ENERGY•WATER•WASTE WATER•MUNICIPAL WASTE

PATHS TO SUSTAINBILITY
FOR RURAL TOURISM BUSINESSES

Daisy Silvennoinen, Vilma Lehtovaara, Anne Holma & Timo J. Hokkanen

NatureBeST
KARELIA
CBC // Project

NatureBeST

Paths to sustainability for rural tourism businesses

EFFICIENCY TIPS FOR SMEs AND RURAL-BASED TOURISM ACCOMMODATION FACILITIES

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The project focuses on the tourism sector in the Finnish and Russian project areas, identifying problems and obstacles in this sector and developing instruments to reduce the negative impact on the environment with economically sound solutions.

North Karelian activities of the project are part of sustainability co-operation within North Karelia Biosphere Reserve, which belongs to UNESCO's global Man and the Biosphere network (MaB). The global biosphere reserve network consists of over 700 sites devoted to fostering of nature and enhancing sustainability in co-operation with local communities.

Paths to sustainability for rural tourism businesses

EFFICIENCY TIPS FOR SMEs AND RURAL-BASED TOURISM ACCOMMODATION FACILITIES

This booklet provides insights for Tourism Accommodation Facility (TAF) managers and owners seeking to adopt eco-friendly practices or to invest in eco technologies for energy, water, wastewater, and solid waste purposes. The insights are based on common challenges and needs mentioned during the interviews with owners and managers of facilities, and subsequent analysis of the common barriers to improving eco-efficiency and their impacts on the Tourism Accommodation Facilities' sustainable supply chain performance.

Understanding and valuing energy-efficiency, eco-efficiency of water, wastewater treatment and solid waste is important for the overall supply chain performance of tourism accommodation facilities.

Well designed, supply side solutions to issues such as power surges/outages and solid waste structures, and onside solutions at facility such as eco-friendly investments, soft-solutions for energy-water usage, and waste sorting, can impact positively accommodation enterprises' eco-efficiency, image and long-term savings

Contents

FIND RELEVANT INFO QUICKLY

1. **Choose the topic of your interest here (energy supply, water supply, wastewater or solid waste) or from the contents and click it to get onto the chosen page.**
2. **Explore the items from the tables**
3. **Find the savings and improvements**
4. **Get additional information from the links instantaneously (ctrl+click).**

1. 2. 3. 4.

A. Energy supply

Electricity and heating solutions	Considerations	Profitability	Effect on eco-efficiency	Links: click for more information
Joining electricity network (grid)	-Availability of grid -Asking offers and comparing every two years -Check existing consumer rights e.g. ability to change supplier without cost depending on contract type	**Savings:** tendering of service providers	-Tendering for renewable electricity	*PK:n sähkö* (ENG, FIN) *Fortum* (ENG, FIN) *Kajave*, Kuhmo (FIN) *Tendering for electricity* (FIN)

If you are reading a hardcopy version of the booklet, please use the web-link provided here to reach the electronic version with live links.

I INTRODUCTION

Nature and outdoor tourism grow globally by about 20-30% per year with visitors increasingly seeking guesthouses, camp and other accommodation facilities located in natural surroundings. These facilities are usually located close to forests, lakes, rivers, and in some cases within protected areas.

On the other hand, tourist accommodation providers, campsite owners and personnel do not usually have in use eco-efficient solutions to manage tourist related pressures like water, waste, and energy. Businesses can incur financial problems by ignoring the environment, or by investing in wrong technologies.

Ecologically sound and well thought solutions can be easy to use, positively impact accommodation facilities' image, attract spending and enhance long-term savings for businesses. Visitors are increasingly interested in ecological travel and have begun to demand facilities and services that offer ecologically sustainable options.

Karelia CBC NatureBeST project interviewed tourism accommodation facilities (TAFs) in both sides of the Finnish-Russian border on their existing energy-and water supplies, wastewater treatment systems and waste recycling, as well as the challenges they have encountered with existing systems and their future investment plans.

Over 30 accommodation companies from North Karelia and Kainuu (Kuhmo) regions of Finland were interviewed. The main challenges that came up during interviews were in facilities partly connected to municipal networks.

Main supply-side needs were solutions to power outages/surges that affect eco-efficiency of facilities, support for eco-friendly investments mainly concerning energy, and solution to inadequacy or lack of waste sorting structures vital in improving the accommodation enterprises' eco-efficiency actions. Still, most challenges originated from the demand side i.e. at the facilities.

Analysis show that owners are eager to improve eco-efficiency at their accommodation facilities. This is evident in their actions, and most importantly on choices in use and intended investments for energy, heating, and water, and wastewater management. In most cases however, practices do not directly affect economic performance, but can improve it indirectly by saving e.g. energy or water or by making it more attractive for visitors interested in ecological facilities.

The owners of the tourism accommodation facilities stated their interest in information on available soft solutions and complementary/supplementary eco-technologies that could solve existing challenges such as limited or lack of waste sorting stations, and/or supplement or substitute supply-side and climate induced problems such as outages and power surges.

