ELEMENTAL
EXCELERATOR

Written Statement of Elemental Excelerator
before the House Committee on Labor and Public Employment
Tuesday, February 12, 2019

In Consideration of HB 1282
RELATING TO STATE BUILDING CONSTRUCTION

Aloha Chair Johanson, Vice Chair Eli, and Members of the House Committee on Labor and Public Employment:

Elemental Excelerator respectfully **submits strong support** for HB 1282, which requires all state building construction that uses concrete to use post-industrial carbon dioxide [CO2] mineralized concrete unless use of these materials will increase costs or significantly delay construction.

Elemental Excelerator is a Honolulu-based growth accelerator program founded and operating in Hawai'i. We have awarded over $30 million to 82 companies resulting in 56 demonstration projects in Hawai'i & Asia Pacific. Each year, we evaluate over 500 companies and look for innovative entrepreneurs from around the world to come to Hawai'i and find transformative solutions to help us achieve our 100% clean energy goals and solve our most pressing environmental problems. We select 15-20 companies annually that best fit our mission and fund each company up to $1 million.

Five percent of Elemental Excelerator's portfolio companies focus on the circular economy, minimizing waste and making the most of resources. We have seen a growing commercialization of new technologies focused on capturing and repurposing carbon dioxide. HB 1282 aligns with existing policies like Act 15 and Act 32 which structures the Greenhouse Gas Sequestration Task Force[1] and sets a target for a zero-emissions clean economy by 2045.[2] It demonstrates Hawaii's commitment to repurposing and sequestering CO2 and signals Hawai'i's leadership in growing its economy while prioritizing sustainable new technologies.

We strongly support HB 1282 for the following reasons:

1. **It can be implemented quickly and is economically responsible:** The 2016 *Global Roadmap for Implementing CO2 Utilization* (GCI) study has identified several companies in the market that use post-industrial carbon dioxide [CO2] mineralized concrete in partnership with existing concrete producers.[3] This process can reduce operational costs and create up to $26 billion in new production efficiencies.[4]

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[1] Hawai'i Act 015 GM 1115
[2] Hawai'i Act 32 GM 1132
[3] Global Roadmap for Implementing CO2 Utilization (November 2016), p.15. Retrieved from http://www.globalco2initiative.org/wp-content/uploads/2018/09/GlobalRoadmapCO2.pdf
[4] CarbonCure. (n.d.). Retrieved from https://www.carboncure.com/

2. **It reduces greenhouse gas emissions:** Concrete is the most widely used construction material in the world because of its low cost, strength, and durability. However, 7% of CO2 emissions come from cement production.[5] In 2017, Hawai‘i imported around 300,000 tons of cement from Taiwan.[6]The importing of concrete leads to additional costs in shipping, which then leads to a larger CO2 footprint. With CO2 mineralization, concrete development can reduce up to 700 megatons of annual global CO2 emissions.[7]

3. **It is a competitive and innovative technology:** The GCI study found that the emerging carbon utilization industry is expected to become a $1 trillion industry by the year 2030.[8]

Mahalo for the opportunity to testify on this bill.

Sincerely,

Aki Marceau
Elemental Excelerator
Managing Director, Policy & Community - Hawai'i

[5] Ibid.
[6] Who's who in North American cement imports (October 2018). Retrieved from https://cementdistribution.com/wp-content/uploads/2018/11/Who-is-who-in-North-American-cement-imports.pdf
[7] CarbonCure. (n.d.). Retrieved from https://www.carboncure.com/
[8] Global Roadmap for Implementing CO2 Utilization (November 2016), p.5. Retrieved from http://www.globalco2initiative.org/wp-content/uploads/2018/09/GlobalRoadmapCO2.pdf

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HB-1282
Submitted on: 2/11/2019 9:00:40 AM
Testimony for LAB on 2/12/2019 10:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Robert Niven	CarbonCure Technologies	Support	No

Comments:

Aloha Chair Johanson, Vice Chair Eli, and Members of the House Committee on Labor and Public Employment:

I, Robert Niven, *a*nd on behalf of CarbonCure Technologies, respectfully ***submit our strong support for HB 1282,*** which requires all state building construction that uses concrete to use post-industrial carbon dioxide mineralized concrete unless use of these materials will increase costs or significantly delay construction.

CarbonCure has the honor to be a recent cohort company of the Elemental Excelerator (EEX) program based in Honolulu. Our investors include Breakthrough Energy Ventures, a $1 billion clean energy venture fund comprising 20 global business leaders. We are the world leader in CO2 mineralization technologies - a rapidly growing industry with hundreds of companies (including past EEX cohorts) estimated to create $1 trillion annually and reduce 7 GT of CO2 emissions. In particular, CarbonCure serves the concrete sector, however, waste CO2 can now be productively used as a feedstock for numerous products such as chemicals, fuels, aggregates and concrete. Rather than consider CO2 only as a harmful greenhouse gas; this new class of clean technologies can redefine CO2 as a value-added feedstock to make incumbent industry more profitably and sustainable. A win-win cleantech solution.

