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A Study of Sustainability at RV Parks

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Executive Summary

The natural landscape that makes recreational vehicle (RV) travel so rewarding does not insulate the hospitality leg of the RV industry-- RV parks and campgrounds--from issues of environmentally sustainability which similarly confront other travel sectors. Greenhouse gas accounting confirms that actual RV travel creates a lower carbon footprint than comparable air/drive/hotel vacations, research borne out across different continents. Yet despite this lower-impact lifestyle, RV travel entails increasing energy demand from larger vehicle floor plans and novel, energy-based comforts. RV industry demographics forecast rising RV sales over the next decade due to a growing U.S. population and higher rates of RV ownership, factors which further compel sustainable approaches at RV guest facilities. Furthermore, the use of chemical-based cleaners in RV holding tanks, often by non-resident park guests indifferent to local campground health, leads to corrosion and costly clean-up. RV park owners concur that taming energy consumption and eliminating sewage damage would strengthen both the economic and environmental management at their parks. Overcoming the challenges of both issues will have to commit RV travelers, manufacturers, state and federal legislators, and product suppliers to share responsibility with RV park management for environmental sustainability.

This paper examines the underlying challenges to achieve this objective on-site at parks. National and park-specific initiatives to introduce campground managers to sustainable practice provide a state-of-the-industry framework. Snapshot comparisons of energy use, installed renewable systems, and costs by region provide insight into long-term, cost/benefit decisions facing park management. Brief summary conclusions precede my own recommendations for greater RV park sustainability. These include some unconventional proposals for rethinking energy use based on realistic pricing mechanisms that reflect true electricity draw. Deleterious dumping into RV septic systems demands a legislative ban on chemical holding tank products. The green-friendly RV park sustainability program for set forth by the National Association of RV Parks and Campgrounds can be made more robust and attractive to its membership through higher visibility recognition and marketing incentives. Sustainable park designation also should be streamlined on the model of Australia's green park certification through owner-initiated proof of action, thereby drawing in more member parks. Leadership shown by corporate RV park networks and franchises will help position sustainability in the mainstream campground industry through the replication of green practices. The combination of initiatives can return sustainability to the core of RV culture, thus realigning it with the industry's best asset, the land.

Table of Contents

List of Figures and Tables

Abbreviations

ARVC	National Association of Recreational Vehicle Parks and Campgrounds
BLM	Bureau of Land Management
DTSC	Department of Toxic Substances Control, State of California
EPA	Environmental Protection Agency
FMCA	Family Motor Coach Association
GHG	Greenhouse Gas
KOA	Kampgrounds of America
LPG	Liquid propane gas
NEPT	National Environmental Performance Track Program
NPS	National Park Service
NSW	New South Wales, Australia
RV	Recreational Vehicle
RVIA	Recreational Vehicle Industry Association
UNWTO	United Nations World Tourism Organization

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I. Introduction and industry background:

Star-strewn night skies, mountainous backyards, auburn desert landscapes: recreational vehicle (RV) travel puts these vistas right outside one's door. Proximity to nature paradoxically does not relieve RV park owners of the same concerns common to the hospitality industry at large in managing high energy demand, rising energy costs, water and waste disposal, and preservation of scenic resources. In fact, nature's immediacy makes environmental sustainability all the more critical for RV parks and campgrounds welcoming RV travelers. This paper examines challenges to sustainability at these venues. Even as park owners adapt campground design and capacity to the changing footprint of RVing, entrenched habits of land and energy use and waste disposal remain. This paper is intended for RV parks and campgrounds managers, their supporting associations, and guests, to constructively address limits to sustainability at points along the RV supply chain. It is not an industry-wide assessment; however, in assessing the major and reinforcing trends in RV travel, a compelling business argument emerges for introducing sustainable practices to RV parks that coincides with environmental defense. My recommendations for introducing and managing long-term sustainability reflect extensive conversations with RV park owners/managers around the U.S. as well as in Canada and Australia--park managers who are pioneering sustainable solutions that outpace common industry practices. Equally impressive to their business innovations is the frontline role these RV parks have created in linking guest experience to the natural environment.

RV tourism involves an industry supply chain represented by vehicle and product manufacturers, dealerships and rental agencies, trip planners, business chambers and destinations managers, even the National Park Service (NPS). The demographics of RV ownership are as segmented as the general population. Hence, a level of campground amenities to satisfy every visitor need has surfaced in response. The National Association of RV Parks and Campgrounds counts 3,600 (10,000 total) independent campgrounds and RV resorts affiliates. These range in size from small, fifty-site parks to quasi- cities housing several thousand short-term and seasonal sites that swell peak summer visitation to 30,000. KOA—Kampgrounds of America--is a system of 474 franchised and company-operated campgrounds in North America. Smaller park chains like Jellystone and NPS concessionaires further boost the number of private RV parks in the U.S. and Canada.

The principal difference between private campgrounds and camp sites located on public lands is the extent of camper services offered, with "water/sewage/electric hook-up" the short-hand for available core amenities. RVers are welcome at designated campgrounds within U.S. national parks with paid reservations, although water and electricity hook-ups are the exception on pristine NPS

lands. The U.S. Forest Service (USFS) offers a range of facilities to handle all RV camping needs within restricted areas, and some but not all national forest sites provide dumping stations. State park campgrounds range from dry and undeveloped sites to full service campgrounds. The US Bureau of Land Management (BLM) is popular for its backcountry opportunities known as "dispersed camping," notably in the Western U.S. and Alaska. "Boondocking" refers to free-parking an RV on public or private lands such as WalMart and church parking lots; solid RV waste is disposed of for a fee at gas stations, private campgrounds, or the infrequent stations sited on public land. Although boondocking on BLM land is promoted at RV-camping.org, RV park owners object to accepting the environmental externalities of boondockers' sewage waste often rife with chemical content without the benefit of their larger turnstile receipts.

II. Demographics of RV ownership:

Consumer surveys forecast sound expectations for continued growth in RV sales and ownership, owing to general population aging and targeted advertising by the industry to promote RV travel among younger campers. Consumer demographics inform RV manufacturer and vendor strategies while signaling present and future demand for RV guest facilities and destinations.

- More RVs are in use today than at any time previous, with 8% of all vehicle-owning households also owning an RV. Americans currently own nine million RVs, a million more than on the road just five years ago and a 62% growth since the RVIA's first survey of RV owners in 1980. Growth in RV ownership is compounded at an annual rate of 1.9%, with gains signaled in all demographic groups across a 40-year age spectrum. Factors contributing to sales gains include a preference for the RV lifestyle, a favorable economy (to 2008), low interest rates, and stable gas prices throughout most of the period surveyed by U. of Michigan.[i]
- The widening market for RV ownership reflects several demographic trends. The Recreation Vehicle Industry Association (RVIA) anticipates the number of RV-owning households will rise from 9 million to 10.4 million over the next decade, a 15% ownership increase during a period of less than 5% predicted population growth. The burgeoning rise in RV households owes to maturing baby boomers now entering age ranges with the highest RV ownership rates: RV ownership among 45- to 54-year-olds, the nucleus of the baby boom generation, has risen 25% since 1993. Increased life expectancy is also lengthening years of active RVing.
- The median ownership of a current RV is 4.3 years, and a segment of these owners actively engage in trading and *upgrading* their vehicles on average every two years.

- The largest *proportionate* growth in RV ownership is found in the under-35 age group, marking successful efforts to market the RV vacation lifestyle to this group via the "Go RVing" ad campaign.
- Ninety percent of RV owners also maintain a fixed residence, indicating the variety of uses of RVs as seasonal homes for snowbirds, second homes for weekenders, and short-term vacationers who own or rent their vehicle. The remaining 10% of RV owners use their vehicle as a primary residence.[ii]
- 84% of all RV ownership is by married couples, with marriage being the most prevalent demographic across all income and age categories. Dual vehicle occupancy is therefore likely.
- 41% of RV owners have children under age 18 living at home, and current RV owners are more likely to have more school-aged children than former RV owners. The presence of children as stakeholders in the RV vacation market is an important educational marker for efforts to modify energy use behavior at RV parks.
- Camping dominates both planned and actual RV use across all vehicle types, involving 56% of all user activity. Adjunct camping activities like ATV and dune-buggy use are altering this passive lifestyle profile.
- RV ownership is concentrated around median income sectors: only 10% of households are above the median income, and nearly 6% below.
- RV travel shows firm price inelasticity. Fuel prices would need to triple to make RVing more expensive for a family of four than other forms of travel. When gas prices rise, RV travelers reduce mileage traveled but not length of stay. The cost of fuel is considered a minor portion of total travel costs, with adjustments to vacation budgets expressed as shortened length of travel.[iii] Increased oil costs are likely to temporarily retard the pace of growth in the RV sector as the indirect impact of inflation on personal incomes, not as a direct cost of operating an RV.
- The attractive price point of RVing relative to other forms of travel translates to more vacation time. RVers traveled 26.3 days on average during the prior 12 months as compared to 11 days for non-RVers.[iv] Owners of travel trailers averaged 34.9 travel days per year, while owners of smaller RV vehicles averaged about two weeks.
- The life-cycle of RV ownership often culminates in the purchase of a park model--a modified, stationary mobile home which qualifies as an RV because it sits on a chassis. High-end, senior-living RV parks such as Equity LifeStyle Properties have been developed across the Sun Belt to accommodate this retiree segment of mobile RVing. This branded RV residential community may prove significant in reorienting RVers toward sustainability.

III. Future trends of RV sales countervail sustainable park goals:

The quadrennial RV industry survey conducted by the U. of Michigan shows sales of travel trailers--the largest of RV prototypes--overwhelmingly eclipsing the sales of more moderate, conventional models. Low-impact camping at RV parks has become intensified by the use of smaller gas-powered vehicles at destination. Vehicle model names like Voltage epitomize this sector's transformation from "unplugged" nature to grid dependency. Consider that most owners of Class A motorhomes tow a small car behind them to be used for shopping, running errands or sightseeing where the motor home would be too unwieldy. Park owners have reconfigured campground siting to accommodate longer vehicle lengths of up to 45'. KOA offers sites of up to 100' for parking of toy haulers, their contents, and a towed street vehicle. With innovations like slide-outs, more site width also is required for set-up.

- Consumer surveys point to sales of conventional travel trailers and fifth-wheel travel trailers outpacing sales of other RV categories, with travel trailers are more frequently owned by every income category except the under $25,000 group. Future energy demands to heat, cool, and power these larger model RVs portend further upward as smaller, older-model RVs are retired.
- When sales figures are disaggregated, travel trailers accounted for 70% of all new RV sales through 2004. This sales trend is an important parameter for energy use intensity at RV parks that will affect future management decisions governing sustainability.