Back to Contents

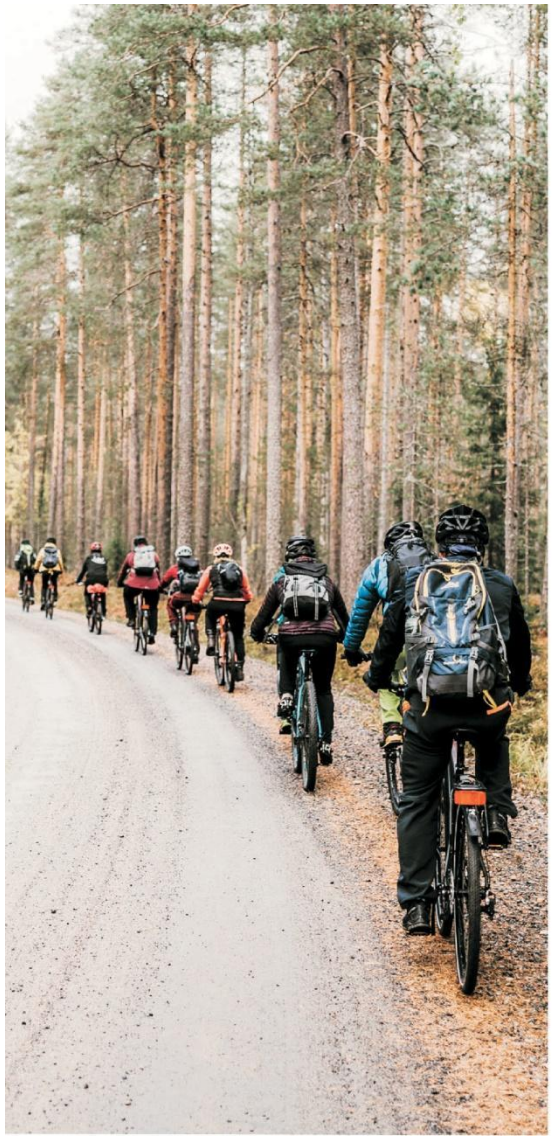
Outcomes of entrepreneur interviews

II INTERVIEW OUTCOMES ON BARRIERS AND NEEDS TO IMPROVING ECO-EFFICIENCY IN FINNISH TAFs

PROBLEM/ CAUSE (Supply side=supplier, User side=at facility)	Supply side	User side	Climate induced	POTENTIAL SOLUTIONS (Supply side)	POTENTIAL SOLUTIONS (Demand/ user side)
A. ENERGY SUPPLY					
Electricity supply					
Facilities attached to communal networks					
Power surges/ outages	*		*	• Reliable energy supply; underground cables • Backup power source • Renewable energy investment support	• Alternative power supply • Supplementary power sources • Backup power source/ uninterruptible power supplies - UPS
Occasional overload burnt fuses	*	*		• More stable network • Higher fuse capacity • Information on available technologies	• Better technologies/ electricity stabilizers • Scheduled use of energy consuming appliances
Electric transfer cost	*			• Government support	• Soft solutions; onsite energy saving features/ measures, onsite supplementary/ complementary energy production
Heat supply					
Instability of hot water (communal network)	*			• Reliable energy supply	• Mix of various heat sources
Malfunctioning of electricity dependant hydronic heater (communal network)	*			• More stable network	• Supplementary/ complementary heat source

Too large water heater		*		• Expert help pre-purchase: too large water heater adds to energy costs	• Expert advice, planning to choose suitable equipment type and size (continuous heating of unnecessary capacity means additional heating costs).
Old windows		*		• Investment support	• Investing in energy efficient windows
Old heaters		*		• Investment support	• Investing in better technology
B. WATER SUPPLY					
Old water pump		*		-	• Investing in better technology
Dry well in summer		*	*	-	• Alternative water source • Supplementary water supply
Low pressure interruptions of cold water (old technology)		*		-	• Expert advice, planning • Investing in better technology
Cold water due to power surge (communal network)	*		*	• Reliable energy supply	• Complementary/ supplementary water supply
C. WASTEWATER SUPPLY AND MANAGEMENT					
Biostation malfunction		*		-	• Keep the treatment plant up and running within specification limits to allow discharge. The system cannot be overloaded/ exceed capacity with either (a) volume of water or (b)the load of BOD/ COD of the pollutant that the system is designed to remove • Remember regular maintenance
Accidental toilet blockages		*		-	• Informing visitors of good practices during check-in • Visitor awareness • Better technologies

Freezing sewage pipes	*	*	*	-	• Expert advice, planning
D. SOLID WASTE MANAGEMENT					
Only mixed waste collection/ no waste sorting possibilities	*			• Trucks with compartments for different waste types for companies far from services e.g. reception terminals (waste company/ government)	• Preventing/ reducing waste e.g. by choosing products with less packaging, maximising use of reusable/ easily recyclable packages
Distance to waste reception terminal	*			• Closer reception terminals • Support systems that enhance waste sorting (waste company/ government) • Info awareness on aims of waste management and role managers can play in preventing waste generation and/ or maximizing onsite recycling.	• Info awareness to visitors • Preventing waste generation • Maximizing onsite recycling
Food waste				• Sorting trucks with compartments for different waste types	• Onsite biowaste container (demand side solution) or compost can help reduce proportion of mixed waste ***Back to contents***



