

Master's Thesis, EN310E

**“The Uncertain Future of Australian LNG Projects: The Use of
Scenario Building in Strategic Management”**

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Abstract

Around US\$ 200 billion was invested in liquefied natural gas (LNG) projects of Australia (period 2005-2013). By 2017 Australia is expected to have export capacity around 88 million metric tonne per annum (mmtpa), thus surpassing Qatar and becoming the largest supplier in Asia Pacific region. This LNG boom attracted investors to Australia and spurred competition for resources.

High demand and competition in the Asia Pacific region is showing importance for Australian projects to be on-time and on-budget in order to be competitive. But Australian LNG projects are experiencing cost overruns and delays. The costs of the projects exceed budget by between 12 and 40%. The project investors and operators are major oil and gas companies.

This thesis examines three Australian LNG projects under construction: Browse, Gorgon and Wheatstone. In order to explore the possible reasons for issues faced by projects they will be compared with three existing LNG facilities in Australia: Pluto and North West Shelf Venture.

This thesis examines possible reasons for the delays and cost overruns faced by Australian LNG projects. The Royal Dutch Shell scenario planning principles as applied by Adam Kahane (2012) and KPMG (2011) are assessed as a management tool for project planning. In order to identify factors influencing the planning process a discussion on findings made by various researchers is included: Pinto (2013), Parker Gates (2010) and Zakhary Wong (2007). They tried to identify common reasons that cause cost overruns and delays in projects and made certain suggestions to minimize issues.

The analysis of selected projects showed that the future is inherently uncertain and even the largest and most experienced companies can run into trouble. Internal and external factors influence projects at the planning, decision making and implementation stages. Global competition and high concentration of LNG projects in one area of Australia made existing challenges more critical. This spurred competition and might be a reason for high LNG prices in the future.

Though it is not possible to predict exact cost and start dates of projects, especially in the long-term, a scenario planning approach can help minimize cost overruns and delays by making strategic planning more flexible and transparent. That helps ready companies for different outcomes.

Key words: project management, scenario planning, strategic planning, transparency, LNG, Australia.

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As a second year master student in Energy management program I decided to write my thesis on this particular subject because I wanted to apply all knowledge and experience gained during my studies. This thesis can be perceived as a resume of everything I have learned during this program.

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Content

Abstract	i
Acknowledgements	iii
List of figures	vi
List of tables	vii
1. Introduction	1
1.1 Background of the thesis.....	1
1.2 Importance of using right approach for future planning.....	1
1.3 Relevance of the research.....	2
1.4 Problem statement and research questions.....	2
1.5 Reason for carrying out research on Australian LNG projects.....	3
1.6 Plans for answering research questions.....	3
1.7 Structure of the thesis.....	4
2. Theoretical framework	5
2.1 Uncertainties in the project planning caused by “Deadly sins”.....	5
2.2 Royal Dutch Shell scenario planning principles.....	11
2.3 Critical success factors and scenario planning.....	14
2.4 Scenario planning as a management tool.....	16
2.5 The human factor in project management.....	19
2.6 Criticism on Scenario planning.....	22
3. Methodology	28
3.1 Timeframe of research.....	28
3.2 Thematising and Designing.....	28
3.3 Research question development.....	29
3.4 Philosophical position.....	29
3.5 Research design.....	30
3.6 Data collection and analysis.....	31
3.7 Why I selected particular projects?.....	31
3.8 Criticism, obstacles and limitations, validity and reliability issues.....	31
4. Empirical findings	33
4.1 Current situation for Australian LNG projects.....	33
4.1.1 “Asian LNG market”.....	38
4.1.2 Problems faced by Pluto and Browse LNG projects.....	39
4.1.3 Problems faced by Gorgon and Wheatstone LNG projects.....	42
4.1.4 Initial planning for projects.....	44

4.1.5 The NWSV comparison	55
4.2 Internal factors influencing success for Australian LNG projects	58
4.2.1 “Australian situation”	58
4.3 External factors influencing success of the projects	60
4.3.1 Major rivals in the APR	61
4.3.2 Fukushima effect.....	68
4.4 “Landed cost” challenge	73
4.5 Lessons learned: future is uncertain, most of the “critical success factors” change over time	76
5. Discussion and analysis	77
5.1. Seven deadly mistakes identified by Pinto.....	77
5.2 Scenario planning.....	80
5.3 Critical success factors.....	81
5.4 “Human Factor”	81
5.5 Do we plan future or is it future influencing our decisions?.....	83
6. Conclusion	85
6.1 Summary of the study	85
6.2 Contribution	87
6.3 Limitations of research.....	87
6.4 Research opportunities for the further disposition of the thesis	88
VII. References	89

List of figures

Figure 2.1 Timeline of uncertainty	9
Figure 2.3 Hierarchy of CSF	14
Figure 2.3 The strategic Process: Strategic Planning and Strategic Thinking.....	15
Figure 2.4 Three types of uncertainties.....	17
Figure 2.5 Phases of scenario planning.....	18
Figure 2.6 Figure 2.6 Project success.....	19
Figure 2.7 Project success	20
Figure 2.8 Team performance elements.....	20
Figure 2.9 Values, behavior and consequences.....	21
Figure 4.1 Map showing Australia’s major LNG projects in production, development and planning.....	34
Figure 4.2 Australia’s LNG exports	38
Figure 4.3 Timeline of Pluto project.....	41
Figure 4.4 Costs of LNG projects.....	44
Figure 4.5 Costs of LNG projects.....	48
Figure 4.6 Timeline of Browse project.....	50
Figure 4.7 Browse project: new timeline.....	51
Figure 4.8 Cost escalation and CPI.....	57
Figure 4.9The contrasting trend in import requirements in the US and Asia-Pacific.....	64
Figure 4.10 Access to markets – shipping distances.....	65
Figure 5.1 Proactive action and uncertainty.....	80
Figure 5.2 Rework and strategic planning through scenario planning.....	82
Figure 5.3 Project success and alternative realities.....	82
Figure 5.4 Human factor forming expectations.....	83

List of tables

Table 2.1. Estimation errors by project class.....	9
Table 2.2 Types of scenario planning offered by KPMG.....	16
Table 2.3 Potential pitfall of scenario planning and solutions.....	18
Table 3.1 Approximate timeframe of my research.....	29
Table 4.1 Australian LNG projects.....	35
Table 4.2 Issues faced by Pluto project.....	41
Table 4.3 Issues faced by Browse project.....	42
Table 4.4 Issues faced by Gorgon project.....	43
Table 4.5 Issues faced by Wheatstone project.....	45
Table 4.6 Initial planning for Pluto project.....	45
Table 4.7 Initial planning for Browse project.....	49
Table 4.8 Gorgon project timeline: Chevron perspective.....	52
Table 4.9 Wheatstone project timeline.....	55
Table 4.10 Natural gas in East Africa.....	66
Table 4.11 Asia/Pacific National Natural Gas Consumption (Bcma) ad Compound Annual Average Growth %	70
Table 4.12 Japanese utilities investment in Australia LNG projects.....	71
Table 4.13 Summary of new options for Asia’s LNG supply.....	72
Table 4.14 Landed cost comparison.....	75
Table 4.15 Compressible and incompressible differences: Australia vs Canada.....	75
Table 5.1 Analysis of “Australian challenges” based on “seven deadly sins” by Pinto (2013).....	79
Table 5.2 Suggestions made by Pinto (2013) and challenges faced within Australian projects.....	80

List of acronyms

APPEA – Australian Petroleum Production and Exploration Association

CSF – Critical Success Factors

NWSV – North West Shelf Venture

RDS – Royal Dutch Shell

1. Introduction

1.1 Background of the thesis

Many projects experience cost overruns and delays. Despite involvement of experienced companies project planning is always a challenge. Companies invest and managers commit to their projects, leaving unanswered question of “how to better plan for the future?” and “which factors are the most critical for project success?” The future is uncertain and planning for future faces obstacles and limitations. Econometric forecasts help estimate cost of projects, but cannot measure effect of all factors influencing final cost of the projects. They take into consideration factors of today and cannot estimate how much the environment might change in the future and what new factors might come into play. Studies conducted on project issues by Pinto (2013) and Parker Gates (2010) showed that projects rarely meet their initial costs and deadlines. Therefore it is important to consider different approaches for planning for future.

1.2 Importance of using right approach for future planning

Managers have different approaches to project planning. It is important to start planning process correctly by choosing right approaches and tools. Strategic management offers various methods in order to plan for future. They help to measure internal and external environment, make certain calculations, and identify critical success factors. The benchmarking method helps to study from the real life case using lessons learned from existing project. But relying on previous experience can be dangerous because it might create “anchoring effect” and prevent of seeing new challenges (Pinto, 2013). Previous experience is based on the past, but circumstances change over time. In order to plan for future it is better to be flexible and prepared for different outcomes. Is it possible to foresee all potential outcomes and how can we consider all possible factors that might have influence on project outcome? Kees van der Heijden from Royal Dutch Shell said that “Whenever life becomes more hectic and uncertain, scenario planning becomes more popular” (Kahane, 2012). Scenario planning principles offer to consider several options and create possible scenarios for future. It is important to understand that scenario planning principles give alternative options in order to minimize future uncertainties but not “predict the future” (Kahane, 2012).

That is why in my work I describe how scenario planning principles can be used as a management tool making strategic planning as a continuous cyclical process (Parker Gates, 2010). This approach does not forecast fixed cost and deadline, but helps to be prepared for future uncertainty with minimum harm.

1.3 Relevance of the research

Project management is a complex process which depends on project participants, external environment, politics, country peculiarities, resource availability and human factor. When projects face issues of cost overruns and delays it is important to evaluate planning process and factors influencing it. Different factors have influence on the planning, decision making and project implementation stages. Some of those factors are known whereas the others are show up later. Thinking strategically and committing to the project is important (Parker Gates, 2010). But why cost overruns and delays still occur? When strategic planning is perceived as a non-static process it becomes easier to identify problems and make necessary changes at the early stages (Parker Gates, 2010). An open and open-ended discussion of challenges and possibilities can also help to evaluate hidden factors influencing the project. It also creates mutual trust and transparency as a basis for cooperation.

1.4 Problem statement and research questions

The problem statement of thesis is “What kind of forecasting method is used for investment decisions like those in large-scale Australian LNG projects?”

- A) Econometric market projections?
- B) Qualitative scenario building among management according to the approach pioneered by the oil company Shell in the 1970s?

Empirical sub-questions:

- 1) How have company management in fact made investment decisions for the Australian LNG projects?
- 2) What are the possible reasons for the delays and cost-overruns? Would it have been possible to avoid those mistakes or was it just a “bad luck”?

1.5 Reason for carrying out research on Australian LNG projects

Australia is a resource-rich country and has great potential for LNG (Lee, 2013). Many oil major companies have invested in Australian LNG projects. This country is expected to be the leading exporter to the Asia Pacific region (Lee, 2013). According to APPEA¹ (2013) the government of Australia is interested in supporting these projects as a country's priority. "It is estimated that it is approximately US\$ 207,658 billion (\$200 billion Australian dollars as of 01.01.2013) have already been invested in these projects" (APPEA, 2013, p. 1). Despite investments involving many actors including international and local companies these projects are experiencing problems. The main problems occur as cost overruns, delays in schedule and some CSR problems. As it is seen from the "Policy Priorities" for 2013 the government is fully aware of reasons causing these problems and even has plans for solving them (APPEA, 2013). Project participants are mainly "three leading" companies such as Shell, Chevron and ExxonMobil with required experience and technological solutions (Chevron, 2009, p. 1).

"The market for Australian LNG is Asia Pacific region with Japan relying on natural gas after Fukushima disaster and emerging economies such as China and India" (Ellis, et al., 2013, pp. 7-9) . At the same time Australia is not the only country exporting to Asia Pacific region. There are many rivals and country has internal obstacles to work on. The question arises why these projects are experiencing such problems putting at risk the whole country and stakeholders from the supply side and questioning energy security for Asia Pacific region.

1.6 Plans for answering research questions

For my thesis I used qualitative analysis and secondary data from official sources of information. The data mainly consists of project reports, publications, articles written by independent observers (not involved in the LNG projects) and reports made by relevant organizations such as EIA, IEA, APPEA. As for the theoretical part I have used the Royal Dutch Shell scenario planning principles together with findings of Jeffrey Pinto (2013) about critical and common managerial mistakes that cause unexpected costs and delays and described how they work within different organizations and situations. I also mention the work of Adam Kahane (2012) applying scenario planning to various projects and "KPMG solutions" for this method. I tried to look

¹ Australian petroleum production & exploration association

further and described the possible reasons that influence project outcome by using methods offered by Zakhary Wong (2007) who emphasized human factor in project management, and some critical success factors approach offered by Linda Parker Gates.

1.7 Structure of the thesis

In order to write the thesis and open up a stated problem I used the structure consisting of six parts. First part describes what the paper is about and the reason for choosing the topic. Second part describes the methods and approaches used for planning in uncertain environment from different perspectives based on real life experience. Third part describes research methods used to write thesis. Fourth part consists of empirical findings. Fifth part consists of analysis and discussion. Sixth part is made of conclusion.

2. Theoretical framework

2.1 Uncertainties in the project planning caused by “Deadly sins”

Project planning is always difficult task and requires accurate estimates. There are many expectations from projects and even more unanswered questions. Jeffrey Pinto (2013, p. 644) from Indiana university tried to answer his own question: “why is it that interest in project management is at an all-time high, professional project managers are being developed within numerous corporations, and project management training and educational opportunities abound, yet numerous projects themselves are still consistently failing to deliver promised value?”. Pinto (2013, p. 644) identified seven “deadly sins” that project managers often do and which cause problems for the projects down the road. Most of them are linked the human factor: “errors of optimism bias, artificial plan manipulation, poor change control, and inadequate risk management” (Pinto, 2013, pp. 645-649). These seven deadly sins will be called mistakes in the rest of the text.

As a first “deadly mistake” Pinto (2013, p. 645) defines “optimism bias” as “individual’s or organization’s belief that they are less at risk than anyone else for experiencing a negative consequence” (cited in Shepperd, et. al, 2002). Pinto (2013, p. 645) lists many factors causing this problem such as: “their desired end state, their cognitive mechanisms, the information they have about themselves versus others, and overall mood”. Further he emphasizes existence of several effects influencing the ability to manage projects “on-time”, “on-budget”, and “to specifications” (Pinto, 2013, p. 645). Pinto (2013, p. 645) refers to implications made by Buehler et. al (1994) when explaining project scheduling and planning fallacy:

“People in general are more likely to underestimate their own, but not others’, completion times”.

“When people make estimates they prefer focusing on plan-based scenarios and ignore relevant past experiences”.

“People undervalue the previous experience and tend to see it as problems caused by independent factors and “other people’s personal mistakes””.

The problem of failure in projects is a serious issue and according to various researches it is a result of many reasons. Thus, mainly projects fail as a result of wrong estimates and ignorance of information (Pinto, 2013, cited in Bent Flyvbjerg et.al, 2009). Pinto (2013, p. 645) defines wrong estimates as “delusion caused by orientation on inside view of the project focusing only on the

plan itself". He seriously criticizes this "inside view", defining it as "a bottom-up decision making process that discounts the wealth of historical data, past experiences, and environmental factors that are likely to affect the projects" (Pinto, 2013, p.645, cited in Flyvbjerg, et.al , 2009).

In order to explain harmful effect of "delusion" (Pinto, 2013) uses combination of some techniques. For example he uses term of "planning fallacy" which is caused by anchoring and adjustment (Pinto, 2013, p. 645). "Anchoring" has negative influence because people forget that this "number is actually artificially derived" (Pinto, 2013, p. 646). In order to demonstrate how critical it is to use a "right starting point" for accurate assumptions he gives example of London Olympics project, where "cost raised from initial £1.8 billion in 2002 to £11+billion in 2012" (Pinto, 2013, p. 646). Interesting fact is that "planners already knew that Barcelona had cost of £8.06 billion in 1992 already and Beijing had £9.8 billion in 2008" (Pinto, 2013, p. 646).

The second "deadly mistake" called by Pinto (2013, p. 646) is "massaging the plan". He explains that sometimes "managers tend to shrink the plan according to their own understandings of the plan and this is mainly issue of trust, or different perception and better knowledge of the plan" (Pinto, 2013, p. 646). If one team member offers to the decision making body his plan he is likely to adjust it to make sure the "top level" will find it "right" and approve it (Pinto, 2013, p. 646). But, apart of these issues Pinto (2013, p:646, cited in Flyvbjerg, 2005) suggests other motives such as "strategic misinterpretation" principle: "sometimes there are political motives to underestimate project costs and schedules". Pinto (2013, p. 646) gives example of Boston's Central Tunnel/Artery project, with initial cost of \$2.54 billion, and final cost of \$15 billion. In order to find out the reason Pinto (2013, p. 646) proposes to look at problem through two questions: "poor estimates?" or "planners did it on purpose in order to get project approved?"

In order to answer these questions Pinto (2013, pp. 646-647) suggests the following explanations: "1. When projects are honestly estimated they will follow initial deadlines of completion, no matter how much they were changed after. He supports this argument by the fact that many projects that are considered to be late at the time of completion actually are just following their original, "true deadline". 2. Project teams and their leaders are reacting on the project cuts in cost or deadline, by investing more effort in other parts of the projects in order to meet those expectations. Thus, at the end they are not avoiding costs, but may be even paying more than expected". Of course, at the first look "it might give illusion that they did all what is possible in order to prevent these "costs" and "meet deadlines"" (Pinto, 2013, p. 647).

The third mistake described by Pinto (2013, p. 647) is “Creating project death marches”. Pinto (2013, p. 647, cited in Yourdon, 2004) explains this expression as “projects that are initially “born to fail” under demands of a company and relying on expectation that team will manage somehow to survive the project”. In other words Pinto (2013, p. 647) considers “the death march as projects whose parameters exceed the norm by at least 50%”. He explains it in the following way: “1. The schedule is compressed and is 50% shorter than was supposed to be; 2. The number of project team members is 50% less than was supposed to be; 3. The budget and other required resources are 50% less than were supposed to be” (Pinto, 2013, p. 647). Pinto (2013, p. 647) also points that “external factors add additional pressure” on this. As example he gives assumption that may be “competition was so high among companies so that in order to win the bid they had to show “nice numbers” and after firm simply could not support to hire required amount of people or support the project team” (Pinto, 2013, p. 647). All these factors have impact on project from the very beginning, and there is no exact answer on why it is happening (Pinto, 2013).

Pinto (2013, p. 647) made a conclusion that massive projects fail despite their efforts to perform just because they were “initially set up to failure due to the conditions they were under”.

Fourth mistake caused by “End date-driven schedules” defined by Pinto (2013, p. 647) as very dangerous since it brings more harm than it seems. From first look it seems to be reasonable to plan things and “set a certain deadline, but then managers fall into the trap: they simply organize and plan things not from the initial start, but orienting on the dead-line” (Pinto, 2013, p. 648). Pinto (2013, p. 648) sees this situation more as a “demotivating rather than challenging, because very often team members and managers after receiving the plan based on dead-line do not have enough resources to complete it on time”. Thus he points that “must be completed on deadline principle does not work” (Pinto, 2013, p. 648). Second negative impact described by Pinto (2013, p. 648) is that once deadlines are announced the scheduling starts to be planned without taking seriously many other factors. “Very often managers and the team driven by the deadline simply ignore or underestimate important issues related to comprehensive planning, risk assessment, scope development, and numerous other elements” (Pinto, 2013, p. 648). The conclusion made by Pinto (2013, p. 648): “if schedule is driven mainly by deadline there should be commitment and support from the top management and ability to provide all necessary resources and support costs”.

Fifth mistake happens when there is “Lack of relevant project management training” (Pinto, 2013, p. 648). Pinto (2013, p. 648) compares this problem with “phenomenon known as “knowledge management””. Thus he argues that really experienced and qualified managers after aging leave the company taking their knowledge with them (Pinto, 2013, p. 648). Organization on the other hand remains with less experienced staff that has to learn all those skills on their own (Pinto, 2013, p. 648). The cost of such “learning through experience often costs a lot for the company and achieved through many trials and errors made by new staff” (Pinto, 2013, p. 648).

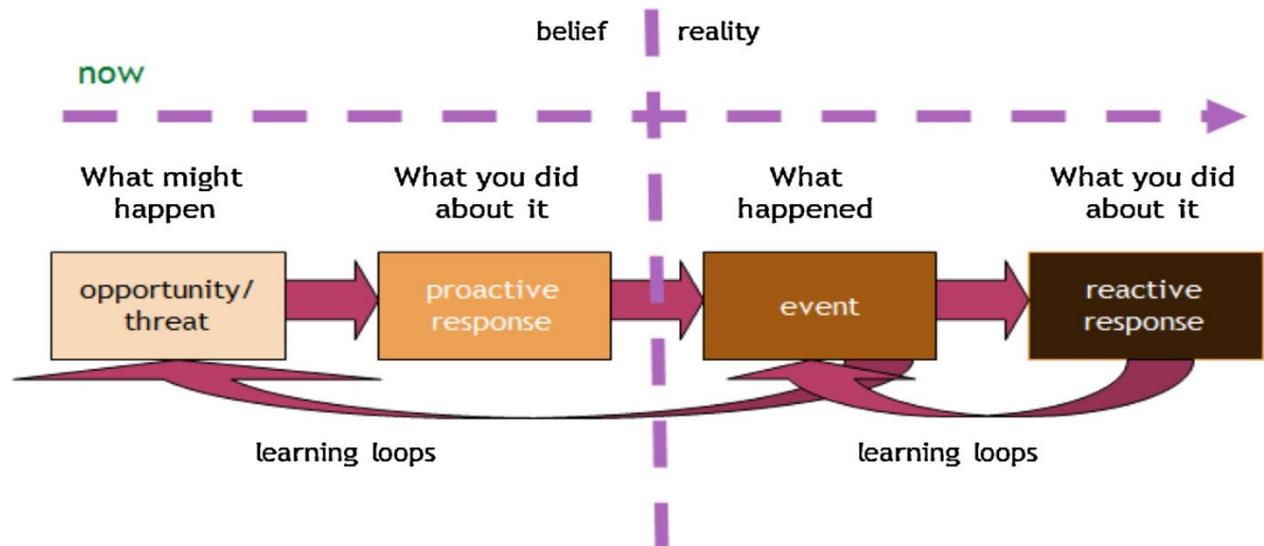
Sixth mistake is caused by “poor change control” (Pinto, 2013, p. 649). Sometimes it happens that during the project implementation environment simply changes and it is very important to be flexible enough to adapt to those shifts (Pinto, 2013, p. 649). If the team is not managing to bring all required modifications during the process they face so called “rework” (Pinto, 2013, p. 649). Pinto (2013, p. 649) describes this process as a “result of failure caused by the wrong estimates”. It happens when “team cannot adequately point all possible problems related to technical, commercial and developmental issues” (Pinto, 2013, p. 649). This “rework” means stepping back to the earlier stage of the project and starting from the beginning, which can be really painful (Pinto, 2013, p. 649). He explains that “rework is important part in the project management, despite the fact that many organizations do not like it. Some of them simply ignore it thus putting the whole project at risk” (Pinto, 2013, p. 649). Pinto (2013, p. 649) based on his own experience and research has concluded that “it is impossible to eliminate all the causes of rework”. Instead he recommends paying attention at the following reasons causing the rework (Pinto, 2013, p. 649):

“Changing requirements – better to get the specifications right before the project is completed”;
“Engineering “gold plating”, - the desire to continuously add features outside of the initial scope in order to give the project a bigger “wow” factor”;
“Poor initial planning and scoping – when engaging in bad planning, critical steps or activities are neglected, which always come back to haunt the project”.

Pinto (2013, p. 649) warns that referring to rework should be done carefully. He suggests using Cooper’s (1994) distinction between “known and undiscovered rework” (Pinto, 2013, p. 649). While known rework is predictable in terms of costs and scope, undiscovered rework can be time costly and it is really difficult to estimate it (Pinto, 2013, p. 649).