Figure 1: Annual RV Shipments: 1970-2005

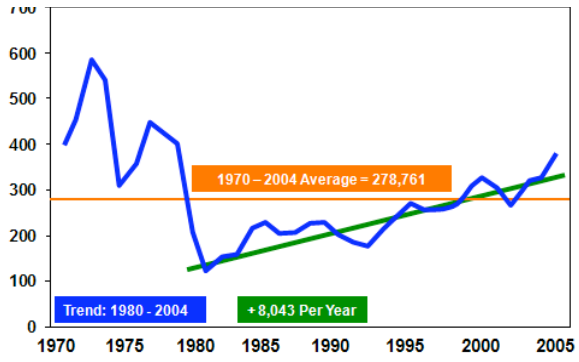
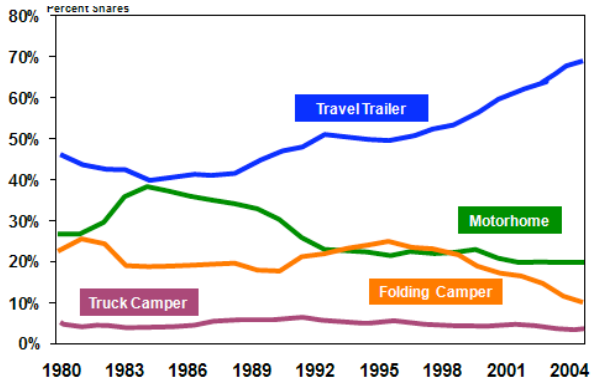


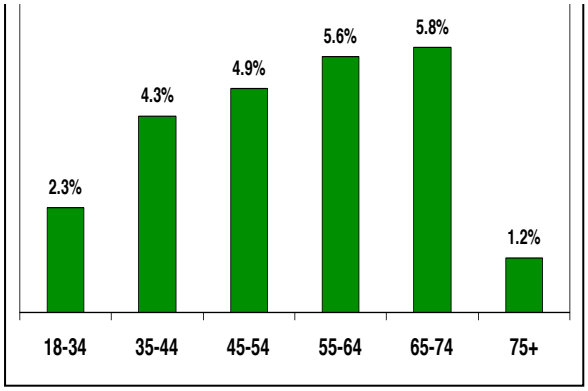
Figure 2: Shares of Annual RV Shipments



Source: University of Michigan, "RV Consumer Demographics," 2008.

- Moreover, rates of travel trailer ownership climb with age, with peak ownership following retirement. The over-65 segment is also the age demographic least likely to accept human-induced global warming, according to the Pew Research Center.

Figure 1: Travel Trailer Ownership Rates by Age



- The fifth wheel trailer has one sub-type, the toy hauler, a name affectionately and appropriately coined for an RV designed to carry vehicular "toys"—small cars, dune buggies, four wheelers, motorcycles, and golf-carts. With the exception of bicycles, most are motorized add-ons.

Source: University of Michigan

The growing plug-in needs of RV travelers at full-service campgrounds is one dimension of upward energy costs, and park owners are reeling from a one-two punch delivered by the absolute hike in energy prices and a business-as-usual protocol over energy use that disproportionately affects management. Installation of on-site, renewable energy technologies is contingent upon high initial investment, land-intensity infrastructure, and attractive financing incentives, options not widely available. For these reasons, renewable-energy use currently appears confined to larger, high-traffic RV parks.

IV. Environmental cost/benefits of RV travel:

Superficially, RV travel is an easy environmental foil due to the low fuel efficiency created by heavy vehicle loads. The quest for fuel economy in RV manufacturing has historically produced light but poorly insulated vehicles, and this imbalance will need to readjust as higher energy costs drive a demand for tighter insulation design to reduce heating and cooling loss. On balance, the on-road, high gas consumption characterizing RV travel is compensated by a traditionally lower-impact lifestyle relative to other forms of travel. While no industry "average" exists for overnight kilowatt usage at any individual RV site, interviews suggest that 13-15 kWh/night is a reasonable band for a Class C Motorhome, barring locations with extreme temperature. In contrast, Hilton Hotels in Europe average energy consumption of 89.5 kWh per night, while Scandic hotels have an average energy consumption of 47.8 kWh per night.[v]

- Finite tank capacity: On-board Water and propane tanks necessitate water and fuel conservation when not serviced by full hook-up.

Figure 2:
Top Row--Motorhomes
Bottom--Towable RVs


Type A Motorhomes


Type B Motorhomes


Type C Motorhomes


Conventional Travel Trailers


Fifth-Wheel Travel Trailers


Folding Camping Trailers


Truck Campers

- Less throw-away waste: Space restrictions aboard an RV offer additional green advantages over hotel/restaurant tourism, as RV travelers shop only for what they need and can consume during the length of a vacation.
- Water conservation: A standard RV uses only 27 gallons of water/day, whereas a household consumes 150 gallon/day. An on-board washing machine uses only five gallons. An on-board toilet uses approximately three cups, or one-fourth the water of a 1.6 gallon low-flush toilet, or up to three gallons per flush for a standard household toilet.
- Lower fuel emissions: Propane used for cooking and heating is cleaner-burning than electric ovens and cook-tops. Diesel-powered RVs can also use biodiesel fuel.
- Local farm support: Farmers' markets and roadside produce stands are found across states, offering RVers the chance to support local agriculture. Additional savings often lies with on-site farm-stand purchases vis-à-vis grocery stores and fresher produce can't be found.
- Eco-vacation option: Newer RV models come with the option of bicycle racks, or the entire vehicle becomes a trailer for cycling vacations.
- Landscape: RV parks are often situated amidst splendid landscape, a main draw of RV travel. Low-impact land development at RV parks holds a more intensely built environment at bay, even as parks weigh the conundrum of optimizing land for maximum RV siting.

V. Comparison of RV vacation to traditional drive/hotel vacations:

Two previously published studies and data compiled by the author quantify energy used for RV vacations as compared to drive/hotel vacations. A carbon budget for RV travel was established in each of these models, and in every scenario travel by RV trumped the alternative for energy efficiency. [Mobile combustion fuel and LPG (propane or butane) for generators were considered independently from electricity used at campsite hook-ups.]

U.S. study: A pivotal report commissioned by RVIA in 2008 examines quantitative economic and environmental factors associated with RV travel vis-à-vis travel industry alternatives. Qualitative factors are not considered in PFK Consulting's comparative study of vacation travel. The PKF Report, as it has become known, is invaluable for its consistent results measuring RV travel of varying length, distance, and terrain against air/drive/hotel vacations for the same routes. In all scenarios, RV travel was shown to emit less CO2 than travel alternatives. The study also estimates carbon footprints for sample travel comparisons in the U.S. and Canada; however, carbon counts in both regional scenarios omit CO2 that would have been emitted by electrical hook-up or propane generator during RV park overnight stays. This data was not included because it proved impossible

to collect.[1] A second critical point in reviewing this study from a sustainability perspective is that PFK calculated RV fuel economy for a Type C motorhome of 1,060 sq ft, as given by manufacturers - supplied averages. While a Type C may represents mean RV dimensions, increased sales of larger models most likely has skewed the median square footage upward, and with it, the budget for CO2 emissions. See Appendix I for CO2 comparisons based on sample itineraries from the PFK study. Despite fuel economy that is at best, half that of other forms of vehicular travel, the PFK study witnessed only moderate price elasticity in RV travel owing to lower expenditures embedded in the RV vacation model such as campground fees and cooking relative to hotel and restaurant expenses. RVers respond to rising fuel costs by reducing travel distance and road time but not length of vacation. Fuel costs constitute a disproportionate level of expenditure in RV travel budgets, and the travel distance factor can be offset without loss of quality of the RV experience.

German study: The German research center Öko-Institut examined the climate impact of RV travel in scientific detail, comparing energy consumption of both air/auto to RV travel and accommodations by season, rates of occupancy, and terrain. "Comparative Material Flow Analysis in RV Travel" amply demonstrates that travel by RV produces fewer GHG emissions than any other combination of travel modes within Europe. The study presents tables for specific GHG emissions factors even for electricity and heat conversion; LPG; hotel, camping, and dining out; energy consumption in motorhomes; and transportation. Moreover, tourists that own campers are more likely to travel overland than air travel, thereby reducing their carbon footprint up front through their selection of

Figure 5: Per night comparisons of specific GHG for mobile homes, RV parks, & hotel stays, 2006

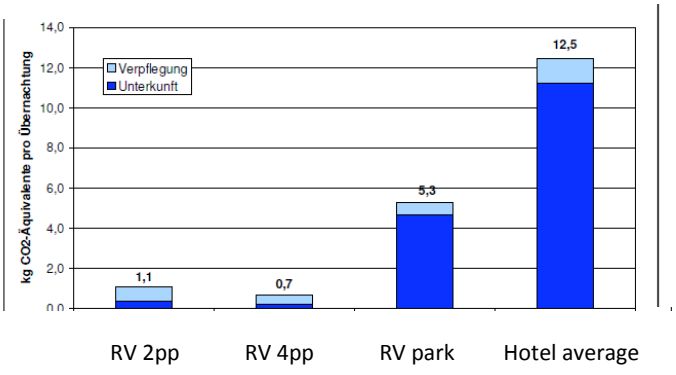
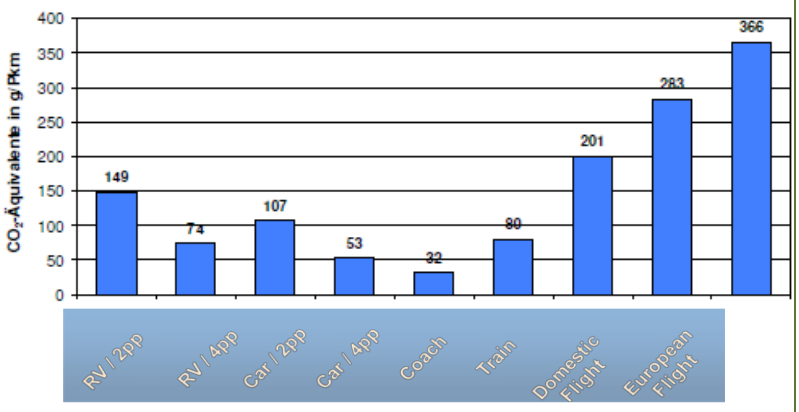


Figure 6: Comparisons of specific GHG with different means of transport for year 2006



Source: Öko-Institut

[1] Survey research needed voluntary support from campgrounds regarding kWh/site/night but did not get enough of a response to measure figures for carbon emissions with accuracy. This omission of CO2 from overnight campground stays is acknowledged in the study.

a lower-carbon transportation option.[vi] In every travel scenario regardless of destination, type of accommodation, or vehicle occupancy, RV travel produced fewer GHG emissions than did air travel, with emissions from air travel exceeding travel by motor homes by a factor of 21-215%.

Author's calculations: Three RV trips taken by the author provide an actual accounting of GHG emissions that compare surface travel and overnight emissions from RVing to drive/hotel stays for a family of six. Total emissions for my itineraries reflect GHG inventories for carbon dioxide (CO2), methane (CH4), and nitrous oxide (N2O) as compared to the single focus on CO2 in the PFK study, although I shared their approximation of overnight hotel emissions which is limited to CO2. This broader GHG accounting results in higher rates of emissions for my on-road RV travel than in the PFK sample itineraries. Since cross-country, round-trip travel by RV could not be completed in a two-week period, passenger air miles common to both travel experiences are therefore dropped from comparative accounting. Emissions differentials between travel modes would have been markedly greater if air travel had taken the place of point-to-point surface travel. The narrower emissions tallies is also attributable to the relatively low fuel efficiency I assigned to a rental vehicle based on the 18 mpg attained by my Yukon XL when carrying six people and luggage. With the rental car's average highway mileage not even double the RV's, GHG emissions from overnight stays take on greater significance when comparing overall travel emissions.

