

FROM TUGS TO TILLAGE



It's all about **ENERGY**
and how we maximize its potential

JASON ASPIN

Chief Executive Officer
Aspin Kemp & Associates





Introduction

Aspin Kemp & Associates

- Marine electrical engineering, systems integration, maintenance, operations, and documentation
- Innovators in power and propulsion systems and energy management
- Oil & Gas, Ferry, Tug and Barge, Cargo, Coast Guard & Navy experience

XeroPoint

- Relatively new company formed to focus on development of innovative energy solutions



xero|point
green|technology

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Outline

- Introduction and Acknowledgements
- The Hybrid Tug Project
- Energy in a Rural Environment
- Where Can Real and Practical Solutions be Applied in the Rural Setting
- Costs vs Benefits
- Conclusion
- Discussion forum and Q&A



The Hybrid Tug Project

- World's first Hybrid Tug Boat – applicable to any system
- Mainly capitalizes on duty cycle rather than energy recovery
- Advances in electrical conversion technology allow many sources to provide propulsive and hotel power to the vessel
- What is the connection between this tug and rural energy?



Introducing: The World's First Hybrid Tug

Foss to build first-ever hybrid tugboat

Apr 12, 2007 PDT

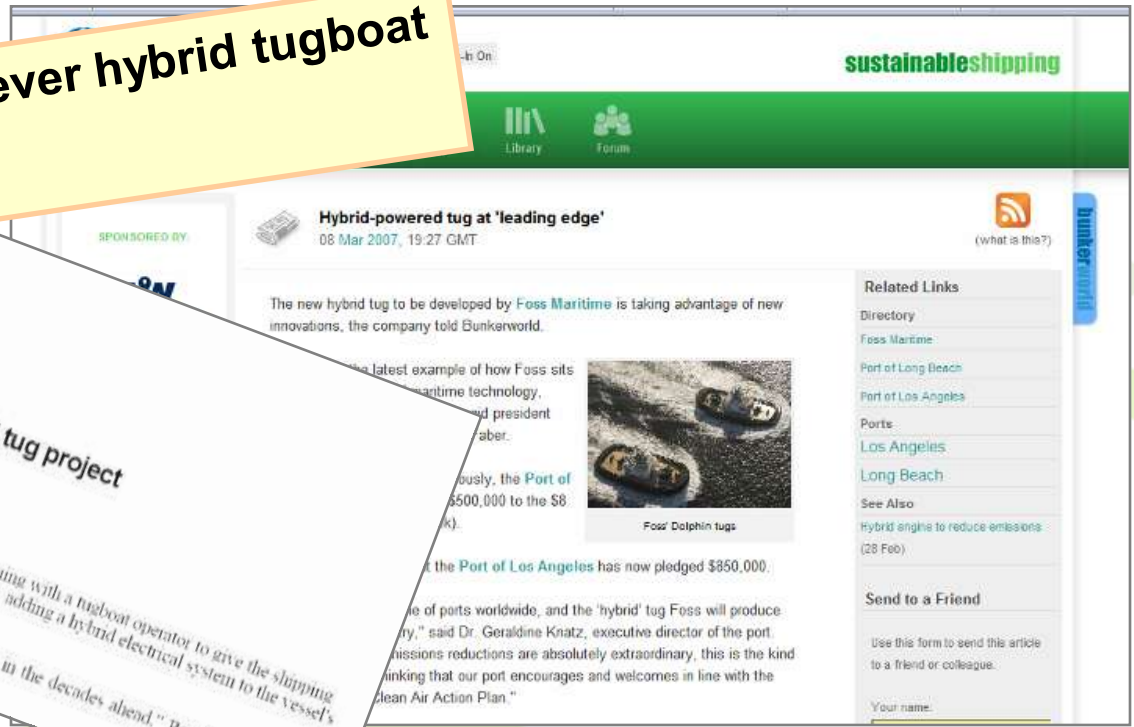
latimes.com

Local ports help fund hybrid tug project

From the Associated Press
March 3, 2007

The ports of Los Angeles and Long Beach are teaming with a tugboat operator to give the shipping industry's grumpy workhorse an ecological makeover, adding a hybrid electrical system to the vessel's powerful diesel engines.

"It should have a profound impact on tug technology in the decades ahead," Port of Los Angeles spokesman Arley Baker said.



