

Renewable Energies: Safe Investment or Dangerous Deal?^{1, 2}

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ABSTRACT

Renewable energies, nowadays, have a significant impact on the way we consider creating energy and affect all layer of society

One of the way, to have access to renewable energies on a project level is to contract a Renewable power purchase agreement with an energy supplier (Contractor).

However, it is accustomed in this field that the whole investment and building part of the power supply source of a RPPA should be taken care by the contractor himself. The said investment can represent a great amount of money that the contractor should have return on. However, in case of delays, the Renewable power purchase agreement contract often contains an “early termination right” which grants the Owner authority on the cancelation part.

How can we share the responsibility and how can mitigate the delays?

Incremental delivery and shared investment could be a good track to follow to diminish the identified risk and bring valuable knowledge to the Owner

Keywords: United Nations, Sustainable Development Goals, Renewable energy, Eco-friendly energy, Energy Seller, Energy Buyer, Power Purchase Agreement, Early termination right, Risk sharing

INTRODUCTION

Renewable Energy transition is one of the major stake of our century. Indeed, one of the Sustainable Development Goal number 7 set by the United Nations was to provide access to clean energy to everyone; one of the sub-objectives being that renewable energy share

¹ Editor's note: Student papers are authored by graduate or undergraduate students based on coursework at accredited universities or training programs. This paper was prepared as a deliverable for the course “International Contract Management” facilitated by Dr Paul D. Giammalvo of PT Mitratata Citragraha, Jakarta, Indonesia as an Adjunct Professor under contract to SKEMA Business School for the program Master of Science in Project and Programme Management and Business Development. <http://www.skema.edu/programmes/masters-of-science>. For more information on this global program (Lille and Paris in France; Belo Horizonte in Brazil), contact Dr Paul Gardiner, Global Programme Director, at paul.gardiner@skema.edu.

² How to cite this paper: Cojutti, C. (2018). Renewable Energies: Safe Investment or Dangerous Deal? *PM World Journal*, Vol. VII, Issue XI - November.

become more significant in the energy global mix. Improving their technology every year, eco-friendly energy providers proved the significant impact sustainable energies could have on an ecological and social level. Although, the efficiency of those latter is often source of concern compared to fossil fuel or even nuclear based energy it has become a necessity not to rely on them anymore in order to protect our habitat.

30% of the world GDP is invested on project every year and tends to 40% on 2020. Thus, it becomes important to increment as much and as soon as possible renewable energy and sustainable strategies to project. To provide energy to a project or a business, it is essential to make a Power Purchase Agreement, which is a legal contract between at least two parties, a seller (energy provider) and a buyer. With the increasing development of technologies such as Solar Panels or Wind Mills, a sustainable aspect of the PPA have been created.

Usually when contracting a Renewable PPA, the contract itself will be scaled from 5 to 20 years. The seller will take into his responsibility the whole project of creating, financing the energy farm and make sure the right amount of energy is delivered to the buyer. As you can see from this brief introduction of the PPA, the power and risk sharing balance between the two parties is not even. Beside this issue, Renewable energies are submitted to a major constraint which is the random aspect of the weather. Thus, it becomes difficult to insure a constant amount of energy. From all these risks, one seemed major to deal with. When facing a delay in delivering power, what happens to the contract? Many PPA contain a “early termination rights” clause which allows the contract Owner to terminate the contract if not delivered on time. As we mentioned it before, creating renewable energy require a huge investment supported by the Contractor and not reaching a return on investment can be critical to any company.

Therefore, it is essential to think of a solution that could share the risks and avoid such an unpleasant conclusion to the power purchase agreement which would be unfavorable for both owner and contractor.

Objective statement

On this paper we will go through the following issues:

- What are the risks of a Power Purchase Agreement?
- Which one can be shared between the two parties?
- What solution can be brought to avoid early termination of the contract in case of delays?

