Research & Development Committee
September 23, 2015

Several existing R&D projects are seeking time extensions and/or requesting changes of scope for the uses of TRRC grant funds. The R&D Committee will meet on September 23rd prior to the meeting of the full Commission to consider these requests:

Halifax County IDA
Design, Development, and Manufacturing of a New High Performance Vehicle and Creation of Composite Manufacturing Capabilities (2868)
$838,786 Grant Award – Request to Approve Change of/Expanded Scope

Executive Summary provided by Grantee in original application: TMI AutoTech, a long-standing company in the footprint, will design and prototype a high performance vehicle geared to amateur use, which will be named the TMI_SNIPER. TMI will partner with existing TIC funded research and development centers and international automotive companies to develop the TMI_SNIPER prototype from the ground up. TMI_SNIPER requires advanced materials, such as Fiber reinforced Composite Materials, a manufacturing capability that is not currently available in our region. This project will create a new initiative to bring composite manufacturing capabilities to our region. TMI_SNIPER will be completely manufactured in the Tobacco region, creating approximately 18 skilled jobs.

Staff Comments and Recommendation: The grantee is requesting approval for a change of and expanded scope from design, development and manufacturing of the sportscar, TMI Sniper to that of a new robust and confidentially-named off-road vehicle; while also adding deliverables associated with design and commercialization of an Ariel Atom Sportscar. A primary driver in this change is related to competitors releasing vehicles in the months following the grant award targeted to the same buyer group; and during this same time period TMI being provided with the opportunity and awarded the rights for development of the off-road prototype vehicle in the North and South American markets that would serve a much larger client base. TMI has provided a document detailing the Future Business areas to be developed. TMI has committed to reach all target job creation and private investment commitments presented in the original proposal. A comparative analysis between the original proposal and the restructured project demonstrates that all original project deliverables, timelines, and sales projections would be met or exceeded for the new proposed vehicle. Unit sales price for the off-road vehicle would be $80,000 compared to $135,000 for the Sniper, and sales projections for the off-road vehicle are a 120% increase (220 units in 5 years versus 100 units for the Sniper). R&D activities related to the off-road vehicle will include full engineering into SolidWorks, engineering of Honda engine to chassis interface, tooling and fixture creation, and hiring of skilled workforce for full assembly and sales and marketing in the footprint. Additionally TMI is adding two deliverables related to design of full composite body and commercialization for an Ariel Atom sportscar. TMI is currently the North American contract manufacturer for the successful supercar, the Ariel Atom, and under this project TMI would design a full composite sports car with a lightweight, aerodynamic body based on the Ariel Atom. The applicant has proposed a change in the scope that would ultimately result in development of two new vehicles for manufacturing in the tobacco region, along with opportunities that are expected to result from creation of the composites manufacturing facility. The company's track record of providing high-wage jobs in the region is also of significant note. **Staff recommends approval of the requested changes in scope.**

Institute for Advanced Learning and Research
Package Innovation and Development Center (2984)
$1,997,033 Grant Award – Request for Approval of Disposition of Assets following Verification of Performance Measuring Being Met

Executive Summary provided by Grantee in original application: Synergy Packaging Systems, LLC (SPS) is seeking funding for a Packaging Innovation and Development Center to promote a new plastic packaging technology. This technology utilizes advanced manufacturing methods to produce lower cost replacements for metal cans, glass jars, high-barrier extrusion blow molded and thermoformed containers, and rigid paper/foil laminated canisters.