Final mistake defined by Pinto (2013, p. 649) is “Superficial risk management”.

Risk is uncertain situation or unexpected event that causes damages (Pinto, 2013, p. 650). There are many techniques and strategies in order to overcome risk, but there is no common one for all projects (Pinto, 2013). Pinto (2013, p. 650) suggests thinking about risk as “a product of two dimensions: likelihood and consequence”. In other words risks should be identified in terms of “probability or likelihood and managers should be aware of possible consequences” (Pinto, 2013, p. 650). Pinto (2013, p. 650) gives very good illustration for uncertainty.



Source: Winch (2010)

Figure 2.1 Timeline of uncertainty (Pinto,2013)

Pinto (2013, p. 650) refers to this figure as very good illustration on risk management and approaches. Here we see both types of responses towards uncertainties: “proactive and reactive” (Pinto, 2013, p. 650). Practice shows that most of the time managers and teams are using reactive response on a certain event (Pinto, 2013, p. 650). This leads to the problems because they see only top of the iceberg. “The real problem is not event itself, it is a result of existing opportunities and threats that were actually obvious since the beginning” (Pinto, 2013, p. 650). Thus, “identifying the real reason of event will lead to the proactive response which is more efficient and gives better results” (Pinto, 2013, p. 650). Pinto (2013, p.650) emphasizes the importance of proactive response stating that “proactive management is about responding to events and learning from them in order to plan better in the future.” He explains that “in order to use risk management fully and get effective results managers and teams should learn to see the “whole picture”” (Pinto, 2013, p. 650). Very often managers avoid or do not notice particular parts, in this case he underlies importance of “learning loops” (Pinto, 2013, p. 650). “Learning loops” help better plan for the future using risk management on full capacity (Pinto, 2013, p. 651).

After identifying critical mistakes related to human element, Pinto (2013) proposes certain suggestions that can help minimize the negative effect of possible mistakes and to be ready for different outcomes. His first suggestion is based on findings of Flyvbjerg (2007) called “reference class forecasting” (Pinto, 2013, p. 651). This term is about identifying the common path in systematic project overruns within classes of projects and using it for future prevention of human bias based on “over-optimistic” estimation (Pinto, 2013, p. 651). “This method is based on previous experience and historical data of similar projects in order to make more realistic assumptions about possible future outcomes” (Pinto, 2013, p. 651). Thus, he gives again example of London Olympics and its comparison with similar projects. If we rely on this method it is obvious that actually planners of London Olympics could have made more accurate predictions (Pinto, 2013, p. 651). Pinto (2013, p. 651)proposes the following table made by Flyvbjerg (2007).

Table 2.1. Estimation errors by project class

Type of project	Average accuracy
Rail	44.7%
Bridge and Tunnel	33.8%
Road	20.4%
All	27.0%

Source: Flyvbjerg (2007) (Pinto, 2013)

Pinto’s (2013, p. 651) second suggestion is about “rework as a necessary part of the process in project development”. Though he agrees that “making predictions based on historical data and still accepting rework as a normal event might sound controversial” (Pinto, 2013, p. 651). Here managers have to be really flexible to see the process of rework not as unexpected negative event, but as a tool to correct something despite planned schedule (Pinto, 2013, p. 652).

The third deadline mistake identified by Pinto (2013) is really a result of human factor and might depend on personality type of manager and team members. As Pinto (2013, p. 652) was listing “seven sins” which bring project to the failure, “self-interest and self-protection” influence the numbers shown for project approval. Sometimes explains Pinto (2013, p. 652) that “realistic numbers and data” shown by managers related to costs or deadline might be specially tailored for their top managers in order “to get approval and in order to protect themselves from “aggressive bosses””. Here we can see that the concept of new management style where the leadership has to go hand by hand with cooperation plays critical role. “Authenticity” in this case is described by

Pinto (2013, p. 652) as a “conscious decision to be true to one-self and forget about self-protection, in other words not to be influenced by fear”. He recommends “prior to the schedule being finalized, all project duration estimates be reassessed as 50/50 probabilities” (Pinto, 2013, p.652, cited in Goldratt, 1997). This according to Pinto (2013, p. 652) gives “freedom to project management and releases the fear of punishment”. As a result this solution is helping to achieve two crucial things in project: “1. Improving the actual project delivery and 2. Improving relationships between managers and team members” (Pinto, 2013, p. 652). This solution is based on mutual trust when everybody is working for the overall benefit (Pinto, 2013, p. 652). Authenticity defined by Pinto (2013, p. 652) within this situation is very critical when it comes to the contractor-client relationships. He defines “common dynamic of this relationships as very complicated based on: promising much, bidding low and renegotiating” (Pinto, 2013, p. 652). “This situation is very harmful for the relationships, mutual trust and the project outcome” (Pinto, 2013, p. 652). Conclusion made by Pinto (2013, p. 652) is that authenticity is a key to mutual trust and good relationship based on transparency.

Fourth suggestion is for “Planning in segments, not just wholes” (Pinto, 2013, p. 652).

Pinto (2013, p. 652) suggests that “projects are already complicated, so in order to start making changes or solving problems it is reasonable to divide them onto segments and start applying solutions on them”. This he believes will make task more simple and will lead to better results (Pinto, 2013, p. 652).

2.2 Royal Dutch Shell scenario planning principles

The company Royal Dutch Shell started applying its famous scenario planning in 1967. “The first formal scenario proposed by Shell was completed in 1971” (Wilkinson & Kupers, 2013). “According to research on 77 large companies conducted by Rene Rohrbeck of Aarhus University and Jan Oliver Schwarz of Germany’s EBS Business School this method is being used outside the company due to its effectiveness” (Wilkinson & Kupers, 2013). “Conclusion made by researchers showed that this method helped to be ready to perceive change; better interpretation and responding to change; influence on other actors and better organizational learning” (Wilkinson & Kupers, 2013).

RDS scenario planning

“Whenever life becomes more hectic and uncertain, scenario planning becomes more popular”, - Kees van der Heijden (Kahane, 2012).

Kees van der Heijden suggests that scenario planning method has proved itself “as a successful diagnostic tool” (Kahane, 2012). By summarizing the core ideas of this method he identifies “three main focus areas: 1. Systemic diagnosis of the situation and its context; 2. Network development to enable self-reinforcing coping behavior; and 3. Personal identification with the project” (Kahane, 2012).

“Shell scenario planning also known as transformative scenario planning was used in South African transformation” (Kahane, 2012). Adam Kahane (2012) described step by step how method used by RDS company was applied in South Africa based on own experience. In a situation for South Africa he was giving advices about “building team in order to construct scenarios” (Kahane, 2012). He suggested that team have to consist of people who could “look at South African situation from challenging alternative perspectives” (Kahane, 2012). Normally Shell was using this method by involving staff within its own organization (Kahane, 2012) But this time organizers of scenario decided to include “current and potential leaders from across the whole of the emerging South African social-political-economic system” (Kahane, 2012). This decision was based on believe that “diverse team will have different perspectives on situation and will be more credible while presenting its conclusions to the whole country” (Kahane, 2012). The scenario method according to Kahane (2012) “asks people to talk not about what they predict will happen or what they believe should happen but only about what they think could happen”. He explains that “at the end of the 6 month team came up with four possible scenarios: “Ostrich”, “Lame Duck”, “Icarus” and “Flight of the Flamingoes”” (Kahane, 2012). ““Icarus” was the one with biggest impact that was about unconstrained democratic government that ignored fiscal limits and crashed the economy” (Kahane, 2012). He emphasizes that “while the decision making part has choice to accept or reject, in both cases scenario has impact” (Kahane, 2012). But one thing was for sure: “they lead to change and transformation, and Mont Fleur contributed to creating peaceful forward movement in a society that was violently stuck” (Kahane, 2012). Kahane (2012) presented this approach as “invention born of necessity”.

This method “made contribution to change in South Africa” and Kahane (2012) suggested several questions to consider for this method: “How this way of working could be used in other context? In which type of situation this method could be useful? Which factors would influence success: inputs and outputs? Which steps were the most essential?”

Regarding the “when to use this method?” Kahane (2012) recommends applying it “when people find themselves in a situation that has following three characteristics:

1. Situation is seen as unacceptable, unstable or unsustainable
2. People involved in this situation cannot transform situation on their own or by working only with their friends and colleagues.
3. People cannot transform the situation directly. The actors are too polarized to be able to see it differently”.

In order to know “how this method works?”, Kahane (2012) suggests his vision on “four-part logic:

1. transformation of their understandings
2. transformation of their relationships
3. transformation of their intentions
4. transformation of their actions as a result of previous transformation”.

In order to “generate this transformation” Kahane (2012) states that there should be “three components” and the ““whole system will work only if all of them are present”:

1. “Team consisting of insightful, influential, and interested actors”. All of them should have different perspectives and views, and they should not be only observers.
2. “Strong container”. In order to build such container there should be special attention given to multiple dimensions of the space where participants work. Among them he mentions political positioning, psychological conditions and physical locations of the meetings. These are conditions according to him that will “enable participants feel safe, comfortable and challenge their own thoughts and meet their counterparts from other parts of the system”.
3. “Rigorous process”: he warns that this method means that “actors construct a set of relevant, challenging, plausible, and clear stories about what could happen – not about what will happen (a forecast) or about what should happen (a wish or proposal) - and then act on what they have learned from this construction””.

“Transformative scenario planning was adapted at Mont Fleur and is based on adaptive scenario which is invention of Shell” (Kahane, 2012). Kahane (2012) clearly explains that there are “similarities and differences in both methods”. As a key difference he defines “purpose”. He sees that “adaptive scenario is using stories about possible futures”, while “transformative is targeted on using stories in order to influence what could happen” (Kahane, 2012).

2.3 Critical success factors and scenario planning

Strategic planning is important for company and there are different factors influencing this process: organization's mission, vision, goals, organizational structure (Parker Gates, 2010). Some researchers suggest using method of CSF or "critical success factor" (Parker Gates, 2010). Linda Parker Gates (2010) from Software engineering institute defines certain "critical success factors" which can influence the outcome of the project. In her research Parker Gates (2010) tried to connect CSF with scenario planning.

The concept CSF offered by Parker Gates (2010) is explained through following characteristics: CSF hierarchy, types, uniqueness and stability over time.

Based on Daniel's (1961) work she explains that "concept of hierarchy of CSF might slightly differ under different circumstances" (Parker Gates, 2010, p. 9). "It can be seen as a unique for all companies in one industry or can actually differ from company to company and from manager to manager" (Parker Gates, 2010, p.9, cited in Anthony 1972).

The figure below shows how Caralli (2004) and Rockart (1979) see this hierarchy (Parker Gates, 2010, p. 10).



Figure 2.2 Hierarchy of CSF (Parker Gates, 2010)

"CSF types": According to Rockart (1979) there are five types of CSF (Parker Gates, 2010, p. 10):

- "The structure of the particular industry (Industry CSFs);
- Competitive strategy, industry position, and geographical location (strategy CSF);
- The macro environment (environment CSF);
- Problems or challenges to the organization (temporal CSFs);
- Management perspective (management CSFs)"

“CSF uniqueness”: Parker Gates (2010, p. 11) compares Caralli’s vision with Rockarts: “Caralli sees uniqueness depending on industry, organization or manager and Rockart sees it at managerial level and assumes that it could be non-unique or linked to internal or external factors”.

“CSF stability over time: Rockart (1979) in his findings underlies that CSF might change over time due to the change in external or internal environment” (Parker Gates, 2010, p. 11). Apparently he warns that “CSF might not necessarily be applicable to all divisions of organization and might change due to the changing goals” (Parker Gates, 2010, p. 11).

Strategic planning, Future scenarios and CSF

When managers plan they should think strategically and plan strategically (Parker Gates, 2010, p. 21). What is the difference between strategic thinking and planning? Parker Gates comments in a following way: “a common criticism of strategic planning is that it is overly involved with extrapolation of the past and present and can create the illusion of certainty regarding the future” (Parker Gates, 2010, p.21 cited in Heracleous, 1998). She offers to consider analysis of two concepts made by Jeanne Liedtka. According to Liedtka (1998) “strategic thinking consists of five elements: a systems perspective, a focus on intention, a focus on time, a focus on opportunity, and hypothesis testing” (Parker Gates, 2010, p. 22). She is describing strategic process as “a non-static activity with continuous adaptability and change” (Parker Gates, 2010, p. 22).

Figure below reflects integrity of strategic planning, future scenarios and CSF

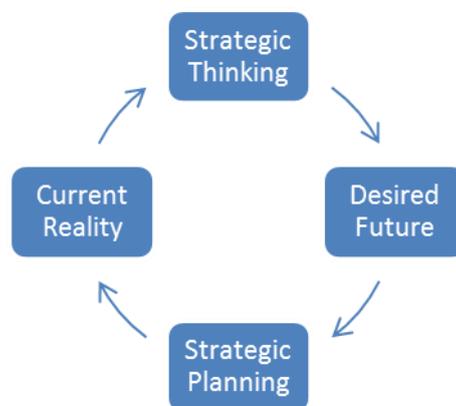


Figure 2.3 The strategic Process: Strategic Planning and Strategic Thinking (Parker Gates, 2010)

But Parker Gates (2010, p. 22) warns about “strategy paradox” described by Raynor (2007) who explains that “uncertainty increases when time passes, so he suggests separating management of commitments from management of uncertainty”.

Parker Gates (2010, p. 23) concludes that identifying critical success factors can help to better plan and propose different future scenarios.

2.4 Scenario planning as a management tool

Scenario planning by KPMG

Due to its effectiveness scenario planning has become one of the tools and methods for strategic planning in different industries (KPMG, 2011). Companies choose it because they see it as unique and universal helping to make strategic planning in a more flexible way (KPMG, 2011, p. 5). KPMG consulting (2011, p.5) recommends this method as “a way to managing future”.

KPMG (2011) is using this method for consulting its clients. It has classified scenarios into different types according to the aim (KPMG, p.4-5).

Table 2.2 Types of scenario planning offered by KPMG (2011,pp.4-5):

Type of scenario	Characteristics	Time horizon	Concepts and examples
Quantitative	Describe future in terms of relatively hard facts and numbers. Typically embody potential best and worst outcome	Can reflect short-term planning horizon	Involve concept of return on investment. E.g: Effect of weather delays on a project
Multi-dimensional	Depict futures in terms of multiple, interrelated events and drivers. Typically economic in nature based on historic data	Planning horizon is usually short	E.g.: Effect on the economy or organization’s revenue performance if unemployment, interest rates and oil prices increase at the same time
Event	Seek to explain how the future is determined by a single significant	Usually medium	They tend to be more proactive than reactive.

	event, often one that arises in an organization's external environment	term	E.g: Iceland volcanic eruption
Strategic	Describe possible futures in broad terms	Reflect long-term planning horizon	They are essentially proactive. E.g: effect of the iPhone on a mobile phone manufacturer

Scenario planning method is applicable to different types of projects, the most important is to “understand project objectives and stakeholder expectations” (KPMG, 2011, p. 12).

Future uncertainty is the challenge that scenario planning aims to resolve. KPMG (2011, p. 6) suggests classifying uncertainties into three categories:



Figure 2.4 Three types of uncertainties (KPMG, 2011)

Scenario planning according to KPMG (2011, p. 12) findings aims to find “non-obvious and hidden linkages and relationships”. For this reason KPMG (2011, p. 12) suggests considering “several questions that should be asked for successful scenario planning”:

- “Who are the participants, the stakeholders and the owners of the exercise?”;
- “What is the specific purpose of the exercise?”;
- “What are the key future events that should be examined?”;
- “When in the future are these events (scenarios) going to occur?”;
- “Why are these future events occurring? (What is it that is driving or causing them?)”

In order to better plan KPMG (2011, p. 12) recommends five key phases for scenario planning process:

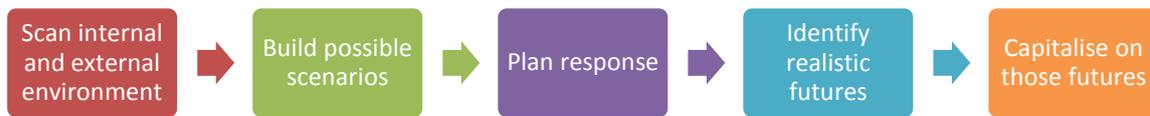


Figure 2.5 Phases of scenario planning (KPMG, 2011, p.12)

KPMG (2011, p. 12) gives the following explanation regarding each step: “first step is about scanning internal and external environment for emerging trends and issues; at the second step it is recommended to build one or more scenarios choosing from four types of scenarios; third stage is about identifying impacts and planning strategic and operational responses for each of the scenarios; fourth step is about identifying the five the most realistic futures and working particularly with them; fifth step is about implementing those responses for the possible scenarios when they are most likely to happen”.

Like any other method or technique this method also faces certain challenges.

KPMG (2011, p. 13) based on experience has identified potential “pitfalls” and recommends “solutions/options” for them:

Table 2.3 Potential pitfall of scenario planning and solutions (KPMG, 2011)

Potential pitfalls	Options/Solutions
Bias: <ul style="list-style-type: none"> • Motivational • Availability/Reporting • Anchoring • Partition Dependence • Overconfident/ Underconfident • Culture • Group think 	Scenario techniques and design to account for bias
Relevance	Participants, preparation, knowledge/data
Longevity and resilience	Variety/ different techniques: <ul style="list-style-type: none"> • Challenge • External data • Peer review

Finally, KPMG (2011, p. 14) recommends using scenario planning method for “Governance, risk and compliance” (GRC) which “will lead to convergence and transparency of information during whole process”.

2.5 The human factor in project management

The methods described earlier in this paper have one thing in common - “human factor”. Zachary Wong (2007) from Chevron Energy Technology believes that “human factor deserves more attention than before and behavioral management will be more popular in the future”.

Wong (2007) advocates the idea of “not just to get results but to get results the right way”. He defines a new definition of success in project management through the concept “getting results and feeling good about it” (Wong, 2007).

Figure below illustrates his vision of project success:

Meeting people's expectations	High	Partial Success	Success 
		Failure	Partial Success
	Low		High
Meeting Project Expectations			

Figure 2.6 Project success (Wong, 2007)

This figure reflects Wong’s (2007) beliefs regarding success: “when both expectations meet at a high level success will be guaranteed”. He suggests that “first it should be project and human expectations to be met” (Wong, 2007). By “project expectations” he means: “results meet project objectives, which includes being on-time, on spec and within budget”(Wong, 2007). By “people’s expectations” he defines: “the values are respected, people feel fulfilled, and they succeed together as a team” (Wong, 2007).

Wong (2007) sees a “project as one system where all factors are influencing each other”. In order to explain it he used “three spaces of project management” concept. This concept shows how organizational, team and personal space are interrelated (Wong, 2007).

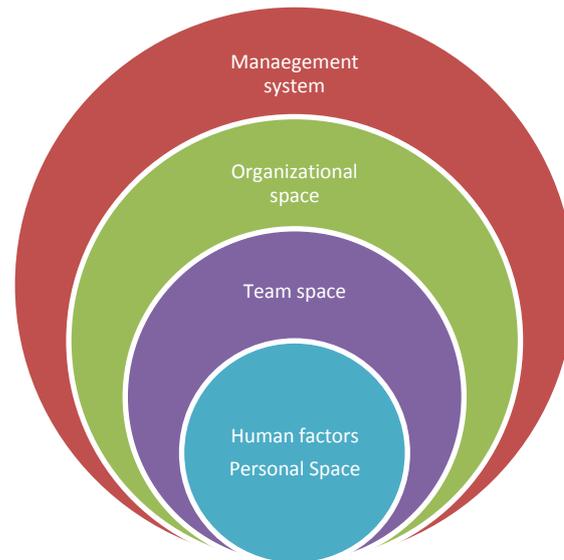
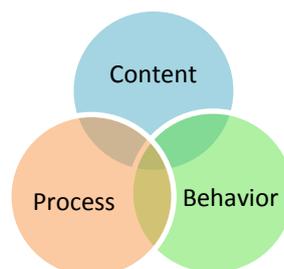


Figure 2.7 Three spaces of project management (Wong, 2007)

Wong (2007) links “Personal space and human factor” to theories of Maslow, Herzberg’s dual factors, and McGregor’s Theory. All of them are aimed to explain “human behavior patterns and motives of decision making” (Wong, 2007). I will not describe these theories in details since my aim in this paper is to define the managerial mistake in project management and to explain how better to plan in uncertain environment.

“Team performance” by Wong (2007) explained through “team performance depending on three key elements: content, process and behavior”. These elements like other methods described in this paper are applicable for all types of projects, organizations and work teams (Wong, 2007).



2.8 Team performance elements (Wong, 2007)

Wong (2007) explains these key elements as follows:

“Content is defined as: “the “what” or intent of the team – the vision, objectives, direction, opportunities, strategies, and assumptions”;

“Process is: “the “how” – the tools and procedures that help a team reach its objectives”;

Behavior: “collective human interactions of the team””.

Each of these elements according to Wong (2007) “require certain conditions to be met”. In order to create “Content” there should be: “project team charter for setting clear goals and

agenda; air cover for the team for getting all necessary support (financial, political, etc.) and funding, and importance of identifying bias at the early stages” (Wong, 2007).

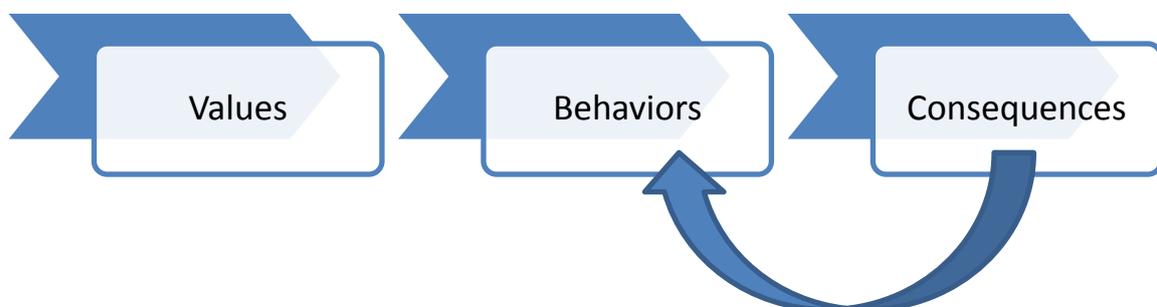
The “Process” as understood from the word refers to “taking actions after deciding on “what” to do” Wong (2007). Wong (2007) defines a “good team process” through five key attributes:

1. “It depersonalizes the topic issue”;
2. “It increases transparency among team members”;
3. “It makes the discussion more objective and less emotional”;
4. “It creates an inclusive, participative environment”;
5. “It gives each team member equal power”.

As for the “Behavior” Wong (2007) identified “top six team behaviors”:

1. “Mutual trust”;
2. “Interdependency”;
3. “Accountability”;
4. “Valuing individual differences”;
5. “Transparency”;
6. “Learning and recognition”.

Finally the “Personal space” in the project management is important as “all processes in the organization or project are performed by people it should not be underestimated” (Wong, 2007). Wong (2007) shows through the figure below how behavior is influenced by values and consequences.



2.9 Values, behaviors and consequences (Wong, 2007)

It seems from the first look that there is logical sequence that builds this chain: “values form certain behaviors and behaviors bring to consequences” (Wong, 2007). But as we see from the figure: acknowledgment of possible consequences by people can influence their behavior (usually it is fear) (Wong, 2007). Values on the other hand are shaped by culture, experiences and personality type (Wong, 2007).

Wong (2007) also emphasized that “a leader should have well balanced personality type: it should be balanced between intellectual and emotional”. “This balance is important because both intellectual and emotional needs of a person shape motivation for action” (Wong, 2007). Finally Wong (2007) states that: “The power of human factor is understanding motivation. How we motivate and develop people is determined by their talents and dynamics, as well as the competitive challenges of company objectives and strategies”.

