

LOL Engineers LTD | 5 Page Briefing Note

Title: SUPPORTING SPOTLIGHT SDGs WITH AN ENGINEERED OPTION

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Spotlight SDGs:

SDG 7. Ensure access to affordable, reliable, sustainable and modern energy for all

SDG 9. Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation

Sustainability Issue(s) Relevant to the Spotlight SDGs:

Demand for energy continues to grow as the world populations are increasing fast nowadays. However, as we know, most of the countries still generate power by burning fossil fuels. These types of resources are not sustainable (limited quantity) and produce a huge amount of greenhouse gases such as carbon dioxide, which is one of the main reasons that causes rising temperatures and climate change. Start using clean and affordable energy will help protect our environment. As a result, investing in sustainable energy and improving energy productivity is vital if we are to achieve SDG 7 by 2030.

Traditional industries prioritize profits and ignore the negative environmental effect they cause during production. Sustainable industries involve materials, equipment, and methods that promote efficient use of resources and the reduction of waste, which means innovation is needed. To achieve SDG 9, industries transformation is needed. Promoting sustainable industries, and investing in scientific research and innovation, are all important ways to facilitate sustainable development.

Background on Spotlight SDGs:

Civilized society is almost completely reliant upon consuming resources for nearly every aspect of its existence. Daily transportation, industrial production is dependent on fossil fuels, water, and other finite natural resources. As the world population rises and economic growth occurs, the depletion of natural resources influenced by the unsustainable extraction of raw materials becomes an increasing concern. A number of consequences may arise due to the exploitation such as biodiversity loss and the Greenhouse Effect. Using clean and affordable energy is the future trend.

Besides the energy transformation, industry companies nowadays are also seeking for changing. Traditional industries rely heavily on coal and fossil fuels, which produces a

huge amount of pollution and causes negative effects on our environment. More and more resilient and sustainable infrastructure is needed. Canadian government is working actively on upgrading infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes in order to achieve sustainable development goals by 2030.

According to the Code of Ethics, engineers have a direct and vital impact on the quality of life for all people and shall hold paramount the safety, health, and welfare of the public. Dr. Marlene Kanga, a former Engineers Australia National President, said engineers have an important role in designing and building resilient infrastructure and cities. There are plenty of potential clients such as the Canadian government, new energy-oriented companies, who are trying to bring sustainability to our society. What is more, job positions and domestic production will increase as the government takes action to achieve sustainability, which will be beneficial not only to citizens but also to the whole society. As a result, it is a great opportunity to start corporations with those clients who need engineering support on the development of modern and sustainable infrastructure.

Current Global and National Status of Spotlight SDGs:

The 2019 tracking SDG7 report shows that the world is making progress towards achieving SDG7 but will fall short of meeting the targets by 2030 at the current rate of ambition. Current achievements are:

1. Global population without access to electricity decreased to about 840 million in 2017 from 1.2 billion in 2010 (Indicator 7.1).
2. The proportion of sustainable energy increased from 16.6% in 2010 to 17.5% in 2017 (Indicator 7.2). However in Canada, the latest data shows the opposite, proportion rate of household access to electricity decreased to 92.5% in 2015 from 97.5% in 2013, and the renewable energy share in the total final energy consumption also decreased to 17.4% in 2016 from 17.6% in 2015.

A number of achievements have been made for SDG 9, carbon emission is an indicator which can measure how efficient the resources have been used. Latest data shows that global carbon dioxide emission intensity decreased steadily, from 0.39kg in 2003 to 0.34kg in 2014 (Indicator 9.4). In Canada, a decreasing trend has also been witnessed, carbon emissions decreased to 0.323 Metric tonnes in 2015 from 0.329 in 2014.