Hybrid-powered tug at 'leading edge'
08 Mar 2007, 19:27 GMT

The new hybrid tug to be developed by Foss Maritime is taking advantage of new innovations, the company told Bunkerworld.

The latest example of how Foss sits at the leading edge of maritime technology, said Foss Maritime president and CEO, Arley Baker.

Previously, the Port of Los Angeles had pledged \$500,000 to the \$8.5 million project.

The Port of Los Angeles has now pledged \$350,000 to the project.

"The ports of Los Angeles and Long Beach are teaming with a tugboat operator to give the shipping industry's grumpy workhorse an ecological makeover, adding a hybrid electrical system to the vessel's powerful diesel engines."

"It should have a profound impact on tug technology in the decades ahead," Port of Los Angeles spokesman Arley Baker said.

Related Links

- Directory
- Foss Maritime
- Port of Long Beach
- Port of Los Angeles
- Ports
- Los Angeles
- Long Beach
- See Also
- Hybrid engines to reduce emissions (28 Feb)

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Foss Dolphin Class Hybrid Tug

Hybrid Technology:

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Distributed Power

- Direct Diesel
- Diesel-Electric
- Electric

Systems Integration:



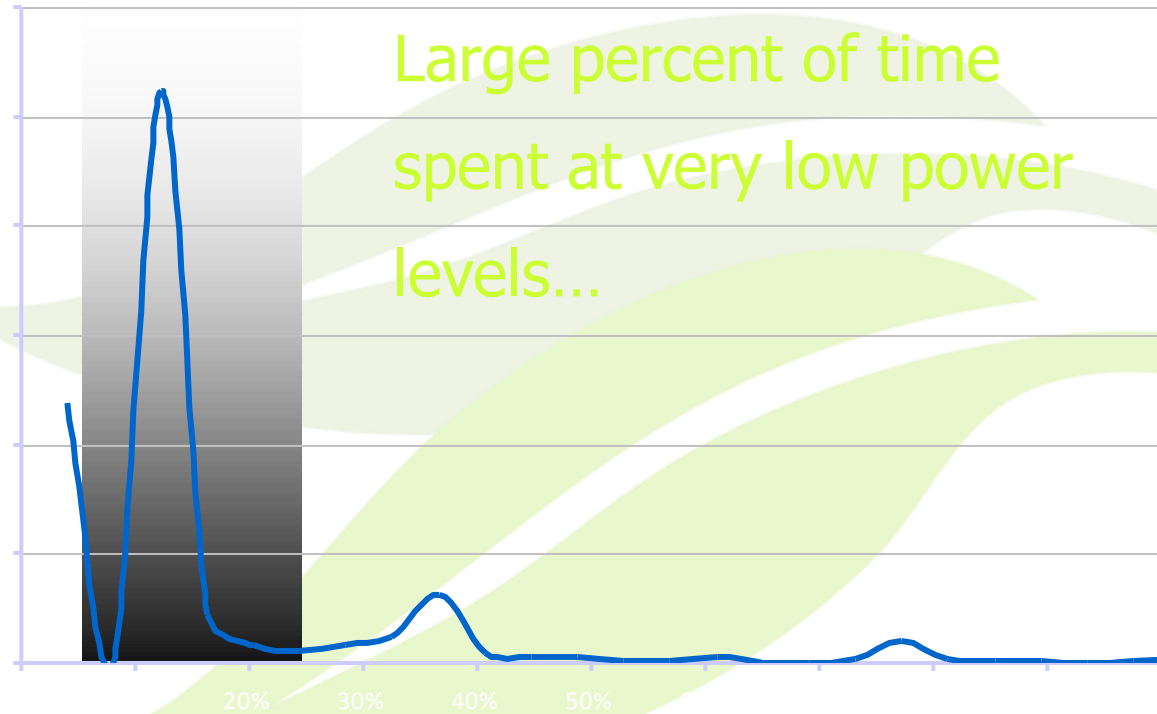
Control & Optimization

- Energy Management
- Propulsion Control
- Vessel Monitoring
- Adaptive Optimization
- Advanced Generator Protection
- Alarm & Maintenance Utilities