2.6 Criticism on Scenario planning

Shell is well known for its scenario planning, but despite the fact of using for 40 years, it is facing criticism for not being accurate enough. Peter Foster from *Financial Post* referred to one case of Shell scenario as “Shell’s solar scenario fantasies” (Foster, 2013). He argues that the scenario planning method offered by Shell actually is wrong, as he stated “the further out you look, and the broader your perspective, the more wrong you will be” (Foster, 2013). All this harsh criticism is addressed to the whole concept of building scenarios by Shell. As evidence he gives examples of scenarios proposed by Shell about “solar panels being the most important single energy source by 2100” (Foster, 2013). Another criticism was about “New Lenses Scenario”. He is not agreeing on accuracy of these scenarios and gives example of “another projections back in 1992 which were promising to have tens millions of electric cars on the road by 2013” (Foster, 2013). Very important point of his argumentation is about “cleaner” energy: “according to Shell’s CEO Peter Voser the environmental problems occurred for four decades were linked to the one single source- bad policy” (Foster, 2013). According to Foster (2013) “the need for this “cleaner” energy was based on decrease in fossil fuels and partly on man-made climate change”. “But there are a lot of other opinions about climate change and alternative sources” argues Foster (2013). As for New Lenses Scenario it consists of two different scenarios: “Mountains” and “Oceans” (Foster, 2013). The ““Mountains” sees natural gas as the most important energy source by the 2030s” (Foster, 2013). The ““Oceans” sees solar power becoming the top source by about 2070” (Foster, 2013). Foster (2013) finds the idea about solar energy rise as “the most bizarre” because “companies like BP have pulled out of it several years

ago”. He comments that “Shell uses as an argument “public pressure” to influence solar energy boom” (Foster, 2013). But he comments further “alternative sources have a lot of drawbacks, such as: high costs due to the inefficiency of the technology and generating capacity when the clouds roll in” (Foster, 2013). Next criticism is about “the lack of the alternative option in such scenarios, such as what if the “climate crisis” proves to be non-existent” (Foster, 2013). Foster (2013) concludes his critical article by mentioning what once was said by Warren Buffet about forecasting: “Forecasts tell you little about the future but a lot about the forecaster”.

Research conducted by Alex Wright from University of Wolverhampton in 2004 criticizes the scenario planning process of Royal Dutch Shell Company. His paper concentrates on the work of Kees van der Heijden and Paul J.H. Schoemaker as: “representing the influence of this approach” (Wright, 2004, p. 8). In other words he means that it is them who form and influence this approach (Wright, 2004). Wright (2004) criticizes approach and shows key points: social and constructive natures of scenarios. Thus he concludes that the “objectivity of authors is misleading and highly subjective” (Wright, 2004, p.8).

Wright (2004, p. 8) in his research describes all steps of the scenario planning from ontological and epistemological point of view. First step according to Shell scenario planning is – “*structuring the scenario process*” (Wright, 2004, p. 8). “At this stage a company has to identify strategic issue, question or problem that has a critical impact on the organization and its business around which scenarios are built” (Wright, 2004, p. 8). Wright (2004, p. 8) sees this stage as a “demonstration of the RDS² experience”. “RDS identifies key factors having the most influence on the business” (Wright, 2004, p. 8). In this case he suggests “the factors as oil reserves and price have disproportionate effect on the dynamics in business” (Wright, 2004, p. 8). But he continues “these variables are outside of the organizations’ immediate areas of control and influence” (Wright, 2004, p. 8). He underlies that “for that particular period of time and for that particular company they were the most critical issues and it was logical to build scenarios around them” (Wright, 2004, p. 8). But as Wright (2004, p. 8) argues: “most organizations conduct their business in a more complex environment, where multiple variables interact in confusing and unpredictable ways”. He also mentions that “service-based organizations continually interact with their environment and their interpretations shape the environment more than the environment shapes them” (Wright, 2004, p.8, cited in Clark, 2004; Nathan, 2004). That is why Wright (2004, p. 8) finds very difficult to “identify the main issue for organizations”. He comments that “ontological assumptions of the RDS scenarios are that the future itself would be

² Royal Dutch Shell

predominantly affected by one of a small number of variables that were independent of it” (Wright, 2004, p.8, cited in Easterby-Smith, Thorpe & Lowe, 2002). That is why Wright (2004, p. 8) suggests” it is critical and important to identify issue or hypothesis first, than the scenario should be built”. “This will also influence where and how the data will be collected and what are responses going to be” (Wright, 2004, p. 8).

Second stage of the RDS scenario planning is about – “*exploring the scenario context*” (Wright, 2004, p. 8). Wright (2004, p. 9) critics about this stages starts from the word “exploring”. He argues that: “the verb explore used in this circumstance is not neutral; its use suggests that the scenario context exists independently of the explorer(s), locating their role as being to enter this domain in order to understand its characteristics, much like an explorer when entering an alien land” (Wright, 2004, p. 9). He suggests that using verb “create” as more accurate (Wright, 2004, p.9). Wright’s (2004, p. 9) disagreement based on the fact that “the scenario context doesn’t exist independently of the scenario team to be explored, on the contrary it is created collectively and is a social construction”. Second argument of Wright (2004, p. 9) against scenarios is based on “approach” for this process. Thus, he criticizes van der Heijden, et al (2002), because “the word explore instead of create actually makes a distance between individuals within organization and the consultants from outside of the organization from the results they co-produce” (Wright, 2004, p. 9). The next criticism by Wright (2004, p. 9) falls on the concept of “remarkable people” used by van der Heijden. He argues that van der Heijden , et al. (2002) describes this category of people as “...observers who understand how the world works...” thus bringing “out of the box” thinking into the intervention (Wright, 2004, p. 9). Wright (2004, p. 9) agrees on the opinion about “professionalism of those “remarkable people””, but states that it is “exaggeration”. He underlies “importance of the external vision and perspectives as a crucial part of successful scenario building” (Wright, 2004, p.9). He questions believes of van der Heijden about considering opinion of “remarkable people” as “absolute knowledge of universal truth” (Wright, 2004, p. 9).

“Third stage is about “*developing scenarios*” and results in the creation of the scenarios as narratives” (Wright, 2004, p. 9). This stage involves “identifying the driving forces, their degree of uncertainty and potential impact on organization, the capture of the essence of the scenario end state, and a fleshing out of the storylines of the narratives” (Wright, 2004, p.9, cited in van der Heijden, et al., 2002 pp.225-227). “The next step is in identifying the two general areas that are deemed to have the highest level of uncertainty and potentially the highest impact on the issue or question around which the scenarios are being constructed” (Wright, 2004, p.9, cited in

Shoemaker, 1993). “Scenario planners are asked to place the cluster headings on the two-dimensional axis depending on their view of uncertainty and impact (Wright, 2004, p.9, cited in van der Heijden, 2002 p.206). Wright (2004, p. 9) criticizes this stage as “being highly subjective because participants make sense and allocate a position upon the grid based on their own understanding and sense making”. “These decisions on the other side are based on the discussions that take place at this stage” (Wright, 2004, p. 9). Wright (2004, p. 9) comments: “Through this stage the role of facilitators is presented as neutral and value-free”. “But in reality a cluster is uncertain just because majority of participants think so and they decide to place it on a certain quadrant” (Wright, 2004, p. 9). Further Wright (2004, p. 9) comments that by “capturing the essence scenario planners have positivist perspective of what makes a thing what it is and the necessary relations that comprise it of each scenario taken to its plausible extreme”. “Constructionism on the other hand advances an alternative view that worlds have no “essence” to be discovered as they are not given, but constantly made and remade” (Wright, 2004, p.9, cited in Czarniawska, 2001).

Wright (2004, p. 10) further comments that “van der Heijden’s (cited 2002, p.214) himself has rationalist assumption about organization and its environment being separate and independent of each other: “...the scenarios themselves should never contain the organization as an actor. That is to say, the organization should not be shown to be having an input and impact on the story...” Wright (2004, p. 10) continues his *criticism through “Stakeholder analysis”*. At this stage Wright (2004, p. 10) comments that “scenario planners are the ones who consider the relative degree of interest and power of the stakeholder”. He suggests that “Van der Heijden et al. (2002) supports the idea of using matrix similar to Eden and Ackerman’s to “help separate reality from emotion”” (Wright, 2004, p. 10). He explains that “Eden and Ackerman’s matrix helps to categorize stakeholders according to the level of power and interest assigned” (Wright, 2004, p. 10).

Criticism on “Systems check” (Wright, 2004, p.10)

“According to van der Heijden (2002, p.219) scenario planners should use systems thinking at any time during storytelling phase in order to identify underlying causal relationships driving the stories as they are crafter together” (Wright, 2004, p. 10). Wright (2004, p. 10) comments that “this activity is said to challenge the internal consistency of the storylines”. Wright (2004, p.10) thinks that “value of stories lies in their usefulness to the organization not in their internal consistency”.

“Impacting organizational thinking and acting” (Wright, 2004, p.10)

“After scenarios are developed a task of communicating them becomes important: it should be addressed to whom it was developed - key decision-makers” (Wright, 2004, p.10, cited in van der Heijden, et al., 2002). Wright (2004, p. 11) sees “two-fold purpose of this: to influence the eventual decisions taken, ensuring they are robust against each scenario or if they are not at least that the risks are known” (cited in Goodwin & Wright, 2001), thus stimulating strategic thinking and adaptive organizational learning skills through the strategic conversation (cited in Chesley & Wenger, 1999; van der Heijden, et al. 2002). Further, Wright (2004, p. 11) argues that “van der Heijden does not identify how this strategic conversation should be conducted”. He gives example of “five categories of performative speech acts” by Ford and Ford (1995) seen as “important in producing intentional change in organizations: assertives, directives, commissives, expressives and declarations” (Wright, 2004, p. 11). Another critical point described by Wright (2004, p. 11) is that “organizations often interpret past successes as evidence of their competence and effectiveness of their methods, and consequently lock into these behaviors, and seek to generalize on their appropriateness for others”(cited in Nathan, 2004). He further comments that “scenario planners for over the last 20 years were using the same thinking that saw forecasting as the predominant strategic planning approach in the 60s and 70s” (Wright, 2004, p. 11). Thus “scenario planning process is missing important part of the research – self-reflectivity which is not considered when objectivity is assumed” (Wright, 2004, p. 11). A very good description about “relationship between social construction and reflexivity” is given by Wright (2004, p. 11)based on Cunliffe’s summary: “Social constructionists argue that we construct and make sense of social realities in various forms of discourse; conversation, writing and reading. Radically reflexive researchers recognize their own place in this process, suggesting we construct inter-subjectively the very objective realities we think we are studying: we are inventors not representers of realities (cited in Clifford, 1986). Constructionist research explores how meaning is created between research participants (cited in Cunliffe, 2003 p.988)”.

Conclusion

Main theoretical points:

Despite good planning, managers tend to make common “deadly mistakes” caused by the “human factor” (Pinto, 2013, p. 644). It is important to identify mistakes and learn from “learning loops” and be “proactive instead of reactive” (Pinto, 2013, pp. 650-651). Royal Dutch Shell scenario planning principles are widely used due to their “uniqueness and flexibility” (KPMG, 2011, p. 5). Adam Kahane (2012) recommends asking right “questions regarding when to use it and how it will work before applying this approach and providing certain conditions as

good team, good conditions and rigorous process”. Future planning can be done through identification of “Critical success factors” (Parker Gates, 2010). Parker Gates (2010, p. 22) warns about “strategy paradox” when “uncertainty increases by the time so it is better to separate management of commitments from management of uncertainty” (Parker Gates, 2012, p.22 cited in Raynor, 2007). KPMG (2011, p. 12) suggest that scenario planning finds “non-obvious and hidden linkages and relationships”. But KPMG (2011, p. 13) warns about “potential pitfalls linked to bias, relevance and longevity with resilience”. Zachary Wong (2007) suggests that “success is achieved when people’s expectations meet project expectations”. “Proper communication within organizational, team and personal spaces will bring more transparency” (Wong, 2007). Wong (2007) argues that “consequences form people’s behavior”. Criticism on RDS approach is based on “subjectivity of forecasts thus reflecting personal vision” (Foster, 2013) and “socially constructive nature of scenarios” (Wright, 2004, p. 5).

3. Methodology

3.1 Timeframe of research

The data sources are secondary and publicly available. Since I did not have opportunity for direct interviewing I was relying fully on official sources. There were a lot of ideas regarding the topic but it had to be enough to answer research questions and pass through the theoretical prism. That is why a lot of time was spent on data collection and realization whether it will fit within triangle: data, theory and research question.

Table 2.4 The approximate timeframe of my research was as follows:

Period	Action
01.01.2014-27.01.2014	Identifying the topic and research question
28.01.2014	First requirement: Delivery of first proposal for master thesis
29.01.2014-27.03.2014	Analysis of data and discussion with supervisors; narrowing down the data scope through phone calls, mails and consultations; Identifying the limitations on data; discussing the relevance of data
28.03.2014	Second requirement: Review of progress
01.04.2014	Analysis of data, theory and research questions; Discussions with supervisors
07.05.2014	Work with remarks
20.05.2014	Delivery

The data availability, problem statement and research questions were discussed with my academic supervisor and other professors at university. These discussions helped me to narrow down the scope of my research.

3.2 Thematizing and Designing

At the beginning of research I have studied my topic briefly and decided to stick on it due to its relevance. Australia is “extending LNG boom” and most of the projects are quite new (Ellis, et

al., 2013, pp. 3-4). In order to set a design I have checked how much information is available in order to study the problem. Further, I had discussion with my supervisor regarding the data, theory and research questions frame.

3.3 Research question development

The research question was chosen due to the existing problems in Australian LNG projects and uncertain future perspectives. I decided to choose this topic due to its relevancy: demand for LNG in Asia Pacific is rising and Australia is planning to use its “national comparative advantage” (APPEA, 2013). The problem was found through brief overview of the obstacles and challenges faced by Australian LNG industry and interest in future perspectives. In order to open up a problem from different perspectives I described different approaches offered by companies, organizations and researchers.

For better explanation of the problem I have stated two empirical sub-questions: 1)How have company management in fact made investment decisions for the Australian LNG projects?; 2)Given the delays and cost-overruns what are the possible reasons for it? Was it possible to avoid those mistakes or was it just a “bad luck”?

These questions are useful for specifying the scope of research and narrowing down focus. Because project management is complex process and making research on problems related to uncertainties can be very broad with different outcomes and visions.

3.4 Philosophical position

Any research should have particular ontological and epistemological position. Ontology refers to the “nature of reality” and epistemology is about “the ways of inquiring into the nature of the world” (Easterby-Smith, et al., 2012, pp. 18-19). For the philosophical position Easterby-Smith et.al (2012, p. 19) describes two main positions: realism and relativism. As for epistemology he describes two methods of how research should be conducted: positivism and social constructionism (Easterby-Smith, et al., 2012, p. 21). In order to understand the difference they gives the list of the criteria for both approaches. They reflect the position of researcher, aims, data types, starting points and designs (Easterby-Smith, et al., 2012, p. 24) .

Positivist approach refers to the “social world existing externally” and in order to measure its properties one should use “objective methods” (Easterby-Smith, et al., 2012, p. 22). Social constructionism approach on the other hand is described by Easterby-Smith et. al (2012, p. 23) as a “reality” based on social construction and “given meaning by people” instead. This approach reflects “reality” formed by people. Based on a research problem there can be one or combination of philosophies used. For my paper I decided to choose relativistic position and “inquire” it through social constructionism.

The information was collected through secondary data and some of the interviews were readily available on public sources. The data was collected selectively due to the aim of the stated problem. I was trying to find answer to the question on why particular projects facing obstacles and what made them happen. The thesis itself does not have aim to give exact answer but rather to reflect the situation and see it from alternative perspective. This should help to reevaluate the vision of project management through influencing patterns that usually overlooked and to underlie that future is uncertain.

3.5 Research design

It is important to choose research design because it is the “framework or plan for a study as a guide in collecting and analyzing data” (Brown & Suter, 2012). There are three basic types of research design: exploratory, descriptive and causal. Research design of this work is exploratory because it has “aim to better understand the situation and does not provide certain answers or decision” (Brown & Suter, 2012). Approach used for this research is qualitative because “it begins with assumptions, a worldview, the possible use of theoretical lens, and the study of research problems inquiring into the meaning individuals or groups ascribe to a social or human problem” (Creswell, 2007, p. 37). Among qualitative approaches I have used case study. Case study is approach in which “researcher is exploring the case or cases through detailed data collection from multiple sources, and reports a case description and case-based themes” (Creswell, 2007, p. 37). At the same time my research was descriptive in term of considering “description of certain projects together with their characteristics and relationships between variables” (Brown & Suter, 2012). Descriptive design is aimed to “answer the questions such as who, what, when, where and why before the data collection” (Brown & Suter, 2012).

3.6 Data collection and analysis

I could not use in-depth interview method since the managers of the selected projects are not open for interviewing and I could not be an observer neither due to the lack of permission to do so. But while studying the project management and possible risks with obstacles I came out with the conclusion that basically managers use approximately same approach for the project planning. Thus in order to narrow down my data collection I decided to seek for advice from project manager who is familiar more or less with the process. Informal conversation as narrative story was very useful for me to extract necessary ideas about sort of information I should use for my work. Instead of describing the whole planning process in management I focused on the reasons why problems occur. Information on these issues was written by people involved in the project management and scenario planning process.

3.7 Why I selected particular projects?

I reflected problems of over cost and delays within particular projects due to the following reason: Pluto and Browse LNG projects were initially started by Australian company Woodside (operator). Despite negative experience they had in Pluto project they could not avoid similar problems with Browse project. Gorgon and Wheatstone are promising and among the largest projects in Australia. The project participants are experienced and leading companies such as Shell, Chevron (operator) and ExxonMobil. The projects are in same country face similar problems given that companies have different background. Moreover these companies had experience in working together in the similar LNG project in Australia North West Shelf. They were operating as a joint venture participants.

3.8 Criticism, obstacles and limitations, validity and reliability issues

While conducting research it is important to consider validity and reliability of the data. When we work with quantitative data we consider “external and internal validity in order to know how accurate we reflected our concept” (Easterby-Smith, et al., 2012, p. 45). As my research is based on qualitative secondary data I need to check its validity in a different way. Easterby-Smith et. al (2012, p. 53) explains that for qualitative research it is rarely called as “validity” thus referring to Golden-Biddle and Locke (1993) as they identified three key criteria: “authenticity,

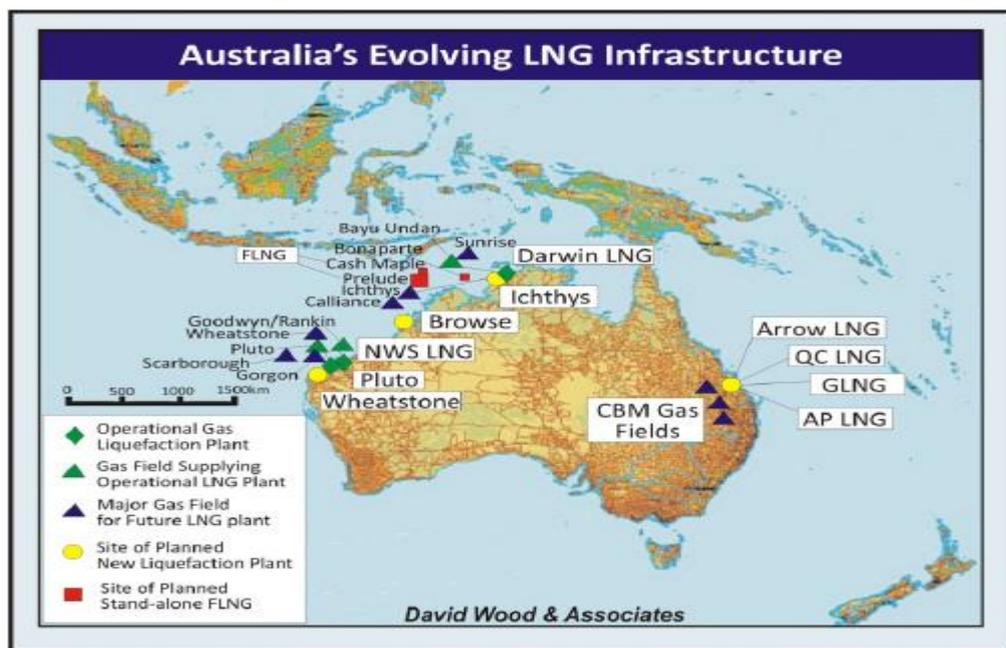
plausibility and criticality”. By “authenticity” he suggests “convincing the reader by the author that he has deep understanding on what is going on within organization (Easterby-Smith, et al., 2012, p. 53). By “plausibility” he suggests that the research should be linked to the “interest among other researchers” (Easterby-Smith, et al., 2012, p. 53). “Criticality” is important for “encouraging readers to question their initial assumptions regarding the subject and offer something new” (Easterby-Smith, et al., 2012, p. 54). I also used some data in order to question and disconfirm scenario planning method as it is not “cure all” but rather an alternative method which is also dependent on certain obstacles and limitations.

The problems I faced within this thesis were linked to fitting into triangle: data, theory, research question. These three elements should coincide in order to create a whole picture. The problems with data collection occurred due to the lack of access for direct interviewing and detailed information on how projects were planned. At the same time I have realized that direct interviewing will not give me more information than it is provided in public sources. But the data used was written by people who had work experience in Shell and Chevron, the companies involved in some of Australian LNG projects.

4. Empirical findings

4.1 Current situation for Australian LNG projects

According to Ellis, et. al (2013) LNG has serious impact on Australian economy. Thus it is estimated that “existing and committed projects might contribute about US\$ 538,325 billion (A\$520 billion) to the economy during 2015 to 2025” (Ellis, et al., 2013, p. 4). These numbers show how important it is for Australia to have its LNG projects start on time and be competitive (Ellis, et al., 2013) .



4.1 Map showing Australia's major LNG projects in production, development and planning (Leather & Wood, 2012)

“Australia’s conventional gas projects are mainly situated in remote locations where limited infrastructure exists” (Leather & Wood, 2012, p. 4). From the map we can see that majority of projects are located in the Western Australia. In this paper I am studying Browse, Gorgon, Wheatstone projects and existing facilities NWSV and Pluto. As we will see further in the discussion location of projects also has great impact on costs and delays. This is related to the existing challenge of labor deficit (Leather & Wood, 2012, p. 4) “The existing labor force is employed on a fly-in fly-out (FIFO) or drive-in-drive-out (DIDO) basis, working unequal “on” to “off”” (Leather & Wood, 2012, p. 4). Leather and Wood (2012, p. 4) compare it to the “situation once faced in the Northern Alberta oil sands developments in Canada”. They comment that after completion of projects there will be demand only for small team of workers in the plant (Leather & Wood, 2012). They further state that “present CBM projects are more favorably

located: they will pipe gas from inland coal basins to LNG facilities near the town of Gladstone in Queensland, closer to Australia’s major east coast labor markets” (Leather & Wood, 2012, p. 5). So they explain that “if each project is expected to employ some 5000-construction workers, a work force of some 15000 to 20000 will be needed to construct the projects and Gladstone for instance has population of only 50000” (Leather & Wood, 2012, p. 5). Australian projects promise to bring a lot of benefits such as creating new jobs (Leather & Wood, 2012). But how they will manage this labor deficit?

