

EXECUTIVE SUMMARY

The Bank of Canada will be changing the substrate material of bank notes from cotton paper to polymer and is interested in evaluating the environmental impacts of producing and distributing Canadian bank notes based on those two substrates. This was done by identifying substances of concern, whether in the form of bank note components or emissions arising from bank note production, revealing those aspects of bank note production and distribution that could be targeted to further reduce environmental impact and ensuring that Canada's new polymer bank notes are consistent with established or prospective Canadian health, safety and environmental legislation and any related treaties to which Canada is a signatory.

The Bank of Canada therefore commissioned PE Americas and Tryskele Sustainable Environment, Safety & Health to undergo a "Cradle-to-Grave" Life-Cycle Assessment (LCA) of the current *Canadian Journey* series cotton-paper bank notes and the new polymer bank note design configuration to evaluate the environmental impacts of the two types of bank notes. This analysis is intended to support external communication and to be shared with the public. It is compliant with the ISO 14040 standards for Life-Cycle Assessment (LCA), and has been examined by a Critical Review Panel as indicated in the ISO 14044 guidelines.

The functional unit for this study is a "Provision of \$2,000 (CDN) of cash value over a time span of 7.5 years." Accordingly, the reference flows are chosen to be multiples of a \$20 (CDN) bank note. The cotton-paper substrate bank note has been considered to have a lifetime of 3 years, and the impact associated with manufacturing and end-of-life has been adjusted accordingly. The polymer-substrate bank note has been considered to have a lifetime of 7.5 years, which has been considered conservative according to other countries' statistics.

For all indicators under study (Primary energy demand, global warming potential, eutrophication potential, acidification potential, smog potential, and USETox™), most of the impacts are associated with the distribution and use phase. The polymer substrate shows benefits over cotton for all the main phases of the life cycle:

1. for the manufacturing phase, since it has to be produced 2.5 fewer times than the cotton-paper bank note;
2. for the distribution phase, since it has to be distributed 2.5 fewer times and its weight is lighter;
3. for the end-of-life phase, since the contained carbon in cotton-paper bank notes is released as greenhouse gases in the landfill.