Figure 3: Per trip GHG emissions comparing hotel/drive travel (blue) with actual RV travel (red), in MTCDE

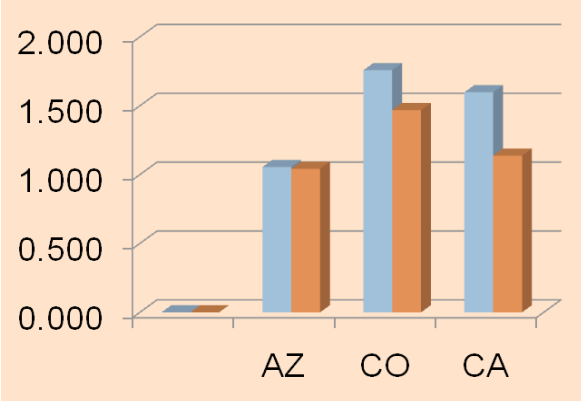
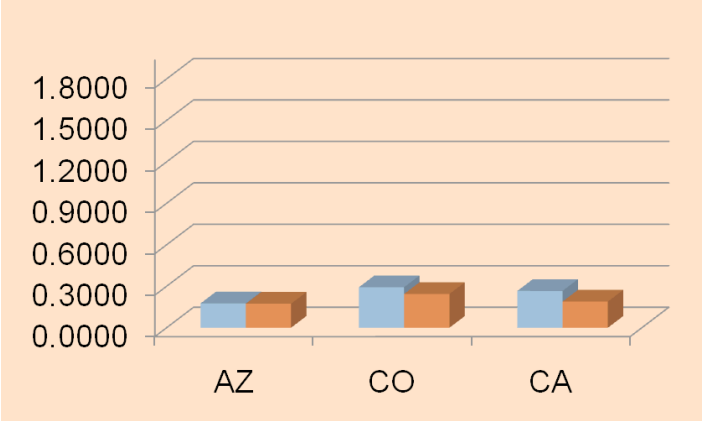


Figure 8: Per person GHG emissions comparing hotel/drive travel (blue) with actual RV travel (red), in MTCDE



Source: Author's calculations based on completed trip data.

My RV itineraries combined both electricity use from RV campgrounds hook-ups and propane use from dry camping. Both are factored into my GHG trip accounting., found in Appendix II. Note also that the Colorado trip included five nights of wilderness camping that excluded any fuel use.

Table 1: Comparisons of RV travel differentials that influence GHG emissions

Author Trips	Total nights	Hookup Nights	NPS/BLM No hookup	Notes: Dry Camping	Terrain	Climate
AZ	7	4	3	Gr Canyon 2 nights Cococino Nat Forest 2 x	Flat, high altitude	April dry
CO	13	7	6	Rocky Mt NP 1 night Weminuche Wilderness 5x	mountainous	July cool
CA	12	9	3	Tuolomme/Yosemite, 3 nights	mixed	Jul/Aug hot

Table 2: Comparative GHG emissions accounting for RV travel vs. hotel/drive vacation

	Arizona	Colorado	California
Vehicle Miles Traveled	973	1403	1080
Passenger Air Miles*	4440	3446	5120]
Air Emissions X .0004/air mile	1.8204	1.4129	2.0992
Hotel Nights	7	13	12
CO2 hotel Emissions X .0136/night	.0952	.1768	.1632
Number of people	6	6	6
Sub-Total (hotel)	.5712	1.0608	.9792
Gas emissions	.4843	.6974	.5406
Total hotel/drive emissions, in mtcde	**1.0555**	**1.7582**	**1.598**
Per person Hotel/ drive Emissions	**.1759**	**.2930**	**.2663**
Total RV travel emissions, in mtcde	**1.043**	**1.469**	**1.138**
Per person RV travel Emissions	**.1738**	**.2448**	**.1897**

Source: Author's calculations based on actual RV trip data.

VI. Assessment of Current Sustainability Efforts at RV Parks:

Sustainability concerns have seeped into the management of RV campground in almost metaphoric parallel to leakage from heating and septic tanks. A full-throttle pursuit of a sustainable agenda clearly rewards innovators at RV parks. Despite a high degree of awareness, mainstream park approaches to sustainability tend not to be systemic but emerge as clusters of high-visibility

programs like recycling and small but effective cost-saving adaptations such as energy-efficient lighting and bathroom retrofits to conserve water. Interviews confirm that the low-hanging fruits of RV park sustainability are attainable regardless of operation size. The larger and higher-traffic parks have ably partnered with municipalities and utility companies on renewable energy buy-back programs and have taken advantage of economies of scale and high seasonal occupancy to dramatically shorten the pay-back periods on energy investments. Size and limited capitalization penalize smaller independent parks that would like to move decisively in a sustainable direction to lower operational expense as well as do the right thing environmentally. Still, no single stakeholder group speaks for the interests of the RV industry broadly defined, and the environmental interests of RV parks and campgrounds are not always upheld by RV manufacturing lobbies. A proposed coalition to address RV sustainability in the U.S. announced January 2010 failed to coalesce, and my own several inquiries to info@sustainablerv.com went unanswered. Interviews elicited opposing viewpoints regarding the support RV manufacturers and suppliers lend the goals of independent campgrounds. Several interviewees cited FMCA's opposition to California legislation banning toxic chemicals in RV holding tanks. Others said manufacturers were beginning to consult park managers to innovate new RVs features in tacit recognition that size and resource consumption constrain RV campground sustainability. Thor Industries was specifically mentioned as working with campgrounds to address energy use.

The National Association of RV Parks and Campgrounds (ARVC) has led the mission to move RV parks toward sustainability with the introduction of its Plan-It Green Program. The two-tiered program equates to a very basic certification of environmental citizenship.[vii] The introductory Plan-It Green Pledge provides RV park owners an opportunity to move voluntarily toward higher levels of environmental responsibility by fulfilling a minimum of three sustainable criteria. Park owners can then earn the designation of "Green-Friendly Park" upon compliance with nine or more of eighteen criteria marking responsible environmental management. Criteria are listed in Appendix III. Campgrounds vying for Green-Friendly Park designation are subject to third-party inspection by Woodall's Guide evaluators. ARVC worked directly with Leave No Trace to develop educational materials for RV park guests as part of Plan-It Green user guidance and is looking at internal energy audit models offered by the NPS. About 100 of ARVC's 3,600 member parks to date have taken the Plan-It Green Pledge. More parks express an interest in going green, according to ARVC, but it has proven a challenge them to participate. Of those pledged to sustainability many have been certified as ARVC-designated Green Friendly Parks and shared their some of their

successes for this paper. A comparison of criteria achieved by three Green Friendly Parks is found as Appendix IV. Installation of renewable energy mars the near-perfect compliance record of these RV park industry leaders.

KOA, which is on the board of ARVC, embarked on an internal sustainability review of its 26 corporately-owned and several hundred franchise RV parks in the US and Canada in 2008. "We are excited about the program and the potential it has to bring a greater level of sustainability for our campgrounds and the educational opportunities for our owners and guests," says Doug Mulvaney, KOA's Facilities Development Manager. KOA has created a recognition program analogous to ARVC's Plan-It Green Program to distinguish KOA-owned campgrounds and franchise parks who meet nine of 20 sustainable criteria, for example, the sale of green product alternatives in KOA camp stores. The company is currently working with consultants to establish baseline practices and to outline areas of sustainable improvement at its parks to identify win-win action areas for campgrounds management, such as sustainable energy investment based on rebate availability. Several, mainly larger, KOA parks have experienced success with renewable energies and now serve as the network's in-house case studies. KOA will provide its franchises technical consultancy on alternative energies, a big advantage not shared by independent RV parks, although alternative energy installations will be financed by independent franchisers. KOA's green recognition program —*not* certification, out of concern for premature greenwashing--will also look at the model of Australia's government-backed Gumnut Award for environmentally responsible parks and at green practices implemented by Australia's Big Four chain such as inspection by university departments and passport programs for kids. KOA intends for these first steps toward a network-wide sustainability commitment to promote and encourage participation in the Kamp Green Recognition program and further the KOA-branded sustainable practices within the entire KOA system.

During its years of existence, the EPA- sponsored National Environmental Performance Track Program functioned as a private-public partnership to recognize business entities for their commitment to preserving and improving the environment. NEPT program members not surprisingly included over 500 RV parks, notably Forever Resorts and Xanterra parks, both NPS concessionaires.[2] Target criteria for NEPT recognition of reduced energy use, GHG emissions and water consumption, with additional member-selected, core environmental areas (land conservation, habitat restoration, priority chemical elimination) emphasized continuous

[2] Xanterra, in fact, was named 2005 Performance Track Corporate Leader.

improvement among members. The sharing of best practices and innovation dialogues raised participants to levels of environmental performance that went beyond industry targets and was often not covered by regulations. NEPT was terminated in 2009 as it was felt the national program was replaced and made redundant by equivalent agencies in more than half of U.S. states.[viii]

International Benchmarks: Canada, Germany, and Australia far outpace the U.S. in regulating environmental practices at RV parks.

Canada: Camping is a popular activity in Canada. Here RV parks are regulated at the provincial level akin to U.S. state governments, and regulations differ by province. An exception is federal-level support through rebate; otherwise, provincial levels mandate environmental policy and make recommendations to municipalities, for example, a five-year ban on pesticides. Provinces handed the opportunity to lead sustainable trends are doing so. A signature green initiative is the Ontario Government's initiative to incentivize solar power installation with a buy-back purchase price of 80.5¢/ kWh, a payback 4.5 times the commercial electric rate, through the FIT program of micro-power generation.[3] Another example is a meeting organized in Ontario around 2002 between the Canadian federal government and an association of 38 campgrounds including the Eastern Canadian KOA Owners Association, which has its roots in Ontario. The government supplied posters and free marketing tools for campgrounds which did not want chemical products. Alternative products were first found and promoted, but chemicals were not made illegal, per se. The campgrounds collectively took this on as marketing issue and used group buying power to obtain a more competitive wholesale price from an alternative non-chemical supplier.

Australia: In 2005 the Australian NPS looked at camping and its off-shoot, RVing, and adapted best practices to better align camping tourism with its natural setting. Andrew Daff pioneered, implemented, and manages to this day a sustainability scheme for Lane Cove River Tourist Park in use today at 15 other nationally RV accredited parks under the OZ park umbrella. Having a park chain permitted the "indulgence" of a sustainable agenda, Daff explains: "Taking sustainability best practice and incorporating it into an already successful eco- tourism business model allows us to better define our product and provides us with an additional sales distinction that we use with our marketing to promote our business." Lane Cove River Park today sets the bar internationally,

[3] A partnership with the Royal Bank of Canada will finance 90% of structural materials required to erect a new barn equipped with solar panels and 100% of the solar costs. The Bank will take 100% of proceeds from Ontario Hydro, a regulated electrical utility, up to $100,000. Projects are self-insured by the people who build them. Since Ontario Hydro is not providing insurance, there is no liability to the Government and no bonding issuance; hence government incentives to micro-generation are significant (Barton interview).

having been recognized by UNWTO for its sustainability criteria and is now being studied by the Chinese and Bhutanese governments. Daff set out to do the basics: run a profitable business and establish a sustainable eco-business model; in essence, taking a simplified basic model and then adjust the proposition to include sustainability and the environment. Triple-bottom line accounting defines payback from economic, social, and environmental points of view. The parks perform cost-benefit analyses on all proposals, including a calculation of cost returns and depreciation, and find they are more than reducing their operational costs through green upgrades.

