Burning Issue

Environmental Degradation
Landfill Saturation
Increasing Waste Generation

Sustainable Resource Management

WASTE

The Ulysses: Thermal Treatment of Waste

Waste Reduction
Revenue Generation
Environmental Conservation
The Ulysses
Chris Olson, B.A., NAIT Alt E
Director

Bruce Saunders, NAIT Alt E
Director

- Incorporated in 2014
- IRSI team has over 40 years experience
- IRSI Staff:
  - FTE: Mechanical Engineer, Chemical Engineer
  - PTE: Process/Chemical Engineer, Electrical Engineer
  - Contractors: Fabricators, Vendors, Electrical Fabricator
IRSI Advisory Board

Trevor Nickel
Executive Director at Alberta Bottle Depot Association

Don Harfield
AITF – Senior Projects Leader

Don McIntyre
MLA for Innisfail – Sylvan Lake

Gregory Snaith
NRC-IRAP Technology Advisor

Darrell Ewaskiw
VP Operations Altaland Steelworks Inc.
Market Opportunity

600+ Sites Throughout Western Canada
• Waste To Energy Throughout Europe and Asia

Ulysses Can Utilize Majority of Waste Streams

Multiple Applications for End Char Product
• Biochar Market Growth of 15%-20% in Next 4 Years

Substantial Revenue Generation From the Implementation of IRSI System

Mid Value Chain Waste Management Market
Client Revenue Generation

- Waste Reduction Revenue Generation
  70% Reduced

- Ulysses System

- Combined Heat and Power

- Biochar Sales Revenue

- Carbon Offsets
Waste Reduction Revenue Generation

Normal Operation
• 60 tons x $50.00
• $3,000.00 disposal fee
• $600.00 for labor and transport
• Total cost of $3,600/day

Ulysses System
• 12 tons x $5.00
• $60.00 disposal fee
• $100.00 for labor and transport
• Total cost of $160/day

Net Benefit
• 95% savings in disposal costs
• Daily swing in costs of $3,440
• Annual gross savings of $980,400

Based off estimated rates in Alberta
Waste Reduction Revenue Generation
Landfill Life Extension

14,500 tons per year
3 cubic yd per ton
43,500 cubic yards

70% reduced
30,450 yd$^3$ saved per year
456,750 yd$^3$ saved 15 years

Landfill diversion with Ulysses operating 10 hours a day @ 5 tons/hr for 285 days a year is 11,250 tons of CO$_2$E
## Client Revenue Generation

### End Char Product
- High value (fertilizer, food additive, organic growth medium)
- Mid value (biofilters, absorbents, compost mix)
- Lower value (alternate daily cover, improved landfill decomposition)

### Combined Heat and Power
- Thermal energy generation
- Electrical energy generation
- Reduced GHG emissions
- Net metering

### Carbon Offsets
- Landfill diversion credits
- Reduced reliance on petrochemicals
- Biochar Sequestration Protocol
- Absorption of GHG at landfill sites
System Payback

Additional Revenue Generation:

Combined Heat and Power: 8MW thermal or 1-2MW Electrical (Additional Capital Cost)

Carbon Offsets: 22,000+ tons ($14.50/ton in Alberta)

Cost to Operate $360,000.00/yr

Volume Reduction Payback 5-7 years

Biochar Payback <2 years

Based off estimated rates in Alberta
Go-To-Market Strategy

- Government, Waste Management, Agriculture, Forestry, Biochar Production
- Evaluate Pyrolysis, Biochar, CHP, Energy, and Waste Markets
- Trade Shows, Conferences, Workshops, Media Exposure
- Build and Operate Systems (Quantify Data)
- Operate Demonstration System
- Optimize Ulysses for Specific Markets (Engineering)

Right Side:
- Build and Connect Network with Early Adopters in Biochar and Pyrolysis
- Provide Biochar at a Effective Price Point to Drive the Biochar Market Forward
- Use Data to Drive Permitting of Pyrolysis Systems in Canada
- Use Quantitative Data to Drive Biochar Sequestration Protocol in Canada
IRSI Sales Cycle

Pre-Qualification

Qualification

Evaluation
(IRSI will release detailed information to client)

Fabrication/Commission

- 30 days
- 30 to 60 days
- 45 days
- 60 to 90 days

- 50% down for P.O.
- 25% on completion
- 25% on delivery

5 to 8 months sale cycle
Project Sponsors