Like Hawaii, CarbonCure is also based in a coastal community and understand the effects of being exposed to the severe effects of climate change. Upon having the opportunity to begin working with local Hawaiian partners from academia, industry, civil society and government; I've learnt that Hawaii is willing to take a true climate leadership position for not only the US but the Asia Pacific region. Its track record on passing climate and renewable energy legislation has put it on a path to sustainable prosperity while managing the risks climate for generations to come.

CO2 Utilization technologies, otherwise known as CO2 Sequestration or Mineralization, are both an adaptation necessity and business opportunity for Hawaii. The technology produces stronger concrete with a lower carbon footprint and imposes no change to the price, schedule or product handling. The technology could be applied to the +1 million yards of concrete produced annually by local concrete producers. Building more resilient construction to withstand climate change (eg. sea level rise and storms) will

require more high strength and climate friendly concrete. Furthermore, by passing this bill, Hawaii will establish itself as a lighthouse for attracting investment, talent and innovation. We know that capital and talent flows to most markets to deploy and develop high-growth clean technology businesses, however, a unique competitive advantage is created when governments establish early markets for technologies to scale up. In the case of Hawaii, it can additionally become a bridge to Asia Pacific markets. By taking nimble legislative action (HB1282), Hawaii can create the cornerstone to establish itself as the preferred market for CO2 Utilization technology investment, talent attraction and deployment. As a climate leader, Hawaii can then export the best solutions globally to help other governments meet their Paris climate commitments. There is a strong demand for climate solutions that provide deep GHG reductions without incurring costs or operating issues (eg. scheduling delays).

Since the EEX started in October 2018, CarbonCure has already established partnerships and is making investments in Hawaii to tap into this exciting emerging market opportunity. Some early developments are:

1. Retrofitting our first concrete plant in partnership with Island Ready Mix with production to begin in March 2019. This will be a showcase for other producers, builders and engineers. It also will reduce the reliance on imported cement (from Taiwan), create a market for recycling local CO2 and lower the state GHG inventory.
2. Developing supplier relationships with Matheson Gases and Hawaiian Gas to source CO2 from the local SNG plant.
3. Supply concrete with mineralized CO2 for Hawaii Department of Transportation projects in June or early.
4. Launch a joint research project with the University of Hawaii, Department of Engineering.
5. Strengthened relationships with local engineering, architecture and construction association organizations.

We **submit our strong support for HB 1282**. The bill enhances the attractiveness of investing in Hawaii and participating in its ambitious climate goals and market for clean technologies. Like CarbonCure other CO2 Utilization technology companies will be drawn to invest in the State with supportive legislation like HB 1282.

Mahalo for the opportunity to testify.

Robert Niven

CEO/Founder

CarbonCure Technologies, *an Elemental Excelerator cohort company*

rniven@carboncure.com

LATE

Aloha Chair Johanson, Vice Chair Eli, and Members of the House Committee on Labor and Public Employment:

I am *F.H.."Shorty" Kuhn a*nd on behalf of *Island Ready-Mix Concrete, Inc.*, we respectfully ***submit our strong support for HB 1282,*** which requires all state building construction that uses concrete to use post-industrial carbon dioxide mineralized concrete unless use of these materials will increase costs or significantly delay construction.

Island Ready-Mix Concrete, Inc. is a locally owned concrete supplier located on the island of Oahu. The business was founded in 1983 and services many County, Military and State projects along with being the supplier for the bulk of the concrete precast products manufactured on Oahu. We were the major concrete supplier for the development of Mililani Mauka, Waikele and now the new Ho'opili project in west Oahu.

The use of carbon dioxide mineralized concrete will both reduce the amount of cement needed in our mixes but also provide owners and developers with Leadership in Energy and Environmental (LEED) Design points.

Carbon dioxide mineralized concrete is a new class of clean technologies that recycles post-industrial CO_2 into fresh concrete to lower its carbon footprint and improve concrete quality and economics. In the process known as CO_2 Mineralization, Sequestration or Utilization, the CO_2 is permanently converted into a solid mineral within the concrete. This process allows industry to derive value by recycling local waste CO_2 and stops the release of greenhouse gases. It is widely adopted by industry in over 125 plants across the United States, Canada and Southeast Asia. Introduction of carbon dioxide mineralized concrete in Hawaii is already underway. Island Ready Mix and HC&D have adopted the technology in Kapolei using CO_2 sourced locally from Hawaiian Gas. The Hawaii Department of Transportation (HDOT) is actively cooperating with industry and the University of Hawaii to implement the technology and study its material impacts.