Table 4.1 Australian LNG projects (EIA, 2013a)

Liquefaction terminal	Equity partners	Status/online date	Capacity (Bcf/y)	Consumer markets	Capital cost
Existing facilities					
Northwest Shelf LNG	Woodside, Shell, BHP Biliton, BP, Chevron, Mitsubishi&Mitsui – 16.7% each	Existing	780; 5 trains	Japan, China spot market	\$11.5 billion for T1-3; \$3.5 billion for T4; \$6.5 billion for T5
Darwin LNG	ConocoPhillips 57.2%, Santos 11.4%, Inpex 11.3%, Eni 11%, Tepeco 6%, Tokyo Gas 3%	Existing	170; 1 train	Japan and spot market	\$3.84 billion
Pluto LNG	Woodside 90%, Kansai Electric 5%, Tokyo Gas 5%	Existing/Expansion plans are being discussed	205; 1 train	Japan, Malaysia	\$15 billion
Planned LNG projects using traditional gas					
Gorgon LNG	Chevron, 47.33%, ExxonMobil 25%,	Under construction; Q1	720; 3 trains	Long-term contracts	\$52 billion

	Shell 25%, Japanese gas&electric utilities 2.667%	2015; T4 planned with construction to begin in 2014			with Japan, Korea, China, India, Mexico.Spot market	
Ichthys LNG	INPEX 66.07%, Total 30%, Japanese gas & electric utilities 2.74%	Under construction; 2017	400; 2 trains		Japan, Taiwan	\$34 billion
Wheatstone LNG	Chevron 64.14%, Apache 13%, KUFPEC (Kuwait) 7% , Shell 6.4%, Japanese gas & electric utilities 9.455%	Under construction; 2016	430; 2 trains		Japanese utilities	\$29 billion
Prelude LNG	Shell 67.5%, Inpex 17.5%, Kogas 10%, CPC 5%	Under construction; 2017	175; 1 floating terminal 2		Japan and Asian markets	\$11.4 billion
Cash Maple LNG	PTTEP (Thailand) 100%	2017	100; 1 floating terminal		Potentially Thailand	N/A
Browse LNG	Woodside 31.23%, Shell 26.63%, BP 17.21%, PetroChina 10.23%, Mitsui 7.35%, Mitsubishi 7.35%	2020; Cancelled financial investment decision (FID) for onshore facility in 2013, potential floating terminal proposed	576; 3 trains		Japan, Taiwan, other Asia	\$48 billion
Bonaparte LNG	GDF Suez 60%, Santos 40%	2018; FID expected 2014	100-150; 1 floating		N/A	\$8 billion

				terminal		
Scarborough LNG	BHP Billiton 50%, ExxonMobil 50% (operator)	2020/21; anticipated 2014/15	FID	300; 1 floating terminal	N/A	N/A
Sunrise LNG(Joint development Area-Australia and Timor-Leste)	Woodside 33.44%, ConocoPhillips 30%, Shell 26.56%, Osaka Gas 10%	2017		525; 1 floating terminal	N/A	\$5 billion
Planned CBM to LNG projects						
Queensland Curtis LNG	T1: BG 50%, CNOOC 50%; T2: BG 97.5%, Tokyo Gas 2.5%	Under construction; 2014		400; 2 trains	Chile, Singapore, China, India	\$20.4 billion
Australia Pacific LNG	Origin Energy 37.5%, ConocoPhillips 37.5%, Sinopec 25%	Under construction; mid- 2015; Proposed expansion		430; 2 trains	China and Japan (Kansai Electric)	\$25.3 billion
Gladstone LNG	Santos 30%, Petronas 27.5%, Total 27.5%, Kogas 15%	Under construction; 2015		375; 2 trains	Malaysia and Korea	\$18.5 billion
Fisherman's Landing	LNG Ltd 81.11%, CNPC subsidiary 19.89%	2016; expected 2H2013	FID	144; 2 trains	Potentially CNPC	\$1.1 billion
Arrow LNG	Shell 50%, PetroChina 50%	2018; EIS plan submitted; FID expected end-2013		384; 2 trains in Phase 1	China	\$24.2 billion

Note: prices reflected at the above table are in US\$.

This table shows existing LNG facilities and planned projects. As we see from the table above there are 3 existing facilities, 9 planned projects using traditional gas and 5 CBM to LNG projects. The target market is mainly oriented towards Asia. Two of the existing facilities NWSV and Pluto will be used for further comparison with Gorgon, Wheatstone and Browse projects (selected for studies).

The project participants in the existing facilities are mainly Australian, Japanese and Korean. But we see that number of planned projects increased with the involvement of international companies. This difference shows that role of Australian LNG in the Asia Pacific region is growing. Despite being very attractive destination for investments Australia has number of challenges as well (Ellis, et al., 2013). These challenges will be discussed in other parts as internal and external factors, together with “Fukushima effect”. If we look at start dates we can see that they range from 2014 to 2020. Many projects, many companies operating in one country with one target market with deadlines oriented towards 2020. This is related to increased demand in Asia Pacific region. “Increase in demand is related to various factors: population growth by 500 million, increase in real per capita by 90%, decrease in coal use, increased fuel mix with natural gas” (Bradshaw, et al., 2013, pp. 8-9). This is creating competition for projects inside the country, in the target market and as we will see further companies also compete with each other within same projects and market. It looks like 2020 is a “common deadline” for all projects.

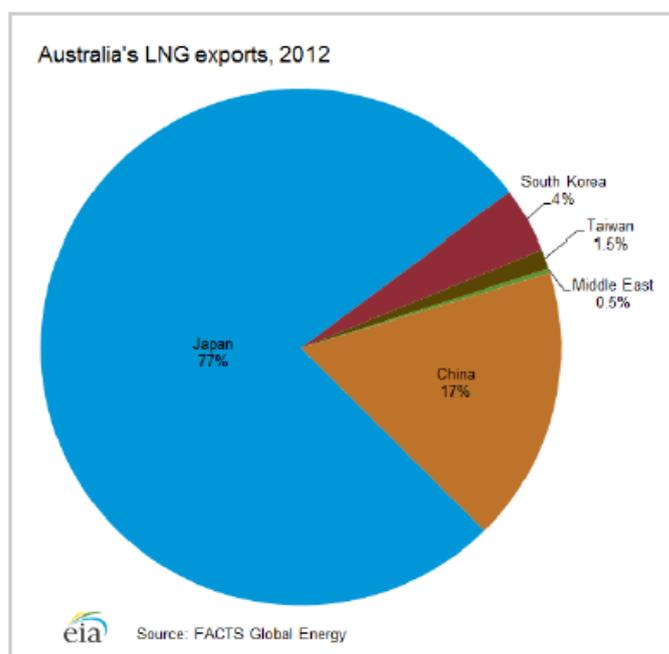


Figure 4.2 Australia's LNG exports

This chart shows that majority of Australia's LNG exports go to Japan. That is why "Fukushima Effect" and Japanese customers will be discussed later in order to show the importance of particular country.

Australian LNG projects are experiencing cost overruns. "Increased costs are related to different factors: labor shortages and high wages, appreciation of the Australian dollar to the U.S. dollar since 2009, greater environmental hurdles due to more strict regulations recently, remote locations of some projects" (EIA, 2013a). "The costs of the projects exceeds at different levels". According to EIA report (2013a), "cost overruns between 12 and 32 % are faced within following projects: Ichthys, Gorgon, Wheatstone, Gladstone, and Queensland Curtis". "Pluto LNG experienced 30% cost overrun in 2007 and Gorgon project increased its cost about 40% from US\$37 billion to US\$52 billion" (EIA, 2013a).

"Current LNG boom is causing high labor demand and companies have deficit of well trained workers" (Ellis, et al., 2013). Thus there might be need to hire workers from abroad (Ellis, et al., 2013).

This situation is very critical for Australia and is causing a lot of uncertainties for the future (Ellis, et al., 2013). This might influence shareholders willingness to invest further (Ellis, et al., 2013). But it seems that unexpected costs are not influencing decisions of some. Thus, Japanese companies show their interest in projects (Lee, 2014). The reasons and motives for such decision will be discussed further.

4.1.1 "Asian LNG market"

It is important to mention that "there is no such thing as an "Asian" market" (Bradshaw, et al., 2013, p. 9). Thus, "in countries such as Bangladesh, Malaysia and Pakistan gas is dominant; in China, India, the Philippines and Myanmar gas is marginal (providing less than 10% of total energy); in Singapore, Japan, Indonesia, South Korea, Taiwan, and Vietnam, gas market up to 10-20% of total energy" (Bradshaw, et al., 2013, pp. 9,10). LNG imports are important for Asia because gas in this region is traded mostly via LNG (Bradshaw, et al., 2013, pp. 9-11). "Asian consumers are the largest in the world, thus, their imports were at least 60% of the world's available LNG in each year since 1980" (Bradshaw, et al., 2013, p. 11). "LNG has provided one third of the total gas demand in Asia since 2000 and expected to increase to 38% by 2020" (Bradshaw, et al., 2013, p. 11).

“After LNG imports from Australia and Qatar have started in 1989 and 1997 the region sources only 29% of its LNG within Asian” (Bradshaw, et al., 2013, p. 11). “It is expected that by 2017 Australia will largest supplier for Asia surpassing Qatar (Bradshaw, et al., 2013, pp. 12-13). Thus, Tsafos (2013, p. 12) suggests that “Asian consumers will benefit from Australia’s growth: Japan committed to buy 32 million tons per annum, China has contracted 18mmtpa; and Malaysia, Taiwan, and India will purchase smaller amounts of LNG from Australia”. “But there is downside of this situation, as increased interest of investors in Australia had spurred competition for resources, thus making prices of future LNG higher by 12% to 30%” (Bradshaw, et al., 2013, p. 13). Tsafos (2013, p. 13)emphasizes that: “Asian companies which invested in these LNG projects, will need to commit more capital into these projects to secure supply and higher prices to “justify their investments”.

4.1.2 Problems faced by Pluto and Browse LNG projects

Pluto project

On July 2007 the project got approval for the development (Woodside, 2007). “Till the date of approval it is been approximately US\$ 701,929 million (A\$796 million as of 27.07.2007) spent on all phases of Pluto field and LNG project” (Woodside, 2007). “The additional funding of US\$ 9,87 billion (A\$11.2 billion as of 27.07.2007) was also approved by Board for project on a 100% basis” (Woodside, 2007). There was “LNG Sale and Purchase agreements signed with Tokyo Gas and Kansai Electric of Japan” and it was stated by Woodside (2007) that it will provide “commercial certainty, ensuring a competitive rate of return for the foundation project without any regard to future expansions”. The Board gave approval for further studies on an expansion of LNG (Woodside, 2007). Environmental approvals from State and Commonwealth were received (Woodside, 2007). According to the agreement signed with Japanese companies “it was expected to have sales up to 3.75 mtpa for 15 years” (Woodside, 2007). As a result of Board approval there was “formation of a joint venture with Tokyo Gas and Kansai Electric resulting in 5% share for each of the companies and leaving Woodside with remaining 90% of the share” (Woodside, 2007). The project was expected to be funded through free cash flow from its Australian operations (Woodside, 2007).

Now let us see how they were planning the pace for the project:

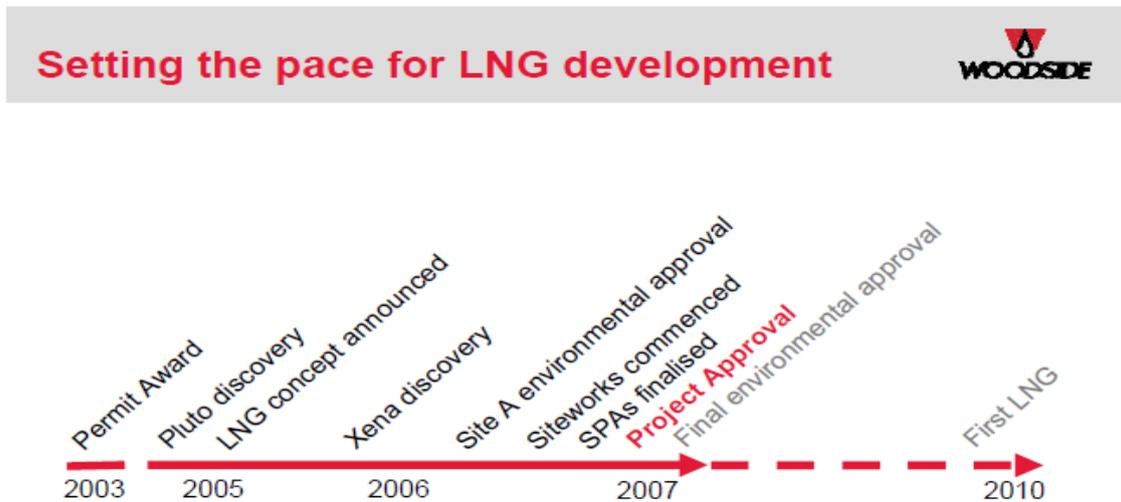


Figure 4.3 Timeline of Pluto project (Woodside, 2014)

What happened next?

Here is some information about issues related to project in chronological order

Table 4.2 Issues faced by Pluto project

Date	Situation
30.11.2010	“The project cost increased by US\$ 867,114 million (A\$900 million as of 30.11.2010) and six more month extension before production. Increase in cost from estimated US\$ 12,62 billion (A\$13.1 billion) to US\$ 13,49 billion (A\$14 billion). Reason: rebuild of several flare towers used to burn off waste gas, because they don’t meet design requirements due to the “wind issue”. Manager: Don Voelte” (AAP, 2010)
17.06.2011	“First shipments are scheduled for March 2012, costs are rising by US\$ 948,88 million (A\$900 million as of 17.06.2011) making it US\$ 15,71 billion (A\$14.9 billion). Reason: design fault and weather-related issues. Manager: new CEO Peter Coleman. Remark: some analysts state that despite delays this project is relatively fast and aggressive for industry standards” (Bendeich & Kebede, 2011)
25.09.2012	“New CEO of Woodside Peter Coleman lists the recent problems in LNG industry: the “plethora of LNG projects” in Pilbara and Queensland are making high-cost situation worse. He calls it “inertia” for required fall in costs. He lists projects: Gorgon, Wheatstone and some in Queensland. He criticizes Chevron, Inpex and Santos for being “not enough experienced” which is also reason for delays and high-costs. Moreover he emphasized that margin between project cost and LNG

	price is really thin. Most of the project participants according to him lack previous experience in LNG. Pluto is completed in 2012, 1.5 years late and 25% over budget” (Klinger, 2012)
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New CEO of Woodside Peter Coleman is listing the challenges in Australian LNG industry stating that it is concentration of projects in Western Australia which is causing competition (Klinger, 2012). “The reason for that is lack of experience of some projects participants, the timeline of projects that goes in approximately in parallel which is increasing already existing labor shortages and wages issues” (Klinger, 2012). He emphasized that this situation inside the country has more negative effect on costs than external factors (Klinger, 2012). He also mentioned that him “being Australian-based can see some challenges that are overlooked by other project managers who are concerned more about portfolio” (Klinger, 2012). Weather issues are also unpredictable and difficult to calculate (Klinger, 2012).

Browse project

This project had experienced difficulties related to delays and over costs. “Aboriginal population issues occurred during planning of Browse LNG project” (Leather & Wood, 2012). On 12 April 2013 the company CEO and Managing Director Peter Coleman gave interview about project delays and over costs (Woodside, 2013a).

Information about project issues:

Table 4.3 Issues faced by Browse project

Date	Situation
12.04.2013	<p>“Cost escalation of Browse project making the current development concept not commercial. Coleman (Woodside, 2013a) said: “Woodside does not discuss publicly the capital costs or the commercial terms used to evaluate the project, nor do we publicly discuss the hurdle rates of investment returns which would likely differ for each joint venture participant”. He states that issues are not related to environment or red tape, but purely commercial.</p> <p>According to him US shale does not have impact on decision to delay and they have learned lessons from Pluto project: front-end planning activities such as the quality and cost assurance.</p> <p>He said that they are looking for alternative solutions” (Woodside, 2013a)</p>
30.04.2013	“Accepting Shell’s Floating LNG (FLNG) technology. This will bring

	development to the project and build relationship with Shell” (Woodside, 2013a)
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Coleman was listing concentration of projects in one area within approximately same timeline as factor influencing project costs and making labor and wage issues worse (Klinger, 2012). These factors are critical for costs but cannot be easily estimated.

4.1.3 Problems faced by Gorgon and Wheatstone LNG projects

Gorgon project

“The project got approval in 14 September 2009 as a joint venture. It is the largest resources project in Australia. The same year Australian Prime Minister Kevin Rudd announced that Gorgon signed contract to export LNG to Japan and Korea” (Chevron, 2009). “The project participants initially were Chevron 50%, ExxonMobil and Shell 25% each” (Sapienza, 2009). “The project received all necessary approvals from state authorities and environmental conditions were planned to be met” (Chevron, 2009).

Issues faced by the project:

Table 4.4 Issues faced by Gorgon project

Date	Situation
06.12.2012	“40% cost blowout puts a question on further expansion plans. Increase in cost from \$US 43 billion to \$US 52 billion. Reasons: strong Australian dollar (caused \$US 5 billion increase in this cost), poor productivity at the remote Barrow Island site off WA, labor costs and weather. Project received criticism from ExxonMobil and Shell, calling it “over-ambitious target”” (Macdonald-Smith, 2012) .
12.03.2014	“The cost raised from \$US 52 to \$US 54. Start-up date pushed to mid- 2015 instead of first quarter. But, Chevron says that it is 80% complete and 2/3 of gas contracts signed” (AAP, 2014).

“According to sources from Australian Mine and Metals Association the reason for that is high wages. While the Maritime Union claims that multiple levels of bureaucracy and mismanagement by Chevron are the reasons for that” (Diss & Lannin, 2013). Some estimates made in 2012 about future costs of the projects from the article by Angela Macdonald –Smith

(2012): the figure shows “the cost competitiveness of Australian projects when cost of Gorgon LNG raised from \$US 43 to \$US 52”. The projects seem to compete with each other though they do supply for one market. “Australian dollar started highly increase since early 2000s, the exact effect of this factor was not predictable before final investment decision” (Macdonald-Smith, 2012).

Top dollar gas

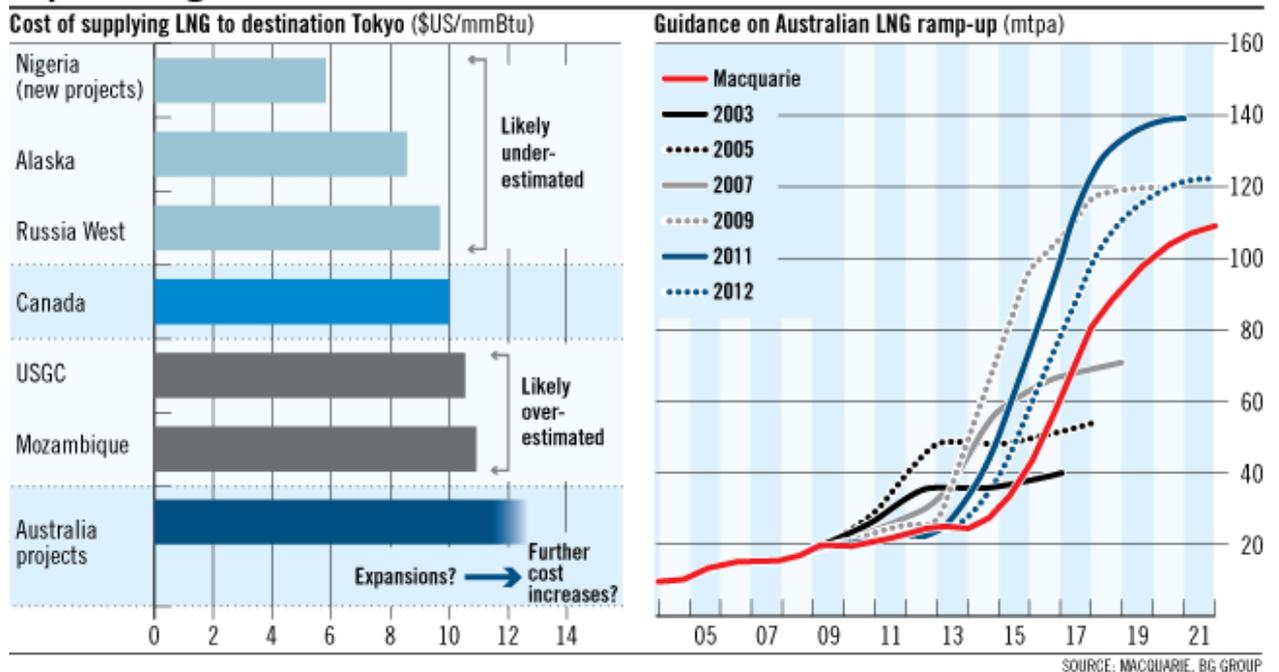


Figure 4.4 Costs of LNG projects: (Macdonald-Smith, 2012)

If this is effect of Gorgon project cost overrun we can assume that there is certain “synergy” in cost increase within remaining projects. As CEO of Woodside Peter Coleman stated in his interview “the concentration of projects are increasing costs for all of them making labor and issues worse. In addition their timeline almost coincides so this is another issue” (Klinger, 2012).

Wheatstone project

“This project is one of the largest LNG projects of Australia. The final investment decision was received in 2011 and the project participants : Chevron 64.14%, apache 13%, Kuwait Foreign Petroleum Exploration Company (KUFPEC) 7%, Shell 6.4% and Kyushu Electric power Company 1.46%, together with PE Wheatstone Pty Ltd (part owned by TEPCO 8%)” (Chevron, 2014b).

“Australia’s federal government attached more than 70 conditions to the approval of Wheatstone project to limit the impact on the environment in the area” (Leather & Wood, 2012, p. 13).

Table 4.5 Issues faced by Wheatstone project

Date	Situation
20.01.2014	“Shell plans to exit Wheatstone LNG after selling its interest for US\$ 1.14 billion to Kuwait Foreign Exploration Petroleum Co. According to the statement Shell is still interested in Australian investments but, further is planning to “concentrate investment away from the Chevron Corp (CVX)”” (Kennedy & Gismatullin, 2014)

According to information we can know that Shell is still interested in investing to Australia despite its challenges (Kennedy & Gismatullin). Approximate cost overrun for this project is between 12-32% (EIA, 2013a). As of March 2014 the project is 30% complete and scheduled to start in 2016 (AAP, 2014).

Conclusion based on project issues: from the information above we can see that the reasons influencing high costs were known: labor shortages, high wages, and strong currency. But unfortunately the extend of influence of these factors cannot be estimated exactly. The projects started their implementations almost at the same time with same approximately same start date. These factors made existing challenges more difficult (costs increased and dates shifted).

4.1.4 Initial planning for projects

Pluto Project

The table below shows the chronological order of the events and decisions during planning process prior to final investment decision. The information provided in the table is based on the data available in the official website of Australia’s oil and gas company Woodside.

Table 4.6 Initial planning for Pluto project (Woodside, 2006)

2003 December	Pluto project receives permit
2005	Pluto 100% owned by Woodside
2005 April	Initial discovery of Pluto field
2005 July	Completion of first appraisal well

2005 August	Announcement of LNG project based on Pluto field. Development was granted Major Project Facilitation Status by the Australian government. Land was reserved by Western Australian government.
2005 fourth quarter	Key commercial terms had been agreed with North Asian customers for the delivery of 3.5 to 4 million tonnes of LNG a year.
2005 December	Agreement between Woodside and Tokyo Gas Co., Ltd. For the supply of 1.5 to 1.75 million tones of LNG a year.
For 2006	There were plans to make final site selection
2006 December	Approval of US\$ 1,47 billion (A\$1.4 billion) for Pluto site preparation by the Board.
2006	The basis for design for facilities completed, FEED commenced (front end engineering design).
2006	Three wells drilled to enable resource estimate, it was increased from 3.6 trillion cubic feet (Tcf) of gas to 4.1 Tcf.
2007	Final investment decision

I would like to further describe activities conducted by Woodside in order to better understand the situation during decision making process. “Woodside in 2006 as an operator of North West Shelf Venture delivered first cargo to the Southern China” (Woodside, 2006, p. 2). “Same year NWSV Phase 5 project was scheduled on a schedule for 2008 and the Board approved 1.4 billion dollars for Pluto” (Woodside, 2006, p. 2). In this report it was written “we seek to improve efficiency and minimize lead times through for example, standardization of engineering specifications and equipment” (Woodside, 2006, p. 5). They also stated “despite the industry’s cost and schedule pressures we are committed to delivering our projects on track” (Woodside, 2006, p. 5). They believed that they “made great progress in the projects and confident that they matured Pluto sufficiently to make final investment decision” (Woodside, 2006, p. 5).

Woodside was studying demand in Asia Pacific region. They knew that “Asian buyers need to secure their supply side outside their region” (Woodside, 2006, p.7). So for Pluto project, the company selected “reliable customers with proven track records in order to have smooth demand profile” (Woodside, 2006, p. 7).