Staff Comments and Recommendation: In working through the details in their contract with Synergy Packaging Systems, LLC, the private beneficiary on this grant, IALR requests the Commission's approval for a proposed plan for disposition of assets purchased with grant funds upon verification of performance measures having been met. The entire Commission grant of $1,997,033 is approved to support equipment costs for which are the subject of this request. IALR would hold title to all equipment purchased with grant funds until the performance measures are verified. Consideration of disposition would occur following the three year project period of the Commission's grant. IALR is proposing the performance measure for private capital investment to be at $3,859,033. This amount is essentially that which was presented in the business plan provided by the company with the grant application for the initial capital outlay to establish their R&D based manufacturing facility in Danville (less that which is being supported by the grant). Verification of capital asset investments would be based on review of expense documentation (i.e. invoices and receipts) for equipment located in Danville; as opposed to valuation by the local Commissioner of Revenues Office which is the method used under the Commission's TROF program. The performance measure for job creation by Synergy Packaging Systems would be 38 new jobs created, which is consistent with the commitment made by the company in the original approved application for the R&D Phase of the project, and with verification to be based on employment reporting to the Virginia Employment Commission similar to how the TROF agreement performance is measured. This is the first request to staff for approval of a plan for disposition of assets to a private beneficiary under an R&D grant. **Staff recommends approval of the transfer of ownership of TRRC-funded equipment assets to the beneficiary company upon proof of attainment of performance measures, as proposed by the Grantee, and to be verified by TRRC staff prior to ownership transfer.**

University of Virginia
Fermata V2G Project (2831)
$2,000,000 Grant Award – Revised Budget Approval Requested

Executive Summary provided by Grantee in original application: Our project will develop technology that enables electric vehicles and plug-in hybrids to provide energy storage and other valuable services for the electricity grid. This capability is known as vehicle-to-grid (V2G). We will develop a vehicle drivetrain, a vehicle battery pack, a bi-directional V2G charger and V2G software. In order to facilitate research, we plan to establish a V2G test center in the tobacco footprint. The facility will be a functioning V2G site where different batteries, chargers, software and other systems can be fabricated and tested with grid interconnection.

Staff Comments and Recommendation: Staff has been in dialogue with principals with Fermata, LLC., the private beneficiary on this grant starting in March 2015, where it was brought to our attention that the scope of work proposed under the original grant request and the related use of

grant funding was expected to change due to existing technologies being available, and grant funds no longer being necessary to support these technology advancements through research engineers working in our footprint. In more recent conversations staff requested a revised Business Plan, as it was determined that the one submitted with the application did not align with the proposal that was funded, and thereby did not meet the requirement for a business plan detailing the value proposition for the Tobacco Commission during commercialization. A revised business plan and revised proposal budget were provided. One critical change in the outcomes of this project is that Fermata is no longer planning to build a manufacturing facility in the footprint; and instead they are proposing to work with EIT, an electronics manufacturing company with an existing facility in Danville for manufacture of charges and the associated cables. The revised business plan included four pages specific to the tobacco region project with content related to the revised R&D strategy and proposed project activities in Danville. While the original application provided for eleven full time research engineers in Danville (primarily funded with $1.86 million from the grant) and lease of a 10,000 square foot space to be increased to 20,000 square feet for a V2G research center during the R&D Phase of the project; the revised proposal does not provide a clear indication for any new positions that would be created in the footprint during the R&D Phase of the project. Instead of a research facility the project team is proposing four V2G test sites utilizing Nissan Leafs at locations which have been identified through their partnership with the City of Danville and their Electric Utilities Service. While no grant funds have been approved for disbursement, Fermata reports having spent ~ $850K since the grant award approval developing the V2G project including working with new partners, acquiring experimental V2G systems, and researching initial markets and commercial applications. Fermata has identified two options for development of the charger: a 30kw charger by Princeton Power of which four have been purchased for the demonstration sites, but whose current prices are too high for commercial application; and a Blacksburg based company, PowerHub who has developed a design for a prototype which still requires development to a design-for-manufacturing. Fermata continues to explore options with these companies for provision of charges to meet their needs, and this includes opportunities for working with EIT on the manufacturing. Estimated job creation by EIT during commercialization for production of the chargers is estimated to be 20 new jobs by 2017 (based on 1,000 systems) and 50 jobs created by 2018 (based on 2,500 systems). Staff has requested additional information on the average salary/wages for positions expected to result during commercialization and the estimated private capital investment. Whereas the original approved budget provided for the majority of grant funds and ~ $1 million in matching funds to be spent in Danville; it is unclear what portion of the revised budget would be spent in the footprint, as the distribution of use of funds has shifted to development activities and licensing involving PowerHub, Princeton Power, and Kisensum (a software provider in California who has been involved with deployment of V2G for a DOD project). Staff has requested a detailed budget narrative to help clarify what spending on research and development activities are expected to take place in Danville. Staff has also asked if the manufacturing partner, EIT would be willing to be a party to our grant agreement, since they appear to be the primary entity expected to provide the outcomes for job creation and private investment. Given the lack of details in the revised business plan for commercialization in the tobacco region and the uncertainty on the partnership agreements for certain research activities and how these would directly result in jobs created in the tobacco region during the research phase of the project, it may be appropriate for the committee to consider a freeze on disbursement on the majority of grant funds until more is known. In order for the company to continue their negotiations with the prospective partners on the project, and to demonstrate their plans for the V2G system, it seems reasonable to allow for disbursement of a certain level of grant funds directly related to set-up of the vehicles and charting stations at the four test locations in Danville. At the March 2015 meeting in Charlottesville, Fermata estimated the costs for this to be at ~ $283,000; however, from the revised detailed budget this cost may now be substantially higher in which case the committee could consider approval of disbursement of 50% of the direct costs essential to this set-up related to the