ENERGY SUPPLY

WATER SUPPLY

PATHS TO SUSTAINBILITY
FOR RURAL TOURISM BUSINESSES

WASTE WATER MANAGEMENT

MUNICIPAL WASTE MANAGEMENT

III ECO SOLUTIONS FOR ENERGY, WATER, WASTEWATER AND SOLID WASTE

A. Energy supply

Electricity and heating solutions	Considerations	Profitability	Effect on eco-efficiency	Links: click for more information
Joining electricity network (grid)	-Availability of grid -Asking offers and comparing every two years -Check existing consumer rights e.g. ability to change supplier without cost depending on contract type	**Savings:** tendering of service providers	-Tendering for renewable electricity	*PK:n sähkö* (ENG, FIN) *Fortum* (ENG, FIN) *Kajave*, Kuhmo (FIN) *Tendering for electricity* (FIN)
Smart electricity	-Using energy saving lighting, heating, and air conditioning features	**Savings:** up to 40% saving possible with digitally managed system	-Up to 40 % lower consumption	*Smart solutions for heating and cooling* (ENG, FIN)
Solar panels	-Easy access to project developer and financier: make use of available support e.g. business Finland/ ELY centre -Easy access to the necessary authority permits -Quality of product: better savings long-term	**Return on investment:** average 10-15 years Make use of available funding e.g. 20% for companies by Business Finland **Savings:** Depends on market prices, transfer costs and own energy production volume	-Depends on quality and positioning of panels -Excess electricity storage/ sell back to grid -Company can communicate its	*Solar panel funding for companies* (ENG, FIN) Investment and other support: *Business Finland* (ENG, FIN), *ELY-Centre* (FIN), *Leader project* (FIN) *Photovoltaic profitability calculator* (FIN)

	-Accurate calculations of the size needed; not too big or too small -On grid: grid connection and access to the electricity buyer including necessary permissions/ restrictions from existing operators -Easy access to maintenance and guarantee (average 25yrs)	Less greenhouse gases from energy production	values and responsible choice	*Solar actors in Finland* (ENG, FIN) *Energy amounts produced and prices in Finland per panel type* (ENG, FIN) *Cost-benefit analysis and real case study examples* (FIN)
Solar heat collector	-**Potential:** additional heat for domestic water or facility -**Space:** collectors can produce energy from lesser surface coverage compared to solar panels -**Efficiency:** glazing of collectors can increase the number of production hours when thermal energy is most valuable	**Return on investment:** very profitable for warm water (in combination with central heating, or wood). Positioning and type of panels can also contribute additional savings and faster return on investments **Cost saving:** DIY possibility	- Depends on quality and positioning of panels -Energy storage	Investment and other support: *Business Finland* (ENG,FIN), ELY-Centre (FIN), *Leader project* (FIN) *Opportunities for solar collectors* (ENG) *Solar actors in Finland* (ENG, FIN) *Energy amounts produced and prices in Finland per panel type* (FIN) *Cost-benefit analysis and real case study examples* (FIN) *DIY solar collector* (FI)

Heat pump (air and/ or water)	-Carefully calculate the required heat output and annual amount of energy before making an investment decision -Profitability of heat pumps are dependent on the price of fuels, electricity and district heating.	**Return on investment:** low investment cost, lower life cycle costs	-If complemented with renewable electricity, combined with bioenergy (wood fuel)	*Heat pumps technologies, installation process* (ENG, FIN) *Suitability for different building types* (FIN) Investment and other support: *Business Finland* (ENG, FIN), ELY-Centre (FIN), *Leader project* (FIN) *Cost benefit analysis of common heat pumps by real case study comparisons* (ENG)
Geothermal heat	-Consider offers and that price package consists e.g. a geothermal heat pump, well drilling, installation and connection to a heat distribution network, and possible demolition of old heating equipment. -Make use of available investment opportunities e.g. ELY-centre, Business Finland -Check restrictions, e.g. if the property is in a groundwater area -Space and optimal efficiency: important to measure the bedrock to know how much energy exists and what type system is best (e.g. no. of wells needed/ to be drilled).	**Long-term profitability:** High initial investment cost (12,000-25,000 €), but very profitable in long term. **Cost savings:** Energy costs are more predictable. In Finland case sites report savings of 65-80% onwards **Reliable:** offers a competitive alternative to district heating	-Very good	Investment and other support: *Business Finland* (ENG, FIN), ELY-Centre (FIN), *Leader project* (FIN) *Suitability for different building types* (FIN) *Geothermal energy potential of North Karelia* (FIN) *Cost benefit analysis of heat pump investment Finland* (ENG)

Wood fuel	-Secure and economic way of producing main and extra heat especially during the cold winter months -Wood burned with poor technique and technology lowers the efficiency, increases carbon monoxide emissions and other emissions such as particulate matter -Needs an onsite rain shelter storage space -May increase manual work	**Cost for purchase** is low. **Savings:** profitable as reduces heating costs if burnt correctly **Reliable:** locally available	-Cost: eco-efficient when combined with other sources of heating (e.g. solar) and/ or technologies (e.g. water radiators) or used to replace oil -Choice of equipment, e.g. size and low-emission boiler saves fuel	*Wood heating* (FIN) *Hints for efficient wood heating* (ENG) *Hints for efficient wood heating* (FIN)
Natural gas	-Local production or distribution network and suitable infra: Facility's distance from the source -Very limited use in Finland: The natural gas grid in Finland covers the southern and south-eastern parts of Finland.	**Cost:** 20% cheaper compared to oil or electricity	-Natural gas is eco-efficient when it is used to replace other fossil fuels	*Natural gas specifications Finland* (FIN) *Natural gas market Finland* (ENG)
Micro hydropower system/generator	-Best for remote areas lacking power or detached from grid (e.g. cottages) -Check tax exemptions and other requirements -Make use of available investment funding: small hydroelectric power projects, 15–20% (Business Finland)	**Material costs:** emergency power can limit loss and additional costs e.g. waste of frozen produce/ foods in refrigerator during power outage/ surge	-Not a risk for fish and does not affect the water ecosystem	*Considerations, planning and benefits* (FIN) Investment and other support: *Business Finland* (ENG, FIN), ELY-Centre (FIN), *Leader project* (FIN) *Tax exemptions* (FIN)