State-of-the art grid technology, energy conservation, and guest education have reduced energy consumption at Lane Park Cove to a fraction of U.S. use. Site electricity use is tracking at 5-7 kWh/per night as compared to 13-16 kWh/night in the U.S. (admitting that Sydney does not have hot /cold temperature extremes.) Another 25-30% of energy use would occur if not for the use of Korean-made voltage regulation technology, which works like one big smart meter. The smart grid inputs 240-volt electricity at the lowest peak demand and issues electricity use at 216-218 volts. The greater the kWh voltage, the more kilowatts are actually used; so here the higher voltage results in greater savings potential for electricity conversion at lower smart grid levels. A purchase investment of $25,000 reduces total electricity demand by 20% a year. With electricity billing at $7000/month, voltage regulation technology purchase will return investment in full within 2.5 years. Wi-fi meter reading additionally monitors any utility use at the park, both water and energy use, solar or fossil-fuel.

Australia's 240-volt current makes electricity more expensive than in the U.S.,[4] so the cost of *not* doing renewables is detrimental. Daff estimates that since 2005, his park has experienced 11% annual compounded visitor growth with a 32% increase in electricity rates, and Lane River is paying the same costs in 2010 as in 2005. Lane Cove River Park has set a 25% reduction target of annual energy consumption on-site through four types of solar and one wind power installation, falling to 50% by 2015. Management intends to be non-grid reliant by 2020.[ix] State policy in New South Wales is enviable, with goals for climate change mitigation spelled out and referenced in Appendix IV as

Figure 4: Sample NSW Government Sustainability Criteria

Factor	*Energy and water use*
Considerations	
• *Incorporate best practice energy and water efficiency measures.* • *Ensure metering arrangements will enable accurate monitoring of energy and water use.*	

[4] The cost of energy in Australia is a base rate of 7.5 cents/kWh, 11 cents for grid distribution, and 9 cents for network kWh charges, renewable energy offsets, and taxes for a total 25 cents/ kWh.

Sustainability Assessment Criteria. The Government of New South Wales made changes to its Wildlife Act of 1974 to make sustainable tourism an achievable goal within a regional environmental planning context. A report from the New South Wales Taskforce on Tourism and National Parks addresses nature-based tourism development outside national parks with recommendations to give financial support to ecotourism proposals, including those on private lands, to enhance capacity building as a region.

VII. Major Environmental Challenges facing RV Parks:

The image of RV parks as overnight gateways to some of the most spectacular landscapes on the planet—national parks, monuments, and historic waterways—camouflages the challenges to sustainability easily overlooked in the absence of a built environment. Extensive discussion with independent RV park owners and a senior member of KOA's corporate "green team" reveals the extent to which unrestrained on-site energy use, sewage dumping, and waste disposal are the core environmental challenges besetting park managers. Ironically, the first two of these three issue areas afflict RV park management regardless of their interest in sustainability, as rising energy costs and unscheduled maintenance are concerns endemic to every business. The third issue area, waste disposal, elicits a highly localized response and cannot be treated summarily. What is summary fact is that even a good citizen pursuit of sustainability subjects RV park owners to market mechanisms that ultimately dictate their management decisions necessary for run often seasonal, small- to medium-sized businesses. For this reason, some unconventional proposals outside the culture of RVing will later be recommended that respond to issues of dollars and cents.

Energy consumption. While the romance of cooking hot dogs over an open fire continues to feed enthusiasm for RV camping, the reality of away-from-home convenience has moved the energy needs of RVs away from flickering torchiers toward double 50-amp systems that power home theatres, multiple ACs, and an array of full-scale kitchen and laundry appliances. The entry of RV travel trailers and fifth wheels into the mainstream RV marketplace, as shown in earlier graphs, has correspondingly grown the energy footprint of RV park vacations. Increased energy demand is manifested by soaring electricity costs that are not being captured in full by park user fees due a practice of flat-rate hook-ups. Park owners in Sunbelt locations complain of electricity costs at 25% of operational budget; electricity costs increasing at 25-35% in Pennsylvania; $30,000-40,000 per month energy bills in large central California parks. From the perspective of long-term energy availability and operations budgets, these numbers are not sustainable. Consider that the Lifeline

helicopter to Milton Hershey Hospital was known to navigate its nocturnal emergencies by the lights of an RV park at ground level.[x]

The RV park industry standard for short-term visitor stays of under-30 days is a flat, overnight rate for unmetered electricity, water, and sewage hook-up. This arrangement mirrors, in essence, an open bar for electricity consumption. The forgotten acronym in this traditional arrangement is kWh; amp, mpg, TV, and DVD are the acronyms that sell for manufacturers' vehicles. The owner of a mid-Atlantic park described a mid-summer scenario with 40-45' big rigs running double ACs, many with screen doors open due to RV neighborliness. Minimal vehicle insulation and high degrees of leakage have made energy efficiency their casualty. RV refrigerators work only to 80% of ambient temperature; but without effective insulation, fridges are working full tilt, even at night. Shade trees, available in most Pennsylvania parks, partially offset the full sun, but in summers, "the vehicles get blasted."

Electricity delivery reaches the RVs parks at commercial rates. Campgrounds are considered a business, despite the presence of long-term residents for up to six months. In some parks, no sites are metered; at others, long-term guests on seasonal sites are individually metered and pay utility bills directly, albeit at commercial rates. Some RV parks such as KOA charge guests according to site length, but others fear losing business to competitors if their fee structure is deemed unfriendly to big rigs. Owners say they neither wish to reward nor penalize guests based on rig size. 45' buses and 42' fifth wheels--toy haulers for motorcycles and other gear--require longer sites of up to 100'. Estimates of electricity draws run from $2/day on average, based on 16¢/kWh in Central Pennsylvania, to $4-5/day in southern California, where commercial electricity rates are 24¢.

Green campgrounds have reduced their consumption of oil- or propone-based heating expenses through the use of solar-powered hot water in restrooms, showers, and laundry washing machine. But even here, campgrounds must have room to ground- mount these sizable arrays in a southward-facing direction, which presents a trade-off between otherwise remunerable space for RV siting, or roof-mount the panels, provided there is sufficient, weight-bearing surface space. Park owners note the difference between solar hot water, which is not suitable for camper units, and solar-electricity generated by photovoltaic panels. Some of the larger campgrounds have countered spiraling electricity costs by installing renewable energy systems of their own, principally solar but

also wind turbines and in one case, geothermal.[5] Two solar systems installed on opposite U.S. coasts more than a decade apart yield nearly identical cost/benefit analyses. Actual details on these installations demonstrate the sizable impact solar-generated electricity has had in reducing utility costs at these parks:

Table 3: Actual cost comparisons of RV park solar installations

Location	Central PA	Northern CA
Base power unit	18 kWh/yr from 2 sets of panels	18 kWh/yr
Year installed	April 2010	1998
Cost	$121,000	$120,000 in 1998
Grants & Incentives	60% from State of PA, Federal DOE. Without grant, not economically feasible.	$35,000 in State of CA & Federal grants; State and Federal Tax Credits of about 25%;
Energy reduction	10% total annual electric use, including pump station	15% total annual electric use, or $38,000-$45,000 per year. Actual annual savings from energy generation results in a lower PG & E bill of about $6,750/mo, for an annualized rate of return 15 %.
Pay-back period	Six to seven years	System as designed has pay-back period of seven years
Other applications	Heating 2 150-gal tanks to 140°; works all day, though temp drops to 80-90° on busy weekends.	PG & E has a special Net Energy Metering phone number for their Solar Service Center for their customers with solar arrays
Expansion plans	None at present unless right incentives come along; priced a larger system of up to 200 kWh, space providing, to power 65-70% of electric needs	Solar array being priced for renovation of sister park

Source: Tomasso interviews with park owners, confidentiality requested.

At what point will rising energy costs make alternative energies at RV parks not only essential but price competitive? Eventually the answer depends not only on the price of energy alone but on external financing, state and federal grants, and like opportunities energy buy-backs that make installing alternative systems price effective. Converting some electric consumption purchase to a portfolio of renewables is not financially viable for many businesses for that reason. At every RV

[5] Wind turbines help power private campgrounds in Kansas, at KOA Flagstaff, AZ and soon at Sacred Rocks Reserve Park, outside San Diego. A unique materials reuse project that will manufacture blades for wind turbine at a site adjoining the campground. A Geothermal system is in use at Shady Pines in Hopkins, MI.

park but one, the direct purchase of renewable energy from the utility involved costs far beyond the commercial rate for electricity.[6]

Septic systems: Chemical-based cleaning products are believed to cause the majority of unscheduled maintenance expenses and lead to more frequent replacement of corroded tanks and liners. Large commercial septic systems of the type found at RV parks function by separating solids from liquid waste while promoting the partial breakdown of solid contaminants by bacterial microorganisms naturally found in sewage wastewater. Consider that RV plumbing systems reduce the water amount of flush water to just three cups from the standard 1.6 gallons for low-flush toilets. Thus septic tanks serving RV parks confront the specific challenge of processing a waste content that has a disproportionately high ratio of solid to liquid waste. EPA states that tank chemicals kill the bacterial agents necessary to process these typically high contents of solids, resulting in the clogging of leach fields surrounding the septic system. System clogging or malfunctioning allows inadequately treated solids to rise to the surface or percolate into nearby groundwater systems, thus presenting public health and safety hazards.

The absence of explicit bans on chemical-based RV holding tank cleaners is cited as a major environmental challenge to RV parks not on municipal sewage lines, which include most. The Australian government bans all chemical cleaners for use in RV holding tanks. Very strict regulations on septic tank mandate 100% use of biodegradable products. The government actually co-funded treatment technology in lieu of a chemical-to-chemical response through the Australian Science and Technology Agency, where maintaining biodiversity became the essential focus to technology innovation. The challenge was to come up with a reactor that uses nano-particles to filter bacteria and microbes on ANY wastewater, not just RV wastewater, to sustainably treat and manage waste without doing harm to the underlying environmental assets. The state took the position of developing preventative technology while making it affordable for the investor, with the result that the technology developed is now headed to Fiji. The Canadian government relegates the ban on chemical tank products to the provincial level. A provision on non-chemical septic products has meant the customer base for alternative products is up, lowering their price point. Provincial testing of septic systems occurs every two weeks in theory, but testing passed to the municipalities

[6] An exception occurred when Pacific Natural Gas publicly sold off a block of renewable energies at 8¢/ kWh—one third the 24¢/kWh commercial rate the R park owner was then paying. Within one minute of release, the block "sold out," PNG told the park owner.

in 2009 and over the last year, also to local health boards. Site inspections have waned for lack of resources, at best once a summer, and commercial septic systems will be inspected into the future even less regularly, given current backloads.