charger stations, electric contractor, and Nissan Leafs. **Staff finds these changes to the project to be significant and material in scope, and recommends approval of use of grant funds for only those project costs directly incurred in the tobacco region and matched equally by additional project expenses, with the balance of grant funds to be held by TRRC pending additional clarification of research tasks and project costs, subject to approval of revised uses of funds.**

Southwest Virginia Higher Education Center Foundation
LiteSheet: energy-efficient and lower-cost LED lights (#2699)
$2,000,000 Grant Award – Request for Reallocation of Funds

Executive Summary provided by Grantee in original application: LiteSheet has developed solid state light emitting diode (LED) lighting technology that is up to 15X more efficient (lumens per watt) than incandescent lights, 4X more efficient that CFL's and 2X more efficient than the next best LED lights on the market. LiteSheet's LED lights are less costly to manufacture than other LED lights. LiteSheet will use Commission and private funds to finalize the development of its first generation LED lighting system, and obtain vital commercial certifications (e.g., Underwriters Laboratory). LiteSheet will establish its manufacturing operations in the Tobacco Region, begin commercialization, and develop the next generation of LED lights

Staff Comments and Recommendation: This project was approved in September, 2013 with the entire $2,000,000 budget allocated for Equipment. In January, 2014 the Commission approved the reallocation of $1,012,000 to fund Personal Services with additional shifts of funds to the Continuous Charges and Plant and Equipment Categories. In March, 2014 and administrative approval was given to reallocate an additional $197,273 from Equipment into Personal Services. These shifts resulted in a total of $1,209,273 allocated to salaries with $600,727 left for Equipment. In July, 2015 another reallocation request was submitted to reduce the Equipment line item by an additional $450,000 and shift the funds to the following areas:

- Increase the Personal Services line item by $300,000 to fully fund the Electrical Engineer salary by $140,000, the CEO by $128,000, and the Office Manager by $32,000
- $150,000 to be moved to the Contractual Services category for product certification expenses since January, 2015 (predating this approval and previously submitted as match for TRRC funds).