	-Angle of the spiral blades	**Costs:** Reduces maintenance costs e.g. for lines if facility is far from grid supplier **Profitable:** when its capacity is more than 1MW, and the head at least 5m		
Biomeiler (harnessing heat from compost)	-Requires larger volumes of material (80-100% wood chips and straw and no more than 20% manure works for 1,5 years and produces hot water between 1000-2000 litres at 55-70 degrees) -Takes lot more space to be realised (Best for farms with accommodation enterprises/ greenhouses, or in cooperation between multiple companies) -Horse and hen manure are the best but others work too	**Cost:** Heating costs **Extra income**: by-product can be used as gardening material	- Reduction in pick-up/ transportation savings from waste management taxes -Replacing fossil fuel with a renewable source for hot water production → economic savings and reduction of air pollution	*Specifications and use* (FIN) *Specifications and use* (ENG) *DIY biomeiler* (ENG)
Certificates, benchmarking, audits	-If company's energy costs exceed 50,000€ a year, facility should have an energy audit done for appropriate energy saving. -State subsidies for surveys/ audits of up to 40-50% of the cost of the work (for SMEs).	**Income/ gain:** Better company image as result of commitment to greener processes	-Setting of targets and bench marking (certificates), BUT …eco-efficiency is a moving target! -Good if development and improving of	*Soft solutions by Motiva Oy* (ENG, FIN) *Energy aids for companies operating in Finland* (ENG, FIN) *Climate Joensuu Partnership Network* (ENG, FIN)

			processes and setting targets is a permanent way of management	*Renewable energy in Finland* (ENG)
Good practices	-Energy saving lightbulbs -Energy saving machines -Positioning of machines in the facility -Remote monitoring applications (heating, cooling, lighting) -Design solutions e.g. colours and lighting for different spaces within the facility (common places, bedrooms, etc)	**Planning and design of spaces:** Saves costs and time if thought from planning to end of supply chain. **Keeping to recommendations:** Heating for different spaces; the recommended eco-efficient temperature for living spaces are as follows: ✔ common living areas 20-21 ºC ✔ sleeping areas 18-20 ºC ✔ block building staircase corridors 17-18 °C ✔ Storage area 12 ºC ✔ Garage 5 ºC	-Setting of targets…eco-efficiency is a moving target!	*Easy to use smart solutions for heating and cooling* (ENG, FIN) *Lighting solutions, efficiency, and recycling advice* (ENG) *Lighting solutions, efficiency, and recycling advice* (FIN) *Energy saving by positioning of machines in the facilit*y (FIN) *Case studies of energy solutions showing cost benefit analysis* (ENG, FIN) *Measuring gadgets borrowing, educational videos, interior design, and lighting solutions by illuminating Engineering Society of Finland* (FIN) *Example from North Karelia Biosphere Reserve partner* (ENG, FIN)

Back to Contents

ENERGY SUPPLY

WATER SUPPLY

PATHS TO SUSTAINBILITY
FOR RURAL TOURISM BUSINESSES

WASTE WATER MANAGEMENT

MUNICIPAL WASTE MANAGEMENT

III ECO SOLUTIONS FOR ENERGY, WATER, WASTEWATER AND SOLID WASTE

B. Water supply solutions

Water supply solutions	**Considerations**	**Links**: **click for more information**
Joining the municipal/ village network	-Closeness of facility to network - The care and maintenance needed for the equipment/ technology and the entrepreneur's ability to respond; joining a sewerage network is the best option for water protection if network is near facility, and facility has necessary infrastructure/ amenities - Pressurized water increases water consumption and the amount of wastewater generated (good to adopt water saving features) **<u>Profitability/ Effect on eco-efficiency:</u>** -Time saving -Cost saving: if clean water and wastewater are within a single network- and/ or combined with good onsite practices and smart solutions	**Joining the communal networks:** *Joensuu and Tuupovaara* (FIN) *Ilomantsi* (FIN) *Lieksa* (FIN) *Kuhmo* (FIN) *Planning and measures,* Kuhmo (FIN) *Example of smart water solutions; North Karelia Biosphere Reserve partner* (ENG, FIN)
Simple water well	- Water use should be managed according to availability -Depth of the well need be enough -Location of the facility (e.g. flood prone area) -Using water from the well produces small amount of wastewater. In this case, the wastewater can be sucked into, for example "drain field".	*Water quality testing;* North Karelia, Kuhmo (FIN) *Temporary clean water supply for facilities with e.g. water quality problems, under renovation*; North Karelia (FIN)