In the U.S, however, no regulatory statute at either the federal or state level prohibits the use of chemical-based holding tank cleaners in RV or marine tanks. A long-standing Alert for RV, Boat, Mobile Home Owners and Park Operators, issued by EPA Region 9 Ground Water Office in July 1999 and reiterated by the University of Arizona's College of Agriculture and Life Sciences, cautions against the use of chemical-based holding tank products that impose hazards on the safety of ground water drinking systems. Specifically, the alert cites formaldehyde is an EPA-recognized probable carcinogen. Another tank cleaner ingredient, para-dichlorobenzene, is a known carcinogen and drinking water contaminant. The Alert goes on to mention benzene, toluene, xylene, ethylene glycol (anti-freeze), methylene chloride, 1,1,1-trichloroethane (TCA), trichlorethylene (TCE) and perchloroethylene (PCE) as specific agents known for their potential to corrode underground septic tanks, tank liners, and pipes. Acids and bases contained in these chemicals can destroy biological activity, inhibiting the decomposition of fecal material present in the holding tanks. Appendix VI excerpts EPA's published list of toxic chemical holding tank ingredients and their affects on human and environmental health. Biodegradation of formaldehyde was also evaluated in several studies conducted by the Sanitary Engineering Laboratory at the University of California at Berkeley.[xi] From three separate research trials on batch septic tank study it was concluded that 1) formaldehyde removal from tank effluent declined as the dose increased and from separate study that 2) formaldehyde was found to inhibit the biodegradation of wastewater.[xii] The authors observed that "The anaerobic toxicity results show substantial reduction in biological activity at 50 to 150 mg per liter formaldehyde and no significant reduction in activity at levels of 5 to 10 mg per liter."[xiii]

The original EPA Alert, though never enacted as federal legislation, serves as regulatory precedent for California Legislation AB 1824 which is awaiting decision as of this writing. Legislation already on the books made it illegal to put in chemicals in RV or marine holding tanks that were non-biodegradable *or* toxic; the key word is *or* not *and*, for without being both, the chemical use could continue since permissible use of formaldedyde is based on a biodegradable window. When the regulations were softened to recommendations based on this miswording, neither the Department of Toxic Substances Control or the State Water Quality Board could help. Legislative process became the last resort. AB 1824 seeks to prohibit the use of RV and Marine holding tank products

that contain bronopol, dowicil, formaldehyde, glutaraldehyde, para-formaldehyde and para-dichlorobenzene.chemical. Unanimous passage in the California State Legislature and only three nay Senate votes presaged swift approval of the chemical ban. On August 18, 2010, Governor Schwartzenagger vetoed the legislation, deferring the decision to the Green Chemistry Initiative at the STDT.[7] Meanwhile, the probability of chemicals disappearing from RV tanks grows slim: the SDTD told the California ARVC it would be taking on more broadly affected chemicals first before they addressed AB 1824, since it concerned a smaller niche market.

As campgrounds across the U.S. follow the vetoed legislation, RVers haven taken to influencing demand for alternative products at the register. Camping World and WalMart, both large after-market product retailers of RV supplies, attest to the continuous, steady growth in the sale of green products marketed for RVers. Camping World has seen over the past three years an annual increase in unit sales of 'green products' by three to five percent, a trend expected to continue. "Units sold of 'green products' are almost half of our total overall unit sales," says Patricia Fleming of Camping World, "I believe the 'green' category will continue to grow as consumers become more aware of the products available as well as the quality of the products, and as state legislatures pass new laws regarding the use of certain chemicals at campgrounds."[xiv] WalMart is greening its inventory of holding tank products to match the larger percentage of sales in this market segment. George Alderman oversees WalMart's procurement and sale of camping supplies: "[…]We are seeing growing demand for both our oxygen- and microbial-based holding tank products. . . In fact, we expect to expand selection of our enzyme-based products in the future to meet customer expectations."[xv]

Consumers are further ahead on the chemical-septic divide than they are given credit. Demand is there, but the product industry is pretending there is no problem —notably Thetford, a major manufacture of chemicals and cleaners for RVs appearing to discredit the research science. Consumer demand will have to force change in the industry,[xvi] but it cannot be led by the campground associations.[8] The ARVC is a 501C(6) Trade Organization, beholden to anti-trust

[7] It was suspected the deferral of the bill, despite its merits and near-unanimous legislative support, was an untimely casualty of placement immediately prior to a high-profile decision to regulate the California chemical industry.

[8] RV consumers are pushing for the replacement of low volatile organic compound recyclable construction materials in RV interiors in place of formaldehyde-soaked wood products that have proven toxic to some RV dwellers. Similar to the holding tank stand-off, there is no federally mandated requirement that eliminates component products made from formaldehyde-treated wood in RV manufacturer. RVIA has embraced the

regulations. Under this status, the organization or its state counterparts cannot recommend boycotts of other commercial businesses, nor can it authorize action against one manufacturer. Without enforceable regulation, the default nay vote on dumping falls to park owners themselves. The problem is enforcement, as RV park owners do not want to be dump station "potty police." Most RV park residents who are aware of the problem are responsible about what goes into host campgrounds septic tanks, park owners say. The problem rests with non-residents--dry campers or boondockers—who request fee-based use of a park's dump station when outside facilities are not available. Sewage dumping from non-residents is more likely to contain damaging chemical tank effluent that deteriorates underground systems and becomes an environmental hazard to RV parks and their surrounding groundwater basins. Use of dump stations by transient campers who tend not to be invested in the environmental health of a campground is squeezing park owners between short-term business revenue, long-term septic system viability, and industry courtesy to campers in need.

Need is likely to rise as public dump stations begin to disappear. Small municipalities not wanting dumping by non-residents to tax their municipal septic systems have denied dump station permits to local businesses like gas stations. There are reports of many rural parks and gas stations that are closing their stations to transient RVs as the operational risk from chemical tank additives becomes too high. California rest stops are already closing their dump stations, and Washington State has closed *all* its road-side rest stop dump stations. Some parks have imposed restrictions on sewage treated with formaldehyde, though policies on fee-based dumping vary by park. Even the KOA network leaves it to the discretion of individual campgrounds whether or not to permit non-resident RVers to use their dump stations. Other parks are off-setting this risk by raising standard dumping fees from $5-10 to $20 to disincentive the use of chemicals correlated to low-budget camping. Considering that overnight stays at independent RV parks range between $36-50, $20 equates to a hefty precautionary tax on pollution.

Greywater Reuse: The issue of greywater reuse is pertinent to any discussion of RV park wastewater. No county where the RV parks I spoke with were located permits the reuse of

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HUD formaldehyde emission requirements for the use of manufactured homes and now requires that compliance with the California Air Resources Board standard's formaldehyde emission limits be a condition for RVIA membership.

greywater from showers, faucets, kitchen, and laundry. Grey water makes up on average 60% and up to 80% of residential outflow from a house's plumbing systems (except toilets). Because it contains little or no pathogens and 90% less nitrogen than black water, grey water does not require the same treatment process to neutralize microbial activity. With proper design of plumbing systems to separate it from black water, grey water can be recycled for purposes of irrigation, toilets, and exterior washing to achieve high levels of water conservation. The separation of the two types of flows saves on water transport, laying of pipe infrastructure, and treatment expenses where offsite sewer treatment is in use. Heat reclamation of up to 60% from appliance grey water outflow-- dishwashers, laundry, hot tubs, showering—can lower energy costs.

Greywater reuse is one of the 18 points of sustainability recommended in the ARVC Plan-It Green Program, ideal for irrigation of entry landscaping of RV facilities. Greywater recycling systems benefit the environment in substantial ways: a) reducing the fresh water outtake from rivers and aquifers; b) cushioning the impact from septic tank and sewage treatment infrastructure; c) reducing energy use and chemicals used in water treatment; d) groundwater recharge; and e) topsoil nitrification. In counties that do permit an active onsite treatment system for greywater, infrastructure installation can cost from $1,500 to $2,500. On the operational side, there are no additional costs anticipated from the drain pipe side of a greywater system. Monthly maintenance contracts on systems generally include water sampling in areas where on-site greywater reuse is allowed. Monthly service contract are priced between $35-60.

Waste Disposal: Various waste streams beyond septic accumulate at RV parks from household trash, building materials, recyclables, and pet waste. Park owners view recycling as the minimum buy-in to convince RV guests of a sustainability agenda heavily dependent on guest behavior. However, recycling is so localized a topic due to its various challenges of contracted pick-up, distance to recycling drop-offs, and expenses related to both. For many parks not on a municipal collection route, recycling represents an expense in excess of several thousand dollars per year between pick-up fees and labor for on-site sorting which can easily run to sixteen manpower hours/week. Recycling adds additional expense to a campground budget without offsetting rebates so that the cost of separated removal is greater than the same amount of unseparated trash, and waste management companies charge more per recycled materials dumpster than a regular trash dumpster. With communities and county jurisdictions no longer offering incentives, and collection companies selling recyclable materials for profit, RV parks justly feel squeezed at both ends. Many parks would like to recycle their own and guest waste streams but cannot afford to do so.

Ocean Lakes Family Campground in Myrtle Beach, South Carolina, is the unqualified industry leader in on-site recycling. What began as DIY recycling at the 3500-site facility culminated in a park-wide sustainability program branded and marketed under the name iCare. "Little things do matter," attests Barb Krumm, iCare program coordinator, who addressed the December 2010 National ARVC conference on sustainability planning. Employee education is a huge component of Ocean Lakes' success and has enabled the park's green team to move contracted recycling services in-house and still be profitable: the 21.61 tons recycled from June-December 2009 the park saved $1006.74 in land-fill tip fees for starters. Park recycling jumped to 90 tons of solid waste during the 2010 visitor season. Ocean Lakes has added refuse unnecessary product packaging to its reuse, redirect, and recycle maxims. With no curb-side pick-up, the park reduced solid waste by 1.3% from June-August 2009 and more than doubled that to 2.8% in 2010. A 30% waste reduction goal is the park target.[xvii] A thermal pool cover has also saved energy and was paid for by a shift to propane versus electricity use on-site.

VIII. Conclusions:

Historic access to cheap energy has bred a cynicism over time toward changing patterns of usage perceived to lessen enjoyment and individual choice among vacationers. The resulting problem of "the commons" is no different for the RV sector than for any other weighing restrictions on prevailing practices: a change in activity hinges on a change in culture which in turn depends on a change in thinking about the issue. Recycling, though expensive, and cleaning trails are fun, participatory activities. Neither alone restores the surrounding environment, but accomplishments like these motivate the larger system. The small victories set the stage for larger changes in an RV travel culture that typifies the Ehrlich identity.[9] "Going Green in an RV may have several elements. Harnessing solar power would be an important element, but the biggest "green" bang for the buck, would be an RV design that could increase full mileage by 50%," commented the president of Americana RV manufacturers.[xviii] A combination of innovation in vehicle manufacture, toxic substance and carbon emissions regulation, behavioral change, economies of scale to lower costs of green products, financing incentives for renewable energies, and educational campaigns to make consumers aware of their energy footprint are the necessary prerequisites to change. Solutions

[9] The Ehrlich identity recognizes that growth in user population, affluence, and technology jointly contribute to environmental problems.

specific to local situations were heard to bring the best results. RV parks want to lead by example, even though best practices sometimes cost them more.

Ten to 15% of RV travelers claim to want greener practices at RV parks, double or triple the five percent of ARVC's membership which has taken the Plan-It Green pledge. What of the other 85%-90%? How many will accept a voluntary shift in responsibility for levels of resource use from RV park management before market mechanisms pegged to energy costs or federal regulations over groundwater supplies tighten up old habits? From park owners' perspective, to what degree can sustainability be pursued through park management priorities without sacrificing standard guest amenities in the RV hospitality industry? There is a financial impact to going green in small, family-owned businesses, and investment in facility upgrades often crowds out desired sustainable alternatives that are imperceptible to guests. A variety of approaches to sustainability and energy reduction that recognize the needs of small and large campgrounds alike are thus offered in a concluding section.