METHODOLOGY

Renewable power purchase agreement triggers two major risks, Guarantying energy with an instable resource and delivering the project on time. We mentioned previously that the case

contractor must handle all the process of the project (including financing, building, and maintaining the renewable power farm) and to ensure a constant delivery of energy. Thus, it is likely that the contractor meets problems on, at least, one step of the process and, therefore, gets delayed. "The early termination right" puts a lot of pressure on contractors and can both compromise the quality of the final product and the energy the latter can produce.

What are the alternatives to this clause to bring a better balance between Owner and contractor power? We will see on a later stage what outcomes those can bring as well.

STEP 2 - FEASIBLE ALTERNATIVES

Based on the researched we lead, we can establish different feasible alternatives:

- Documentation / Follow-up of the investment
- Delay acceptance clause
- Shared investment on the construction project
- Penalty
- Incremental and multi-layered delivery of the product

STEP 3 - DEVELOPMENT OF THE OUTCOMES-

1- Documentation/ Follow-up of the investment

When signing a Renewable Power Purchase Agreement, in order to insure the safe advancement of the project a system of gate review with documentation can be set. Thus, when reaching a major step or meeting big change in the project, the owner can have a real follow up on what is done. It will eventually enable them to anticipate delay and adapt to wait for the renewable energy to come.

2- Delay acceptance clause

Delay acceptance clause, decrease the pressure on the contractor's side. With a more flexible time scale, contractor can ensure the quality of the project and react more effectively to the constraint of such a project. On a legal aspect, if contractor has to comply with new law for instance, he can work on seeking for better and safer alternatives solution to answer the owners need than just fixing the project on the road.

3- Shared investment on the construction project

As currently all the process is handled by the contractor, sharing the responsibility and the investment is more viable solution on both process and financial level. In other words, the project of creating a renewable energy farm would be done by both parties; the owner would put a Project Management team of its own at disposition and it will support the Contractor's solution development team in the whole project. Doing so could eventually decrease the price of renewable energy the Owner will use with an assistance discount system.

4- Penalty

Penalty is a more classic solution to solve delays. If facing a delay in the delivery, the owner will charge a contract-fixed amount of money to the contributor to compensate the lost this issue triggers.

5- Incremental and multi-layered delivery of the product

Renewable energy has the advantage of being modulable and easily fixable. Therefore, when achieving a large scale renewable energy project, it is possible to deliver on different incremental steps. The plan would be the following, the owner and the contractor agrees on what must be delivered and what amount of energy should be guaranteed at the end of the project. Then both parties agree on key milestones of the project in which one part of the final deliverable will be implemented incrementally. At the first key milestones, the contributor will deliver the first surface of the renewable energy plant that can deliver the minimum amount of energy acceptable. Then, on the next milestones the contributor will complete the plant in order to reach the final agreed result. This solution is also adequate regarding the evolution of the renewable energy technology. Owner can benefit of the best technology released.

STEP 4 - SELECTION CRITERIA

In the following Multi-attributes decision matrix, we identified the main attributes that are relevant to decide on the solution to choose regarding this matter, as it to say, Cost, Transparency, Delay insurance, Energy supply, responsibility and feasibility. These attributes frame exactly the renewable Power Purchase Agreement stakes and enable us to pick the most efficient solution.

Cost: The alternative should be cost efficient for both the owner and the contractor, otherwise it makes no sense as the issue is partially financial.

Transparency: Does both parties benefit from all the information or is it only partial? This information is important to identify the degree of communication involved between both Owner and Contractor.

Energy supply: Will it insure the right amount of energy?

Responsibility: It is interesting to analyze the level of responsibility shared by both parties.

Feasibility: Estimating how easy the solution can be implemented.

Delay Insurance: Does this alternative can insure the right-on-time delivery of the project.

Note that the graduation system represents 3 elements (**Low = -**, **Medium = 0**, **High = 1**) and gives an interpretation of the impact the solution could have on the attributes.

The graduation for cost is reversed as the lower it is, the better.