Woodside is experienced company and “in 2006 despite delivered cargoes (NWS project) faced uncertain problems” (Woodside, 2006). According to their report of 2006 “ five tropical cyclones, record high temperatures in Karratha, typhoon activity in Japan and technical issues at the Karratha plant made 2006 challenging year” (Woodside, 2006, p. 6). “Same year NWSV signed agreements with Chugoku Electric, Toho Gas, Chuib Electric, Kansai Electric, Tokyo Gas, Tokyo Electric and Osaka Gas for future LNG deliveries of about 40 million tonnes after 2009” (Woodside, 2006). Woodside had plans to “construct a Burrup LNG Park to provide

capital efficiencies for all gas owners in the area and achieve early commercialization of resources” (Woodside, 2006, p. 12).

In order to “manage costs the company decided to use benchmarks of the NWS Phase 5 expansion project” (Woodside, 2006, p. 12). They decided to use “schedule synergies” between Pluto and Phase 5 to have transition of management, labor, suppliers and contractors (Woodside, 2006, p. 12). They expected to contribute \$17 billion to Australia’s economy according to financial forecasts. Further they write in report: “we expect to be in a position to make a final investment decision in mid - 2007 to enable delivery of first LNG to Tokyo Gas and Kansai Electric by late 2010” (Woodside, 2006, p. 12).

In 2006 the company decided to “incorporate Xena field into the Pluto LNG. This is because field has 0.4 trillion cubic feet of dry gas” (Woodside, 2006, p. 12).

“The final investment decision on Pluto project was taken in July 2007 and was the most significant achievement for the company for the given year” (Woodside, 2007, p. 2). According to the company’s report of 2007: “Pluto is one of the only three LNG projects to receive approval worldwide over the last three years and is the fastest ever from discovery to FID” (Woodside, 2007, p. 2).

In the “capital management strategy” part of the report, they wrote: “During 2007, Woodside’s capital investment grew, as spending on the newly approved Pluto project ramped up” (Woodside, 2007, p. 8). Moreover “it was expected to increase expenditure to US\$ 3,94 billion (A\$5 billion) and as stated in the report “most of these capital was going to be spent for Pluto project in order to progress it and make sure to deliver first gas by the end of 2010” (Woodside, 2007, p. 8).

“This same year was good for the company in terms of long-term contracting. Thus, Tokyo Gas and Kansai Electric Power Company Inc. became partners of Woodside in the Pluto field” (Woodside, 2007, p. 10). As stated in the report “these deals underpinned the US\$ 8,83 billion (A\$11.2 billion dollar) final investment decision for the Pluto” (Woodside, 2007, p. 10).

“As for LNG shipments, it was expected that customers and joint ventures of the Woodside company Tokyo Gas and Kansai Electric will each supply one ship” (Woodside, 2007, p. 11).

“From technological point, Pluto was expected to be similar to Angel project (NWSV) and “incorporate 25 years of experience” of Woodside” (Woodside, 2007, p. 16).

As “Woodside is a pioneer in a modular design for LNG trains, it applied this design for Pluto project’ (Woodside, 2007, p. 17).

“According to Board sanctioned assumptions the Pluto project generates an internal rate of return of 10-15%” (Woodside, 2007, p. 24).

“In order to meet schedule requirements Woodside was focusing on hiring right people and contractors with world class expertise” (Woodside, 2007, p. 24). Report states the following: “technical specialists and trades people involved in the construction of the NWS train 5 project have progressively moved to the Pluto construction project, supporting the business objectives of both projects” (Woodside, 2007, p. 25). “All operations resources were supposed to be provided from Woodside existing technician training capabilities” (Woodside, 2007, p. 25).

If “in 2006 the Board approved US\$ 1,02 billion (A\$1.4 billion) for Pluto, by the time the final investment decision was made the whole sum was already committed. By the end of 2007 this number increased to US\$ 3,94 billion (A\$5 billion)” (Woodside, 2007, p. 25). “For managing schedule uncertainties and costs Woodside was securing vital equipment and services in advance” (Woodside, 2007, p. 25). “At the same time the feasibility studies for Train 2 were underway. There are a lot of undeveloped gas discoveries in the area so the Pluto project was initially designed for expansion” (Woodside, 2007, p. 25).



Figure 4.5 Pluto planned timeline (Woodside, 2007, p.25)

From the timeline above we can see two dates: approval and first gas delivery. It looks like Woodside was aware of possible challenges: industry costs, weather conditions, pressure related to the contracts and labor issues. They decided to use their previous experience and relied on benchmarking of NWS phase 5. Moreover, they decided to transfer technicians from NWS phase 5 and use “schedule synergy”.

Conclusion: based on information we can assume that possible reasons for costs and delays were linked to the critical success factors known by the company: high industry and labor costs, weather conditions. They signed contracts with customers before final investment decision and were committed to deliver first cargoes in 2010. But despite their commitment most of the critical factors change over time and it is difficult to estimate their exact impact on project costs and start dates.

Browse project

Information about planning process for this project is provided in the table below based on data provided by Woodside.

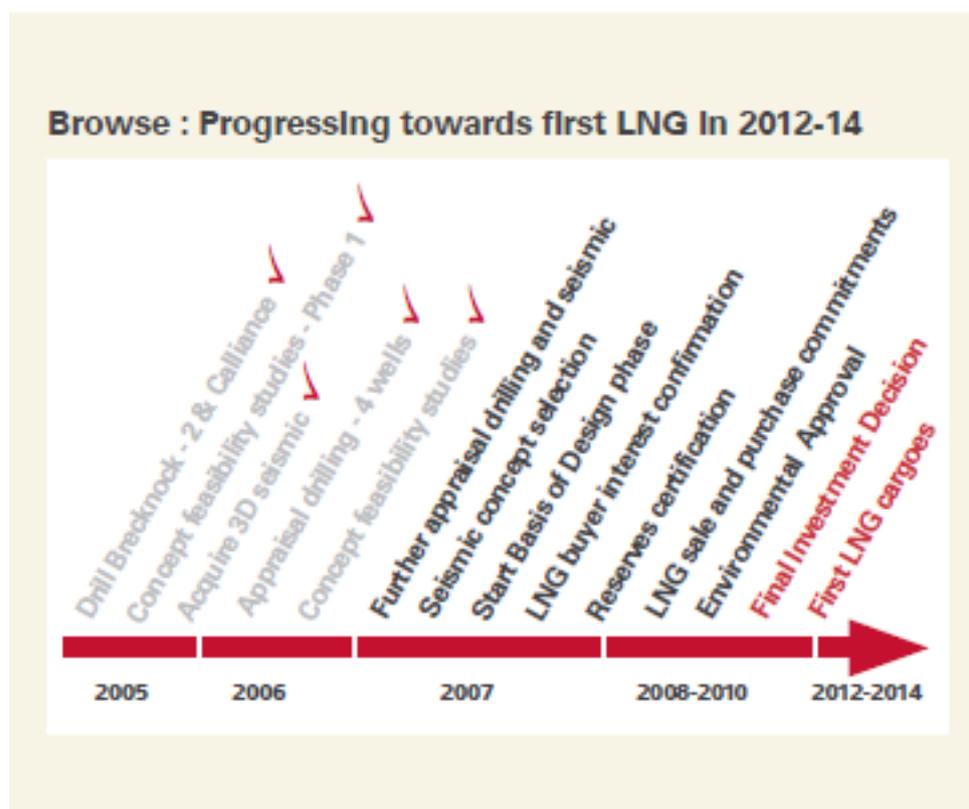
Table 4.7 Initial planning for Browse project (Woodside, 2006-2013)

2006	Appraisal of fields: Torosa-5, Torosa-6, Callaince-3
2007	Evaluation of sites, proposing three options for project development
2008	Appraisal of fields: Torosa-5, Torosa-6, Callaince-3 (the work continued)
2008	Woodside and joint venture participants to decide which option to choose: onshore liquefaction in Kimberley or piping gas to existing facilities at Karratha
2010	Choosing Kimberley option as preferred location (James Price Point, Western Australia). Selection was made anonymously by joint venture participants
2011	Environmental approvals are expected, the native title agreement signed
2012 April	Variations to the Browse Basin retention leases were approved, which included extending the timetable for readiness for a FID to the 1H 2013. FEED studies completed.
2012	Woodside sold a minority of its equity in Browse LNG Development to Japan Australia LNG (MIMI Browse) Pty LTD. Chevron sold its equity share to Shell development in Australia and BHP Billiton announced about intentions to sell its equity to PetroChina
2012 July	Western Australian Environmental Protection Authority (EPA) recommended conditional approval of the State Government’s proposed LNG precinct. The Precinct requires approval from the Commonwealth Environment Minister, which was expected in 1H 2013.
2012 December	The EPA and WA Environment Minister approved Woodside’s proposal to build LNG processing facility in the Precinct. The public review of Environmental Impact Statement for the project was completed and final information was expected to be approved in Q1 2013

2013 April	Woodside announced that James Price Point development concept did not meet the company's commercial requirements for FID (final investment decision)
2013 September 2	Selection of new concept: FLNG (Shell)

“In 2013 the expected final investment decision was postponed because the initial concept for project development was not approved. The final investment decision for Browse LNG project is expected to be taken in 2015” (Woodside, 2013, p. 17).

“In 2006 Woodside was working on understanding the potential of the fields. Afterwards there were three drillings to confirm field boundaries” (Woodside, 2006, p. 14).



4.6 Timeline of Browse project (Woodside 2006, p.15)

“During 2007 Woodside evaluated several sites where potentially LNG facilities could be built, the result showed that each option has its advantages and challenges” (Woodside, 2007, p. 26).

“Woodside compared three options: offshore, onshore and “Browse to Borrop”. Testing so called “offshore option” showed that developing liquefaction facilities in the lagoonal waters is the lowest cost option and highest economic value. But the company was aware that this environmentally sensitive area could cause some hesitations among stakeholders” (Woodside, 2007, p. 26).

“Testing for the “onshore option” showed that it is possible to locate liquefaction facilities in the Kimberley and Darwin areas, thus preventing issues by minimizing environmental impact” (Woodside, 2007, p. 26).

““Browse to Borrop” option was about building pipeline of approximately 1,000 km and compression platform in order to transport gas to Karratha. But it would add more cost, technical challenges and alignment of different joint ventures” (Woodside, 2007, p. 26).

Report of 2007 underlined that “Woodside was developing offshore and onshore options in parallel” (Woodside, 2007, p. 26).

“Same year Woodside signed agreements with PetroChina Company Ltd and CPC Corporation, Taiwan for future supplies starting from 2013-2015 for 15-20 years period and 2-3 million tonnes of LNG each” (Woodside, 2007, p. 26) .

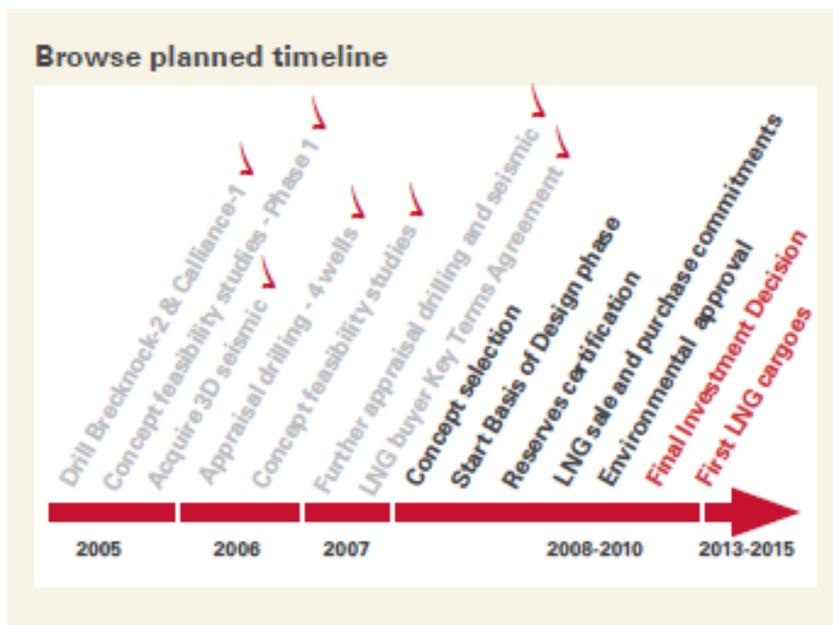


Figure 4.7 Browse project: new timeline (Woodside, 2007, p.27)

Conclusion: in 2007 the company was evaluating three possible options and same year they signed agreement for future supplies with customers. In 2008 through anonymous voting the company decided to choose. In 2013 the company decided to change the concept before final investment decision. CEO of the company Peter Coleman stated that the reason is commercial though cannot be discussed openly. We can assume that “Kimberley option” was selected due to the following reasons: 1. Supply agreement added some pressure on decision in order to deliver first cargoes in 2013-2015.; 2. “Kimberley option” was perhaps viable in 2008, but uncertainty increases over time and prices also (labor costs, currency appreciation). Indeed it was good for

the project that they decided to shift the date for final investment decision. This time of approximately less than half year gave them chance to find new FLNG option as a better alternative. They benefited from the “rework” through “learning loops”. “Rework” should not be seen as unexpected negative event but rather tool to correct the situation (Pinto, 2013).

Gorgon and Wheatstone projects

Gorgon project

The project got approved in 2009 (Chevron, 2009). Since Chevron has 47.33% shares in the project and acts as operator I would like to describe the planning process from Chevron perspective. Further I will try to reflect how ExxonMobil and Shell participated in the decision making process.

Table 4.8 Gorgon project timeline: Chevron perspective (Frontier, 2009, p.14)

Date	Action
1973	West Tryal Rocks Field discovered
1976	Spar field discovered
1984	Gorgon field discovered
1994	Chrysoar field discovered
1996	Dionysus field discovered
1998	Reserves certified and Gorgon JVPs undertake Front End Engineering and Design (FEED) work (8mtpa Burrup) Asian economic crisis puts a hold on project
1999	Io, Jansz and Geryon fields discovered
2001	Chevron promotes standalone Barrow Island plant location
2003	Environmental, Social and Economic Assessment process completed Barrow Island Act 2003 passed; WA Government approves 300 hectares for development
2005	FEED commences for 2X5 mtpa with supply from Gorgon and Io/Jansz Framework Agreement Signed
2006	Chandon and Clio fields discovered
2007	Environmental approvals for 2X5 mtpa granted; 3X5 mtpa scheme agreed by JVPs
2008	Public Environmental Review starts on revised and expanded scope Successful on-ground test of prototype drilling rig for CO2 injection Project
2009	WA Environmental Protection Authority approves revised and expanded 3X5 mtpa scope Gorgon Downstream FEED completed Arrival of Ensco 7500 rig starts one of the largest drilling programs in Australia Expressions of Interest for domestic gas State and Federal Government environmental approvals completed Production Licenses offered Gorgon Project Final Investment Decision (FID) by JVPs

According to the information provided by Chevron Australia: “project start up and first gas is planned for mid-2015. Domestic gas is due to be delivered to the market in 2015. The Gorgon Joint Venture Participants are progressing environmental approvals for expansion of the Project” (Chevron, 2014b).

While looking at the information from the 2009 we see that “project cost is estimated to be US\$ 29,78 billion (A\$43 billion) for the first phase development” (Chevron, 2014b). It says further that “it is expected to be operational in 2014” (Chevron, 2009, p. 9).

In 2009 Chris Oliver, Upstream Engineering manager has offered some innovative solutions for Gorgon project (Chevron, 2009b, p. 18) . This solution was “to build the Jansz Northern Route (direction of the subsea pipeline)” (Chevron, 2009, p.18). According to Chevron (2009b): “a project team recommended this solution” and Oliver (Chevron, 2009b) says further that: “importantly, all risk associated with the Northern Route were deemed acceptable, in line with Chevron’s risk assessment criteria”. Further Chris Oliver (Chevron, 2009b) tells about “Finding a Creative, Doable Solution: he mentioned that at the beginning the project team selected southern route and that it required “adding a number of specialist to the team –including members from the Gorgon JVP ExxonMobil partnership and from University of Western Australia”. But finally, “after evaluating alternative option of Jansz northern route the team decided to choose it as a demonstration of the critical link between quality decision-making and sound capital stewardship” (Chevron, 2009b, p. 20).

Managing Director of Chevron Australia Roy Krzywosinski (Chevron, 2009b, p. 9) stated that: “Having right people with the appropriate skills, commitment and “operator mindset” is essential and this is where Chevron’s corporate values and ongoing focus on safety, capital stewardship and operational excellence will be fundamental to our success”.

Shell perspective

From the media release of Shell dating to 14 September 2009 we see that “Shell announced a long-term agreement with PetroChina for LNG from its share in Gorgon” (Shell, 2009) . Interesting fact that “PetroChina signed same year contract with Qatargas and Shell to purchase 3 million tonnes LNG per annum from Qatargas project in Qatar. The additional 3.3 million tonnes of LNG supplied to China from NWS project where Shell is also participant” (Xinhua news agency, 2008).

ExxonMobil perspective

In the news release of ExxonMobil Australia stated that: “The decision follows recent execution of LNG sales and purchase agreements with PetroChina International Company Limited and Petronet LNG Limited of India for ExxonMobil’s equity share of LNG in the Gorgon Project” (ExxonMobil, 2009).

Chevron Australia sees this approach as “innovative marketing approach” because the project participants sign agreements with customers (Chevron, 2014a). Thus Chevron Australia executed Sale and Purchase agreements with following companies: Osaka Gas, Tokyo Gas, Chubu Electric Power, GS Caltex of South Korea, Nippon Oil Corporation and Kyushu Electric (Chevron, 2014a) .

Conclusion: from the Chevron perspective it is seen that they received all necessary approvals and committed to create jobs. Probably the company was aware of existing challenges, but had to get its project approved in order to be benefit from rising demand in Asia-Pacific region. The issues of labor shortages and wages cannot be solved easily. Hiring people from abroad and training staff adds additional costs and shifts start date. Furthermore company had to sign agreements and set a certain start date which was another factor adding pressure on decision making process. “Chevron’s risk assessment criteria” is not quite clear and since the company is of American origin it is probably based on “American approach” of assessing risks. May be that is why the CEO of Woodside Peter Coleman was emphasizing that he is Australian-based and most of the companies do not see the real situation in Australian LNG industry. In addition concentration of companies in one area is increasing costs even more. Can the project participants discuss strategic plan openly? Shell is European company and participates in other Australian LNG projects: NWS and Browse.

Wheatstone project

“A final investment decision for Wheatstone project was made in September 2011” (Chevron, 2009c). According to information provided “before FID (final investment decision) was taken there were studies taken on environmental, site together with social and economic impacts” (Chevron, 2009c).

Table 4.9 Wheatstone project timeline (Chevron, 2014)

August 2004	Chevron discovers the Wheatstone gas field
March 2008	Chevron announces its intention to develop the wholly owned WA-17-R and WA-253-P petroleum titles as a greenfield onshore LNG and domestic gas project
June 2008	Chevron identifies three potential sites for further investigation, based on a site screening study
September 2008	Chevron begins the environmental approval process (based on three short-listed sites)
December 2008	Chevron announces Ashburton North as the preferred site
March 2009	Chevron begins engineering and environmental studies on the Ashburton North site
May 2009	Chevron announces a two-train LNG development for the first phase
July 2009	Chevron Australia awards Front End Engineering and Design (FEED) contract for Wheatstone LNG and domestic gas plant to Bechtel Oil, Gas & Chemicals Inc.
October 2009	Local subsidiaries of Apache Corporation and Kuwait Foreign Petroleum Exploration Company (KUFPEC) sign deals to join the project as natural gas suppliers and 25 percent equity participants
December 2009	Tokyo Electric Power Company (TEPCO) sign a non-binding Heads of Agreement (HOA) to take 4.1 MTPA of LNG, become a 15% owner of the Wheatstone gas resources and an 11.25% owner of the gas plant
January 2010	Chevron signs a HOA with Kyushu Electric Power Company to acquire 1.83% of Chevron's equity share in the Wheatstone field licenses and a 1.37% interest in the Wheatstone natural gas processing facilities, which includes taking delivery of 0.8 MTPA of LNG
July 2010	Chevron signs a HOA with the Thalanyji People of Onslow, for land required to develop the Wheatstone Project. The Native Title agreement sets out significant benefits in terms of education, training, employment, business development and financial support
July 2010	Chevron releases the draft Environmental Impact Statement (EIS)/Environmental Review and Management Programme (ERMP)
April 2011	Chevron signs an agreement with Shell Development (Australia) for an 8% participating interest in the Wheatstone and Iago natural gas fields and a 6.4% interest in the project facilities
July 2011	Chevron signs a Sales and Purchase Agreement (SPA) with TEPCO for the delivery of 3.1 MTPA of LNG for a period of up to 20 years
August 2011	Chevron welcomes the Western Australian Government Environmental Approval for the Wheatstone Project
September 2011	Chevron signs SPA with Kyushu to deliver 0.7MTPA of LNG for a period of up to 20 years
September 2011	Chevron welcomes Australian Commonwealth Government Environmental Approval for its Wheatstone Project
September 2011	Chevron announces the Final Investment Decision for the Wheatstone Project

Conclusion: the project is operated by the same company as Gorgon and the timeline between final investment decision in both projects is approximately with two years difference. We can assume that the factors influencing the project's outcome are similar. Moreover this project is also located in Western Australia where there is high concentration of projects. The costs were unavoidable.

4.1.5 The NWSV comparison

While studying reports on described projects provided by Chevron Australia, I decided that one more project deserves attention in this paper. The reason for choosing this project is that it is located in Australia and it will help to analyze initial planning and possible reasons that caused "unexpected costs and delays". I refer to analysis through the prism of "seven deadly sins" that managers tend to repeat found by Pinto (2013). In his article he analyzed his findings through comparison of the existing projects and the projects that were experiencing cost and delay issues.

"The North West Shelf Venture project celebrated 25 years anniversary in 2009" (Chevron, 2009b, p. 16). "This venture exports LNG for 20 years to Asia Pacific region" (Chevron, 2009b, p. 16). The other interesting thing about it that "joint venture participants are: Chevron, Shell, BP, BHP Billiton, Japan LNG Australia and Woodside Petroleum operator" (Chevron, 2009b, p. 16). Woodside Company was using this project "as a benchmark in the Pluto project in order to manage costs" (Woodside, 2006). "The cost of the project represents investment of more than US\$ 23, 74 billion (A\$27 billion) and it accounts for more than 40% of Australia's oil and gas production" (Woodside, 2014).

"This project is pride of Australia and venture participants" (Chevron, 2009b, p. 16).

In October 2009 ACIL Tasman published report named "Nation Builder" explaining "How the North Shelf Project has driven economic transformation in Australia". Apart of contributions and benefits that this project brought to Australia, report describes conclusions based on findings and some observations made through analysis of the project.

"The NWSV was formed in 1963 and initially had three participants: Woodside, Shell and Burmah Oil. The project starts its history from 1970 when natural gas reserves were found in Carnavon Basin off the Pilbara Coast (North West Australia). First LNG train was built in 1989" (Begley, 2009, p. 5).

The most remarkable findings are related to the recommendations made for project costs. Begley (2009, p. 8) suggests that “there is certain cost escalation which occurs through the time. As example they consider that A\$ 1 in 1990 would be equal to A\$ 1.61 in 2008-09”. That is why he used “Australian Consumer Price Index to compare cost estimates made during initial planning with “real day” cost” (Begley, 2009, p. 8). “A single CPI cost escalator is used because it brings estimates into today’s terms-while reflecting the changing expenditure power of a dollar for consumers” (Begley, 2009, p. 8). But Begley (2009, p. 8) warns that “the price we get after calculating it through CPI can underestimate the cost of facilities compare to the ones of today”.

A figure below illustrates the cost difference between Australian CPI and recent estimates for the capital costs for the global upstream oil and gas industry recommended by Begley (2009,p.8).