Water well with a pump	-Planning the positioning of equipment for easy pumping and maintenance -Depth of the well need be enough	*Water quality testing*; North Karelia, Kuhmo (FIN) *Temporary clean water supply for facilities with e.g. water quality problems, under renovation*; North Karelia (FIN)
Simple septic tank	-Water supply system should be drained for the winter or effectively insulated, and pipeline heating and centralization of the equipment and water points and their local heating should be organised	*Water quality testing* (North Karelia, Kuhmo) *Temporary clean water supply for facilities with e.g. water quality problems, under renovation*; North Karelia (FIN)
Good practices	-Water saving machines e.g. low flush toilets/ dry toilets -Water saving faucets and shower solutions -Monitoring solutions e.g. for leakages - Preventing the use of wastewater for watering flower beds **Profitability/ Effect on eco-efficiency:** - Cost savings: Prevention of leakages to natural environments/ extra costs of renovation (with use of quality/ smart technologies) -Reduction of costs e.g. energy and water bills - Preventing the nutrient content of nutrient-rich soils, which will very likely end up in waterways or groundwater.	*Water saving hints; onsite solutions* (ENG, FIN) *Rural women advisory organization* (ENG, FIN) *North Karelia Biosphere Reserve sustainability partnership* (ENG, FIN)

Back to Contents

ENERGY SUPPLY

WATER SUPPLY

PATHS TO SUSTAINBILITY
FOR RURAL TOURISM BUSINESSES

WASTE WATER MANAGEMENT

MUNICIPAL WASTE MANAGEMENT

III ECO SOLUTIONS FOR ENERGY, WATER, WASTEWATER AND SOLID WASTE

C. Solutions to wastewater management/treatment

- **Law:** If the cottage has pressurized water, a wastewater treatment system is required, even if water is only used slightly and the cottage has in use a dry toilet
- **Treatment method**: Must be selected taking into account the characteristics and the application of the equipment and/or technology in use
- **Weather:** The suitability of the chosen equipment/ technology for different seasons. Wastewater drains freeze easily in winter, especially in areas where snow cover (eg yard and roads) is cleared from the ground.

Solutions: wastewater management/ treatment	Considerations	Profitability/ effect on eco-efficiency	Links: click for more information
Village/ municipal network	-The care and maintenance needed for the equipment/ technology and the entrepreneur's ability to respond; joining a sewerage network is best option for water protection if network is near facility, and facility has necessary infrastructure/ amenities. -Determine the need for insulation and heating of water pipes and sewers -Checking the depth of installation and insulation of pipe (wastewater drains freeze easily in winter, especially in areas where snow cover on the yard is cleared from the ground since	-Time saving -Cost saving (if water and wastewater within single network)	Joining a network: Network connection; Joensuu and Tuupovaara (FIN) Network connection; Ilomantsi(FIN) Network connection; Lieksa (FIN)

	sewage drain is usually installed closer to the ground than the water pipe) -Choosing right equipment for the site. e.g. freeze free systems		Network connection; Kuhmo (FIN)
Simple septic tank	-Transportation/ collection distance and pricing; reducing the amount of waste/ sludge -If the facility does not produce any wastewater in winter, it is advisable to empty the pressure sewer - It is advisable to pump the tank once every three to five years. Doing so clears the waste within, including grey water that might otherwise freeze -In harsh winter location; purchase insulation blankets for the tank/ consider insulation during planning phase -Major factors that influence frequency of septic pumping: ✔ Occupancy rate ✔ Total wastewater generated ✔ Volume of solids in wastewater ✔ Septic tank size -Check need to upgrade to cope with the waste peaks e.g. in cases of increased visitor amounts	-Lesser distance for transportation saves costs -Longer lifespan of equipment -Incorporating water saving features	Maintenance; North Karelia region (FIN) Maintenance; Kuhmo (FIN) Government Decree on Treating Domestic Wastewater in Areas Outside Sewer Networks (ENG) Government Decree on Treating Domestic Wastewater in Areas Outside Sewer Networks (FIN)
Biostation	-Organize water use according to availability (well/ surface water), keeping wastewater at reasonable levels and ensuring proper treatment. -Keep the treatment plant up and running within specification limits to allow discharge. The system cannot be overloaded/	-The lesser the water consumption, the lower the costs	Common Problems with Biological Wastewater Treatment Systems and How to Avoid Them (ENG)

	exceed capacity with either (a) volume of water or (b)the load of BOD/ COD of the pollutant that the system is designed to remove		Government Decree on Treating Domestic Wastewater in Areas Outside Sewer Networks (ENG) Government Decree on Treating Domestic Wastewater in Areas Outside Sewer Networks (FIN)
Septic well	-Transportation/ collection distance and pricing; reducing the amount of waste/ sludge -Water use should be organized according to availability, keeping wastewater at reasonable level, and ensuring proper treatment of wastewater -Check cracks or holes to make sure the seal is intact and tightly secured	-Lesser distance for transportation saves costs	Maintenance; Kuhmo (FIN) Maintenance; Kuhmo (FIN) Water quality checks; North Karelia, Kuhmo (FIN) Government Decree on Treating Domestic Wastewater in Areas Outside Sewer Networks (ENG) Well maintenance and quality check; North Karelia (FIN) Well emptying; North Karelia region (FIN)