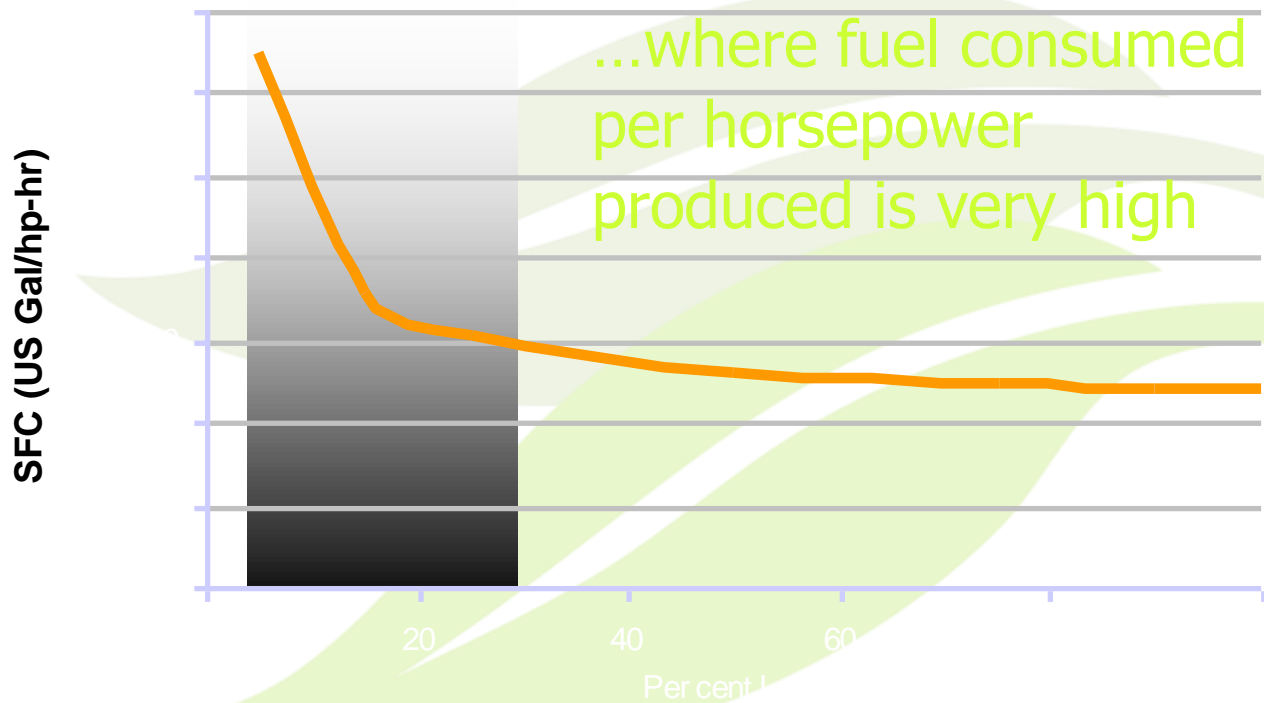
The Harbour Tug Dilemma



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