

Testimony of
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Good morning Chairman Murkowski, Ranking Member Cantwell and members of the Committee. Thank you for allowing me to speak before the Committee.

My name is Colleen McAleer. I am a Commissioner for the Port of Port Angeles, located in Clallam County on the northern portion of Washington State's Olympic Peninsula.

I moved to Washington State after serving ten years in the Army as an intelligence officer and aviator. I served with the 2nd Armored Cavalry Regiment as a platoon leader in Desert Storm and then flew rotary and fixed-wing aircraft in stateside and overseas assignments for the Army. In 2002, I moved to Washington State to raise two young boys. For nearly a decade, I worked with my father and brother as an owner of a successful family business.

Working with our clients, I watched too many businesses struggle and eventually close, leaving vacant storefronts across our county's communities. In the economic downturn, I saw that local governments needed a different approach to make an impact on the local economy. We couldn't afford to sit by and hope a rising tide would lift Clallam County. That's where the Port comes into this story.

In 2011, I accepted a position as Director of Business Development at the Port of Port Angeles. After two years, I felt compelled to run for Port Commissioner. I ran on economic progress and fiscal responsibility—two areas I am passionate about.

The Washington State Port System

Port authorities in Washington State are unique; they are autonomous governments with commissioners directly elected by the citizens of our districts. A Washington State port's primary function is to drive a prosperous economy within its defined district. The commissioners have the authority to levy taxes and prioritize spending. I will try to show how our potential for economic improvement relates to the legislation under consideration.

Clallam County Economy

Historically, logging has been our county's economic lifeblood. But with issues of threatened species, we've been less able to profitably harvest much timber, costing tens of thousands of jobs and affecting the entire county economy. Add the lingering economic downturn, and our county has struggled with double digit unemployment, a private industry median wage holding at about \$33,000, and a trend of exporting our graduates. Our unemployment numbers would be higher, but many in the local labor force have departed the county to find work in Seattle and the booming I-5 corridor to our east. To turn this around, we know we must innovate, change, and compete.

Synergy in the Composites Industry

As both the former Director of Business Development and current Commissioner, I have courted and collaborated with leaders in industry, academia, and government, making the argument that our county is ripe for investment in composites technology and sustained economic growth.

As you may know, composites are the material of the future. They are lightweight, adaptable and strong. Boeing's new planes are made of composites. Our relatively small county already has several manufacturers who use these materials. They make yachts, cutters, snowboards, aerospace parts and more. And the Pacific Northwest National Laboratory's Marine Science lab (PNNL) located in our county has facilities to test marine hydro-kinetic devices made from carbon fiber.

We have three large mills that have closed their doors in just the last year. This workforce is ideally suited for the carbon fiber industry. Both sectors are automated, high volume industries that require precise processes and quality control. A strong composites manufacturing capability holds the promise of becoming a sorely needed economic driver. Advanced manufacturing technology can boost each of these two industries and have a multiplier effect on the Clallam County economy. This brings me to our **Composites Recycling Technology Center (CRTC)** initiative.

The CRTC Story

Recycling carbon fiber composites has two challenges. The first is how to deal with leftover or uncured scrap. Today, over 29 million pounds of this material ends up in landfills every year in the United States alone. The second, larger challenge is to reclaim fibers from cured material.

We have created a non-profit center called the Composite Recycling Technology Center (CRTC) to meet the challenge around the uncured (pre-impregnated or pre-preg) scrap or waste that is created through the manufacturing process.

Since 2012, the Port of Port Angeles has spearheaded the idea of an advanced composites manufacturing, where industry and researchers share workspace and workforce. It would leverage our existing technologies and assets.

- Our Port has owned and operated a Composite Manufacturing Campus since 1988 as part of our airport industrial park which houses industrial-scale autoclaves used to cure advanced carbon fiber pre-preg products.
- Our relatively small county already has several manufacturers that use composite materials to manufacture products such as yachts, cutters, aerospace components, snowboards, surfboards, skateboards, and fishing rods.
- PNNL's Marine Science Laboratory is located in our county and already has the necessary facilities to research and demonstrate in-water marine hydro-kinetic devices made from carbon fiber materials.