IX. Recommendations:

Sustainability must reinforce the financial and management objectives of park owners, the quality of the guest experience, and the long-term health of the underlying property if it is to become a basic tenet at RV campgrounds. The following recommendations for attaining sustainability at RV parks include mitigation measures aimed at simple conservation and energy efficiency, alternative strategies for rethinking resource use, and some out-of-the box proposals to market sustainability as a backbone of RV industry culture.

A. **<u>Electricity use:</u>** Electricity consumption at RV sites beyond historic use patterns site is the consistent refrain heard from park owners. These proposals challenge status quo usage:

- RV park guests historically use less electricity if their consumption is monitored in some way. Metering of annual and seasonal sites bears this out. Individual metering of sites by park management is impractical at several levels. However, a **voluntary, self-metering system** patterned on reported mileage in the rental cars industry is a feasible way to trigger awareness and lower RV electricity draw. Many park owners support a site fee rebate as an incentive for reduced consumption. Consider that a 25% reduced electricity draw on an RV site costing $4/day produces a $30/month savings, or $100/season/site from Memorial to Labor Days. An individual meter such as

the one at right costs $185 requires and can piggy-back on existing site wiring at no additional cost. Payback is 18-20 months or less, depending on energy savings.

- The single-tier, **flat-rate hook-up fee** is past its prime and **must be phased out**. Changing the dynamic of large, energy-consuming vehicles, lifestyle intensity, and indifference among guests accustomed to flat rates for electric hook-up cannot be accomplished without redirecting pricing mechanisms. A more realistic accounting of electricity use as a combination of square footage (length x width) and amp use must become the new metric for energy consumption, where metering cannot be accomplished. Site costs for RV parks reflect many inputs, not just electricity, but as requirements for 30 amps have grown to 50 amps to 100-amps, so has the cost per site square footage. A one-size turnstile rate for hook-ups no longer fits all, just as a 25' Class A Motorhome does not consume at the level of a air-conditioned 45' travel trailer.

- The RVIA should explore this reality with a commissioned study that looks at actual energy use and not just manufacturers' averages.

- A second, fee-based option is a **multi-tiered pricing structure** that takes into account both vehicle square footage and green energy adjustments to RVs such as roof-mounted solar panels. Some parking lots in Cambridge, Massachusetts have adapted a three-tiered parking fee structure: 1) Smart Cars receive aggressive parking discounts; 2) non-GHG emitting electric vehicles enjoy "good citizen" rates and 3) all other cars pay a uniform, highest-tier parking rate. RV parks should adapt this fee structure that rewards low-impact campers and energy-efficient , solar-adapted models.

- **RV-mounted solar panels** can replace electricity used in lighting, battery recharge for portable electronics, and power for overhead fans that circulate heating and cooling. A single roof-mounted 110+ watt rated solar panel, with normal sunshine, keeps up with average 12v DC power use. If more power is desired , the standard RV can accommodate four or more roof-mounted solar panel. To stimulate interest in RV solar power through energy rebates, RV parks can consider offering discounted solar panel rentals at in return for lower hook-up fees.

- Switching energy use from electricity to propane lowers both long-term user cost and GHG emissions, with certain energy retro-fits to the vehicle. Propane is a cleaner than electricity, if one considers that 70% of electricity production in the U.S. is generated from coal-fueled power plants and that propane is combusted on-site, whereas two-thirds of the energy in electricity is lost in the production and transmission phases. One RV owner compared electricity usage to propane consumption for heating and from switching his refrigerator to propane.[10] **Table 4: Cost of Energy Comparison: Electric/solar/propane**

Month	Electric cost/without solar package:	Propane Usage:

[10] Cost of propane ranged from $2.45 to $2.85 per gallon and fueled a 12 ft^3 refrigerator, an on-demand hot water system, and the RV furnace for a

January	$227	$75
February	$240	$96
	Electric cost/with solar package:	
March (solar installed 3/16)	$261	$200
April (through 4/16)	$61	$66
TOTAL OVERALL COST	$789	$437

"RV Guests show an indifference to electric costs instead of propane use." Park owners in Canada find packaging from WalMart ceramic electric heaters at curbside when overnight temperatures plummet rather than see the use of standard propane generator on-board. RVers can extend their RV propane supply by turning off the water heater and using it only when needed. Xanterra minimized the propane tank waste at the RV campgrounds it manages for NPS by developing a mobile propane bottle recycling unit that recycles camper propane bottles and collects and reuses discarded fuel to power the recycling unit.

- RVs used as a seasonal, weekend home still consume electricity throughout the week to refrigerate food and control humidity. Stripping back contents of the refrigerator and transporting spoilable food to/from home in a cooler would draw far less energy. Intermittent power supplied by the generator can moderate cooling levels mid-week.

Industry association support for sustainability efforts:

- The ARVC should **streamline the certification process** for the Plan-It Green Program to make procedures for achieving green park status easier on park owners. In the U.S., evaluators will add sustainability criteria to their annual campground inspections on behalf of Woodall's for those participating in the Plan-It Green program. The Australian green park scheme tightens the recognition cycle by putting the initial burden of proof in the hands of park managers, trading the *writing* of sustainability action plans for *doable* action criteria. Park managers simply follow a standard work-sheet and submit their own proof of sustainability upgrades-- photographs and submissions of receipts for purchases and labor--related to five action/ outcome objectives that becomes the basis for certification. Self-reporting thus becomes verifiable and more quickly rewarded, leading to momentum in new areas of sustainability. Once a park achieves green status, evaluators monitor continuation of practices across subsequent years. Australia's Green Park work-sheet and certificate of Green Park status is shown as Appendix VII.

- Plan-It Green parks should receive **promotional recognition of their commitment to sustainability** through dedicated marketing links that prize green travel both within and beyond the RV industry. RV travel sites like "Go RVing" are silent on issues of sustainability, missing an opportunity within the sector to credit green-friendly parks most suited to the outdoor images on the opening screen.

- While Woodall's Campground Guide--the Michelin Guide of RV Travel—will recognize ARVC Plan-It Green parks, **marketing opportunities in mainstream travel guides** to promote green parks are being overlooked. Many RV parks also offer cabins—some even solar-powered cabins—that would appeal to non-RV tourists with interests in sustainable travel. Sacred Rocks Park invested in solar-powered park models to rent out. The Lonely Planet travel guides include a GreenDex of local accommodations and attractions that meet the criteria for sustainable tourism; Plan-It Green Parks deserve entry here as well as in AAA guides popular with motorists.

- **Web-sites for international green camping networks** such as Oz Parks in Australia and need to link to green RV parks in North America. The KOA site eventually leads to green caravan travel in Europe through its international camping link, but nowhere is the reverse true for KOA or ARVC green parks.

User-ratings for RV sustainability:

- The RV culture must begin to associate the autonomy of the RV camping experience with conservation of an environment that makes this mode of travel possible. Two popular user-submitted review sites for RV campgrounds are Campground Map, a U.S.-wide interactive map of 11,000 campsites, and RVParkReviews.com. Neither of these sites rates environmental or sustainability criteria, but each contains references to sustainable practices highly prized by visitors, such as organic gardens for camper use and the presence of shade trees. User awareness of sustainable RV practices with time can be embedded into these rating systems.

Transportation issues:

- Park guests and owners alike can reduce their carbon footprint by **optimizing the number of trips and vehicles operating in and out of the park**. An appeal to cost savings from reduced fuel use generally overlaps with issues of pollution and waste reduction. However, in considering the benefits of recycling, park owners often must factor in the distance to transport waste from the park site to a recycling station.

- Campgrounds located in the vicinity of major cities (ex. KOA Petulama north of San Francisco) recognize the difficulty of urban RV travel and coordinate **shuttle service into town**. This thinking should be adapted wherever proximity to major tourist sites limits RV use to travel to/from the destination only to be parked all day in the heat. Park locations which cater to specific visitor destinations can provide scheduled shuttle runs at start/ finish of the day to access local attractions on a fee basis. The advantage to RV travelers is the avoidance of hooking/unhooking the RV and overfilled parking lots upon arrival.

- Park owners might consider **electric-powered ATV service vehicles** for on-site travel for routine maintenance chores when older models needs replacing. The switch from fossil-based fuel use to electricity is cheaper, quieter, less GHG emitting, and can easily plug-into the electric power infrastructure already in place at RV parks.

Sustainability leadership: Once sustainable practices become part of contractual agreements and replicable models, they become so widespread that they go mainstream.

- **Franchise agreements** that offer sustainable practices as corporate priorities **imprint a culture of sustainability** as an industry standard. KOA is planning for a lead time of several years to introduce an opt-in program of compliance with green practices to its franchisees. During this lead time, a corporate culture oriented toward sustainability can similarly prepare RV park guests to meet new expectations of branded green practices.

- Equity Lifestyle properties,a network of over 150 upscale RV resorts for retired snowbirds, has launched a private label of industrial green holding tank products.[11] The company is currently creating a holding-tank cleaner for consumers to attack solid waste on both ends. **Corporate endorsement of non-chemical products** by a major property developer within the RV industry sets a priority commitment to this issue for guests and park owners to follow.

- **High visibility, low-cost projects and programs communicate to RV guests management's commitment to a sustainability agenda**. Salt water swimming pools that move away from chemicals without impacting guest comfort target a central guest meeting place for relaying this message. Investments in solar water heating for pools create interest in solar while saving money long-term. Recycling programs such as the iCare Sustainability Program at Ocean Lakes by their very nature invite guest participation, creating a high level of buy-in for waste-related initiatives correlated to recycling.

Septic Systems:

- State campgrounds associations together with the national ARVC must follow California ARVC's lead in partnering with state water quality boards to draw up **legislation restricting the use of chemical RV holding tank products**. CARVC opposed the use of chemicals on grounds of defending the business interests of its member affiliates and worked with the water quality control board to find a cooperative solution over years. A demand for regulatory elimination at state and federal levels of formaldehyde- and benzene-based products is paramount to enacting attitudinal change toward the use of sewage dumping in the RV sector. Mounting an opposition will bring attention to this issue.

- Rising consumer demand for environmentally friendly RV holding tank products indicates that marketers are encouraged by the growing **purchasing preferences for RV products** that are **non-toxic to the environment** where they vacation. First-time RV purchasers without long-time loyalties to mainstream chemical cleaners are a key target audience for

[11] The company licensed the alternative technology from Bio-wish in Australia and relocated from Sydney to Chicago to serve the U.S. RV market. Equity Lifestyle hired an outside consultant to tackle waste water at the campground level, modeling the chemical-free alternative from agricultural wastewater treatment.

green holding tank products into the future. Consumers need also to act on the urging of their host RV park and campground associations in spurning chemical use.

- RV campgrounds must reinforce these preferences by **marketing non-chemical alternative products for holding tanks** and cleaning in their camp stores or, at a minimum, offering alternatives at competitive prices--even at cost--alongside traditional chemical cleaners. Any lost revenue from product sales will be made up in reduced septic system maintenance costs down the road.

- Thetford places a sample bottle of AquaChem in every new RV purchased in this country. The ARVCs must pressure RV manufacturers to **withdraw chemical samples**, at least until side-by-side alternatives can be supplied. (Currently no other company has the funds and capacity to deliver alternatives, although Thetford has two new eco-safe products available.)

- Park owners should be aware of chemical use in other areas of park maintenance such as landscaping, where **organic fertilizers/pest control** are preferred near children and pets.