Septic well with drain field	-Organize water use according to availability, keeping wastewater at reasonable levels and ensuring proper treatment of wastewater -Transportation/ collection distance and pricing; reducing the amount of waste/ sludge -Frozen ground/ freezing temperatures can severely damage the septic tank; add two to three-inch (~ 5 - 7,5 cm) layer of mulch or straw over the drainage field/ consider other insulation	-Time saving i.e. time that would have gone to organizing collection	Guide to installation and treatment (FIN) Well maintenance and quality check; North Karelia, Kuhmo (FIN) Government Decree on Treating Domestic Wastewater in Areas Outside Sewer Networks (ENG) Government Decree on Treating Domestic Wastewater in Areas Outside Sewer Networks (FIN)
Dry toilet/ Outhouse	-Replacing water toilet with dry toilet; Dry toilet saves water, facilitates wastewater treatment, is self-installing and low maintenance, reliable in frost, collects nutrients, protects lakes, and does not pollute groundwater. -Property type and intended uses limits the freedom of choice: need inside a new/ old residential building, or in a separate outbuilding? Other important issues are (a) onsite composting and utilization of compost, (b) separation and utilization of urine, (c) operating and maintaining the system. -Choice of solution: Keeping in mind intended uses, and personnel	-No water bills -Very low maintenance costs	Why dry toilets? (ENG, FIN) Finnish dry toilets (ENG, FIN) Finnish dry toilets (Other languages incl. RUS) Product range and price options (FIN) Use and maintenance (FIN) Experiences from users (FIN)

			DIY toilet (FIN)
Good practices	-Awareness for customers on good practices and their actions impact on wastewater may change their actions towards more cautious -Taking into use water saving features -Grey wastewater from washing and washing dishes should be treated before discharge to prevent eutrophication and potential contamination of surface and groundwater from nutrients and bacteria -Dry toilet or separate low-flush toilet combined with grey wastewater treatment is cost-effective and environmentally friendly	- Cost savings from wastewater efficiency; the amount of wastewater is positively related to amount of water use. Increase in water use, means increase in the costs associated with wastewater -Income; Clean nature near facility is important. Clean surrounding gives a positive image and attracts visitors	Jassi wastewater advice (FIN) Jassi wastewater advice (RUS) Treatment of grey water (FIN) Wastewater testing; North Karelia, Kuhmo (FIN)

Back to Contents

ENERGY SUPPLY

WATER SUPPLY

PATHS TO SUSTAINBILITY
FOR RURAL TOURISM BUSINESSES

WASTE WATER MANAGEMENT

MUNICIPAL WASTE MANAGEMENT

III ECO SOLUTIONS FOR ENERGY, WATER, WASTEWATER AND SOLID WASTE

D. Solid waste management

Solid waste management	Considerations	Profitability/ effect on eco-efficiency	Links: click for more information
Sorting at property	-Contacting waste management company can help them design/ offer better solutions/ needed services -Tendering for waste management: note that the cheapest is not necessarily the best for the environment. Start with Materiaalitori service or take contact to waste companies -Preventing waste whenever necessary e.g. packaging -If waste cannot be prevented, opting for reusable/ recyclable options -Waste Law prohibits burning of waste at facilities. Exception is use of untreated waste wood. Treated wood of any type e.g. by pressure or surface treated, plastic-coated, wood-based panels are strictly prohibited. If not sure, the best thing to do is to contact authorities for advice on nearest reception terminal or for collection possibility from property.	**-Cost, time, and energy efficiency:** By contacting waste handling operators, offering ideas/ asking for solutions at the facility. -Consider sharing waste recycling facilities with other small business(es) located nearby. **-Cost and material efficiency:** ✔ helps manage/ reduce waste ✔ limits/ reduces frequency of driving to reception terminal ✔ reuse of untreated wood for heating wood sauna/ fireplace (according to law; see considerations)	*Puhas Oy customer service*; Joensuu, Ilomantsi, Liperi, Kontiolahti, Polvijärvi (FIN, ENG) *Jätekukko customer service*; Lieksa, Juuka, Nurmes (FIN) *Ekokymppi*, Kuhmo (FIN) *Joensuun Kierrätys-Kuljetus Oy*, North Karelia (FIN) *Jätehuolto Teuvo Lehikoinen Ky*, Lieksa (FIN) *Tendering waste collection* (FIN) *Gathered information for entrepreneurs* (FIN)
Handling recyclables-taking recycled waste to the	-Contacting waste management company: It is highly recommended to first check possibility of collection from	-Contacting waste management companies -It is more affordable to take the recyclables to the waste operators'	*Encore environmental services*, Joensuu (FIN)