We support HB 1282 for the following reasons:

1. **It can be implemented quickly and is economically responsible:** The technology is retrofitted into existing concrete plants and requires minimal effort and capital investment from the concrete industry to transition. Material benefits of the treated concrete create new production efficiencies from lowering the demand for imported cement that cover the incremental costs of technology adoption. In effect, the technology allows concrete producers to provide a higher quality and lower CO_2 concrete without imposing additional costs.
2. **It can reduce greenhouse gas emissions:** Concrete is the most widely used construction material in the world because of its superior affordability, strength, and durability. However, 7% of global CO_2 emissions come from cement production. With CO_2 mineralization, concrete producers can reduce up to 700 megatons of annual global CO_2 emissions. The World Business Council of Sustainable Development (WBCSD) predicts it to be the primary greenhouse gas mitigation solution for the global cement sector.
3. **It is a competitive and innovative technology:** A 2016 study called the *Global Roadmap for Implementing CO_2 Utilization* found that the emerging industry of beneficial-reuse-of-CO_2 sector is expected to become a $1 trillion industry by the year 2030 with over 200 companies presently operating in the space. The concrete sector is expected to be the largest and earliest sector to benefit from these technologies.

Mahalo for the opportunity to testify.

LATE

HC&D
ROCK SOLID SINCE 1908

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To: The Honorable Aaron Ling Johanson, Chair
and Members of the House Committee on
Labor and Public Employment

Re: **TESTIMONY SUPPORTING H.B. 1282 RELATING TO STATE BUILDING CONSTRUCTION**

Aloha Chair Johanson, Vice Chair Eli, and Members of the House Committee on Labor and Public Employment:

I am Wade Wakayama and on behalf of HC&D, LLC, we respectfully **submit our strong support for HB 1282,** which requires all state building construction that uses concrete to use post-industrial carbon dioxide mineralized concrete provided it is available and unless use of these materials will increase costs or significantly delay construction.

HC&D is one of Hawaii's leading manufacturer of ready-mix concrete with locations on Oahu and Maui.

Carbon dioxide mineralized concrete is a new class of clean technologies that recycles post-industrial CO_2 into fresh concrete to lower its carbon footprint and improve concrete quality and economics. In the process known as CO_2 Mineralization, Sequestration or Utilization, the CO_2 is permanently converted into a solid mineral within the concrete. This process allows industry to derive value by recycling local waste CO_2 and stops the release of greenhouse gases. It is widely adopted by industry in over 125 plants across the United States, Canada and Southeast Asia. Introduction of carbon dioxide mineralized concrete in Hawaii is already underway. Island Ready-Mix and HC&D have adopted the technology in Kapolei using CO_2 sourced locally from Hawaiian Gas. The Hawaii Department of Transportation (HDOT) is actively cooperating with industry and the University of Hawaii to implement the technology and study its material impacts.

We support HB 1282 for the following reasons:

1. **It can be implemented quickly and is economically responsible:** The technology is retrofitted into existing concrete plants and requires minimal effort and capital investment from the concrete industry to transition. Material benefits of the treated concrete create new production efficiencies from lowering the demand for imported cement that cover the incremental costs of technology adoption. In effect, the technology allows concrete producers to provide a higher quality and lower CO_2 concrete without imposing additional costs.
2. **It can reduce greenhouse gas emissions:** Concrete is the most widely used construction material in the world because of its superior affordability, strength, and durability. However, 7% of global CO_2 emissions come from cement production. With CO_2 mineralization, concrete producers can reduce up to 700 megatons of annual global CO_2 emissions. The World Business Council of Sustainable Development (WBCSD) predicts it to be the primary greenhouse gas mitigation solution for the global cement sector.
3. **It is a competitive and innovative technology:** A 2016 study called the Global Roadmap for Implementing CO_2 Utilization found that the emerging industry of beneficial-reuse-of-CO_2 sector is expected to become a $1 trillion industry by the year 2030 with over 200 companies presently operating in the space. The concrete sector is expected to be the largest and earliest sector to benefit from these technologies.

Mahalo for the opportunity to testify.

Wade H. Wakayama
President

LATE

HB-1282
Submitted on: 2/11/2019 8:58:41 PM
Testimony for LAB on 2/12/2019 10:00:00 AM

Submitted By	Organization	Testifier Position	Present at Hearing
Lin Shen	Individual	Support	No

Comments:

Aloha Chair Johanson, Vice Chair Eli, and Members of the House Committee on Labor and Public Employment:

I am Lin Shen, a Associate Professor at UH Manoa doing research on concrete, and I respectfully submit my strong support for HB 1282, which requires all state building construction that uses concrete to use post-industrial carbon dioxide mineralized concrete unless use of these materials will increase costs or significantly delay construction.

