RMIT UNIVERSITY

Royal Melbourne Institute of Technology

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9 May 2018

Joe Richardson
Senior Vice President of Professional Products and Services
Behr Process Corporation
3400 W. Segerstrom Ave.
Santa Ana, CA 92704

Dear Joe Richardson,

Please find enclosed a proposal offering your company the opportunity to manufacture, distribute, and sell our new invention, Solar Paint.

Solar paint is the first paint that can generate energy by capturing hydrogen from the atmosphere to power the homes and appliances of people around the world. Solar Paint is being developed especially for those looking to reduce their environmental footprint by offering greater benefits than solar panels at a lower price. This innovation will change the way people conserve energy. This development will inspire people to paint their houses in an effort to reduce emissions.

Thank you for your time and consideration. I hope to speak to you soon to further discuss this opportunity.

Sincerely,

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Solar Paint

Royal Melbourne Institute of Technology

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Executive Summary

After an era of using fossil fuels as the only source of energy, we now harvest the sunlight as one of the most effective ways of producing power for our use. Installing solar panels is an expensive and laborious process, this is a fact that keeps many homeowners from making the switch. But what if there was a cheaper, less complicated method of generating solar energy? What if the future solar energy source came in the form of paint? Well, that future is actually not as far off as you might think.

Solar paint is a paint that you can apply to any surface that will capture hydrogen from the atmosphere to power the homes and appliances of people around the world. Anyone can benefit this technology as there are zero emissions from its use. People are becoming more aware of the destruction of our planet through the neglect of sustainable practices that have led climate change. The people are adopting new methods to be "off the grid." Solar paint along with solar cells and wind energy can accomplish this need to be 100% sustainable in the near future.

Background

The Royal Melbourne Institute of Technology, known as RMIT, is an Australian public research university founded originally in 1887 in Melbourne, Victoria, Australia. It is a dual sector university, meaning it is both a provider of vocational and higher education studies. As of 2015, the student population was comprised of approximately over 44,000 undergraduate and 12,000 graduate students, as well as over 26,000 students in online and vocational schools, making RMIT Australia's largest university with a total student population of over 83,000. RMIT focuses on applied research in areas of design, technology, health, globalization, and

sustainability while maintaining exclusive partnerships with firms from these industries, as well as the Australian government. As an institution, RMIT strives to adapt to a changing economy and society so that it may contribute to sustainable prosperity and respond successfully to changing demands, funding pressures, and global opportunities.

General Description of Products

Solar Paint can be used and accommodated to many surfaces that solar panels could not fit. It can also be used in conjunction with solar panels in order to maximize clean power output. A person can use the paint fill fuel cells to power hydrogen products and solar panels to charge batteries producing power for AC/DC appliances. This technology greatly increases the ability for clean power during hours that solar panels alone could not produce during. Storage tanks and batteries are the key to off the grid power consumption.

Royal Melbourne Institute of Technology, RMIT, has created a solar paint that recovers hydrogen molecules in the air that occur from evaporation then stores them in a hydrogen fuel cell, which can be used while the sun is no longer shining. “Lead by Dr. Torben Daeneke, the RMIT University team recently introduced a new type of paint made of a synthetic molybdenum-sulphide. The substance acts like a semiconductor that forces water molecules to divide into hydrogen and oxygen.” (RMIT)

The base of the paint contains titanium dioxide, which can be found in most high quality outdoor paint. “It has become one of the most used white pigments because of its brightness and very high refractive index, surpassed only by a few other liquids and gases. When deposited as a thin film, titanium oxide’s refractive index and color makes it an excellent reflective optical

coating for dielectric mirrors...” (Curiosity) The durability of this paint, as with most titanium oxide based paints, is about 10 years.

A fuel cell combines hydrogen and oxygen to produce electricity, heat, and water. Fuel cells are usually compared to batteries. Both convert the energy produced by a chemical reaction into usable electric power. However, the fuel cell will produce electricity as long as fuel, hydrogen, is supplied and never losing its charge.

Detailed solution or rationale

We are looking for a successful company like BEHR to partner with that has an understanding of interior and exterior color inspirations. We see those qualities in your company and we invite you to join RMIT in our mission of taking solar paint the technology into our future. The idea is now more than a concept and less than a consumer level product, with our technology and your resource we both can achieve a higher level of success. Moreover, no one has ever done this before, we can be the first leading company with solar paint in the industry.

Solar Paint in comparison to solar panels is an uneven playing field at the moment as Solar Paint is in its infancy stage while solar panels have taken precedent as an alternative energy source for the past 20 years. Though, as Solar Paint becomes more refined with time and ingenuity, it will prevail, not only being cheaper, as a person would be able to paint and absorb hydrogen energy from any surface that is touched by the sun, but the manufacturing of the paint will be extremely cheaper than manufacturing of solar panels. In addition, solar paint will become available in about 4 to 5 years in conjunction with hydrogen fuel cells being promoted for the public to use.

Cost Analysis

According to Fixr.com, “an average household in the United States consumes about 1 kW per hour (kWh) of electricity. Each 30-day month has 720 hours and the average price of 1 kW is $0.10. A solar panel has the capability of generating 10 kW per square foot. For every kW generated, you will need 100 square feet of solar panels to power 100 square feet of home space. Solar panels typically cost $7-$9 per kW. An average 6 kW solar panel system costs around $18,000 to power a 2,500 square foot home,” or roughly the area of a roof that is 50 feet by 50 feet.

Now, Solar Paint is estimated to cost more than than your average paint in consideration that it does much more than coat a person's house, car, or even mobile devices to recharge, continuously power or store that power to use at a later time. The average 5 gallon bucket of high quality paint can cover an area of 1,250 to 2,000 square feet and cost around $150 to $200 depending on quality.