Large manufacturers and suppliers have agreed to donate their scrap carbon fiber pre-preg material to the CRTC. In addition, these major aerospace partners have the capability to support targeted technology transfer to secondary use industries and partnered marketing support. As the primary generators of vast quantities of this high quality "waste," aerospace firms want to stop landfilling the pre-preg materials and put it to a more productive use. These carbon fiber pre-preg users have both business and operational reasons for not creating secondary products themselves and there is no existing industry to repurpose the material.

Last year, the CRTC, led by the Puget Sound Regional Council, was one of six Catalytic Investments to win the Federal Investing in Manufacturing Communities Designation. In addition, our local team was an integral part of the state's application for the \$70 million DOE Clean Energy Manufacturing Innovation Institute. The state team lost that competition to a team in the Southeast, but we believed the composites recycling composites niche was an excellent fit for our state and country, and even more so for our community. So we carried on without the Department of Energy funding.

Industry partners, small businesses, universities and community colleges have committed more than \$30 million over many years of in-kind support. The Port of Port Angeles has already spent millions on this project and will add another \$2 million in capital and operational funding. In addition, we have received preliminary notice of awards for the full \$4M needed for infrastructure through a combination of federal, state and local support.

The 25,000 square foot CRTC facility will be a shared equipment center that serves the following functions:

1. Reduce carbon fiber pre-preg waste in landfills by accepting regional manufacturer's scrap and waste pre-preg material.
2. Sell reformed carbon fiber pre-preg material to manufacturers when supplies allow.
3. Manufacture secondary repurposed products with uncured waste material.
4. Serve as a hub for industry and academic research to universities.
5. Serve as a workforce training space for Peninsula College and potentially others.

We anticipate opening our doors in January 2016. We also anticipate that this investment in advanced manufacturing and composites technology will help boost the Clallam County economy, while providing other benefits to our State and country.

Technology Transfer

Small businesses will use the CRTC to conduct proprietary product development at our shared equipment center and consult with our material and process experts on hand at a fraction of the price and risk they would take on if they were to do it on their own. An example of a Clallam County business partner is Mervin Manufacturing. They manufacture skis, skateboards and surfboards and several brands of snowboards (LibTech & GNU) from carbon fiber composite materials. Mervin exports \$13 million of their product overseas annually. They plan to recycle some of their composite waste stream with the CRTC. More importantly, they will develop new manufacturing methods and products created from the high-grade recycled composites that the CRTC will be processing in a variety of their products including snowboard bindings, surfboard fins and accessories, skateboards, and other action-sports accessories.

University partners, such as WSU, UW, USC, UCLA, and the University of Alabama, Birmingham all have interests in sending researchers and students to test composites recycling technology and work with CRTC personnel on projects of mutual interest. The commercialization of technology owned by universities and PNNL will be readily transferred to other parties. Universities will send their graduate students to complete capstone projects at our full-scale manufacturing facility.

As an example, Washington State University has a 35-year history of commercializing products ranging from wood oriented strand board (OSB) to plastic lumber materials used in decking. WSU has the capability to certify a product for building codes. We are finalizing an MOU with WSU and their Composite Material Engineering Center for certification of building materials and development of specifications for municipalities building code.

Intellectual Property

The ultimate goal of the Port and its funders is to create spinoff companies and jobs in Clallam County. The CRTC non-profit board will finalize the IP Management Plan. We plan to incentivize companies to use our center, rather than require IP ownership rights which would create a barrier for prospective users of the facility and thus create a barrier to economic growth for our county.

Reshoring Manufacturing

We can't and don't want to compete with the low wages of foreign countries. One way to deal with this is by lowering material and process costs while raising wages. Recycling the two million pounds of incredibly valuable carbon fiber pre-preg scrap, instead of landfilling it, meets this goal.