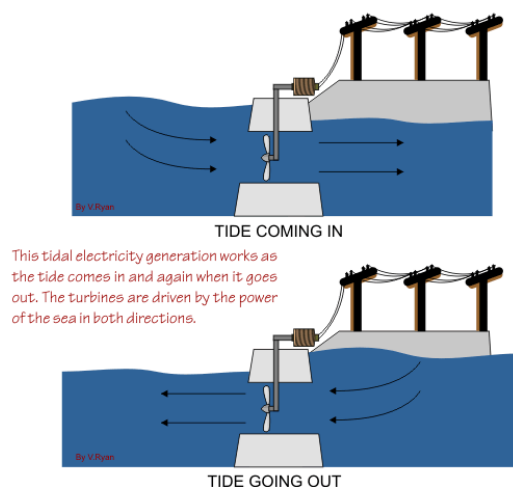
Key Considerations:

In order to achieve the spotlight SDGs, several key considerations have to be addressed for the engineered options. Some of the Engineering firms have already started to focus on developing sustainability. The Ivanpah Solar Electric Generating System, located in the Mojave Desert, was the world's largest solar thermal power

station in 2014. This project was constructed by Bechtel and BrightSource Energy and 173,500 heliostat mirrors and solar power towers were used to generate electricity. Similar engineering projects such as San Geronio Wind Farms and Salton Sea Power Station in California are also playing an important part in power generation. From the current progress that Canada has achieved shown above, there is no doubt that we have to develop sustainable and clean energy to keep on track with the global status as soon as possible.

As a result, what clients want from the engineered option is one of the key considerations. The project should help clients achieve spotlight SDGs and bring expected profits during the operation, which means that the project should meet the sustainable requirements, produce clean and affordable energy as expected. Waste production is inevitable for most of the projects, so it should also be kept at the minimum level as well. What is more, the life span of the project should be kept as long as possible in order to achieve resiliency. Maintenance fees should also not exceed client's expected budget in the long run. Another key consideration is that as an engineer, it is our responsibility to consider unintended consequences such as accidental failure or collapse, so we need to consider whether the project is sustainable, feasible before starting the project, and design carefully throughout the whole stages of construction. Additionally, we can also focus on enhancing the performance of the engineered option and reduce any irrelevant cost so that it will be more competitive to other firms.

Engineered Option:



The engineered option I recommend is Tidal Power, which is a form of hydropower that converts the energy obtained from tides into useful forms of power, mainly electricity. The power generators are placed in the ocean and they are driven by the tides. The

Generating electricity from hydro-energy does not produce harmful greenhouse gases, and it has a very high energy conversion efficiency. Approximately 90% of the energy captured is able to be converted into electricity energy. On the contrary, energy conversion efficiencies for solar and wind are much lower, averaging 15% for solar and 60% for wind respectively.

The implementation of the tide power plant will provide clean energy and resilient infrastructure to people in the future, and create various job positions to the society, which will also boost our economic growth. Majority of the countries and firms have not yet focused on the development of Tidal Power, as a result, it is a great opportunity for us to take the first step.

Recommendation and Conclusion:

Various environmental and sustainable issues we need to face with are still existing, such as climate change, biodiversity loss and resources shortage. However, they can be eliminated or solved if all of us just do our best to protect our world. As an engineer, we have the responsibility to make contributions on achieving spotlight sustainable development goals, such as building resilient infrastructure and promoting sustainable industries, ensure people at home and abroad will have access to clean, affordable energy. As a result, Tidal Power is a recommending engineered option we can work on, it not only generates sustainable and stable energy but also inspires people that there are many possible ways to make our traditional industries more sustainable and environmental-friendly.

APPENDIX 1: References

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11. Population Education. (2019). *What are the Pros and Cons of Hydropower and Tidal Energy - Population Education*. [online] Available at: <https://populationeducation.org/what-are-pros-and-cons-hydropower-and-tidal-energy/> [Accessed 15 Jun. 2019].

APPENDIX 2: Photo References

1. Left-side photo in “Engineered Option”: <http://technologystudent.com/images5/tidal1.gif>
2. Right-side photo in “Engineered Option”: <https://www.cleanenergybc.org/wp-content/uploads/2015/09/TidalPower.jpg>