ALBERTA INNOVATES

KNOWLEDGE GAPS

CARBON FIBRES

Unless otherwise noted, the carbon fibres are to be derived from bitumen constituents

Carbon Fibres

Production technology	Small scale experimental demonstration of promising production technology	Characteristics of the produced carbon fibres and comparison with carbon fibres produced from polyacrylonitrile (PAN) and pitch	Deployment issues of the promising production technology in Alberta and elsewhere in Canada; uptake of the fibres in major national and international markets	High-level business case (including CAPEX and OPEX estimates) for making the promising carbon fibres for major national and international markets

*Carbon Fibres / Cement Composites**

Best practices pertaining to promising carbon fibre – cement composites, with large potential markets	Small scale production of the promising composites	Performance of the promising composites, including compliance assessments with codes and regulations	Suitability of the promising composites for use in 3D printing (additive manufacturing) of civil infrastructure, including housing components	High-level business case (including CAPEX and OPEX estimates) for producing and deploying the promising composites in major national and international markets

* one or more composites may be put forward

*Carbon Fibres / Wood Composites**

Promising carbon fibre – wood composite(s), with large potential markets	Production technologies for the promising composite(s)	Small scale manufacture of the promising composite(s)	Performance evaluation of the composite(s), including compliance assessments with codes and regulations	High-level business case (including CAPEX and OPEX estimates) for making and deploying the promising composite(s) in major national and international markets

* one or more composites may be put forward

*Carbon Fibres / Plastic Composites**

Promising carbon fibre – plastic composite(s), with large potential markets	Production technologies for the promising composite(s)	Small scale manufacture of the promising composite(s)	Performance evaluation of the composite(s), including compliance assessments with codes and regulations	Preparation of a high-level business case (including CAPEX and OPEX estimates) for making and deploying the promising composite(s) in major national and international markets

* one or more composites may be put forward

ASPHALTS

Pelletized asphalts

Pelletizing concept(s)* to enable large-scale, long-range transport, and long-term storage of asphalts at ambient conditions to serve key national and international markets	Small-scale experimental proof of promising pelletizing concept(s)	Performance evaluation of promising pelletized asphalts under transportation and storage conditions typical of key national and international markets,	Compliance of promising pelletized asphalts with specifications pertinent to key national and international markets	High-level business case (including CAPEX and OPEX estimates) for producing promising pelletized asphalts

* one or more concepts may be put forward and evaluated together with their products

Asphalt / Asphaltene Blends

Chemical and physical principles of using bitumen-derived asphaltenes as additives to asphalts	Performance of asphaltene – asphalt blends pertinent to key national and international markets	Issues pertaining to large-scale asphaltene storage and transportation for key national and international markets	Solutions to asphaltene storage and transportation challenges	High-level business case for asphaltene – asphalt blends, for key national and international markets

VANADIUM FOR REDOX FLOW CELLS

Production of vanadium electrolytes from bitumen*	Small-scale experimental proof of promising production concept(s)	Demonstration of electrolyte efficacy in a model flow cell	Comparison with other electricity storage approaches	High-level business case for vanadium electrolytes from bitumen constituents

* one or more production concepts may be put forward

COMPOSTABLE POLYMERS

Promising compostable polymers producible from bitumen constituents	Production technologies for promising polymers	Small-scale experimental proof of innovative production technologies for one or more of the promising polymers	Demonstration of functional efficacy and compostability of the promising polymers	High-level business case based on experimental work and an outline of relevant IP, life cycle, and environmental issues