

Globe 2006



***Biomass Energy
Systems***

“An Innovative Concept in Organics Management”

Global Earth Systems



“Working with Nature to Provide Solutions”

Biomass Energy Systems



**A New Concept in the Management
of Organics for a Sustainable
Environment and for the
generation of Renewable Energy!!**

**UTOPIA
GOLD**





MARVEL

Global Earth Products



Marvel Composting System

“Design - Build - Operate”

Benefits of Composting

- **Nature's Process for Eco-System Regeneration and Renewal**
- **Destruction of Harmful Pathogens**
- **Destruction of Diseases and Weed Seeds**
- **Aerobic Composting Mitigates Odors**
- **Produces Nutrient Stable Product - Compost**
- ***Alternative Energy Resource***

Biomass Energy Systems Components

- **Covering Structure**
- **Concrete Channels - 12' wide x 6' high**
- **Marvel Compost Turner & Transfer Cart**
- **Positive Aeration System**
- **Leachate Collection/Processing System**
- **Structural Ventilation and Bio-Filter**
- ***Thermal Energy Recovery System***

Biomass Energy Recovery Systems



FUNDAMENTAL PRINCIPLES of ENERGY

- Energy can best be defined as the capacity to do work or transfer heat.
- Energy can neither be created nor destroyed, it can only be transformed.
- Heat Loss = Heat Gained.



Alternative Energy Initiatives



Biothermal Energy Recovery

Technical Challenges

- **Temperature vs. Energy**
- **Successfully interfacing**
 - The science of composting biology with
 - The principles of thermodynamics
- **Facility design - composting and alternative energy**
- **Process and Systems Management to**
 - maximize thermal energy “Generation” and
 - maximize thermal energy “Recovery”
- **Compatibility - environmental elements with energy recovery**
- **Implementation - agricultural, industrial, and municipal interests**

BIOHERMAL ENERGY GENERATION

- 1 tonne of biomass in a thermophilic reaction generates 200,000 BTU's of thermal energy daily
- 35% thermal energy recovery rate
- 8 channel Marvel system will provide sufficient thermal energy to heat a 7 acre greenhouse
- *Conserves 2.35 million m³ of natural gas annually*
- *Value of recaptured thermal energy is \$600,000 annually*

Biothermal Energy Recovery



- **Mass temperatures exceed 75°C**
- **Channel floors reach 60 - 65°C**
- **Heat exchanger fluid reaches 50 - 60°C**



Alternative Energy Initiatives



Electrical Energy Generation

Electricity Generation

- Naanovo Energy Inc
- AddPower Technology - 1.5 Mw
- Low temperature turbine (LTT)
- Powered by enhanced hot water from composting system
- Water temperatures of 90°C
- Computer controlled system
- ***No Steam requirement***