Chart 1 – Multi-attributes Decision Making

| Solutions ----- Attributes | Documentation | Delay Acceptance | Shared Investment | Penalty | Incremental Delivery |
|----------------------------------|---------------|---------------------|----------------------|---------|-------------------------|
| Cost | 1 | 0 | 1 | 1 | 0 |
| Transparency | 1 | - | 1 | - | 1 |
| Delay Insurance | 0 | 0 | 0 | - | 1 |
| Energy supply | - | - | 1 | 0 | 1 |
| Responsibility | - | - | 1 | - | 0 |
| Feasibility | 1 | 0 | 0 | 1 | 1 |

From what we can see from this simple Multi-attributes Decision Making chart, the delay acceptance solution does not seem viable at all and is not to be taken into account in the next following steps.

FINDINGS

STEP 5 - ANALYSIS AND COMPARISON OF THE SOLUTIONS

To select efficiently the solution that suits best to our problematics and solve them relevance, we will establish a ranking system on three level; Quantitative representation of the attributes, Relative weighting of the solutions and Additive weighting of the solutions.

First, for a quantitative representation of the attributes, we thought it would be wiser to enlarge our graduation system from three level to five (Low, Medium-low, Medium, Medium-High, High). This way we increase the accuracy in the impact estimation we can have for our research.

Chart 2 – Quantitative representation of the attributes

| Attributes | Cost | Transparency | Delay Insurance | Energy supply | Responsibility | Feasibility |
|-------------|------|--------------|-----------------|---------------|----------------|-------------|
| Low | 1 | 0 | 0 | 0 | 0 | 0 |
| Medium-low | 0.75 | 0.33 | 0.25 | 0.2 | 0.25 | 0.25 |
| Medium | 0.5 | 0.5 | 0.5 | 0.6 | 0.5 | 0.5 |
| Medium-High | 0.25 | 0.8 | 0.75 | 0.8 | 0.75 | 0.75 |
| High | 0 | 1 | 1 | 1 | 1 | 1 |

Then, we use the scale we established on the previously made matrix to get a ranking of the solutions based on their score. Here we can clearly notify two things:

- Delay acceptance is the worst solution as it does not bring any major satisfaction on the attributes
- Shared Investment and Incremental Delivery are the most satisfying solutions.

Chart 3 – Relative weighting of the solutions

| Solutions | Documentation | Delay Acceptance | Shared Investment | Incremental Delivery |
|-----------------|---------------|------------------|-------------------|----------------------|
| ----- | | | | |
| Attributes | | | | |
| Cost | 1 | 0.5 | 0.25 | 0.75 |
| Transparency | 1 | 0 | 1 | 0.8 |
| Delay Insurance | 0.25 | 0.25 | 0.75 | 0.75 |
| Energy supply | 0 | 0,2 | 0.8 | 1 |
| Responsibility | 0 | 0 | 0.75 | 0.75 |
| Feasibility | 1 | 0.25 | 0.5 | 1 |
| Total | 3.33 | 1 | 4.05 | 5.05 |

Finally, to reach another level of quality and precision we need to establish a priority ranking of the attributes (Reversed; the attributes n°6 being the most important).

We need to organize the attributes by priority, making the sum of the ranking and then dividing their rank by their sum to obtain their weight in the balance.

We can see the relevance here of this prioritization process as the result exclude totally the documentation solution and only leave the choice for two of them. (Shared investment and Incremental delivery)