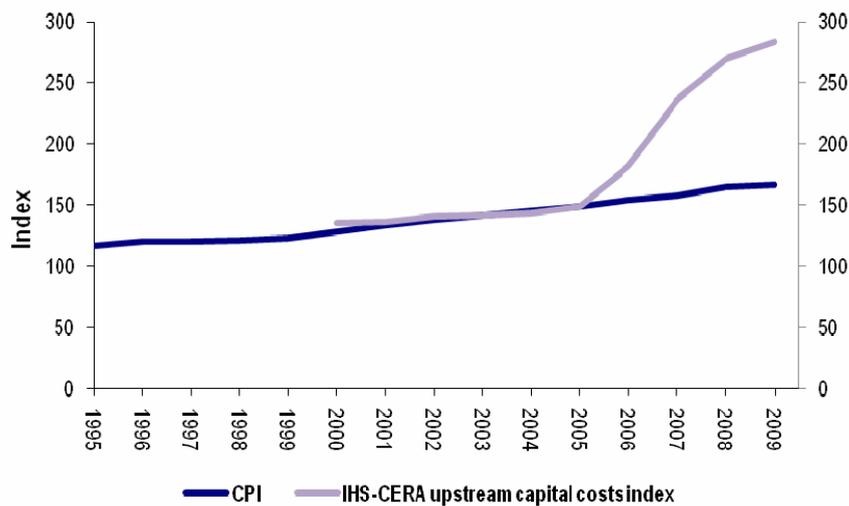


Figure 4.8 Cost escalation and CPI (ACIL Tasman analysis 2009)

“This gap is caused by the rise of upstream construction cost for oil and gas industry which became higher than CPI trends” (Begley, 2009, p. 8).

So Begley (2009, p. 8) suggests that “the US\$ 23,75 billion (A\$27 billion) of construction expenditure on the NWSV oil and gas facilities would cost more than US\$ 43,97 billion (A\$50 billion) if they were constructed in 2009”.

Employment impacts of NWS project: report shows that “it is likely that the wages of specialized labor force were increased due to demand and the number of workers was remaining small because they cannot expand quickly (due to the specialization)” (Begley, 2009, p. 20).

“In 2004 Woodside signed a Joint Venture agreement for a five-year program with the WA Energy Research Alliance (WA:ERA) worth up to US\$ 26,38 million (A\$30 million)” (Begley,

2009, p. 41). “This research alliance is a collaboration between University of Western Australia, CSIRO and Curtin University of Technology. The goal of alliance is to share knowledge, skills and facilities for conducting research in oil and gas industry” (Begley, 2009, p. 41).

“Clough is a Perth based provider that deserves attention. The work of “Clough” a Perth based provider of oil and gas services, front-end engineering design, construction, installation, commissioning to operation, asset support and maintenance services” (Begley, 2009, p. 42). “Clough had its first offshore oil and gas contract with the NWSV North Rankin A platform and now provides its project management and engineering services to the world” (Begley, 2009, p. 42). This provider is “a member of a Kellogg Joint Venture and had worked for Pluto LNG and Chevron’ s Gorgon project” (Begley, 2009, p.42). “The NWSV had an impact on the economic structure of the Western Australian economy” (Begley, 2009, p. 42). Among the other advantages that this project brought are: “benefits of major technology investments arising through transfer of labor, from learning effects and from market development externalities” (Begley, 2009, p. 42). Moreover, Begley (2009, p. 42) in his report talks about “improvements in the productivity of local firms through knowledge externalities through labor transfer”. He explains that this happens for example, “when employees of the NWSV and its sub-contractors – who have gained new knowledge – transfer to a domestic firm” (Begley, 2009, p. 42). “Knowledge transfer can be achieved from foreigners who come from other countries or companies” (Begley, 2009, p. 43). In the example of NWSV there was “transfer of knowledge, personnel was trained and transferred between the organizations to provide services for NWSV” (Begley, 2009, p. 43). As for “technologies”, they were “provided by the international companies such as the Dutch organization SIPM, Kellogg Oversees Corporation, and Japan Gas Corporation” (Begley, 2009, p. 43).

Conclusion: From the example of NWSV we learned that certain challenges were present in Australian LNG industry: labor shortages and wages, and cost escalation. Was it actually possible to estimate effect of these challenges correctly? Critical success factors might change over time and their influence changes as well. The project participants were cooperating and sharing knowledge. But external environment and demand in Asia Pacific were different at that period of time. Even if managers used this project as a benchmark for planning the other factors have changed which would influence decision.

Key empirical points after analyzing issues faced by projects and initial planning process (Pluto, Browse, Gorgon and Wheatstone):

- ❖ Existing challenges such as labor shortages and high wages, strong Australian dollar and legislation peculiarities became more difficult to handle because of high concentration of the projects in the same area (Western Australia)
- ❖ The demand side is “setting a deadline” to start receiving first cargoes by 2020 and spurring competition by signing multiple agreements
- ❖ Cost escalation is unavoidable and cannot be estimated with exact accuracy
- ❖ Knowing critical success factors is not enough they change over time and their effects on projects also changes over time
- ❖ “Human factor” should not be considered as a source of bias during decision making process. The pressure of competition is influencing decision.
- ❖ Example of NWSV shows how cooperation between project participants made it successful. But, the critical success factors at that time were different. Most probably participants’ expectations were met with project expectations. We do not know how project participants position themselves within project and what kind of expectations they have. We also do not know the key driving motives for their decision.

4.2 Internal factors influencing success for Australian LNG projects

“Australia has advantage due to the resources but has internal challenges that are influencing success of the projects. Among them are labor costs, legislation, red tape and green tape, policy and fiscal regimes” (APPEA, 2013). Further we will see how these factors affect LNG projects.

4.2.1 “Australian situation”

Australian government as well as major oil companies investing in project such as Gorgon had high expectations and hopes about the future. As outlined in one of the Chevron Australia Media statements made by Chairman of the Board and CEO Dave O’Reilly in 2008: “Australian government and industry is facing challenges related to Five Expectations” (O’Reilly, 2008)

Among these “Five Expectations” or “5Es” Dave O’Reilly (2008) points that in order to be successful they should focus on: “energy, engineering advancements, the environment, economics and employment”.

“Energy expectations are important because Australia’s LNG exports are oriented towards Asia Pacific region” (O’Reilly, 2008). O’Reilly (2008) underlined importance of two projects of Chevron Corporation in Western Australia - Gorgon and Wheatstone. He explains that “both of them are expected to bring profits to Australia and according to the independent research group ACIL Tasman the government will earn around US\$ 31,74 billion (A\$40 billion of Australian’s dollars as of 17 September 2008) from the Gorgon project” (O’Reilly, 2008). This he explains “will increase Australia’s Gross Domestic Product of around US\$ 50,78 billion (A\$64 billion) net present value, and bring US\$ 26,18 billion (A\$33 billion) through consumption of local goods and services. Moreover they expected to create thousands of jobs” (O’Reilly, 2008). These projects are going to be long-term and Gorgon for example is expected to bring energy for the period of more than 40 years” (O’Reilly, 2008).

The “second expectation” is related to the “success in the area of engineering or technology advancements” (O’Reilly, 2008). He underlies that “building offshore production platforms, pipeline systems, facilities to cool and condense natural gas into a liquid are the challenging tasks in the petroleum business. That is why Chevron has long-term partnerships with universities and supports research” (O’Reilly, 2008). O’Reilly (2008) was explaining the plans related to Gorgon for “building up one of the longest subsea tie backs in the world from the Jansz field, which is 180 km from the wellhead back to Barrow Island”. But he explains there is a “debatable issue related to plans of Australian Government: from one side it has aim to develop Australian LNG and sees it as a national competitive advantage. At the same time there is a regulation concerning emission trading scheme” (O’Reilly, 2008). He stated that “normally the LNG industry should be recognized and encouraged over more polluting energy industries” (O’Reilly, 2008). But in reality he mentioned that “proposed ETS is leaving the LNG industry bearing the full economic costs, and is essentially subsidizing more carbon intensive industries” (O’Reilly, 2008). He warned that it can influence “further growth of the LNG industry and increase global warming” (O’Reilly, 2008).

O’Reilly (2008) brought to the table a question about finding a way “to reduce greenhouse gas emissions without jeopardizing the future of Australia’s LNG industry” as a “third expectation”.

The next “e” mentioned by O’Reilly (2008) was about “economics”, since “LNG is the most capital intensive industry”. He was warning about “uncertainty with return on investments” (O’Reilly, 2008). He suggested considering a “scenario proposed by Professor Ross Garnaut

using a hypothesized emissions price of US\$ 15,86 (A\$20) per ton over the life of a project” (O’Reilly, 2008). “This price could increase the operating costs of the projects Gorgon and Wheatstone operated by Chevron by US\$ 79,35 to US\$ 158,69 million (\$100 to 200 million) each per year. This might be additional cost that could put the projects to difficult situation” (O’Reilly, 2008).

The final “expectation” mentioned by O’Reilly (2008) was about “finding talents for the projects” in other words “labor power”. He mentioned that due to” increasing demand for skilled labor Australian government at all levels should work on certain policies helping the private sector to recruit the talent needed for specific roles” (O’Reilly, 2008).

Conclusion and points made on internal factors:

Wong (2007) argues that a project is successful when human expectations and project expectations are met. Australian projects are expected to be on-time and on-budget. Stakeholders are expecting to see return on investment and benefit from high demand for LNG in Asia-Pacific region. These five expectations are actually challenges for Australian projects because they influence costs and delays. These “challenges-expectations” had influence on planning and decision making process thus putting additional pressure on managers.

4.3 External factors influencing success of the projects

Planning for projects requires considering external factors or factors that do not depend on Australia. There are several rivals in the Asia Pacific region who are also eager to benefit from the growing demand in the area. The cost for LNG will depend on different factors such as “pricing mechanism which is different in Asia, USA and Europe” (BREE, 2013). “Competition from USA can be caused by shale gas revolution which changed the position of the country from buyer to seller” (Bradshaw, et al., 2013, p. 53) . Moreover it is important to note that the “pricing mechanism in USA is linked to Henry Hub which can be more attractive for Asian buyers because it makes it three times cheaper than Asian” (Lee, 2013, p.4). “Asian prices are linked to oil prices on a Btu-equivalent basis, so oil at US\$ 100 a barrel pulls Asia’s LNG to about US\$ 15 per million Btu” (Lee, 2013, p. 4). “US LNG exports will depend on the Department of Energy approvals” (Lee, 2013, p. 4). There is another competitor – “Qatar which is resource rich country with output capacity of 10 bcf a day and who is unwilling easily give up its customers” (Lee, 2013, p. 5). A senior analyst at the Institute of Energy Economics of Japan Hiroshi Hashimoto says that “Qatar’s marketers are gearing up campaigns to secure long-term deals in

the Asia-Pacific region, including Japan, Malaysia and Thailand” (Lee, 2013, p. 5). “The potential of this country should not be underestimated since it delivers nearly one sixth of global LNG supply and has market foothold in 75% of importing countries” (Lee, 2013, p. 5). Russia has ambitions for Asian market due to its political and economic plans for developing Far East (Henderson & Stern, 2014, p. 2). “Gazprom for example may add a third train to Sakhalin-2 project which is the first and only LNG plant for now” (Lee, 2013, p. 7). There are also ongoing “discussions between Russia and Japan for future project developments” (Lee, 2013, p. 8). As for the pricing Lee (2013, p. 8) comments that “Asian buyers are concerned about prices and according to the Development Bank of Japan estimates LNG import costs could fall by 7 to 15% by 2020 if buyers succeed in securing large quantities of LNG from the United States”. Hiroshi Hashimoto from Institute of Energy Economics, Japan warns that “Japan has to take all proactive actions in order to avoid excessive and unexpected costs in LNG prices which can be changed later by suppliers” (Lee, 2013, p. 8). He proposed certain “solutions which include special deals with US LNG plant operators to buy it on Henry Hub prices, investing in projects to have shares, forming the Japanese buyer consortium and importing pipeline gas from Russia” (Lee, 2013, p. 8).

4.3.1 Major rivals in the APR

North America

“After announcement in October 2011 of the US LNG export deal between Cheniere Energy and BG Group and Cheniere’s agreements with Kogas, Gas Natural and GAIL US plans regarding exports to Asia Pacific Region have moved from theory into practice” (Henderson, 2012, p. 4). There are “two main motives driving this decision” according to Henderson (2012, p. 4): commercial and political. Commercial logic states Henderson (2012, p. 4) “was created due to the differing trajectories of the global gas markets over the past 5-10 years, in particular the contrast between the US domestic market and the gas market in the Asia-Pacific region”.

Commercial logic for US LNG and gas export projects

“The commercial logic was clear since 2012 when the gap between prices was so great that any gas exporting company could benefit from high margins” (Henderson, 2012, p. 4).

Henderson (2012, p. 18) calls Cheniere Energy’s Sabine Pass terminal “as a good example of a project initially conceived as an import scheme that is now directing its facilities towards gas

exports”. “The project is planned to consist of 4 trains each with a nominal capacity of 4.5 mtpa for a total of 18 mtpa of LNG (21.6bcma, 2.1 Bcf/d), coming on-stream in stages from 2015 to 2018” (Henderson, 2012, p. 18).

Geopolitical implications

Although LNG is traded globally, natural gas markets are separate (Cunningham, 2013). There is big difference between gas process in Asia and USA. For instance, “in 2012 gas spot prices in Asia reached US\$ 15.63 mcf while in US they were only US\$ 3.30” (Cunningham, 2013, p. 3). Cunningham (2013, p. 3) states that “these factors are allowing USA to export surplus taking advantage of price difference”.

According to Cunningham (2013, p. 5) in this situation “USA sees opportunity as a form of support for its allies in Europe and Asia”. As an argument he mentions “legislation in late 2012 introduced by former Senator Richard Lugar (R-IN) about LNG exports to NATO Allies aiming to boost energy security in Eastern Europe” (Cunningham, 2013, p. 5). He stated that “in 2013 same approach was applied but this time it included Japan” (Cunningham, 2013, p. 5). “These political decisions are going to help US allies to diversify and sustain energy security” (Cunningham, 2013, p. 5).

“Asia-Pacific region became more import dependent despite 76% increase in its domestic gas production between 2000 and 2011” (Henderson, 2012, p. 4). According to Henderson (2012, p. 4) “consumption of gas has more than doubled and region’s need for gas imports has increased by almost 500% from 19 bcm to 112 bcm”. Figure 4.9 shows obvious difference in import requirements in the US and Asia-Pacific region.

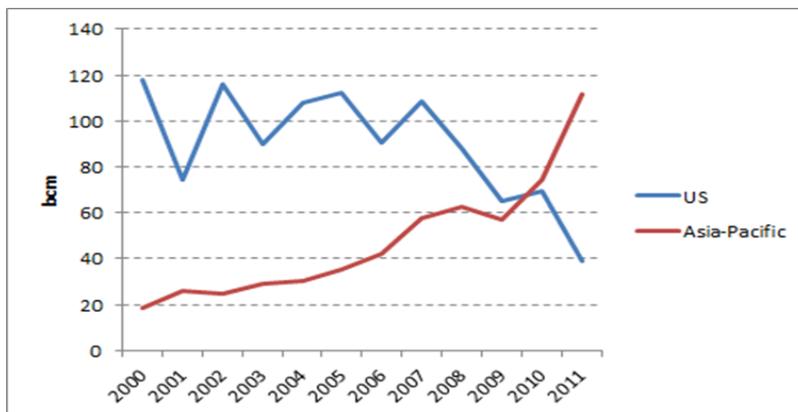


Figure 4.9The contrasting trend in import requirements in the US and Asia-Pacific (Henderson, 2012.p.5)

From the graph we can see that demand in Asia-Pacific region started to rise gradually with rapid growth after 2009. In US situation is different, “the import requirements were experiencing rises and falls, with trend going even more down after 2007” (Henderson, 2012, pp. 4-5).

“This difference between trends caused by the difference in prices: Henry Hub gas price US\$ 2.36/mmbtu and Japan LNG price US\$ 17/mmbtu in 2012” (Henderson, 2012, p. 5). Another “reason for such big gap between prices” according to Henderson (2012, p. 5) is “linked to the gas price dependence on oil prices”. However, Henderson (2012, p. 6) mentions some “key issues North American LNG is facing”. “The first one is related to the extend US exports will go. This he explains will depend on inter-related factors such as: results for the continuing development of the country’s unconventional and conventional gas resources, levels of US gas consumption, the impact of both on gas prices and political perceptions of the impact of gas exports on energy security and prices” (Henderson, 2012, p.6). The second issue mentioned by Henderson (2012, p. 6) is “the level and timing of exports from Canada”. He explains that “some of the Canadian suppliers will continue to look for oil-linked prices rather than accept a link to North American spot markets” (Henderson, 2012, p.6).

Henderson (2012, p. 4) further explains that “during the period between 2000 and 2005 there was 6% decline of production and it seemed that US would require imports of pipeline gas from Canada and LNG from the global market”. However, he explains that “after “shale gas revolution” the picture has changed: there was a 27% increase in gas production, a sharp fall in gas imports from Canada and many companies that have built LNG import terminals in the mid - 2000s changed their strategies” (Henderson, 2012, p. 4). Moreover, “US gas import requirement has fallen by 65% since 2005, and it seems that country could be self-sufficient for nearly a decade” (Henderson, 2012, p. 4).

Canadian LNG projects, and their competitive advantage

“Canada is the fourth-largest exporter of natural gas, behind Russia, Norway, and Qatar” (EIA, 2012a). Though “Canada has plans to export LNG all of Canada’s current natural gas exports are sent to U.S. markets via pipeline” (EIA, 2012a). “The US imported 3.1 Tcf (8.5 Bcf/d) of natural gas from Canada 2011, down from near-peak levels of 3.8 Tcf in 2007” (EIA, 2012a). “Although it was a main source of imported LNG for USA, changes in demand – supply balance influenced Canada as well” (EIA, 2012a). Thus, “seven LNG terminal plans have either been canceled or

suspended with exception of Canaport, Canada's first and only operational regasification terminal, which began importing LNG in June 2009" (EIA, 2012a). "It has capacity of 1.2 Bcf/d and receives cargoes from Qatar due to a new long-term supply agreement" (EIA, 2012a). Kitimat project was "initially aimed to be import terminal, but changed into export terminal expected to process 5 million tons of LNG per year (mmtpa)" (EIA, 2012a). "The project owned by Apache 40% and EOG and Encana 30% each, is expected to start by 2015" (EIA, 2012a). "The companies are planning to sell their LNG on traditional oil-linked contracts rather than at Henry Hub related prices, reflecting the higher capital costs of these greenfield projects compare to US brownfield projects relying on Henry Hub priced gas supply source" (Henderson, 2012, pp. 17-18). "But reluctance of Asian buyers to sign those new contracts means that the project start might begin in 2017" (Henderson, 2012, p. 17). Another important issue states Henderson (2012, p. 18) is that "companies involved in the project have additional back-up supplies in the US, and the project is connected to the North American gas grid". He explains that the "security of supply is not an issue for partners involved in the project" (Henderson, 2012, p.18). "In terms of marketing for the LNG", he states that the "project partners estimate that the fully laden transport time to Asia is 11 days, which gives advantages as: relatively low transport costs, and flexibility in terms of reacting to spot markets" (Henderson, 2012, p. 18). Finally he states that "though the terms of contracts between project partners and Kogas and Gas Natural are not revealed, it is expected that project partners are oriented for long-term (20 year) contracts" (Henderson, 2012, p. 18).

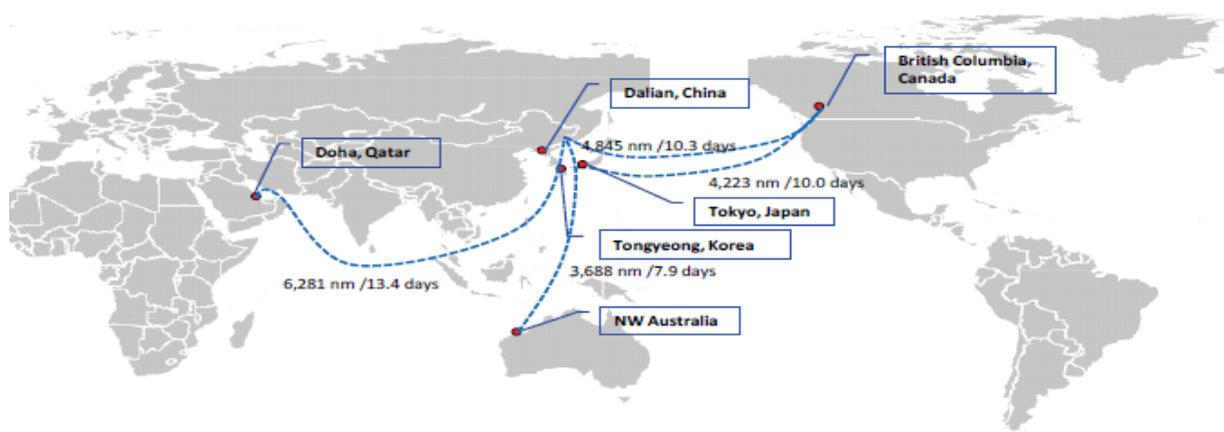


Figure 4.10 Access to markets – shipping distances (Ojeda,2013)

East African LNG

According to EIA (2013b) “among five countries most actively involved in oil and gas activities (Mozambique, Tanzania, Uganda, Kenya, Madagascar) two have proposed LNG plant supporting infrastructure: Mozambique and Tanzania”.

“In comparison to other African regions East Africa was among the least producing regions in 2012 and second smallest gas producer in 2011: Mozambique and Tanzania are the only natural gas producers, with an output of 135 billion cubic feet (Bcf) and 30 Bcf of dry natural gas in 2011, respectively” (EIA, 2013b).

“According to the assessment of gas master plan for Mozambique, the country contains almost 46.7 billion barrels of oil equivalent, or 279.9 Tcf equivalent, of discovered and undiscovered oil and gas resources” (EIA, 2013b). According to EIA (2013b) “more than 70% of those discoveries are located in Rovuma offshore north region and are made by Anadarko and Eni. But it is unclear what portion of Anadarko and Eni’s resource estimates are economically viable because both companies have not yet publically stated reserve estimates for their discoveries and have not indicated the amount that is commercially viable”.

Tanzania

“Tanzania had 230 million cubic feet of proved natural gas reserves as of January 1, 2013 and does not have any proved crude oil reserves” (EIA, 2013b). Similarly to Mozambique Tanzania does not have “export infrastructure for gas transportation and processing”, so there are a lot to do for companies interested in LNG developments (EIA, 2013b). EIA (2013b) states that “Tanzanian offshore discoveries are smaller than in Mozambique and commercial development of new offshore discoveries is expected to be slower and later than Mozambique”.

There are two companies operating in the area: “BG group and Statoil and they face similar issues as Andarko and Eni in Mozambique” (EIA, 2013b). “They had success in offshore Tanzania each finding more than 10 Tcf of recoverable gas resources” (EIA, 2013b). None of these companies “have publically released a reserve estimate for their discoveries and economic viability is not clear as well” (EIA, 2013b).

Table 4.10 Natural gas in East Africa (EIA, 2013b)

Country	Notable oil & gas discoveries	Proposed infrastructure	Companies

Mozambique	32-65 Tcf of recoverable gas resources in Area 1 (Anadarko) and 75 Tcf gas in place in Area 4 (Eni)	LNG Plant and supporting infrastructure	Anadarko and Eni
Tanzania	More than 20 Tcf of recoverable gas resources in Blocks 1-4	LNG Plant and supporting infrastructure	BG Group, Statoil, Ophir Energy, ExxonMobil, Aminex

Note: “the companies are only those that made notable oil and gas discoveries and having activities in the fields” (EIA, 2013b).

Additional Considerations for Mozambique and Tanzania

According to EIA (2013b) report “among the biggest uncertainties that Mozambique and Tanzania face is the global LNG market up to and beyond 2020”. “According to Wood Mackenzie estimates by 2020 there will be oversupply of LNG as global LNG supply surpassed demand by about 100 MMtpa” (EIA, 2013b). At the same time EIA (EIA, 2013b) warns that, “Chevron estimates show that LNG demand will outstrip supply by about 120 MMtpa by 2025, resulting in a supply shortfall”.