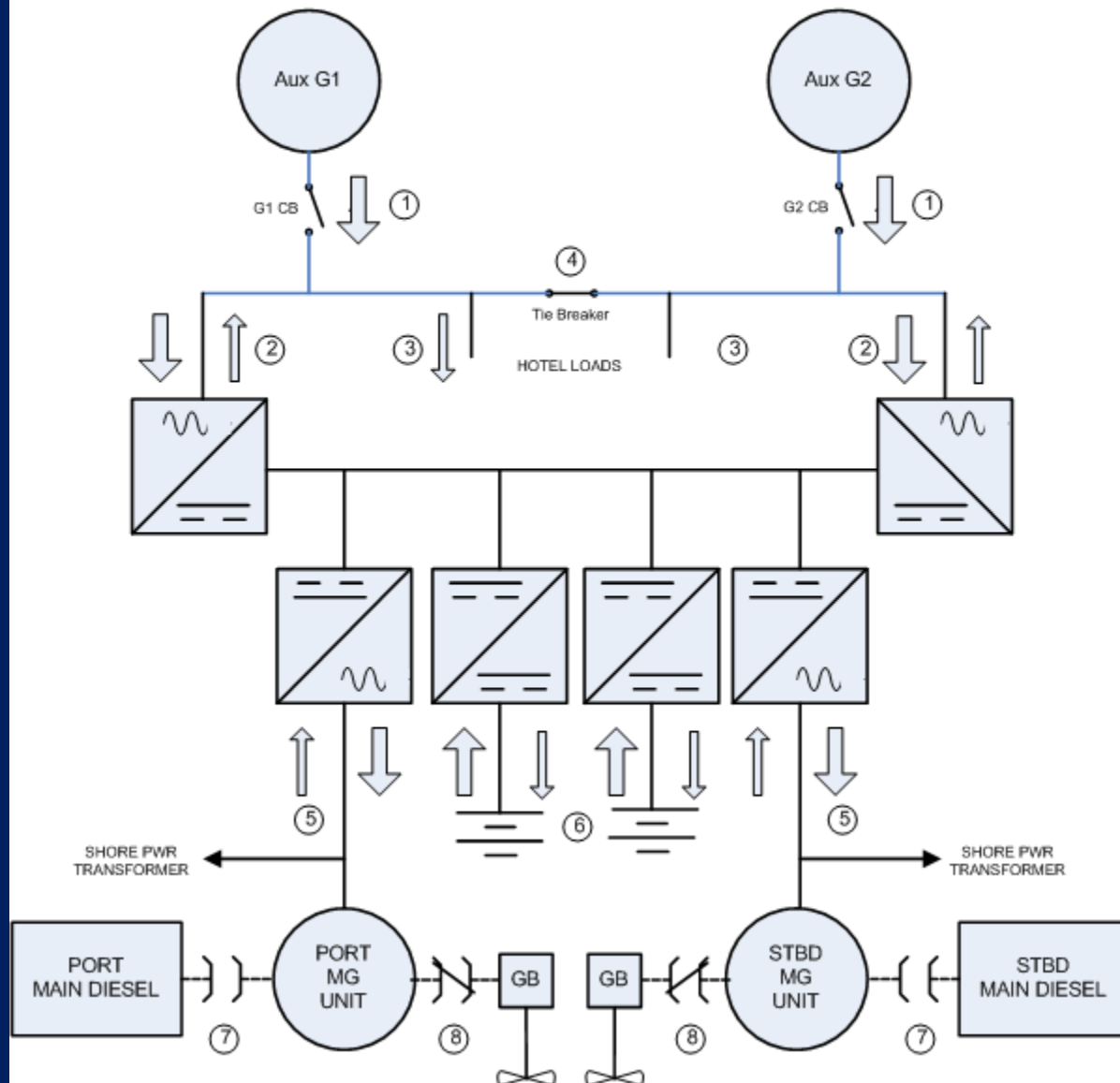


The Harbour Tug Dilemma



Typical marine diesel (2500hp @ 1800 rpm)