Chart 4 – Additive Weighting of the solutions

| Attributes | Ranking | Weighting | Documentation | | Delay Acceptance | | Shared Investment | | Incremental Delivery | |
|-----------------|---------|-----------|---------------|------|------------------|------|-------------------|------|----------------------|------|
| Cost | 3 | 0.14 | 1.00 | 0.14 | 0.50 | 0.07 | 0.25 | 0.04 | 0.75 | 0.11 |
| Transparency | 1 | 0.05 | 1.00 | 0.05 | 0.00 | 0.00 | 1.00 | 0.05 | 0.80 | 0.04 |
| Delay Insurance | 5 | 0.24 | 0.25 | 0.06 | 0.25 | 0.06 | 0.75 | 0.18 | 0.75 | 0.18 |
| Energy supply | 4 | 0.19 | 0.00 | 0.00 | 0.20 | 0.04 | 0.80 | 0.15 | 1.00 | 0.19 |
| Responsibility | 2 | 0.10 | 0.00 | 0.00 | 0.00 | 0.00 | 0.75 | 0.07 | 0.75 | 0.07 |
| Feasibility | 6 | 0.29 | 0.00 | 0.00 | 0.25 | 0.07 | 0.50 | 0.14 | 1.00 | 0.29 |
| Total | 21 | 1.00 | SUM | 0.25 | SUM | 0.24 | SUM | 0.63 | SUM | 0.87 |

STEP 6 - SELECTION OF THE PREFERRED ALTERNATIVE

If we follow strictly the result we have obtained during the process, the Owner and Contractor should go for the fourth alternatives to say the incremental delivery of the product as it brings a lot of advantages:

- Better insurance of power supply
- Decreasing delays
- Better implementation of the technology
- Extra costs avoided
- Better transparency

Thus with all the constraints we put to this solution, it seems as the best.

However it seems important to notify that the second best solution (alternative n°3) which is the shared investment might be another valid option for the company as one clear advantage can be emphasis. Indeed, by taking part of the process, the Owner can add a powerful and extremely valuable knowledge to its company culture. As it to say, when facing a same kind of investment, the company will obviously know what major steps need to be followed. On the other hand, having already such knowledge will undoubtedly influence them toward renewable energy for practical reason. When can see this alternative as a virtuous circle, however difficult to put in place since it requires a greater investment from the Owner.

Therefore, the solution n°4 is the best to solve our problematic efficiently and we will keep it as our main choice since the profits and positive outcomes are immediate.

STEP 7 - PERFORMANCE MONITORING AND POST EVALUATION OF THE RESULTS

To monitor the incremental delivery of the renewable energy it is, first essential to create a strong documentation and follow-up about what is done, how is it done and who is doing it. This way the contract Owner can keep control of the process and anticipate the impact of the delivery. We can, at some extent, consider it, as a Gate review.

Beside that it is important to start this kind of project with reasonable objectives and scale. To create a perfect energetic transition, it is essential to master the subject and know perfectly the expectation and the needs of the project. Beginning with a fair energy mix to reach a 100% renewable is a great objective but should be divided in major milestones throughout time. First knowing the technology and then going deeper.

CONCLUSION

Through this document, we have identified major issues and risks in the Renewable Power Purchase Agreement. One of which being the responsibility taken by both party during the process. We could establish this part was clearly unbalanced and that the initial investment from the contractor could lead to a dead end by the early termination of the contract in case of delays.

Then another issue came onto the chessboard, how to deal with delays in delivery?

By dealing with such problem we could, at once, resolve the root issues of the responsibility. Sharing investment or incremental delivery of a product are both wise option when launching a small or large scale energy transition plan.

However, both solutions should be monitored closely as they bring, indeed, an insurance of quality, delivery and success layer to the project but can easily drift away if now watched closely.

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About the Author



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Cyril Cojutti is a student at Skema Business School in Master of Science Programme and Project Management and Business Development. Being deeply interested in sustainable energies and eco-friendly technologies, he thought it wise to develop an analysis on Renewable Power Purchase Agreement as it is a cornerstone of the global energy transition which can apply to most projects. When graduating, I would like to engage myself in the development of clean energy and its promotion worldwide. It is a major stake of our century and will have an impact on our way of life tomorrow. He wants to play a role in it.

Besides, being passionate by Japan since my childhood, Cyril did an exchange program at Hiroshima University of Economics for one year which enabled him to enhance his understanding of the Japanese culture.

With the nuclear incident of 2011 in Japan, it became one of his objectives to be committed to increase the sustainable energy share in Japan.