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# Innovation & chaos ... in search of optimality



## **Improving charcoal manufacture from coconuts in Samoa: an exemplary project-based learning adventure**

Coconuts abound in the beautiful Pacific country of Samoa. Charcoal, manufactured from coconut shells, is a biofuel with several uses. In addition to domestic cooking, charcoal is used for providing

the heat source for charcoal-powered smoothing irons.

Charcoal manufacture is a labour-intensive and smoke-intensive process conducted using the basic technology of a used 40-gallon steel container. The process appears inefficient in terms of wasted fuel, and environmentally unsatisfactory in terms of the smelly and visually-unattractive smoke generated.



*Image: Charcoal-powered smoothing iron (Best Cook and Lite Co Ltd, China)*

**Your mission:** Surely there must be a simple cost-effective modification to the basic process that can be made to:

- Improve the efficiency of converting the input coconuts to output charcoal
- Reduce the volume and/or toxicity and/or visual colour of the smoke produced
- Use the smoke produced as a biogas suitable for some heat-generating purpose.

The advanced student will also:

- Identify more valuable uses for the coconut shells
- Identify alternative resources available in Samoa for producing the services (cooking, ironing) currently provided by the coconut charcoal that are more economically and environmentally sustainable



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Mellalieu, P. J. (2014, October 18). Shifting frontiers, new priorities, creating pathways: elevating the case for tertiary education for sustainable development in Samoa. Retrieved from <http://pogus.tumblr.com/post/100297641943/shifting-frontiers-new-priorities-creating>

Sad and Flat Irons. (n.d.). Retrieved October 22, 2014, from <http://www.collectorsweekly.com/tools-and-hardware/sad-and-flat-irons>

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