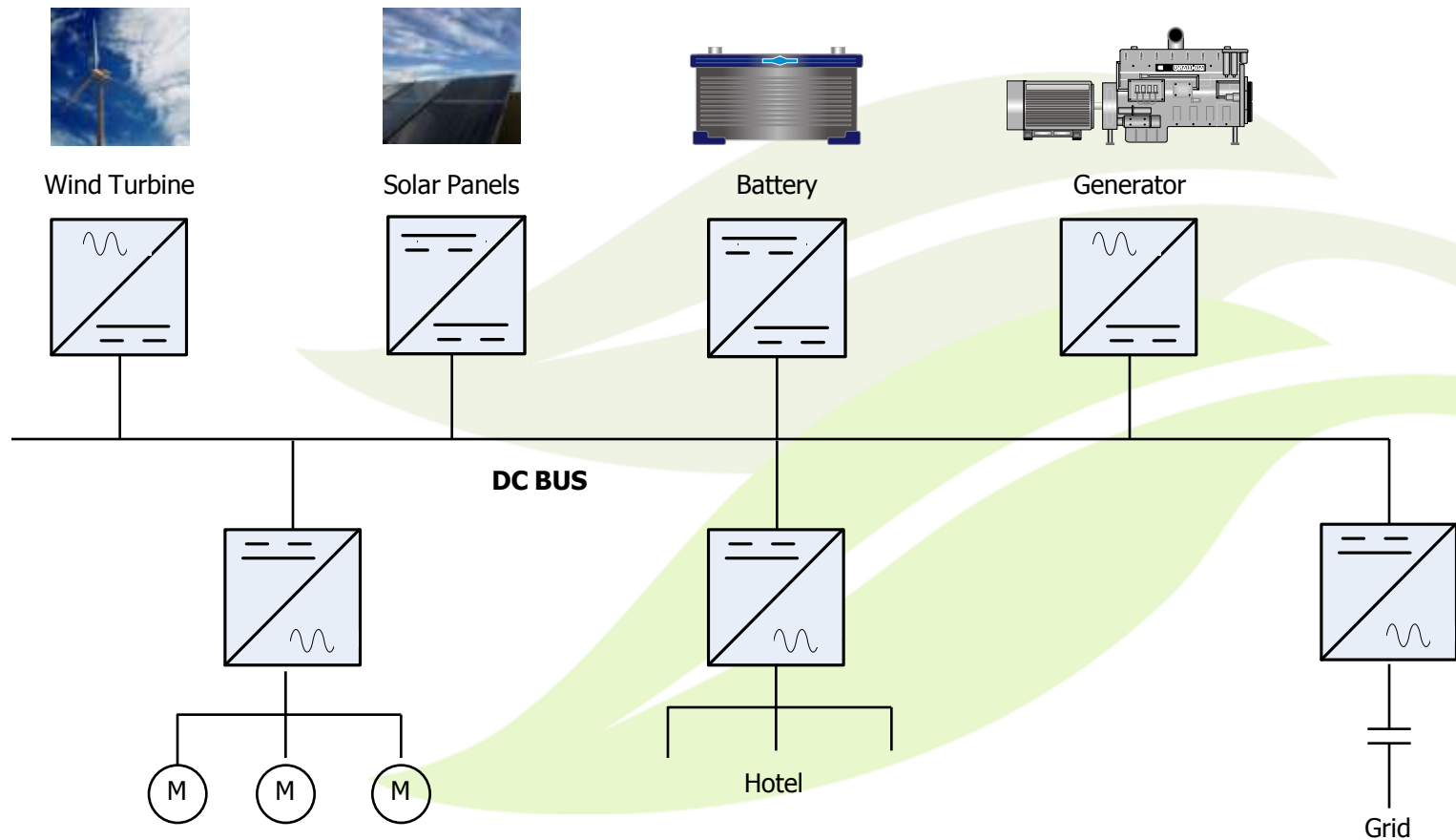
MINIMUM EMISSIONS MODE







Hybrid Power System





Energy in a Rural Environment

- Energy is critical to survival and production in a rural environment
- Eliminate energy waste
- Increase efficiency
- Identify sources and increase use of local renewable resources
- The distributed energy model



Energy Critical to the Rural Economy

- Survival and production relies on dependable and high density energy
- Fishing and farming output would be reduced dramatically without access to energy
- Fishing, farming and tourism are industries that are dependant on a healthy environment while the activities associated with these industries often have a negative environmental impact
- A sustainable approach to energy helps protect the environment and controls the energy resources needed to meet expected production