In general “global liquefaction supply and demand will depend on many factors” and most of them are still uncertain (EIA, 2013b). Among those factors listed by EIA (2013b) are: “shale gas supply growth in North America and China, growth in liquefaction capacity in various regions (particularly in North America, Australia, the Middle East, and East Africa), regional LNG demand growth (particularly in Asia), the expansion of LNG in transportation sectors in various countries, fuel price differentials, the expansion of technologies and infrastructure, and several others”.

Russia and China

“Russia has the potential to produce significant gas from its Eastern Regions, with total proved reserves in East Siberia and the Far East of Russia standing at 5 trillion cubic meters (Tcm) while prospective resources could be as large as 65Tcm” (Henderson & Stern, 2014,p. 2, cited in Gazprom, 2013). Henderson and Stern (2014, p. 2) suggest that “this opportunity gives Russia to have competitive advantage in the Asia Pacific region and particularly for Japan, and fast growing gas markets in China and India” (cited in IEA, 2013). Thus, there is “Sakhalin 2 project

selling 10.8 mt (14.6 Bcm) of LNG per annum into the neighboring Asian markets and there are local rivals of Gazprom in Russia - Rosneft and Novatek” (Henderson & Stern, 2014, p. 2).

According to Henderson (2011) “Russian Energy strategy to 2030 oriented to the future growth will be focused to the East. It is expected that Gazprom is going to be the major player because it possess major assets in East Russia including Sakhalin 2, Chayanda and Kovykta fields” (Henderson & Stern, 2014, p. 2). “The “Power of Siberia” pipeline is expected to be 3,500 kilometers from East Siberia to the Pacific Coast, with a spur pipeline down into NE China at the border point of Blagoveshensk” (Henderson & Stern, 2014, p. 3). Based on Gazprom (2014) estimates “this spur pipeline would carry 38 Bcm of gas into China and the remaining amount is going to be distributed between domestic market and a 10-15 mt LNG facility that is planned to be built at Vladivostok” (Henderson & Stern, 2014, p. 3). This route is “estimated to cost US\$ 80-90 billion and negotiations with China concerning spur pipeline of 38Bcm capacity have not finished” (Henderson & Stern, 2014, p. 3). But the crisis in Ukraine might have influence on the decisions that Russia and China will take (Song, 2014). Henderson and Stern (2014, p. 4) based on earlier reports of 2014 comment that “Gazprom and CNPC were getting closer to agreeing a base price with a range of US\$ 10-11/mmbtu at the Russian border being mentioned”. According to their analysis “both parties at this price can be satisfied: Gazprom would make an adequate return and CNPC would receive gas whose cost-reflective price at the Chinese eastern seaboard would probably equal that of imports arriving by pipe from Central Asia” (Henderson & Stern, 2014, p.4, cited in Stern, 2013) The final outcome will be clear “after Putin’s visit to Beijing in May 2014” (Henderson & Stern, 2014, p.4 cited in Interfax, 2014).

Vladivostok-LNG project will start operating in 2018 with the target market of Asia-Pacific region (Henderson & Stern, 2014). “Gazprom compiled a list of potential strategic partners, whose overall stake in the project might amount to 49%, provided they purchased at least 6 million tons of LNG to be produced as part of the project” (Henderson & Stern, 2014, p. 6).

“In reality, there are only two companies Rosneft and Novatek having projects which qualify: Novatek has Yamal LNG scheme that is expected to be Russia’s next and ultimately largest LNG export project” (Henderson & Stern, 2014, p. 6). This project “scheduled start date of 2017 but harsh climate conditions and difficult access to Asian markets in winter months if it is not delivered by a very long route via the Suez Canal might be the reason that only half of the potential output will reach Eastern markets” (Henderson & Stern, 2014, p. 7). CNPC has 20% share in the project and will take at least 3.0 mtpa of LNG (Henderson & Stern, 2014, p. 7).

According to Henderson and Stern (2014, p. 7) “Yamal project is seen as economically viable due to its estimated price for the gas US\$ 10-11/mmbtu which can give a competitive advantage even with the new US LNG projects at a Henry Hub price of US\$ 45/mmbtu”. Moreover, this project “has signed a contract with CNPC and thus making a competition to Gazprom in Asia” (Henderson & Stern, 2014, p. 7). Another project is “Sakhalin 1 where Rosneft and Exxon are partners and have plans for supplies to Asia” (Henderson & Stern, 2014, p. 7). Henderson and Stern (2014, p. 7) suggest that this project has “more political” logic than economic. It might happen that “Rosneft could start exporting LNG before Gazprom since it has already secured preliminary agreements for all 5mtpa of potential output from the project, and has suggested a first production target in 2019” (Henderson & Stern, 2014, p. 7).

Henderson and Stern (2014, p. 8) furthermore suggest that the “potential outcome for Russia’s LNG in Asia will depend on contract with China” especially after crisis in Ukraine. In a conclusion Henderson and Stern (2014) suggest that there will be “possible over supply due to the other competing exporters and it is important for Russia to sign contracts with China. The early 2020 is expected to be very competitive for LNG suppliers in Asia” (Henderson & Stern, 2014, p. 8).

4.3.2 Fukushima effect

“Japan relies on imported gas to meet its needs because it does not have own resources” (EIA, 2013c). It is “the world’s largest LNG importer, accounted for 37% of the global market share of LNG demand in 2012, rising from 33% in 2011” (EIA, 2013c).

Rogers and Stern (2014, p. 14) in their report on Asian LNG markets show “demand growth for gas in Asia during the period 2000-2012 which is on average 6.6%/year”. “Japan achieved consumption level of some 95 Bcma prior to Fukushima, but growth slowed significantly in the late 2000s” (Rogers and Stern, 2014, p. 8) . After closure of Fukushima situation was as follow: “nuclear stations demand increased by 23%; South Korea and Taiwan had consumption growth of 8.4%/year” (Rogers and Stern, 2014, p. 8). For China “it have grown by a factor of five since 2000, supplied by domestic consumption and by pipeline imports from Turkmenistan (from 2010) and Myanmar (from 2013), and by LNG from a variety of sources since 2006” (Rogers and Stern, 2014, p. 8). For India “growth was of 6.3% on average since 2000 but had declined

since 2010” (Rogers and Stern, 2014, p.8).A period between 2010-12 accounted for 86% of demand growth in natural gas consumption for Japan and China” (Rogers and Stern, 2014, p. 8).

Table 4.11 Asia/Pacific National Natural Gas Consumption (Bcma) ad Compound Annual Average Growth % (Rogers and Stern, 2014)

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	CAGR%
Japan	72	74	73	80	77	79	84	90	94	87	95	106	117	4.1
South Korea	19	21	23	24	28	30	32	35	36	34	43	46	50	8.4
Taiwan	6	7	7	8	9	9	10	11	12	11	14	16	16	8.4
China	28	30	32	36	42	49	59	73	84	93	111	134	147	15.0
India	26	26	28	30	32	36	37	40	41	51	62	61	55	6.3
Thailand	22	25	27	29	30	33	33	35	37	39	45	47	51	7.3
Australia	21	22	22	22	23	22	24	27	26	25	26	26	25	1.8
Bangladesh	10	11	11	12	13	14	15	16	17	19	20	20	22	6.7
Indonesia	30	31	33	35	32	33	33	31	33	37	40	37	36	1.6
Malaysia	24	25	26	27	25	31	34	33	34	33	34	32	33	2.7
New Zealand	6	6	6	4	4	4	4	4	4	4	4	4	4	-2.4
Pakistan	22	23	25	30	34	36	36	37	38	38	40	39	41	5.6
Philippines	0	0	2	3	2	3	3	3	3	3	3	4	3	60.9
Singapore	0	1	4	4	5	7	7	9	8	8	8	9	8	105.1
Vietnam	2	2	2	2	4	6	7	7	7	8	9	8	9	15.9
Other Asia Pacific	4	4	4	4	5	5	5	6	6	5	6	6	6	4.1
Total	290	308	324	351	366	397	424	457	480	497	560	594	625	6.6

Source: BP (2013), Gas consumption worksheet (Rogers and Stern, 2014)

Note: blue color- LNG importers in 2012, purple LNG exporters in 2012

“Japan’s LNG requirements are assumed to be reduced during 2014 and 2015” (Rogers and Stern, 2014, p. 9). As for the “growing trend for LNG” it will be in China (Rogers and Stern, 2014, p. 9). But there are many uncertain issues: “potential domestic production of coal and bed methane and shale gas, pipeline imports from Central Asia and whether agreement is reached for pipeline imports from Russia” (Rogers and Stern, 2014, p. 9). Impact of “Fukushima disaster and decline of nuclear generation which was compensated partially by increase in LNG as power generation fuel was severe for Japanese companies due to the two reasons: loss of low cost nuclear and additional LNG supplies required” (Rogers and Stern, 2014, p. 9).

The studies made by Rogers and Stern (2014, p. 11) on “Fukushima effect” showed that “after Fukushima disaster companies from an aggregate “normal year” profit of US\$5 billion in FY 2011 and 2012 generated a loss of over US\$10 billion excluding Tokyo Electric (TEPCO) and some of US\$20 billion including TEPCO”. Based on this they assume that “in 2014-15

significant proportion of Japan's nuclear plant will be re-started. As for prices for importing countries: in Japan, South Korea, Taiwan and China they include LNG imported under long term contracts and spot cargoes" (Rogers and Stern, 2014, p. 11). Here Rogers and Stern (2014, p. 11) see the reason for "Japan's higher average price" paid by Japan post Fukushima as a "possible reflection of its position of "distressed buyer" for spot cargoes during this period".

The question arises on how long this Fukushima effect will last (Rogers and Stern, 2014).

Several "Japanese utilities are actively investing in overseas projects, particularly in Australian LNG export projects" (Lee, 2014, p. 1). "Companies such as Tokyo gas, Chubu electric and other companies that heat Japan are changing their attitudes towards LNG export projects: instead of signing contracts and waiting for the first cargo they actively buy small shares in ambitious gas developments" (Lee, 2014, p. 1). Lee (2014) suggest that "they hope to gain reliable supply sources on "fair" prices through active engagement in upstream and midstream links". According to Lee (2014, p. 1) it is expected that the "companies may gain in these projects advantages such as: insider access to project plans, spending and technology; the chance to build relationships that smooth the way to long-term gas supply contracts; protection against price upswings; a better understanding of project economics and market trends. Another possibility for utilities through this engagement is that utility might get a share of gas reserves and influence decision where LNG tanker delivers its cargo".

Table 4.12 Japanese utilities investment in Australia LNG projects (Lee, 2014)

Japanese utilities investment in Australia LNG projects				
Project	Utility	Ownership stake	LNG under contract to utility	Length of sales contract
DARWIN LNG (2006) 3.6 mtpa total capacity				
Upstream	Tokyo Timor Sea Resources (a joint venture between Tokyo Electric and Tokyo Gas)	9.20%		
LNG project	Tokyo Electric	6.13%	2 mtpa	17 years
	Tokyo Gas	3.07%	1 mtpa	17 years
PLUTO LNG (2012) 4.3 mtpa total capacity				
Upstream & LNG Project	Kansai Electric	5%	1.75 mtpa	15 years
	Tokyo Gas	5%	1.5-1.75 mtpa	15 years
QUEENSLAND CURTIS LNG (2014*) 9 mtpa total capacity				
Upstream	Tokyo Gas	1.250%		
LNG project	Tokyo Gas	2.500%	1.2 mtpa	20 years
GORGON (2015*) 15.6 mtpa total capacity				

Upstream & LNG project	Osaka Gas	1.25%	1.375 mtpa	25 years
	Tokyo Gas	1%	1.1 mtpa	25 years
	Chubu Electric	0.417%	1.44 mtpa	25 years
WHEATSTONE (2016*) 8.9 mtpa total capacity				
Upstream	Kyushu Electric Power	1.830%		
	Tokyo Electric	0.820%		
LNG project	Kyushu Electric Power	1.460%	0.7 mtpa	20 years
	Tokyo Electric	0.656%	4.2 mtpa	20 years
ICHTHYS (End of 2016*) 8.4 mtpa total capacity				
Upstream & LNG project	Tokyo Gas	1.575%	1.05 mtpa	15 years
	Osaka Gas	1.200%	0.8 mtpa	15 years
	Chubu Electric	0.735%	0.49 mtpa	15 years
	Toho Gas	0.420%	0.28 mtpa	15 ears

*- Projected start-up date

Mtpa = million metric tons per annum (1 million metric tons equals 48.7 billion cubic feet of natural gas)

Asian consumers are concerned about future sources of LNG (Bradshaw, et al., 2013). Thus “besides actively investing in Australian LNG projects they consider five sets of options” (Bradshaw, et al., 2013, p. 15):

Table 4.13 Summary of new options for Asia’s LNG supply (Bradshaw, et al., 2013)

Source	Advantages and attractions	Disadvantages and risks
United States	<ul style="list-style-type: none"> • Access to resources relatively open • Low gas prices (currently) and large resource potential • Political stability • Existing infrastructure offering lower unit costs for liquefaction 	<ul style="list-style-type: none"> • Uncertain policy governing exports • Gas prices could rise substantially • Local opposition to select projects • Most project developers lacking deep balance sheets to finance projects
Canada	<ul style="list-style-type: none"> • Large estimated resource potential • Access to resources relatively open • Proximity to Asian markets • Possible economies of scale • Experienced project sponsors 	<ul style="list-style-type: none"> • Resource poorly delineated so far • Cost inflation from LNG/oil sands • Large pipeline investments needed • Long lead time to negotiate pipeline right-of-way • Development to require high prices
Mozambique	<ul style="list-style-type: none"> • Large resource discovered • Possible economies of scale 	<ul style="list-style-type: none"> • Limited government capacity • High entry (acquisition) costs • Developers lacking LNG track record • Number of stakeholders risks delays • Undefined terms for gas development

Tanzania	<ul style="list-style-type: none"> • Large estimated resource potential • Proximity to Asian markets 	<ul style="list-style-type: none"> • Government potentially allocating some of the gas to the local market • Low government capacity to approve and advance projects • More discoveries needed to support large-scale projects
Russia		
Sakhalin (Gazprom)	<ul style="list-style-type: none"> • Existing infrastructure offering lower unit costs for liquefaction • Proximity to Asian markets 	<ul style="list-style-type: none"> • Uncertain resource base
Sakhalin (Rosneft)	<ul style="list-style-type: none"> • Large existing resource • Proximity to Asian markets • Experienced partner (ExxonMobil) 	<ul style="list-style-type: none"> • Uncertainty over the ability to export without Gazprom intermediation
Vladivostok	<ul style="list-style-type: none"> • Large resource base • Possible economies of scale 	<ul style="list-style-type: none"> • Large pipeline investments needed • Limited partnership interest so far • Difficult to justify investment without also building a pipeline to China • Much less economic than an expansion at Sakhalin
Yamal	<ul style="list-style-type: none"> • Large resource discovered • Possible economies of scale 	<ul style="list-style-type: none"> • Project operator lacking LNG track record • Uncertainty over the ability to export without Gazprom intermediation • Projects requiring an additional partner and lacking secure financing

Bradshaw, et.al (2013, p. 15) warn: “Although Australia offers more political stability than these countries, costs are higher and the potential exists for an environmental backlash against unconventional gas development in eastern Australia”.

Conclusion: Analysis of external factors is showing us that after Fukushima disaster there is high demand for LNG. But Australia is not the only country planning for this Asia Pacific region. There are many rivals and competition should not be underestimated. First of all suppliers compete in the market and secondly countries like Japan and China are securing their future by signing agreements and investing in shares in the projects. Australia is depending on its customers and they have leverages of control. The future prices for LNG will be one of the drivers of this process. External factors also have influence of decision making for Australian LNG projects. Fukushima effect was not predictable but has impact on demand and investments.

4.4 “Landed cost” challenge

There is specific market mechanism working in Australia which is influencing prices for natural gas across the country (BREE, 2013). “East and West Australia are experiencing major changes due to the development of new resources and export projects” (BREE, 2013, p. 18). “The Henry Hub price could possibly become a global spot price for LNG trade at new export facilities and not just for contracted supply from the United States” (BREE, 2013, p. 15). Thus Australian energy bureau is emphasizing importance of gas market reform. As a “possible model Australia might choose Henry Hub in North America, with its high levels of transparency and efficient physical and financial markets” (BREE, 2013, p. 19). But it is debatable whether Australia will use this model because it requires “certain conditions and infrastructure” (BREE, 2013, p. 19).

“High costs and delays of Australian LNG projects might have negative impact in the future prices of LNG” (Ellis, et al., 2013, p. 3). Ellis et. al (2013, p. 3) calculated that “if Australia can return its productivity levels to the long term average, income growth would amount to 3.7% by 2017. Failure to do this will result in income faltering and the prosperity of the entire economy being challenged for the first time in many years”.

It is estimated that “delivery cost for new Australian projects will be 20-30% more costly compare to Canadian and Mozambique projects” (Ellis, et al., 2013, p. 10). Ellis, et. al (2013, p. 13) suggests that in order to be successful “Australia has to overcome this gap through productivity in sector”. “As a main challenge” Ellis, et. al (2013, p. 11) see the “commitment of individual companies to continue investing in these projects”. In order to make analysis Ellis et. al (2013) decided to compare Australian projects with competitors in Canada and Mozambique. Thus, “a coal seam gas (CSG) onshore project in Australia compared to an unconventional gas project in Canada as proxy for North America, and conventional project in Australia is compared to a conventional project in Mozambique as proxy for East Africa” (Ellis, et al., 2013, p. 10). They define delivery costs as “landed cost” or as a “cost for delivering LNG to Japan” (Ellis, et al., 2013, pp. 9-11). Ellis et.al (2013, p.10) suggest that “if Australia manage to convince operators to develop their facilities in Australia rather than East Africa or North America landed or delivery cost will be competitive”

Table below shows that landed cost for Australian-sourced LNG is higher than other countries:

“Break-even landed costs in Japan in US\$/mmbtu have 20-30% gap compare to rivals” (Ellis, et al., 2013, p. 11)

Table 4.14 Landed cost comparison (Bradshaw, et al., 2013)

Australia Unconventional	Canada Unconventional	Australia Conventional	Mozambique Conventional
12.0	9.2-9.5	11.9	9.0-10.0

After analyzing the concept of “landed cost” Ellis et. al (2013, p. 13) offered to consider critical factors influencing costs by differentiating them into two main categories: “compressible differences and incompressible differences”.

Here is the table to compare these differences and see how they make difference between costs in Australia and Canada:

Table 4.15 Compressible and incompressible differences: Australia vs Canada (Bradshaw, et al., 2013)

Compressible differences:	Comparison: Australia vs Canada
Tax	Taxes on gas in Australia are 0.8US\$/mmbtu higher than in Canada. Absence of a Canadian equivalent to the Petroleum Resource Rent Tax (PRRT)
Regulatory approval time	It is assumed that Australian projects experience 3 month longer FEED period, resulting from a longer time required for permits and approvals. This adds 0.03US\$/mmbtu to the cost
Labor productivity	Australian workers spent 8% longer time compare to Canadians. This adds 0.2 US\$/mmbtu
Service market maturity (materials, equipment and freight)	Freight rates for material and equipment are 0.2US\$/mmbtu higher in Australia. Equipment is more expensive but raw materials cheaper in Australia, adding 0.1US\$/mmbtu.
Industry collaboration	
Project optimization (design specifications)	Costs difference caused by operators choice of design and economies of scale. In Australia it adds 0.3US\$/mmbtu. Note: Canadian project used for comparison is larger in capacity than Australian.
Incompressible differences:	
Reservoir characteristics	It is assumed that Australian project 20 to 30% more wells per mtpa than the Canadian. This adds 0.6-0.9 US\$/mmbtu.
Climate related plant efficiency	Liquefaction facilities in Australian require larger capacity than Canadian due to high temperature. This adds 0.2US\$/mmbtu.
Inflation	In Australian inflation rates are higher than in Canada. This adds 0.3US\$/mmbtu.
Shipping	Australia has cost advantage compare to Canada since it is closer to Japan. Advantage is 0.1US\$/mmbtu.

Pipeline length	Australia has slight advantage compare to Canada because Australian CSG fields are closer to the coast.
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Ellis et. al (2013) recommend to work through the differences listed in the table. But the main implications given by them include “industry collaboration” (Ellis, et al., 2013, p. 20). They assume that “working through industry collaborated could give cost improvement around 1.0-1.8 US\$/mmbtu if there will be five potential measures taken” (Ellis, et al., 2013, p. 20). These five measures are as follows: “industry wide standardization; smoother demand; share plant infrastructure; joint operation and maintenance companies; and cooperation on health, safety and environmental standards” (Ellis, et al., 2013, p. 20). Further suggestions given are about “project optimization” including: lean engineering; lean concept and design; best – in – class contract management; claims management; lean operations in production” (Ellis, et al., 2013, p. 21). Ellis et. al (2013, p. 25) put emphasis on “considering opportunities through brownfield developments and technological break-through giving example of Shell’s FLNG technology”. It is assumed that “FLNG plant compare to LNG facility can reduce landed cost by roughly US\$1-1.4/mmbtu including impact on government revenues and other costs (given that there will be a 2-train 8-mtpa development and cost of capital of 7.8% over 40 years of field)” (Ellis, et al., 2013, p. 25).

Finally, Ellis et. al (2013, p. 27) believe that “the key to success is taking action by individual effort and working in cooperation”. In order to have evidence for their proposals Ellis et. al (2013, p. 28) use examples of Norway and UK. They describe these two countries as successful ones: “Their experiences demonstrate the value of forethought and a nuanced but managed evolution in industry arrangements” (Ellis, et al., 2013, p. 28).

Conclusion made on external and internal factors analysis: Landed cost for Australian LNG projects is additional challenge. It is caused by internal factors and comparison with the rivals shows how critical it is to increase reduce productivity gap. External factors are making internal issues more obvious and increase uncertainty. These challenges are industrial critical success factors and can be managed through cooperation.

4.5 Lessons learned: future is uncertain, most of the “critical success factors” change over time

1. Lesson: Deadlines for projects were spurred by demand in Asia. Planned projects are oriented towards 2020 in order to meet demand requirements.

2. Lesson: There is **high concentration of the projects** in the Western Australia. Australia is attractive for investments but this is causing competition for resources. This is increasing costs and shifts dates even more.

3. Lesson: There is **cost escalation** over time, it can be estimated approximately but it is difficult to know exact cost of a project. Factors such as Australian currency appreciation and external competition are difficult to predict.

4. Lesson: Asian market is target market for Australian LNG. But **customers diversifying supplies** and have alternative options.

5. Lesson: Landed cost for Australian LNG will be another challenge even after projects are completed.

6. Lesson: Fukushima effect occurred as unexpected event increasing demand for LNG and could not be predicted. Thus for instance, Fukushima disaster happened in 2011, and Gorgon, Wheatstone and Pluto decision was taken before it. In case of Pluto there was 25% over budget, after completion in case of Gorgon it is already 40% cost overrun. It is not possible to estimate exactly how much events like “Fukushima” can influence project costs and delays.

7. Lesson: Customers securing supply through **investments in Australian LNG projects**

8. Lesson: Project participants have different expectations: Asian investors have to invest more due to the cost overruns but this will make them expect for high price on future LNG (Bradshaw, et al., 2013).

5. Discussion and analysis

5.1. Seven deadly mistakes identified by Pinto

Pinto (2013) concluded that project cost overruns and delays are often linked to the seven mistakes that managers tend to repeat. For evidence he makes comparison between similar projects in order to estimate approximate cost. Therefore I made sort of benchmarking and comparison of three projects and two existing facilities. Important findings are that different types of projects have different critical success factors and they have different effect on them. Pinto (2013) gave cases of construction projects for Olympics and there was no internal neither external competition when projects were planned and implemented. The reason for that is different goal of the projects and different industry. Oil and gas is capital intensive industry and has more uncertainties. During planning phase of projects there was a competition in the country and in the target market. The first mistake is related to optimism bias according to Pinto (2013). But there are factors changing over time such as increased number of LNG projects in the same area in Australia and suppliers from abroad signing contracts with Asian consumers. Therefore we cannot call it a mistake when projects tried to be “on-time” and “on-budget”. The previous experience of NWSV could be used as benchmark but there were different critical success factors at that time period and there was less competition.

