

## Waste Tire Fund Contract Concept

### Environmental life-cycle assessment of waste tire management methods

**Background:** Over 10 million waste tires are landfilled each year in California. Decisions on which management options to support and promote are critical for the CIWMB waste tire program. The environmental impacts of management methods should play a key role in decision-making. It is also important to evaluate emission tradeoffs (e.g., air emissions reduction which leads to water pollution or solid waste) and to include impacts traditionally unaccounted for in decision making (e.g., transportation fuel production emissions). Emergency response and high costs for clean-up of tire pile fires is a concern of the DTSC and many other agencies. Adequate markets for waste tires will reduce the stockpiling of waste tires and result in less impact on the environment. However, holistic evaluation is needed to choose the most sustainable and cost effective options.

The CIWMB has recently received a life-cycle assessment (LCA) study of biomass conversion technologies. A study of waste tire management methods could be similarly made. Specifically, a LCA would quantify the mass flow of materials and energy in and out, emissions and wastes of each process and the benefits from products produced for each management method. Unit processes should include transportation, processing (shredding, grinding, etc), end product manufacture (molded products, asphalt, etc), electricity production, fuels production, waste treatment and disposal, and offset credits for processes such as fuels production and transportation savings (e.g., coal mining and rail transport for cement kilns using tires as a fuel supplement). The EPA website at <http://www.epa.gov/ORD/NRMRL/lcaccess/index.htm> provides background material and a description of the benefits of LCA for further information.

**Benefits:** A fair and balanced comparison of waste tire management methods needs to account for the energy and resources consumed to process waste tires as well as the energy and resources recovered from products produced. LCA provides a systematic and standardized methodology for characterizing environmental and human impacts of products. And LCA is an accepted technique for comparatively assessing the environmental impacts of product end-of-life management methods. The CIWMB will benefit by having a comparative assessment which will help to prioritize the most environmentally acceptable methods for waste tire management.

**Outcome:** The environmental and human health impacts of major waste tire management methods will be characterized and presented comparatively to landfilling. It is proposed to review the three major tire management methods of civil, tire derived fuel and crumb rubber applications. Each scenario will include the impacts of transporting and processing tires into end products, with offset credits given for products produced that offset virgin manufacture or virgin resources (or secondary resources if appropriate). Data will be collected from literature, process vendors and existing databases. A life-cycle inventory for each scenario will be constructed. An impact assessment will then be used to compare the overall environmental and human impacts of the management methods. This balanced comparison will provide information for decision makers based on a holistic comparison of each management method. The characterization will also provide clear information on tradeoffs between each method. The sensitivity of results to assumptions and ranges of data and process considerations will also be examined.

**Budget:** The life-cycle assessment group of DTSC's Office of Pollution Prevention and Technology Development will compare the three major waste tire management methods used in California to landfilling by: constructing appropriate and balanced scenarios for comparison, making site visits and gathering pertinent data, assembling a life cycle inventory for each method, and developing an impact assessment. The term for this project is 1 year and the cost is \$150K.

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