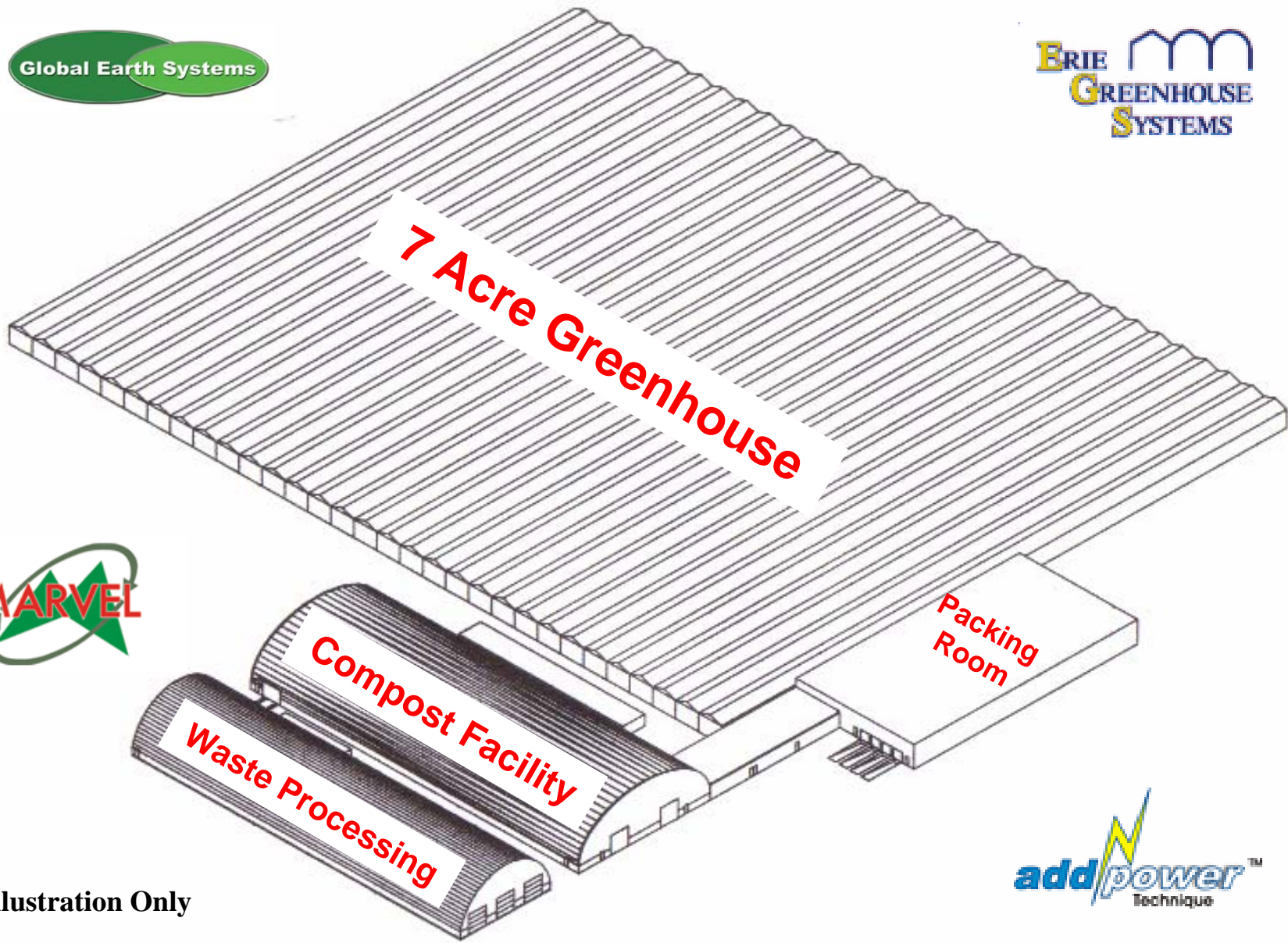


Illustration Only



Biomass Energy System Heating a Greenhouse Range

Benefits of Global Earth Biomass Energy Systems



- ***Environmental***

- *Reduction of waste to landfill*
- *Reduction in surface water contamination*
- *Reduction in greenhouse gas production*
- *Nutrient management*

