PRODUCTION & DEPLOYMENT OF BIOENERGY CROPS CULTIVATED ON MINE IMPACTED LAND

Dwight Rosslee
FACED WITH 3 CHALLENGES

Physical Resources
- Land
- Soil & level of impacts
- Water
- Climate

INTERACT

Energy Crop

Energy Deployment Opportunity

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PHYSICAL RESOURCES

By definition the land is not suitable for food or feed production

Lesser Impacted Land
impacts from surface activities such as wind and water erosion

Soil characteristics similar to that of surrounding farms with varying levels of contamination by heavy metals & other pollutants
Highly Impacted Land
- Tailings Dam / Tailings Footprint

ground rock and process effluents left over after the mining process

characteristics dependent on the ore mineralogy together with the physical and chemical processes used to extract the economic product

In general – low pH (2-3) and little or no organic loading
Development of Agriculture Strategy

Soil Amelioration
• correct pH & nutrient loading

Biological Activation of the Soil

Plant Selection
Energy Beet
Giant King Grass™

25 October 2013

20 March 2014
# Energy Deployment

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<th>Energy Source</th>
<th>Energy Production</th>
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<td>Biogas / CNG</td>
<td>Anaerobic Digestion</td>
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<td>Ethanol / ED95</td>
<td>Fermentation</td>
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<td>Heat</td>
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<td>• Displacement of liquid fuels</td>
<td>Combined Heat &amp; Power</td>
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<td>• Electrical resistive heating</td>
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<td>Electricity</td>
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**What is missing?**

- Biodiesel
- Gasification / pyrolysis

Rather with your money than ours ....
Size Matters

Anaerobic Digestion
1-6 MW Bioenergy
Biogas with possible upgraded to Bio-CNG
Temperate climates with irrigation
30 ha per MW bioenergy

Direct Combustion Biomass Power Plant
10-35 MW Electricity
Tropical & sub-tropical climates
70-100 ha per MW electricity
Having the right partners helps

Bioenergy & Crop Development
- Harmony Gold Mining Company Limited

Liquid Vehicle Fuels
Thank you for the opportunity

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