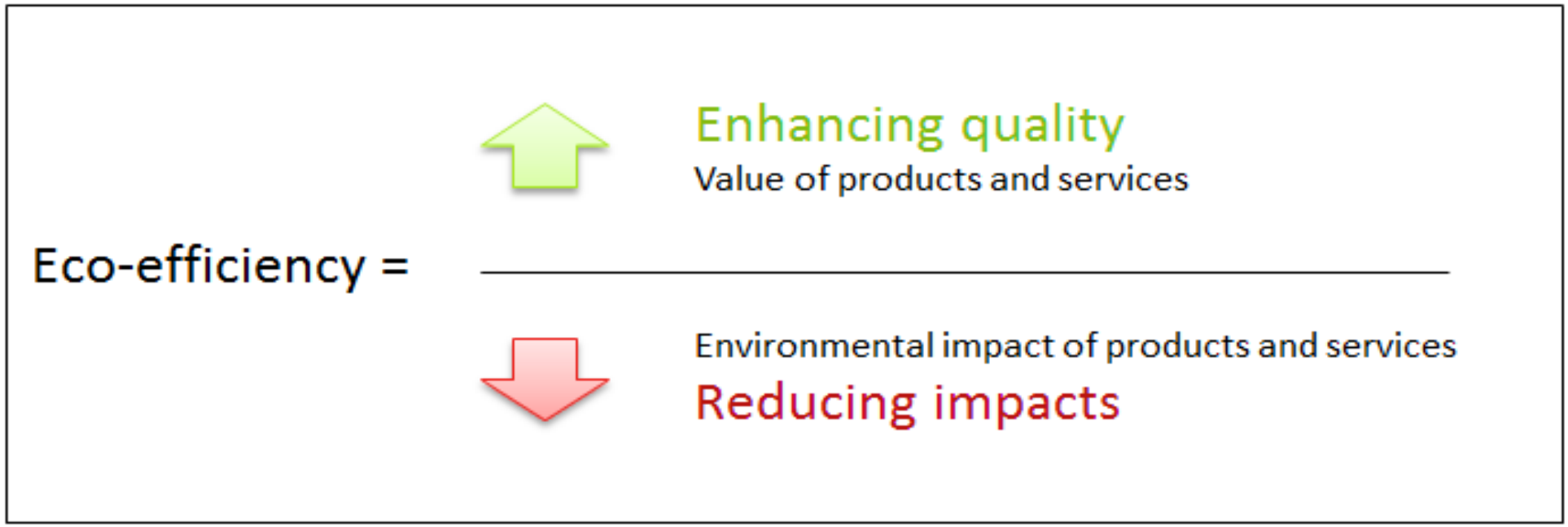
designated reception terminals	facility; only small amounts of packaging waste can be transported by own transport	facilities/ terminals if driving is combined with other visits to city -Waste prevention is costs and time saving: ▪ less frequent visits to the reception terminal focus on other issues e.g. better services	*Reception terminals for wooden packaging waste* (ENG, FIN) *Reception terminals for metal packaging waste* (ENG, FIN) *Reception terminals for carton packaging waste* (ENG, FIN) *Rinki Oy sorting guidelines for companies and reception of packaging waste at terminals* (ENG, FIN)
Biowaste	-Opting an onsite biowaste can reduce frequency of emptying the waste bins; meaning also the cost of collection -One can produce own soil which can be used in the property e.g. for greenhouse, plants, garden -Preventing food waste whenever necessary	-Cost effective; composting reduces the proportion of mixed waste collected, meaning a reduction on the frequency of collection and overall cost -Material efficiency gives a positive image for visitors -Onsite soil production e.g. for garden and flowerbeds.	*Food waste prevention & consumption efficiency* (ENG, FIN) *Composting advice/ instructions for biowaste* (ENG, FIN, RUS) *Bokashi-indoor compost* (ENG) *Bokashi-indoor compost* (FIN)
Plastic packaging waste	-Preventing plastic packaging waste as much as possible by opting e.g. unpackaged groceries/ products, reusable shopping bags, rethinking supplementary options for plastic (non-plastic packages)	-Preventing unnecessary waste generation saves the owner of facility time, which can be used in doing other tasks -Sorting plastic waste reduces proportion of mixed waste and frequency of collection/	*Reception terminals for plastic packaging waste* (ENG, FIN)

	-Plastic waste is bulky and amounts reflects on the frequency of collection/ drive to reception terminal and on cost -In instances that plastic waste cannot be prevented, opting easily recyclable package types -Informing customers how to sort their waste while at the facility	drive to reception terminal thereby saving costs - Changes in consumption is also needed	*Info on sorting and collection of packaging waste* (ENG, FIN)
Beverage containers	-Preventing waste whenever necessary by offering alternatives (e.g. beverage on tap) over single-use beverage containers -If waste cannot be prevented, opt reusable containers, if impossible, consider recyclable options (PALPA marked) -Used PALPA marked containers are taken to PALPA reception terminals. If a facility has a specific beverage supplier, pick-up of used containers could be arranged with the supplier. For unmarked containers refer to "Sorting at property" or "Handling recyclables".	-Limiting single-use containers (material efficiency) offers a positive image for visitors and attracts spending -Reuse/ recycling beverage containers reduces the amount of mixed waste and overall costs for collection	*Bottle, aluminium beverage containers recycling information* (ENG, FIN) *Packaging waste reception terminal and collection for non-marked containers* (ENG, FIN)

Back to Contents

Conclusions and hints for actions

IV CONCLUSIONS AND HINTS FOR FURTHER ACTIONS



A tourism accommodation facility (TAF) is eco-friendly when it takes into account the current and future environmental impacts of its business activities. This means following the ecotourism principles, and continuously improving eco-efficiency in the daily business practices. Eco-efficiency is in the end crucial for long-term environmental and economic sustainability.

In simple words, an eco-friendly tourism business maximizes its product and service output with minimal resources. This is achieved, for example, by using sustainable, renewable and recyclable materials at lowest possible quantities, reducing water and energy consumption, reduction and avoiding use of hazardous materials, minimizing waste, maximizing the use of recycled materials, improving recycling and waste sorting, and opting for durable products.

Eco-efficiency is a useful concept in structuring actions towards sustainability. In addition to environmental sustainability, the long-term economic sustainability can also be achieved. Eco-efficiency commitments can improve attractiveness of an accommodation facility, as visibility ofresponsible actions helps also attract the segment of visitors seeking sustainability as additional value to travel.

There are various ways tourism accommodation facilities can enhance sustainable actions within the facilities and reduce ecological footprints. For example, companies can seek for research & development and financial support from local authorities and in co-operation with research institutions, for example for development fund projects.

There are also regional dedicated websites showcasing real case study examples on cost savings and investment return periods for example concerning heat, electricity and water if using different technologies, or/ and other soft solutions. Eco-efficient renovations information for facilities can also be sourced via regional dedicated websites.