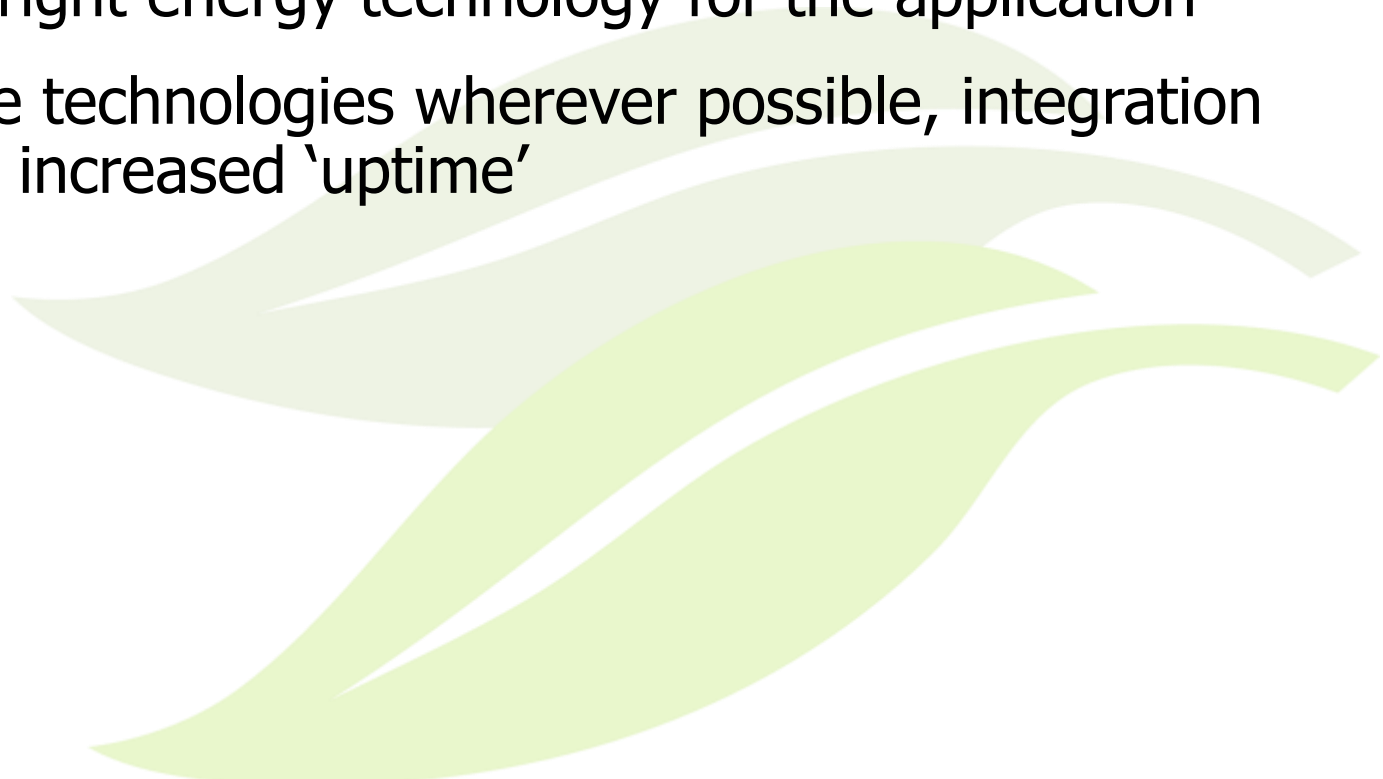
Energy Waste

- We are spoiled with cheap and easily accessible energy, until something becomes valuable it is wasted
- Waste is not always apparent – e.g. energy down the drain
- Look at the processes that are in your home or business, where is there waste? – e.g. braking of a car, heating of unoccupied spaces, heat losses, etc.



Increase Efficiency

- Use the right energy technology for the application
- Integrate technologies wherever possible, integration provides increased 'uptime'



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Renewable Resources

- Typically every rural site with full access to land and resources has the ability to take advantage of at least one form of renewable energy.
- As with the 100 mile diet, using energy produced locally or better: on your property, is the best for a sustainable community.
- Identify sources available: solar, wind, geothermal, bio-fuel, hydro-electric, stored energy, heat recovery and thermal transfer



Distributed Energy

- Centralized power generation and distribution is more risky, less reliable and less efficient.
- Every utility meter connected to the grid allows the connection to act as a consumer or a producer – this enables the distributed energy model.
- A distributed energy model requires progressive policy and regulatory change but combined with other renewable, large production energy it has the potential to make the Island energy self-sufficient in the future



Real and Practical Solutions

- Understand and explore the options that are available.
- In a rural environment the space is available to take advantage of the technologies outlined.
- A single system can be used to effectively integrate all of the energy sources available at a unique site with a unique power requirement.
- Net metering and the power production both exist as options for cost reduction or revenue generation dependant on the site's energy density and available capital.



Costs vs Benefits

- With an emerging technology cost typically outweighs the immediately, apparent benefits.
- Secondary benefits (less obvious than the bottom line) will often result in us reaching the tipping point early but require a mind shift to realize.
- We need to consider what is the right thing to do, this is not always a tangible financial benefit.
- Public policy and regulatory requirements need to drive the right thing to do be the easy thing to do – how do we change this.
- Build for the future



Conclusion

- Rural communities, businesses and families are ideally situated to become self-sufficient or producers from an energy point of view.
- The distributed energy model provides less risk, reduced costs and potential self sufficiency.
- Energy and regulatory policies that encourage distributed energy provide a more stable energy infrastructure and a sustainable energy model.
- There are no technology barriers stopping the shift to a distributed energy model.
- Consider the barriers that have preventing us in achieving this model and keep these in mind through the day.



Q&A

- Where are there processes in your area of interest that you feel waste energy, where technology should be able to recover this energy.
- Where are there processes in your area of interest that you feel could conserve energy, where technology exists to provide a more efficient solution.
- What policies do you feel provide road blocks to making your operation sustainable from an energy perspective.
- What policy changes could allow you to achieve a more sustainable operation.
- What municipal, provincial, and federal incentives could make a profound change to sustainable energy model.