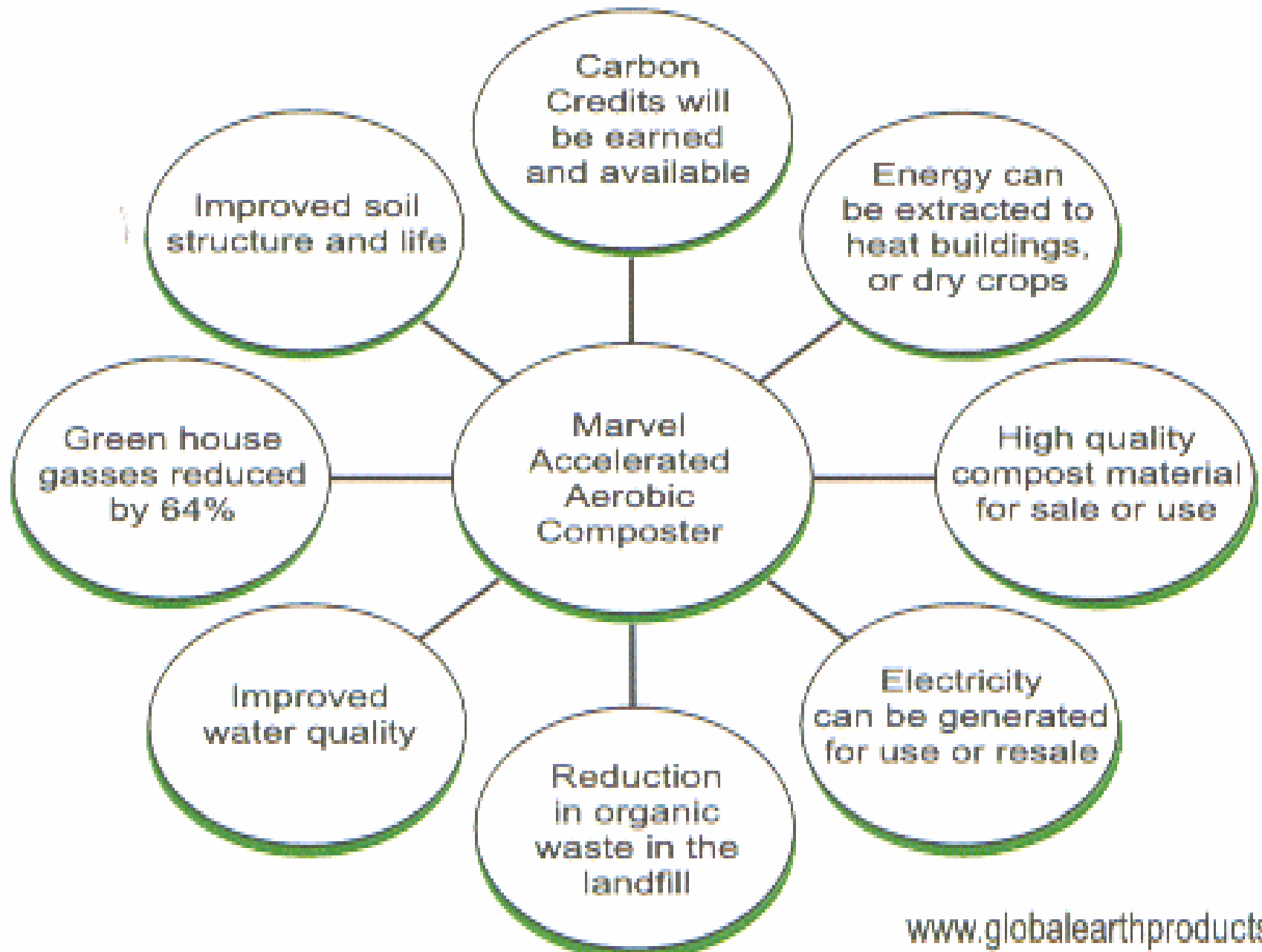
- ***Economic***

- *Renewable energy resource*
- *Value-added products for resale*

- ***Social***

- *Enhances viability of agricultural operations*
- *Electricity generation in remote areas*
- *Expansion of greenhouse production to remote regions*

The Benefits of the Marvel™ Composting System:



Environmental Accreditation

- ***Recognition by Environment Canada***
- ***Environmental Verification Process***
- ***Certification for greenhouse gas reduction in liquid swine manure management***
- ***Value-added Carbon Credits for commercial trading***



Global Earth Systems

Provides

An Integrated Systems Solution !!

- **Marvel Accelerated Compost System**
- **Waste Water Purification System (VSEP)**
- **Organic Fertilizer Production (MCT)**
- **Thermal Energy Recovery System**
- **Thermal Energy Enhancement System**
- **Green Electricity Generation**
- **Greenhouse Crop Production**
- **Systems Management**

Progress in Technology!!

- ***Heat pump system to elevate water to 90°C to power the AddPower LTT generator***
- ***Gasification systems fueled by compost to produce Syn-gas to power Micro-Turbine generators equipped with heat recovery systems***
- ***Gasification systems fueled by compost to produce bio-diesel fuel for resale***
- ***“Signature Facility” - a commercial/demonstration project scheduled for developed in 2006 in Ontario***
- ***Continued focus on Research and Development***

The Need for Change !!

***If we always do
What we have always done,
We will always get
What we've always gotten !!***

***For a sustainable environment
we must view things differently ...***



***We know that we have a lot of work
ahead of us ...***

but we have the Energy for it !!!

**UTOPIA
GOLD**



Global Earth Systems



**“Where the Nature of Power Embraces
the Power of Nature”**

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“Green Energy from Organic Waste”

Thank You
to
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