With that being noted, solar panels can only be used on the roof where the sun directly hits for a portion of the day, for around $18,000… on a high estimate, a person can paint every wall of a one story home which for this example would be 4 walls that are 50 feet wide and 15 feet tall and the roof which could still be accommodated for solar, though for the example will be painted and is 50 by 50 for approximately 5,500 square feet of paintable surface for about $550 to 660 plus installation of a fuel cell, to install the innovation… 27 to 30 times lower than the price of solar with more than almost 2 times as much energy supplying surface as compared to

solar panels alone, though not including the possibilities of incorporating perimeter fences, sheds, and other buildings that may be accommodated on a property.

Not including the price of what a fuel cell will cost, though taking into consideration, "The research firm MarketsandMarkets sees a $5.2 billion industry by 2019, with a compound annual growth rate of 14.7 percent from 2014 to 2019. According to a 2014 report from Navigant Research, the global revenue for stationary fuel cells will grow from $1.4 billion in 2013 to $40 billion in 2022, while WinterGreen Research sees the stationary fuel-cell market poised to increase to $14.3 billion in 2020." (Fuel Cells 2016) There is high evidence to speculate that fuel cell technology will be refined and the price will become affordable to everyone's clean energy needs within the 4 years of R&D at RMIT.

In comparison of the two:

- In an area of 11 square feet, solar paint absorbs an average of 120 watts
- In an area of 11 square feet, most solar panels can absorb an average of 150- 200 watts.

Solar Paint- 5500sq ft x 120 absorption watts / 11sq ft= 60,000 absorbable watts.

Solar Panels- 2500sq ft x 200 absorption watts / 11sq ft = 45,454 absorbable watts

average of 150- 200 watts.

Most homes on average require repainting once every seven to ten years and can vary greatly depending on the weather and composition of the building. With that, stucco homes in temperate climates will have longer lasting paint jobs in comparison to wooden homes in areas that experience extreme temperatures. This entails that Solar Paint would need to be reapplied 3

times at most in the lifetime of solar panels 15 year average lifespan. As this triples the cost of the paint in the long run ensuring the greatest absorption gains over the lifecycle of the paint, considerations of solar panel longevity has only proven to degrade in its usable life cycle by up to 60%.

Delivery Schedule or Work Plan

RMIT has developed a four year plan to help guide us through our research process and establish goals to be met by the end of each year.

- **Year 1: Finish development of Solar Paint:** Within the next year, researchers at RMIT are scheduled to conclude the research and development of the solar paint product.
- **Year 2: Finish development and integration of hydrogen fuel cells:** The research and development of the hydrogen fuel cells that will store the energy produced by the solar paint will begin during year one but is not expected to be completed until the end of year two.
- **Year 3: Mass production:** During year three, our partnership with BEHR will begin. BEHR will have the exclusive rights to mass produce the solar paint as well as the exclusive rights to distribution. Hydrogen fuel cells will be manufactured and distributed by a company in an industry in which BEHR does not compete in.
- **Year 4: Solar Paint is available to the public:** We expect year four to be the rollout of the new solar paint product to the public consumer markets. Due to BEHR's exclusive partnership with the Home Depot, the Home Depot will be the

first and only retail outlet where the solar paint product will be sold until a new distribution deal is worked out at the end of year four.

Organizational Sales Pitch

Picture this: a customer looking for pain to color coat a house walks into a novelty paint store. Looking at the variety of brand of paints, the customer notices Behr paint along with other competitor brands like Benjamin Moore and Valspar. Now, Benjamin Moore, Valspar, and Behr are the top three brands of paint respectively. Based on this assessment which paint would the customer more likely choose? Also consider this: a homeowner who is tired of paying outrageous electric bills has decided to go solar. Even though solar panels would cost roughly 18,000 dollars in the short run, this homeowner would save money in the long run. So, what do these two scenarios have in common? RMIT's idea and Behr's resources.

The problem is that the market has a plethora of competitors that sell paint. Even though Behr's paint is top notch, there are other two brands out there that are more popular: Valspar and Benjamin Moore. Plus, the modern day electric bill keeps getting costly by the year which will turn some homeowners to go solar; since solar energy has been around for roughly 20 years and a reliable source of energy. What if there was a newly untapped resource that would not only turn

the solar industry upside down but would also coat a house that much more efficiently and effectively.

At RMIT this creation of solar paint can wipe away the competition and give a competitive advantage for Behr. Behr can capture not only the solar market but have a firm lead in the paint industry. RMIT has created hydrogen absorbing solar paint that provides a source of energy to anyone who lives where the sun shines, and evaporation occurs. It enables people to have peace of mind even if water is not present near their communities which means that the use of the solar paint will be a sustainable source of energy for domestic, commercial and rural use in a very reliable and abundant way.

Conclusion

RMIT's solar paint is aimed to cover two primary goals. First, its implied that the solar paint will be a massive improvement in getting a reliable source of energy that is a cheaper answer than using solar panels. The solar paint can apply to any area of a house that a solar panel cannot be installed. Also, solar paint can be useful in areas that don't usually get sunshine that often which would gain an edge over the usefulness of solar panels.

The second goal is to convince Behr that adding RMIT's solar paint idea with Behr's resources, can potentially give Behr a competitive advantage in two markets: the paint and solar industry. A Behr solar paint can look more attractive to customers that want a product that's effective. Plus a Behr solar paint can convince customers who want to save on energy consumption to choose this product over the expensive choice in solar panels.

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Appendix

Areas above and below the arctic and antarctic circles would have insufficient sunlight for up to 50 days

https://www.youtube.com/watch?v=xobkKczcgac