Here's an example: Batson Enterprises, located in Clallam County, is a wholesale supplier of fishing rod blanks. Today they purchase some of their component composite and aluminum parts overseas in order to keep their

overall costs competitive. By partnering with the CRTC for product development with the recycled pre-preg, Batson Enterprises will be able to purchase locally-produced, higher quality materials — aerospace-quality materials — that were formerly cost prohibitive.

Workforce Training

We know from local business owners that one of the greatest hurdles to growth is developing a trained workforce. That is why our local community college, Peninsula College, will relocate their Advanced Manufacturing – Composite program into the CRTC facility to conduct workforce training in composite manufacturing and carbon fiber recycling techniques. The CRTC will house both the business entrepreneurs and the future workers. The Center is designed so that skills will be accurately defined and taught, businesses leaders will have a view of the potential workforce, and the workers can better understand which business program more likely will fit their needs.

Like all community colleges in Washington State, Peninsula College works hand-in-hand with local employers to ensure that programs are designed to fit market requirements. Colleges often buy equipment identical to that used by manufacturers in their facilities. Sometimes trained employees apply for job opportunities elsewhere in the state. This makes standardization through certification programs crucial for smart training and hiring. I sit on the Executive Board of the State’s Center of Excellence for Aerospace and Advanced Manufacturing and have heard numerous accounts from manufacturers about the importance of the work this Center has done to standardize college training programs to make the productivity of their businesses more efficient.

Reducing Greenhouse Gases and the Impact of Recycling Carbon Fiber

There is a clear and compelling connection between the CRTC initiative I’ve described and the potential to address environmental challenges. To put the energy savings in perspective, I submit the following estimates for production requirements, which clearly shows the benefit of recycling carbon fiber:

Virgin carbon fiber pre-preg	315 MJ/kg
Virgin aluminum	218 MJ/kg
Recycled aluminum	29 MJ/kg
CRTC Estimates for Recycled carbon fiber pre-preg:	
Collection, transportation, and storage	4 MJ/kg
Cutting, handling, and conversion to “usable” format	4 MJ/kg
Re-processing into final product	12 MJ/kg
Total for recycled carbon fiber pre-preg	20 MJ/kg

Recycled carbon fiber composite embodied energy is estimated as follows:

1. Aluminum and carbon fiber are roughly equivalent in embodied energy use to produce a component with virgin feedstock when we take into account the lighter weight of carbon fiber used. The carbon fiber part continues to have the benefit of the 30-40% weight reduction to lower lifetime energy use during operation. For vehicles, production energy is around 15-20% of total lifecycle energy, so reducing upfront weight is a critical factor in total lifecycle energy usage.
2. Recycled carbon composite in the CRTC approach will have about 6% of the embodied energy of a product made from virgin carbon fiber composite.
3. Recycled carbon fiber component using the CRTC model and approach would have about 1/3 the embodied energy of an equivalent product from recycled aluminum.

Additionally we will develop processes that use net-shape molding, with near-zero waste, further improving the energy and manufacturing benefits.

Conclusion

I hope I have painted a clear picture of how recycling composite carbon fiber scrap will not only provide essential jobs on our local economy, but promote a needed market that provides environmental benefits as well. Our Port sees the CRTC as a win-win on all of these levels. I do not believe that we have to choose between a healthy environment and a healthy economy. I believe that they are mutually supportive and that you can't have one without the other.

We are meeting these societal challenges—and providing derivative benefits to our local and State economy—with the Composite Recycling Technology Center (CRTC). Given the many societal benefits of a recycling center, and the combined interests, we have set it up as a non-profit.

It is my fervent hope that the initiatives supporting energy accountability and reform, particularly S. 1432 which supports a recycled carbon fiber study, and S.1304 for a skilled 21st century energy workforce, will meet with your approval. Thank you for the opportunity to address this committee.