Regulatory compliance: The issuance in Fall 2010 of Secretarial Order 3289 , which deals with climate change impacts to the U.S. natural heritage, and Executive Order 13514**,** which mandates GHG reductions and a sustainability framework in U.S. agencies including the National Parks, will result in more stringent criteria on concessionaires and campgrounds on NPS lands. The second of these "**Federal Green-Line Mandates**" specifically requires federal agencies to meet quantifiable goals for fossil fuel use, water consumption, waste diversion, and energy performance and efficiency.

- The ARVC can broaden a dialogue already begun with the Plan-It Green Program in tracking internal changes to be implemented at RV parks and campgrounds under these federal mandates. Sustainability targets set for national park RV properties serve as points of reference for private parks management, and e-subscriptions to newsletters related to the Green-Line Mandates should be made available to park owners.

- Also, state ARVC should **pick up the National Environmental Performance Track dialogue**, engaging state environmental protection departments in the type of support presumed to have devolved from the federal level when NEPT folded.

Appendix I: PFK Study of CO2 Emissions by Vacation Type

GHG figures are in carbon dioxide (CO_2) equivalents, where 1 metric ton of carbon = 3.67 metric tons of carbon dioxide.
Conservation International Carbon Calculator—Methodology
Mobile Home = 1,060 square feet
Emissions per Commercial Air Passenger Mile = 0.00041 tons of CO_2
Emissions per Gallon of Gasoline = 0.0089 tons of CO_2
Emissions per Person per Hotel Night = 0.0136 tons of CO_2
Average Fuel Economy = 22 mpg
Mostly Vegetarian Diet = 3.0 tons of CO_2
Omnivorous Diet = 3.8 tons of CO_2

Source: PFK Consulting, Carbon Footprint Comparison for RV vs Non-RV Travel

CO_2 Emissions (in Tons) of Vacations by Type: Branson, MO			
Vacation Type/Transport Mode/Accommodation	**Chicago to Branson**	**Minneapolis to Branson**	**Minneapolis to Branson**
RV Vacations			
Car/Folding Camping Trailer	0.62	0.80	0.86
SUV/Travel Trailer	0.98	1.26	1.34
Type C Motorhome	1.29	1.69	1.86
Type A Motorhome (diesel)	1.04	1.35	1.49
Non-RV Vacation			
Airline/Rental Car/Motels or Hotels	1.99	2.61	2.91
Duration of Vacation	7 days	10 days	14 days

CO_2 Emissions (in Tons) of Vacations by Type: Dennis Port, MA			
Vacation Type/Transport Mode/Accommodation	**Washington, DC to Dennis Port**	**Washington, DC to Dennis Port**	**Columbus to Dennis Port**
RV Vacations			
Car/Folding Camping Trailer	0.60	0.65	1.00
SUV/Travel Trailer	0.95	1.01	1.55
Type C Motorhome	1.25	1.39	2.11
Type A Motorhome (diesel)	1.00	1.11	1.69
Non-RV Vacation			
Airline/Rental Car/Motels or Hotels	1.93	2.15	3.30
Duration of Vacation	7 days	10 days	14 days

CO_2 Emissions (in Tons) of Vacations by Type: Grand Canyon, AZ			
Vacation Type/Transport Mode/Accommodation	**Salt Lake City to Grand Canyon**	**Denver to Grand Canyon**	**Dallas to Grand Canyon**
RV Vacations			
Car/Folding Camping Trailer	0.45	0.91	1.84
SUV/Travel Trailer	0.70	1.43	2.91
Type C Motorhome	0.97	1.88	3.71
Type A Motorhome (diesel)	0.78	1.51	2.97
Non-RV Vacation			
Airline/Rental Car/Motels or Hotels	1.49	2.92	5.79
Duration of Vacation	7 days	10 days	14 days

Appendix II: GHG Emissions Calculations for Actual RV Travel

Option 1: RV travel with overnight

CO_2 Emissions (gasoline + propane)	Fuel consumed gal x emission factor kg CO_2 /gal ÷1000 kg/metric ton

Gasoline CO2 Emissions (mt): Table 12.1 US Default Factors for Calculating CO2 Emissions from Fossil Fuel Combustion

AZ: $ 335.22 x 1 gal/ $3.06 x 8.81 kg CO2/gal x 1 MT/1,000 kg = .965 MTCO2

CO: $ 428.85 x 1 gal/ $3.03 x 8.81 kg CO2/gal x 1 MT/1,000 kg = 1.247 MTCO2

CA: $ 379.11 x 1 gal/$3.10 x 8.81 kg CO2/ gal x 1 MT/1,000 kg = 1.077 MTCO2

Propane CO2 Emissions (metric tons) =

AZ: 8.75 gal x 5.74 kg CO2/gal x 1 MT/1,000 kg = .050 MTCO2

CO: 12.18 gal x 5.74 kg CO2/gal x 1 MT/1,000 kg = .070 MTCO2

CA: 10.5 gal x 5.74 kg CO2/gal x 1 MT/1,000 kg = .060 MTCO2

N2O Emissions (metric tons)	Fuel use MMBtu × emission factor g NO2/MMBtu ÷ 1,000,000 g/metric ton

Gasoline NO2 Emissions (metric tons) = Table 13.4 Default CH4 & N20 emission Factors for Highway Vehicles by Year

AZ: 109.54 gal x .0285 g NO2/gal fuel ÷ 1,000,000 g/mt x 310= **.00096** metric tons NO2

CO: 141.53 gal x .0177 g NO2/gal fuel ÷ 1,000,000 g/mt x 310= **.00078** metric tons NO2

CA: 122.29 gal x .0177 g NO2/gal fuel ÷ 1,000,000 g/mt x 310= **.00065** metric tons NO2

Propane NO2 Emissions (metric tons) = Table 12.8 Default CH4 & N2O Emission Factors by Fuel Type Sector (Tier C)

AZ: 8.75 gal x 3.836 MMBtu/bbl x 1 bbl/42 gal x .1 g NO2/MMBtu ÷ 1,000,000 g/mt x 310 GWP = **.00002** mt NO2

CO: 12.18 gal x 3.836 MMBtu/bbl x 1 bbl/42 gal x .1 g NO2/MMBtu ÷ 1,000,000 g/mt x 310 GWP = **.00003** mt NO2

CA: 10.5 gal x 3.836 MMBtu/bbl x 1 bbl/42 gal x .1 g NO2/MMBtu ÷ 1,000,000 g/mt x 310 GWP = **.00003** mt NO2

CH4 Emissions (metric tons)	Fuel use MMBtu × emission factor g CH4/MMBtu ÷ 1,000,000 g/metric ton

Gasoline CH4 Emissions (metric tons)=

AZ: 109.54 gal x 3.836 MMBtu/bbl x 1 bbl/42 gal x 0.0326 g CH_4/MMBtu ÷ 1,000,000 g/mt x 21 GWP= **.000007** mtCH4

CO: 141.53 gal x 3.836 MMBtu/bbl x 1 bbl/42 gal x 0.0326 g CH_4/MMBtu ÷ 1,000,000 g/mt x 21 GWP = **.000008**mtCH4

CA: 122.29 gal x 3.836 MMBtu/bbl x 1 bbl/42 gal x 0.0326 g CH_4/MMBtu ÷ 1,000,000 g/mt x 21 GWP = **.000006** mtCH4

Propane CH4 Emissions (metric tons)=

AZ: 8.75 gal x 3.836 MMBtu/bbl x 1 bbl/42 gal x 5 g NO2/MMBtu ÷ 1,000,000 g/mt x 21 GWP = **.00008** mt NO2

CO: 12.18 gal x 3.836 MMBtu/bbl x 1 bbl/42 gal x 5 g NO2/MMBtu ÷ 1,000,000 g/mt x 21 GWP = **.00012** mt NO2

CA: 10.5 gal x 3.836 MMBtu/bbl x 1 bbl/42 gal x 5 g NO2/MMBtu ÷ 1,000,000 g/mt x 21 GWP = **.0001** mt NO2

Scope 2: electricity from Table 14.1 US Emission Factors for Grid Electricity by eGRID Subregion:

CO2 Emissions mt CO2	MWh x lbs CO2/MWh ÷ 2,204.62 lbs/mt	x 1 GWP = metric tons CO2e

AZ: 4 nights x 12 kWh/night x 1 MWh/1000 kWh x 1,254.02 lbs CO2/1 MWh x 1 MT/2,204.62 lbs = .027 MTCO2

CO: 7 nights x 11 kW/night x 1 MWh/1000 kWh x 2,035.81 lbs CO2/1 MWh x 1 MT/2,204.62 lbs = .071 MTCO2

CA: 9 nights x 14.58 kW/night x 1 MWh/1000 kWh x 878.71 lbs CO2/1 MWh x 1 MT/2,204.62 lbs = .052 MTCO2

N2O Emissions mt CO2e	MWh x lbs N2O/MWh÷ 2,204.62 = mt	x 310 GWP = metric tons CO2e

AZ: 0.048 MWh x .015 lbs NO2/MWh ÷ 2,204.62 x 310 GWP = .00010 **mtcde**

CO: 0.077 MWh x .030 lbs NO2/MWh ÷ 2,204.62 x 310 GWP = .00031 **mtcde**

CA: 0.131 MWh x .008 lbs NO2/MWh ÷ 2,204.62 x 310 GWP = .00012 **mtcde**

CH4 Emissions mt CO2e	MWh x lbs CH4/MWh ÷ 2,204.62= lbs mt	x 21 GWP = metric tons CO2 e

AZ: .048 MWh x .018 lbs CH4/MWh ÷ 2,204.62 x 21 GWP = **.000006 mtcde**

CO: .077 MWh x .024 lbs CH4/MWh ÷ 2,204.62 x 21 GWP = **.000018 mtcde**

CA: .131 MWh x .036 lbs CH4/MWh ÷ 2,204.62 x 21 GWP = **.000045 mtcde**

Option 1: Fly/Drive/Hotel Vacation:

- Fuel consumption data obtained from fuel receipts and miles traveled data. (13.1 Actual use method)
- Fuel economy based on 18 mpg obtained by Yukon XL when loaded with 6 passengers and luggage.
- CO2 directly related to quantity of fuel combusted.
- CH4 & N2O emissions subject to emissions control technology in vehicle and distance traveled.