Second mistake defined by Pinto (2013) as “massaging the plan” can be seen from different perspectives. The research conducted on NWSV showed that there is cost escalation which is unavoidable. Thus, since 2000 Australian currency started to become stronger due to the investments and developments in various industries. Perhaps at a time of calculations of Browse project for example they voted for Kimberley option since it was viable in terms of prices and conditions in 2008. Reevaluation before final investment decision in 2013 showed that it is not commercially viable anymore. At the same time knowing the deficit of labor and high wages did not stop Gorgon and Wheatstone projects from getting approved. Both of them are operated of Chevron US based company and both of them are located in the Western Australia the most resource rich part. This concentration of projects made problem of labor deficit and high wages worse. The CEO of Woodside Peter Coleman emphasized that he is Australian- based while others are not. What were the key drivers motivating Chevron to invest in these two projects? As we have seen US LNG have commercial and geopolitical logic. How much did it influence their decision in terms of Australian LNG projects? May be they were more concerned about geopolitical logic to export LNG to Japan. May be that was the key motivator and additional pressure on final investment decision.

Can we assume that there was “project death marches” as a third mistake? It is difficult to answer. From the schedule of project we see that they have approximately same dates to start varying from 2014 to 2020. This is because they studied demand of target market and it was reasonable to plan for those dates. So the demand for LNG from Asian consumers was factor pressing on decision and it does not actually depend much on project managers in this case. Moreover Asian consumers are securing supply by signing additional contracts with other suppliers.

Fifth mistake was called as “lack of relevant knowledge” and may be that was Coleman was referring to in his interview that most of participants lack previous experience. Important to note that “poor change control” was not the case for Browse project, they changed the concept and selected FLNG thus postponing final investment decision. We do not know exactly what other projects did and whether they used “rework”.

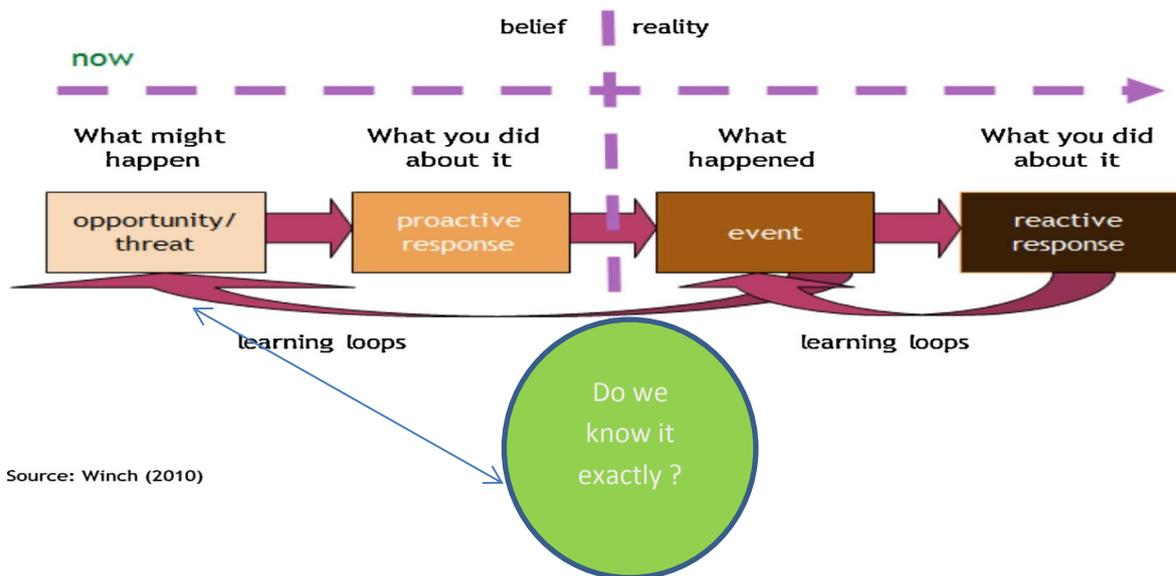
As a final mistakes Pinto (2013) defines “superficial risk management” as result of human bias and recommends to be proactive than reactive by studying “learning loops” and to study similar projects. At the same time in case of Australian projects the threats and challenges are so unpredictable that even if managers will do rework and be proactive it is not possible to completely avoid the costs. Example of London Olympics recommended by Pinto (2013) is good to consider but it operates in different environment and has different “content” and different critical success factors. Despite commitment of managers to these projects it was not possible to avoid these “seven deadly sins” or mistakes. Moreover, from the empirical findings we can see that first of all LNG industry like oil and gas is capital intensive and has more challenges and uncertainties than Olympic projects for example. Therefore, perhaps it is better to refer to “seven deadly sins” as “seven deadly challenges”?

Table 5.1 Analysis of “Australian challenges” based on “seven deadly sins”(Pinto,2013)

“Optimism bias”	Happened as a result of previous experience of major companies. But Australian legislation is different than in US, Canada and Europe. They did not know how much it will have influence on costs and delays
“Massaging the plan”	Happened as a result of unavoidable cost escalation and competition – may be “the numbers were correct” for that particular time under particular conditions, but they changed through the time thus showing the plan in the present as “massaged”
“Creating death marches”	Perhaps participants had different priorities, thus for some companies it was to develop Australian LNG industry as a national company (Woodside) and for others there were geopolitical implications as securing supply to their allies (Chevron)
“End date-driven schedules”	Were the dates set by managers actually or is it pressure from consumers?

“Lack of relevant project management training”	This is not completely the fault of managers but it is the result that some companies are comparatively new in the industry
“Poor change control”	How many changes at a time a manager can do? There are factors depending on them but most of them are beyond of control
“Superficial risk”	Analyzing event and then going back to the first step to check for opportunities and threats and analyze again what might happen can help to reduce risk. But do we know exactly what might happen?

Pinto states that being proactive is better than being reactive. But as we see from illustration “opportunity/threat” is showing what might happen. He suggests when undesired event occurs to go to this step and analyze it. But how accurate can we analyze it? How do we know what might happen? Our assumptions are linked to various factors: change in external and internal environment and human factor. Even this approach does not guarantee that we can avoid unexpected costs and delays.



Source: Winch (2010)

Figure 5.1 Proactive action and uncertainty

Analysis on challenges faced by Australian LNG projects brought to the following conclusions:

Table 5.2 Suggestions made by Pinto (2013) and challenges faced within Australian projects

“reference class forecasting”	Even if managers know common challenges faced by projects it is used it does not prevent from costs and delays.
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“rework”	It helps to minimize risk but does not completely prevent from delays and costs, thus Browse was postponed.
“authenticity”	May be managers were “authentic” enough during planning process but circumstances changed and plan looks “biased”.

5.2 Scenario planning

Scenario planning principles “bring changes whether proposed scenario is accepted or not” (Kahane, 2012). Here we can argue with Wright (2004) about “socially constructive nature of scenario planning”: yes we do influence scenario since we plan it, but, it can show us how what we should do in order to overcome consequences.

There are different projects and stories of success or failure. But after scenarios are built we can find out an answer to the question what to do next. Kahane (2012) suggests that scenarios show “how to discover what can and must be done”. According to Kahane (2012) scenario should be used when people find themselves in following situation: “1. Situation is seen unacceptable, unstable or unsustainable; 2. People involved in this situation cannot transform situation on their own or by working only with their friends and colleagues. 3. People cannot transform the situation directly. The actors are too polarized to be able to see it differently”. Thus Kahane (2012) believes that through “transformation of understandings, relationships and intentions actors can transform their actions”.

KPMG (2011, p.12) suggests to ask questions before building scenario regarding “participants, stakeholders and the owners of the exercise; specific purpose of the exercise; key future events that should be examined; and when in the future are these events (scenarios) going to occur”. After answering these questions KPMG (2011, p. 12) recommends five key phases for scenario planning process: “scan internal and external environment; build possible scenarios (select from four); identifying and planning response; identify the five most realistic futures; and implement responses for possible scenarios when they are most likely to happen”. Thus in the uncertain environment scenario planning process can help to minimize risk caused by unexpected costs and delays. It does not prevent from cost overruns or delays, but rather helps to analyze the “possibility and likelihood of unexpected event” (KPMG, 2011,p.12).

5.3 Critical success factors

Empirical findings on Australian LNG projects showed how critical success factors change over time and influenced by independent factors such as situation in Australia and international market environment. Thus, even if managers identify them at the beginning of planning process the future events are uncertain and they might face a strategy paradox. “Uncertainty increases over time and management of commitments should be separated from management of uncertainty” (Parker Gates, 2010, p. 22). Scenario planning helps to see “strategic planning as a continuous process” (Parker Gates, 2010, p. 22):

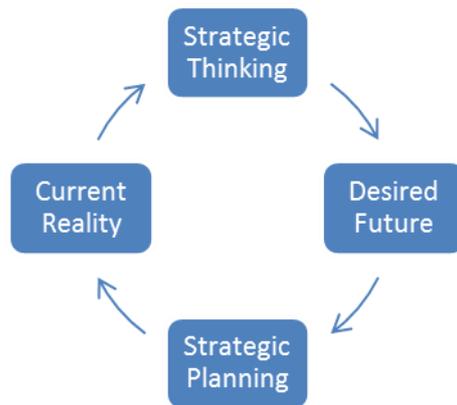


Figure 5.2 Rework and strategic planning through scenario planning

These arrows linking the quadrants can be seen as “rework and learning loops” offered by Pinto (2013).

5.4 “Human Factor”

Wong (2007) defined success in project management through the concept “getting results and feeling good about it”.

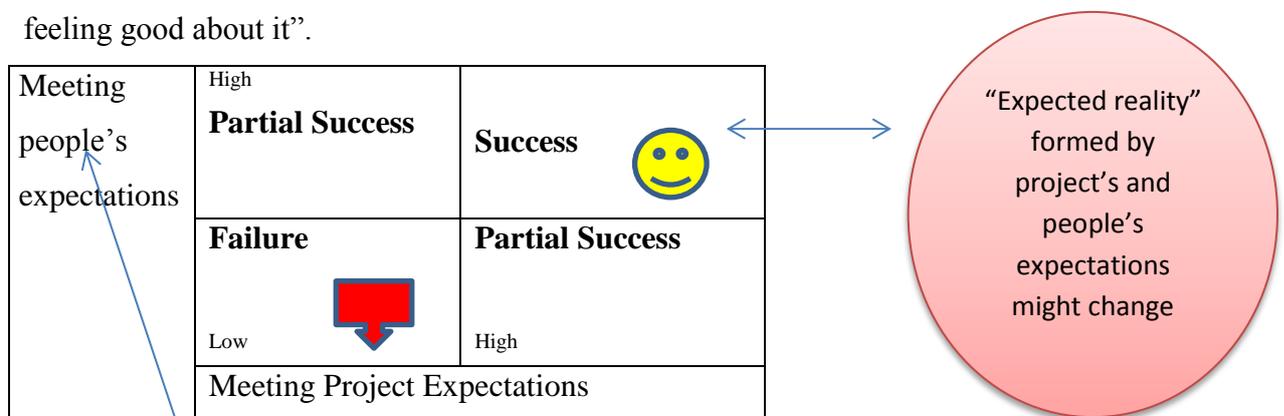


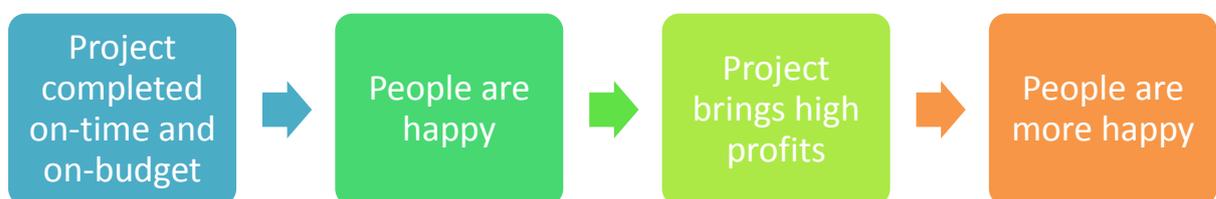
Figure 5.3 Project success and alternative realities

Who are they? Do they have same expectations?

What influences them?

He suggests that first it should be “project” and “human expectations” to be met (Wong, 2007). By “project expectations” he means: “results meet project objectives, which includes being on-time, on spec and within budget” (Wong, 2007). By “people’s expectations” he defines: “the values are respected, people feel fulfilled, and they succeed together as a team” (Wong, 2007). But, as we have seen from Pinto’s (2013, p.645) suggestions “managers tend to be under pressure when they are oriented towards deadlines”. Secondly, how can we know about values of people in the project for sure and how much they coincide with project objectives. Thus, project objectives put pressure on people and they might be under stress. May be it is true for the project when we do not consider external environment and unexpected circumstances. At the same time it is “people” setting deadlines and costs. What if there are several project participants and they have different values and motives can they be equally “happy”? Expectations hurt when they do not coincide with reality. Reality is changing and to some degree created by people. Can people create right reality so that both project and people’s expectations meet? If we assume that project is finished on-time and on-budget how can we know that stakeholder expectations and values were met? Can we call that project successful? What is influencing people’s expectations? If project completed on-time and on-budget it will probably make people happy. After completion of projects level of satisfaction with project will probably depend on return on investments.

So we can remake figure in a following way:



People might not be completely happy if their values were not respected.

At the same time:

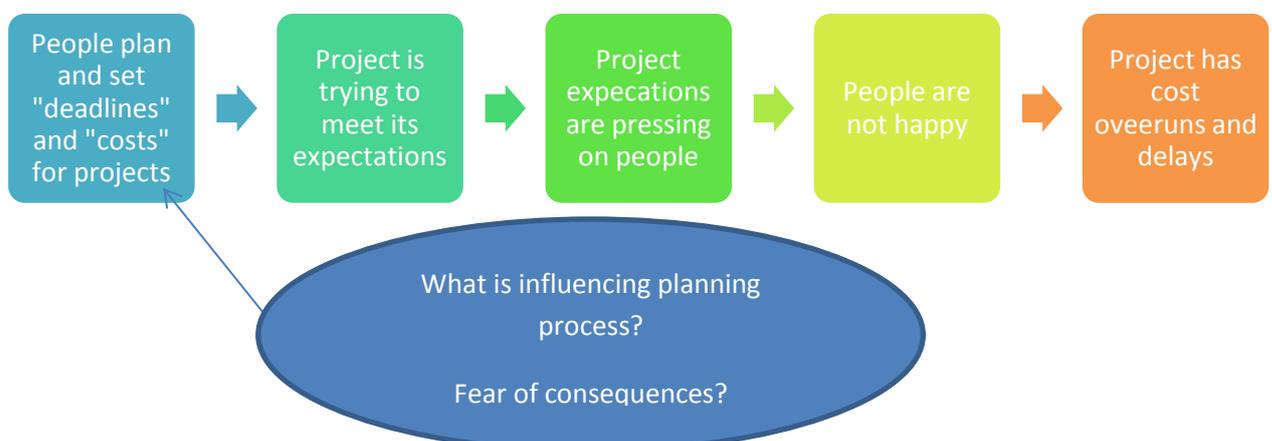


Figure 5.4 Human factor forming expectations

Of course companies also have their values and strategic objectives and when they plan it is better to see the strategic planning as a “non-static but cyclical process” as recommended by Parker Gates (2010, p. 22).

Scenario planning gives several options and thus both project and people’s expectations can meet in different ways because it prepares them for different realities. Scenario planning principles also teach how to ask right questions such as who are participants? When we expect only one reality and do not consider participants people’s and project expectations do not coincide.

5.5 Do we plan future or is it future influencing our decisions?

There were many approaches discussed for managing future uncertainty. “Scenario planning is helping us to think out of the box” (Kahane, 2012). There is criticism on scenario saying that it is “subjective and it has social constructionist nature” (Wright, 2004). It is true in one way because it is people who create scenario. At the same time there are factors influencing future outcome beyond our control, most of them are difficult to measure. Factors influence project outcome and decision making process as well. At the same time we see that the projects are also influencing situation in Australia (Policy priorities to extend LNG exports, e.g). Firstly, we can see price mechanism as example that has to change in order to make LNG price index more simple and predictable (BREE, 2013). It is assumed that Australia might use Henry Hub pricing (BREE, 2013). Secondly legislation is slowing down project approvals, at the same time, government is working on changing it because of the projects. Finally, labor deficit is negatively affecting the project outcome, but projects are training people and attracting various specialists from different countries.

RDS principles are helping to learn from mistakes, do necessary “rework” mentioned by Pinto (2013). As we see current challenges affect projects but projects also influence them and change. “In all cases proposed scenarios bring transformation whether accepted or not” (Kahane, 2012).

“Human factor” is also uncertain not only for future predictions but for present as well. Despite criticism of Foster (2013) regarding “forecaster factor”, we can conclude that even econometric reports are influenced by “human factor” through “massaging the plan” (Pinto, 2013). Moreover, as we have seen from ACIL Tasman report on North West Shelf Venture, future costs are not 100% predictable, and the cost shown before final investment decision is usually in today’s prices (Begley, 2009). Scenario planning in this case can be helpful by allowing several possible

costs for future projects thus “minimizing the bias” and keeping managers more “authentic” (Pinto, 2013).

6. Conclusion

6.1 Summary of the study

This paper studied the reasons of cost overruns and delays in projects, the factors causing and influencing them and approaches to plan for future. In the theoretical part I have analyzed findings of various researchers on reasons causing cost overruns and delays, factors influencing decision and outcome of the projects and management tools used to plan for future in uncertain environment. I have analyzed “seven deadly sins” of Pinto (2013), scenario planning used by Kahane (2012) and KPMG (2011), critical success factors of Parker Gates (2010) and “Human factor” of Wong (2007). Empirical data was built on three LNG projects and two existing facilities of Australia and analysis of internal, external environment together with “Fukushima effect” and “landed cost” challenges. Through examining three LNG projects I compared them to two existing facilities. For comparison I used data regarding initial planning, costs and delays, common challenges and interviews of project managers. The result of analysis showed that managers do not reveal planning process openly and do not discuss details in public. Therefore in order to answer to my research questions I can use assumptions and name the possible reasons for cost overruns and delays. From the analysis of available data I can conclude that probably managers used econometric calculations in order to plan and forecast. As for the question how did they plan I can say that probably planning was made based on the previous experience of the companies operating these projects. They did not mention the method and approach they used. Some of them just mentioned about anonymous voting for the “Kimberley option” (Woodside). While the others mentioned that they decided to ask some of the project participants to participate in decision making process (Chevron Australia). Was it possible to avoid these issues? Most probably not: even if companies will use previous experience of their own and similar projects in Australia the critical success factors change over time within industry, market, organization and global competition. All of these factors influence planning, decision making and implementation stages of the projects.

Conclusions derived from analysis of theoretical concepts and empirical findings:

- ❖ Identifying challenges and critical success factors does not guarantee exact results, because they change over time.
- ❖ It is not possible to know exact cost of a project due to the uncertainty of environment and some factors are beyond of control: currency appreciation, competition, and labor costs.

- ❖ What is referred as “mistakes” in one project should be considered as challenge for another. LNG projects have different critical success factors than Olympic projects for example. Thus, benchmarking and comparing numbers with successful NWSV project and relying on previous experience of companies does not guarantee that they will be on-time and on-budget. Even experienced managers cannot know all threats and opportunities. They and their effect change over time.
- ❖ Scenario planning principles help to define hidden patterns and reasons and gives opportunity to see different options and alternatives. Moreover it can motivate participants to discuss issues more openly and benefit from cooperation.
- ❖ Knowing motives and key drivers of decision making process helps to make project participants to cooperate and work in more transparent environment.
- ❖ Human factor influences decision making process but external environment can influence people taking decision, thus competition is also stressing managers when they take decision. Though it is important to consider human factor we cannot explain behavior only through motivational theory.
- ❖ What is true for today can be seen differently after few years: thus predictions made in 2008 might not be correct in terms of 2013. So, it might look as a result of “human bias”, “massaging the plan” and ignorance of past experience. But in reality effect of various factors change over time. For example managers knew about labor deficit and high wages, as well as currency appreciation. But they cannot measure and estimate how strongly they will influence schedules and costs. Woodside used labor transfer from NWSV to Pluto project but concentration of projects in Australia made existing challenges worse. Companies compete for labor, thus deficit is not being reduced and wages are rising more.
- ❖ As for currency appreciation: it is becoming stronger as a result of rise in terms of trade, commodity prices for exports (oil, coal, iron, etc.) high interest rates on investments (Garton, et al., 2012). This looks like paradox: “Australian paradox”: the country is getting cash flows from abroad, but this is making internal challenges more difficult to overcome. We do not know yet how much effect LNG investments will have on currency appreciation. The projects under construction have start dates varying from 2014 o 2020.
- ❖ At the same time Asian investors spending more capital in LNG projects as their costs rises. After completion of projects they will expect the price for LNG to be high to justify their investments (Bradshaw, et al., 2013). The “Asian consumer paradox”: they wanted to secure supply and future prices so started to invest in projects, but at the end it is them

who will be expecting high prices. It seems that Australian LNG projects were meant to be costly and future LNG prices are meant to be high as well.

- ❖ Expectations do not necessarily coincide with reality. Scenario planning principles might help to create alternative realities and choose the one which will coincide with people's and project's expectations the most.

6.2 Contribution

I believe that this paper can be useful for the project planning process in different companies involved in Australian LNG projects as well as their rivals in the Asia Pacific region. Moreover, I think that the Royal Dutch Shell scenario planning method should not be underestimated as being “not scientific enough” (Wright, 2004), and should be correctly understood. It gives opportunity to see “possible realities” (Kahane, 2012) and measure how much our expectations coincide with it. Future is uncertain and like any other managerial tool RDS scenario planning principles can help to better plan and minimize negative effect of uncertainty, since no method can measure all uncertainties.

This work is proving that future is uncertain and scenario planning principles are helpful to be prepared for it. Applying RDS principles does not reject any “scientific” or econometric approach. On a contrary it shows how combination of approaches can make process of planning and implementation more flexible.

6.3 Limitations of research

The data for my thesis was taken from available public sources. Unfortunately I cannot make strong conclusions regarding what really went wrong in Australian LNG projects. The reason for that is firstly, I was not involved in planning process and I have no access to all documents used for final investment decision. Moreover, I was studying oil and gas companies and even access to the company representatives for interview was not granted. But through my mails with some of the projects and companies I have realized that the information during personal interview will not be too different from the one available on official sources. This made me assume that lack of direct interviews is not a big issue for studying my research questions and describing the problem from different perspectives. What I have tried to do is to answer to the question how

better plan for uncertain future. Final investment decisions in the companies are usually taken on the basis of the econometric calculations which are despite of being “scientific” and more precise and objective (Wright, 2004) are also subject to change and can be “massaged” and adjusted to influence decision (Pinto, 2013). That is why I started to make sort of benchmarking myself by learning from managers of other projects why projects usually are facing problems of delays and over costs. Empirical findings of this paper were checked through the prism of “seven deadly sins”, “human factor” and “csf” mainly. This helped me to identify possible reasons for issues. I underline that conclusions regarding Australian projects made by me are based on possible reasons based on findings of Pinto (2013), Kahane (2012), Parker Gates (2010), and Wong (2007). Learning from KPMG (2011) and RDS experiences helped on the other side to see why it can be better to use these principles.

6.4 Research opportunities for the further disposition of the thesis

Shell is involved in many Australian LNG projects, the question is about whether scenario planning approach was considered as possible management tool for future planning. Research showed why it is useful to apply RDS principles when future is uncertain. But it brought out questions that can be studied further. Which factors influence the choice regarding managerial tools and approaches? This paper shows that all managerial approaches are actually influenced by human factor.

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