For accommodation facilities situated close to or within protected areas such as nature reserves, nationalparks and hiking areas, there exists responsible tourism guides from Metsähallitus. For sustainability related research and development, company visibility and networking assistance, companies can access help from vast network of actors across Finland and globally through help from North Karelia Biosphere Reserve.

Back to Contents

Biosphere Reserve networks for tourism

V BIOSPHERE RESERVE NETWORKS FOR TOURISM

Biosphere Reserves As Biosphere Reserves (BRs) are the test and model areas of sustainable development and information hubs, they have a key role in spreading the good practises within the region. Here are some examples of sustainable and responsible nature tourism. These operators are part of the North Karelia biosphere reserve sustainable partner network.

BRs belong to UNESCO's global Man and the Biosphere (MaB) programme. BR network is the world's leading learning and testing joint action for sustainability with its more than 700 sites around the globe. These sites include the finest nature sites in the world, such as the holy mountain of Uluru in Australia, Galapagos Islands in Ecuador, Yellowstone in USA, Camarque bird sanctuary in France, Cape West Coast in South Africa, Pechoro-Ilychskiy primary forests in Russia etc. The common denominator of the areas is that nature and sustainability are valued in BR activities!

Many BR's are located in remote areas, but there are also many sites close to major population centres (such as Brighton and Lewis Downs in Great Britain). In all cases tourism is important in maintaining the social structures and livelihoods of the sites.

Biosphere reserves' co-operation and information network consists of local, regional, national, and international actors, networks & partners. Openness and impartiality together with local participation and scientific approach make biosphere reserves strong in mediating local conflicts and finding good solutions for challenging problems. The same features also help finding partners and

funding opportunities and spread the results. United Nation's World Tourism Organisation is also deeply committed to sustainability in practise and in various development efforts.

Metsähallitus is responsible for state forest lands nature reserves. Metsähallitus also takes care of hiking routes and the services in the reserves (e.g., nature trails and fireplaces, waste management and accommodation & cooking facilities). Metsähallitus and its partner companies working within the reserves and using the sites for tourism business follow the strict sustainability rules and monitoring principles of World heritage sites.

Metsähallitus is considered as one of the best in the world in management of protected its areas and structures.

Metsähallitus is North Karelian Biosphere Reserve partner and has been an active member in BR steering committee from the very beginning. Read more on Metsähallitus sustainability co-operation in nature reserves:

- *Principles of Sustainable Tourism - National Parks, nature historic sites, & World Heritage sites*
- *Sustainable tourism in protected areas- guides for tourism companies*

▪

GreenStar Hotel chain is originating from Joensuu, North Karelia. Hotel GreenStar Joensuu is a budget hotel, which has been built on sustainability from the very beginning.

It's a well thought combination of features making it easy to live comfortably and eco-efficiently (e.g., water consumption, energy usage, moving in the city) in the middle of the city. GreenStar has a long

time been biosphere reserve sustainability partner.

- *See Hotel GreenStar key sustainability assets*

Guesthouse to Guesthouse –concept is a long-term effort by a group of tourism entrepreneurs from the northern part of North Karelia province. The customers come mainly from abroad. To minimise the carbon emissions per trip they spend in the area several days. Only muscle power is used when trekking/canoeing/biking/skiing (depending on the season) from a guesthouse to another.

All the entrepreneurs are very environmentally conscious women! They have various sustainability strengths in their businesses. The group is also – as the first in North Karelia - getting ready for the new Sustainable Tourism Finland recognition. The network is extending to the southern part of the province.

- *Äksyt Ämmät sustainability ethics, awards, enterprises*

Ilosaarirock festival is a sustainability champion in the field of rock festivals. It's one of the major rock festivals in Finland, still run by an association while all others are run by businesses. It's also the oldest festival in Finland having been owned and operated all the time by the same association.

A rock festival can be a sustainability trendsetter. The organisers understand that a rock act is not the most eco-friendly of acts, but they make it as much so as possible – together with the customers and their partners. It's and as much as possibly wasteless, using green energy and compensating its carbon emissions by nature protection campaigns.

- *Ilosaarirock has received European Green Festival awards*
- *Video produced in SHAPE project about Green festival development*

River Koitajoki area - Case SLOW triathlon. Entrepreneurs in Koitajoki area are networking for developing sustainable nature tourism in Ilomantsi. The activities are located around river Koitajoki and surrounding land areas consisting of eskers, mires and forests. Verstile nature activities in the area combined with local food and Karelian hospitality has created a tourism product "Koitajoki Nature triathlon" (also called "Koitajoki Slow triathlon"). This triathlon is not a competition but enjoying nature on own pace. Added with first class services the product has already proved having potential for a success story.

- *Info on success as a product available for visitors*
- *More information on development of Koitajoki Nature Triathlon*

United Nations Educational, Scientific and Cultural Organization

Man and the Biosphere Programme

POHJOIS-KARJALAN BIOSFÄÄRIALUE
North Karelia Biosphere Reserve

Back to Contents

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Due to time constrains, small businesses face difficulty sourcing information on
various solutions regarding energy and waste supply, wastewater treatment, and solid waste management. We hope that this guide booklet helps source information on the various eco-efficiency options and solutions faster.

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Back to Contents

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Back to Contents

PATHS TO SUSTAINBILITY
FOR RURAL TOURISM BUSINESSES