CO_2 Emissions (gasoline)	Fuel consumed gal x emission factor kg CO_2 /gal ÷1000 kg/metric ton

Source: Table 12.1 US Default Factors for Calculating CO2 Emissions from Fossil Fuel Combustion

AZ: 973 miles x 1 gal/ 18 m/gal = 54.1 gal x 8.81 kg CO2/gal ÷ 1000 = 0 .477 mtCO2

CO: 1403 miles x 1 gal/ 18 m/gal = 77.95 gal x 8.81 kg CO2/gal ÷ 1000 = 0.687 mtCO2

CA: 1080 miles x 1 gal/ 18 m/gal = 60 gal x 8.81 kg CO2/gal ÷ 1000 = 0.529 mtCO2

N2O Emissions (gasoline)	Miles × emission factor g NO2/miles ÷ 1,000,000 g/metric ton

Source: Table 13.4 Default CH4 and N2O Emission Factors for Highway Vehicles by Model Year

AZ: 973 miles x .0228 g NO2/mile ÷ 1,000,000 g/mt x 310 GWP = **.0069** metric tons NO2

CO: 1403 miles x .0228 g NO2/gal fuel ÷ 1,000,000 g/mt x 310= **.0099** metric tons NO2

CA: 1080 miles x .0228 g NO2/gal fuel ÷ 1,000,000 g/mt x 310= **.0076** metric tons NO2

CH4 Emissions (gasoline)	Miles × emission factor g CH4/mile ÷ 1,000,000 g/metric ton

Source: Table 13.4 Default CH4 and N2O Emission Factors for Highway Vehicles by Model Year

AZ: 973 miles x .0178 g NO2/mile ÷ 1,000,000 g/mt x 21 GWP = **.00036** metric tons NO2

CO: 1403 miles x .0178 g NO2/gal fuel ÷ 1,000,000 g/mt x 21= **.00052** metric tons NO2

CA: 1080 miles x .0178 g NO2/gal fuel ÷ 1,000,000 g/mt x 21= **.0040** metric tons NO2

Total CO2 Emissions from Fly/Drive/Hotel Vacation	Arizona	Colorado	California
Vehicle Miles Traveled	973	1403	1080
Gasoline consumed (gal)	54.1	78	60
mt CO2 emissions X .0089 mt/gal	.4815	.6942	.5434
Passenger Air Miles	4440	3446	5120
mt CO2 Emissions X .00041 mt/air mile	1.8204	1.3718	2.0992
Air Emissions x 6 passengers	10.9224	8.2312	12.5952
Hotel Nights	7	13	12
mt CO2 Emissions X .0136 mt/night	.0952	.1768	.1632
Hotel Emissions x 6 people	.5712	1.0608	.9792
Total emissions in mt CO2	**11.9751**	**9.9862**	**14.1178**

Table 5: Total CO2 Emissions from Fly/Drive/Hotel Vacations

Appendix III: ARVC Plan-It Green Sustainability Criteria

Tier I: Green Friendly Park Criteria: *Campgrounds needs nine or more criteria of the 18 to qualify for the Plan it Green 'Green Friendly Park' (Parks need a score of 50% or higher)*

1. Park has converted to a tank-less water heaters
2. Park uses motion sensors for lighting in bathroom and club house timers
3. Park has switched to energy efficient light bulbs
4. Park uses non-toxic biodegradable cleaning products in general
5. Park uses water saving shower heads and/or auto turn-off taps
6. Park provides recycle bins for cans, paper off paper route, glass and plastic.
7. Park uses energy saving products in their campground like Energy Star products.
8. Park offers eco-friendly and 'Leave No Trace' tips and education to RVing & camping guests
9. Parks landscaping consists of wood chip, pebble, paved, or grass paths and is used to decrease soil erosion
10. Park has "Reduce Water Usage" signage to guests around the park in bathrooms, on newsletters
11. Park has one or more of the following: lighting, heaters and/or coolers with timers
12. Park uses Solar Power or Wind Power
13. Park uses Low Flush toilets or waterless urinals (not welcome at most RV parks, I heard.)
14. Park use of Grey Water (if allowed in state)
15. Park participates in on-site organic composting urge it, do w/ wood chippings, up to camper behavior
16. Park sends email confirmations rather than paper confirmations
17. Park uses geo-thermal heating/cooling
18. Park plants new trees frequently

Source: National Association of RV Parks and Campgrounds, Plan-It Green Program web-page: <http://www.woodalls.com/articledetails.aspx?ArticleID=2575549>

Appendix IV: Comparison of Green Friendly Park Sustainability Achievements

Source: Tomasso interviews with RV park owners

Plan-It Green Evaluation Criterion	Park A San Diego	Park B Sacramento	Park C Myrtle Beach
Park has converted to a tank-less water heaters	Yes	no	Don't know
Park uses motion sensors for lighting in bathroom and club house	Yes timers	yes	In new facilities
Park has switched to energy efficient light bulbs	Yes	yes	yes
Park uses non-toxic biodegradable cleaning products	Yes, in general	yes	When can
Park uses water saving shower heads and/or auto turn-off taps	Showers are metered	yes	bath houses & $1800 shower towers have auto-shutoff
Park provides recycle bins for cans, paper (if off paper route), glass and plastic.	Yes, except for paper	Cans, yes, Some paper, at office, not RV parks	Yes + 2 for cardboard (RV center, golf-cart)
Park uses energy saving products in their campground like Energy Star products.	Yes	yes	Phased into
Park offers eco-friendly and 'Leave No Trace' tips and education to our RVing & Camping guests	Yes	Info in newsletter	Yes, but still improving;* at mother station
Parks landscaping consists of wood chip, pebble, paved, or grass paths and is used to decrease soil erosion	Yes, all natural	yes	yes
Park has "Reduce Water Usage" signage to guests around the park	Yes in bathrooms, newsletters	yes	Some but not consistently
Park has one or more of the following: lighting, heaters and/or coolers with timers	Yes	Heaters & lights	yes
Park uses Solar Power or Wind Power, few SOLAR cottages, working on others	Yes, on solar cottages only	Don't yet but at other camp	Solar
Park uses Low Flush toilets or waterless urinals (RV Park, not welcome)	Yes	Plans to install for retrofit	Yes
Park use of Grey Water (if allowed in state) NB most counties don't allow, water must go thru processing plant	Not allowed	Yes, but more difficult	Not allowed
Park participates in On-Site Organic Composting urge it, do w/ wood chippings,	Yes, in office; Up to camper behavior	No	New exciting thing—12 horticulturists Flowerbeds
Park sends email confirmations rather than paper confirmations (office/reservations/notices)	Yes + invoices	Yes, but pushback	Yes; guest choice
Park uses geo-thermal heating/cooling	No, unless Do-It-Yourself	No	No because at sea level
Park plants new trees frequently	Yes ^	Yes	yes

Appendix V: Sample Sustainability Criteria for RV Park Management, Government of New South Wales, Australia

- **Waste management**

Factor	*Waste management arrangements*
Considerations *Identify arrangements for the management of waste, including:* • *garbage disposal, recycling, and measures to prevent animal access to waste; and* • *toilet facilities, preferencing water and chemical free options.* ► *innovative collection and treatment technologies may be considered, but preference must be given to systems that have been proven to be fit for the intended purpose and with least risk to the environment*	

- **Energy and water use**

Factor	*Minimising energy and water use*
Considerations *Provide details of energy and water supply and use, including consideration of minimisation measures such as:* • *sourcing accredited Green power;* • *use of temporary renewable systems to support load requirements;* • *where generators are required, using models that run on biodiesel;* • *purchase of carbon credits to offset energy use and achieve carbon neutrality or better;* • *use of energy and water efficient appliances, fittings and timers;* • *water-less toilets;* • *purchase or provision of bulk potable water (eg. in designated drinking water tanks) to minimise the need for bottled water;* • *planning the event timing to maximise use of natural daylight; and* • *energy and water monitoring systems.*	

Waste management

Factor *Waste management arrangements*

Considerations *Identify arrangements for the management of waste, including:*

• garbage disposal, recycling, and measures to prevent animal access to waste; and

• toilet facilities, preferencing water and chemical free options.

► innovative collection and treatment technologies may be considered, but preference must be given to systems that have been proven to be fit for the intended purpose and with least risk to the environment

Promotion and education

Factor *Promotion, interpretation and education*

Considerations *Detail how the activity will promote community awareness and understanding of the park and its conservation values, including:*

• opportunities for patrons to experience park values, such as guided tours, presentations, interpretation materials, or cultural events (eg. Aboriginal performances); and

• use of event promotional material to emphasize park values, measures to protect those values during the event, and opportunities to experience the park.

Considerations *Detail how sustainability strategies for the activity will be promoted and supported, including:*

• advertising public transport, waste reduction, recycling, and, water and energy measures;

• use of recycled content in printed products such as flyers, signage and ticket.;

• communication strategies, referencing the use of electronic media.

Appendix VI: EPA Alert for RV and Marine Holding Tank Products

Active Ingredient	Threats to Human and Environmental Health
Bronopol (chemical name:bromo-nitropropane-diol)	Bacterial pesticide.
Dowicil (chemical name: 1-(3-chlorallyl)-3,4,7-triaza-1-azoniaadamantane chloride)	Bacterial pesticide. (EPA states "Do not discharge effluent containing this product to sewer systems without previously notifying the local sewage treatment plant authority.")
Formaldehyde (also known as Formalin; degradate of bronopol)	Kills or retards bacterial growth, recognized by EPA as probable carcinogen 1; moderately toxic to humans.2
Glutaraldehyde (also known as embalming fluid)	Retards bacterial growth and covers sewage odor, eye/inhalation irritant.
Paraformaldehyde (polymerized formaldehyde)	Very toxic to humans.3 (see formaldehyde)
Para-dichlorobenzene (common ingredient in mothballs, urinal cakes, and toilet bowl fresheners)	Known carcinogen 1 and drinking water contaminant; moderately toxic to humans.2

1 A carcinogen: causes cancer
2 Lethal dose for 150 lb person is between 1 ounce to 1 pint
3 Lethal dose for 150 lb person is between 1 teaspoon to 1 ounce

Information on active ingredients was excerpted from Alert for RV, Boat and Mobile Home Owners and Park Operators about Safe Wastewater Disposal, EPA Publication 909-F-99-002, July 1999.

Appendix VII: Work Sheet for Australian Sustainable Park Certification

The work sheet is designed to assist you in completing the milestones need to complete the program. We have tried wherever possible to include alternatives to some projects because of the difficulty some parks will face due to restrictions in their particular areas. If you have any questions or queries about the program or the tasks, please contact the project officer.

Program Component	Implementation Tasks and Benchmark	Alternatives	Evidence	Date completed	Sign off
Green House Reduction	**Lighting:** Convert your park lighting to energy efficient lighting by replacing incandescent globes with energy savers or fluros. **Energy:** Upgrade your existing energy to a minimum 15% Accredited Green Energy	Installation of timers or sensors for existing lighting. Convert some hot water to gas or solar, or have gas or solar.	• Proof of Purchase • Note from Electrician • Copy of Power Bill • Photo of gas or solar appliance		
Water Reduction	**Water:** Convert your park shower heads to water savers – minimum 9 litres per minute	Install flow restrictors on taps and existing shower heads	• Proof of purchase • Note from plumber or water authority		
Recycle/Reuse	**Waste:** Implement recycling stations for your guests within your park. Minimum requirement – paper, glass and plastic.	Worm farms for food waste.	• Photo of worm farm or recycle station		
Habitat/Native Vegetation	**Trees/Plants:** Plant a minimum of 20 native shrubs or trees every year in your park gardens to create habitat.		• Pictures of new plantings		

Once completed, please sign off each section, attach your evidence and return to:
Green Park Project
Plassey Road
North Ryde NSW 2113

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Endnotes

[i] (Curtin, 2005)

[ii] (Affinity Group, 2010)

[iii] (Curtin, 2005, p 14.)

[iv] (Harris Survey, 2010)

[v] (Bogdanowicz/Martinac, 2007)

[vi] (Schmied, "Comparative Material Flow Analysis: RV Travel." September 2007, p 36)

[vii] (Tomlin, 2010)

[viii] <http://www.rvbusiness.com/2007/10/rv-parks-recognized-for-environmental-programs/>

[ix] (Daff, 2010)

[x] (McFarland, 2010)

[xi] (Pearson et al. (1991)

[xii] (Brown et al., 1982).

[xiii] (U.S. Environmental Protection Agency, 1999)

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[xv] (Alderman, 2010)

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[xvii] (Krumm, 2010)

[xviii] (American Factory Ordered Fifth Wheels, 2010)