Carbon dioxide mineralized concrete is a new class of clean technologies that recycles post-industrial CO2 into fresh concrete to lower its carbon footprint and improve concrete quality and economics. In the process known as CO2 Mineralization, Sequestration or Utilization, the CO2 is permanently converted into a solid mineral within the concrete. This process allows industry to derive value by recycling local waste CO2 and stops the release of greenhouse gases. It is widely adopted by industry in over 125 plants across the United States, Canada and Southeast Asia. Introduction of carbon dioxide mineralized concrete in Hawaii is already underway. Island Ready Mix and HC&D have adopted the technology in Kapolei using CO2 sourced locally from Hawaiian Gas. The Hawaii Department of Transportation (HDOT) is actively cooperating with industry and the University of Hawaii to implement the technology on projects to study its material impacts.

I support HB 1282 for the following reasons:

1. **It can be implemented quickly and is economically responsible:** The technology is retrofitted into existing concrete plants and requires minimal effort and capital investment from the concrete industry to transition. Material benefits

of the treated concrete create new production efficiencies from lowering the demand for imported cement that cover the incremental costs of technology adoption. In effect, the technology allows concrete producers to provide a higher quality and lower CO2 concrete without imposing additional costs.

2. **It can reduce greenhouse gas emissions:** Concrete is the most widely used construction material in the world because of its superior affordability, strength, and durability. However, 7% of global CO2 emissions come from cement production. With CO2 mineralization, concrete producers can reduce up to 700 megatons of annual global CO2 emissions. The World Business Council of Sustainable Development (WBCSD) predicts it to be the primary greenhouse gas mitigation solution for the global cement sector.
3. **It is a competitive and innovative technology:** A 2016 study called the *Global Roadmap for Implementing CO2 Utilization* found that the emerging industry of beneficial-reuse-of-CO2 sector is expected to become a $1 trillion industry by the year 2030 with over 200 companies presently operating in the space. The concrete sector is expected to be the largest and earliest sector to benefit from these technologies.

Mahalo for the opportunity to testify.

HAWAIʻIGAS
THE CLEAN ENERGY COMPANY

LATE

Testimony to the House Committee on Labor and Public Employment

Tuesday, February 12, 2019, 10:00 a.m.
Conference Room 309, State Capitol
RE: House Bill 1282

Chair Johanson, Vice Chair Eli, and Members of the House Committee on Labor and Public Employment

Hawaii Gas **supports HB 1282** which requires all state building construction that uses concrete to use post-industrial carbon dioxide mineralized concrete unless use of these materials will increase costs or significantly delay construction.

Hawaii Gas (HG) strives to provide clean and reliable energy to the state, including growing initiatives that utilize waste to create renewable natural gas that supplement our energy fuels. HG has been serving customers throughout the state for 115 years and has continued to evolve to meet the state's changing energy needs.

HG represents less than 2% (two percent) of Hawaii's energy demand and our facilities account for 1/3 of 1% of direct greenhouse gas emissions, as respectively reported by the U.S. Energy Information Administration and the U.S. Environmental Protection Agency. HG supports efforts to continue to curb greenhouse gas emissions and has been doing just that. With committed projects to date, HG expects to have reduced the equivalent of over 100,000 barrels per year of imported oil to the state once fully implemented. In addition, with the enactment of HB 1282, HG will have the opportunity for another outlet, besides carbonation for soda and dry ice, for the CO^2 it currently produces as a byproduct of its synthetic natural gas process, thereby reducing its carbon footprint even further.

HB 1282 is another innovative way for the state to reduce and recycle materials, while moving the mark towards lowering our carbon footprint. Post-industrial carbon dioxide mineralized concrete is a technology that injects recycled CO^2 into fresh concrete. In a process known as CO^2 mineralization, the CO^2 is converted into a mineral and becomes permanently captured. This stops the release of additional greenhouse gases.

We support HB 1282 for the following reasons:

1. **It can be implemented quickly and is economically responsible:** The technology is retrofitted into existing concrete plants and requires minimal effort from the concrete industry to transition. This provides an opportunity for the concrete industry to use less cement for more durable concrete. This can reduce operational costs and create up to $26 billion in new production efficiencies.

2. **It can close the carbon loop and reduce greenhouse gas emissions:** Concrete is the most widely used construction material in the world because of its low cost, strength, and durability. However, 7% of CO^2 emissions come from cement production. With CO^2 mineralization, concrete development can reduce up to 700 megatons of annual global CO^2 emissions.

3. **It is a competitive and innovative technology:** A 2016 study called the *Global Roadmap for Implementing CO^2 Utilization* found that the emerging industry of beneficial-reuse-of-CO^2 sector is expected to become a $1 trillion industry by the year 2030.

Mahalo for the opportunity to testify.

Sincerely,

Jeannine A. Souki
Director, Government Affairs and Communication