If approved this revision will allow for TRRC reimbursement of a total of $428,000 or 21% of the grant's total budget for the Founder/CEO/Developer position. An additional $152,000 or 8% of the total budget will have been reimbursed for the Office Manager's position. These two positions which total nearly 30% of the total award exceed the R&D Program's limit of reimbursing no more than 10% of the total grant for non-research general and administrative activities (G&A). Reimbursement has already been provided for other general and administrative operating expenses such as lease, utilities, and insurance. The expenses requested under the Contractual Services reallocation were incurred since January 2015 and have already been submitted as match to the TRRC grant, although the company now asks that those costs be shifted to the grant-funded reimbursement category. **Staff finds that the requested reallocations substantially exceed the R&D program limit of no more than 10% for G&A expenses, and recommends no additional reallocation of funds at this time.**

Southwest Virginia Higher Education Center Foundation
Excavation Damage Prevention Devices (#2698)
$1,500,000 Grant Award – Request for Extension and Change in Scope/ Reduction

Executive Summary provided by Grantee in original application: Excavation Alert Systems, LLC, has developed an innovative system to protect pipelines and other buried infrastructure from excavation damage. Despite laws requiring excavation crews to call 811 or other locating services and locate any underground utilities before beginning work, excavation damage presents a significant problem to the expansive network of underground pipelines. The average cost per significant excavation damage incident is $6 million. The Company will use Tobacco Commission funds and private funds to finalize the development of its ExcAlert devices, set up manufacturing in the Region, and begin commercialization. Company's solution is extremely relevant to SWVA's natural gas industry.

Staff Comments and Recommendation: This project was approved in September 2013 with none of the required $1,500,000 matching funds available. Since that time the project has struggled to raise the required match. Information received in June 2015 and updated on September 15, 2015 indicates that $525,000 has been raised to date with additional funds expected by the end of September. At that time, the company intends to begin a two year project period to achieve certain milestones related to further development and demonstration of the product. An updated project scope and budget was provided in June 2015 reflecting a total project cost of $1,500,000. The Letter of Agreement for the 2013 approval has yet to be executed. **Staff recommends approval for use of up to $750,000 with no disbursement until an equal amount of matching funds are committed and available, with the remaining $750,000 of grant funds to be held by the Commission pending additional commitment of matching funds, clarification of revised research tasks and milestones, and approval of revised uses of funds. Additionally, Staff recommends the project be extended until October 1, 2017. These revisions, if approved, will be reflected in a new Letter of Agreement to be issued for the project.**

Southwest Virginia Higher Education Center Foundation
Development and Demonstration of AdvanSorb LFG(TM) Landfill Gas Upgrading Technology (#2222)
$1,529,863 Grant Award – Request for Extension and Change in Scope/

Executive Summary provided by Grantee in original application: The project is for applied R&D and demonstration of a new technology for upgrading methane-containing landfill gas (LFG) to pipeline quality natural gas. The project will utilize AdvanSorb LFG-a patent-pending process based on pressure swing adsorption (PSA) technology- to upgrade LFG at the Tazewell County Landfill. As proof of the technology's performance, the upgraded LFG will be sold into the natural gas pipeline. Pipeline sales will be possible due to a 7.6 mile extension Appalachian Natural Gas Distribution Company (ANG) will build to the Landfill from its system's current terminus near Bluefield, VA. Landfills emit methane-containing LFG due to the natural decomposition of waste material. Contaminants must be removed before LFG can be sold as pipeline quality natural gas. Standards for natural gas transportation fuel, either as compressed natural gas or liquified natural gas, are even more stringent. However, when LFG is captured today it is used almost exclusively for electricity generation or as "low BTU gas" direct combustion. AdvanSorb LFG removes CO2, N2, and O2 in LFG as well as the other LFG contaminants. To conduct applied R&D and commercialize the AdvanSorb LFG technology, ReNew Fuels, Inc. (RFI), a Virginia corporation,

will be spun-off from Adsorption Research, Inc. (ARI). Key performance parameters to be measured are input gas composition and volume; output gas composition and volume; system energy usage; and adsorbent life.

Staff Comments and Recommendation: This project was approved in May 2011. During the life of this project it became apparent that the landfill would not be able to produce the amount of gas necessary to justify the construction of the pipeline extension that was to serve as the majority of the match for the project. The grantee has requested an extension of the project to allow time to support testing the use of the gas produced at the landfill as an on site energy source. This change in scope will result in additional matching funds for the project. **Staff recommends approval of the change in scope and extension of the project until October 1, 2016.**