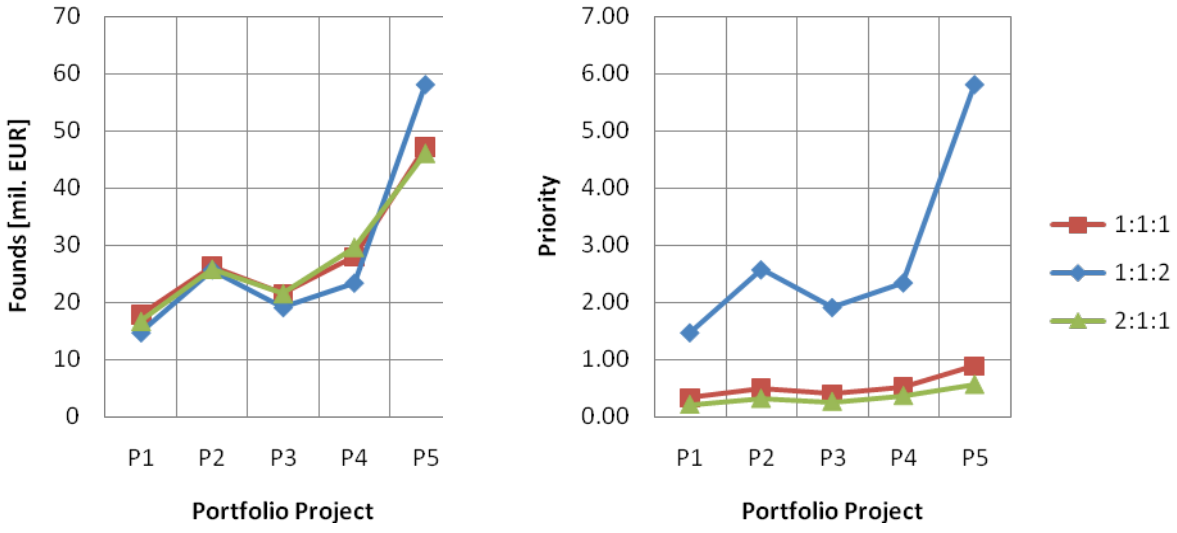


Figure 7. Investment Scenario Graph and Final Weights Graf.

7. Conclusion

The AHP Method is getting increasing attention and gaining in popularity thanks to its bona fide potential for implementation in many decision making areas. Project Portfolio Selection and Optimization - one of

these areas - is now in a period of significant changes. For the previous few decades, the primary attention was given to investment portfolios which worked with the existing enterprises. A very novel direction has appeared just a few years ago as a phenomena pushed by project-driven enterprises. Researchers' attention turned to a more abstract and dynamic Project Portfolio. Our paper describes the concepts necessary to understanding of this new enterprise management trend and it explains the importance of a smart implementation of the AHP decision support modeling to the Strategic and Tactical Management Levels. A special attention is given to Selection of a Project Portfolio and Funding Estimation at the Strategic Management Level using the AHP Method. Based on our research we can improve strategic decision making combining two types of inputs (see Figure 8):

- INPUT 1: Row Project Idea with limited information about External and Internal Influencers affecting Strategic Management Level
- INPUT 2: Business Case with Information about risks reflecting the uncertainty of future events that were taken into consideration during optimizing stage

Our future work will target all aspects influencing the AHP decision making process at the Standard.

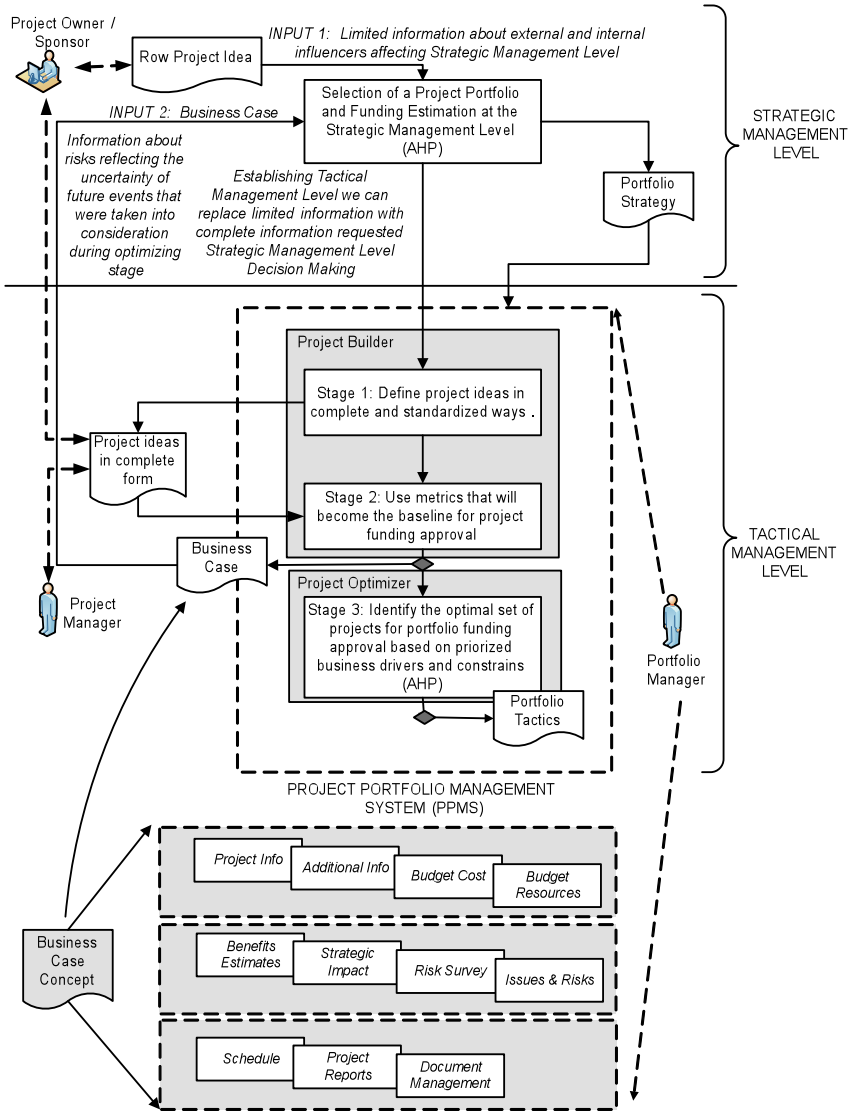


Figure 8. AHP Strategic Decision Modeling combining Row Project Idea and Business Case.

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