

Energy for Rural Development: Powering ICT and the Internet in Remote Areas

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Meeting Topics

- Power solutions for ICT in unelectrified areas
- Power system cost-impacts of ICT equipment choices
- Ensuring appropriate system design and quality
- Info needed from/by ICT and power system vendors
- Identify possible issues/activities for EGAT/E & IT
- Explore possible cross-sector work within USAID
- Guidebook on Powering Rural ICT Systems



Linking Energy to Rural Development in USAID & USAID-Assisted Countries

Information Technologies



Education & Training



Health/
Indoor
Air Quality



Natural Resource
Management



Agriculture and Rural
Enterprise

Water



Background

- USAID-supported work on energy for rural development: Ag, Education, health, PAM
- Experience in energy for rural distance education schools, particularly in Mexico
- Winrock/partners started work on energy for rural ICT to clarify power requirements and options, and provide guidance to key actors



Energy for Rural Development: What is Necessary for Effective Interventions

- Info on sector-specific applications and equipment
- Info on end-use requirements and usage patterns
- Close involvement of some end-use sector experts
- TA, training and informational materials targeted at:
 - decision-makers
 - technical staff
 - users/operators
 - Industry (e.g. IT and/or power system vendors)



Rural ICT: Not Just Internet

- Rural telecom (voice, fax)
- Internet connectivity
- Non-connected computer applications
- Video: broadcast, tape (e.g. education)
- Radio: satellite, integration of small radio stations with internet
- Other services (e.g. Text Messaging)



Off-Grid ICT: Key Considerations

- Moving beyond traditional rural telephony actors, loads, services, technical capabilities
- Need for very low-cost approaches, including for power systems, due to
 - Low to very low income population
 - Many urgent competing demands for investment (potable water, health, schools, roads, etc.)
- Shared ICT systems can get heavy usage
- Systems/costs typical for donor-supported pilot projects will generally not be replicable



Power Options for Rural ICT

Power Technology/ Resource	Capital and O&M Cost Profile	Site Specificity/ Range of Application	Other key characteristics
Diesel/gas generator-sets	Lower capital cost, higher operating costs	Usable in all locations, fuel cost high in remote areas	Often hard to ensure required maintenance in rural communities; noise
Solar Photovoltaic (PV) Systems	High unit capital cost, lower operating cost	Solar resource variable, sufficient in most regions	Modularity, broad resource availability make PV widely applicable for small ICT
Small Wind-electric systems	Higher capital cost and operating cost	Wind resource very site and region specific	
Micro-hydro and pico-hydro	Moderate capital cost and low operating cost	Hydro resource extremely site-specific	Less commonly suitable for dedicated ICT facility power systems



Comparing Computer Power Rating and Actual Consumption

Computer Type	Power Rating ('black plate)	Power Consumption While in Use
Desktop Computer & CRT Monitor	350-600 Watts	120-250 Watts Average
Low-Power Desktop and LCD Monitor	50-100 Watts	30-60 Watts Average
Laptop Computer (w/mobile CPU)	35-60 Watt Power Supply Rating	15-35 Watt Average
Handheld Computer w/2.5"-10" Screen	5-10 Watt Power Supply Rating	3-10 Watt Power Consumption



Cost Impacts of ICT Choice: Power Consumed and Power System Cost at 2,4,8 Hours Use/Day

Computer System	2 hrs/day	4 hrs/day	8 hrs/day
P-4 Desktop w/CRT monitor 185-220 Watts	370-440 WH \$1,480-\$3,520	740-880 WH \$2,960-\$7,040	1480-1760 WH \$5,920-\$14,080
Low Power Desktop w/LCD 30-60 watts	60-120 WH \$240-\$960	120-240WH \$480-\$1,920	240-480 WH \$960-\$3,840
Laptop 15-25 watts	30-50 WH \$200-\$400	60-100 WH \$240-\$800	120-200 WH \$480-\$1,600



Guidebook on Powering Rural ICT

- Winrock, NMSU, Sandia Labs preparing a guidebook on powering rural ICT systems
- Guide will address power requirements and options, and ICT equipment selection, incl.
 - Summary information for decision-makers
 - Detailed information for technical staff
 - Guidance on system specification, procurement
- Draft for review will be available late this year and we wish to identify several reviewers



Conclusions

- Using ICT systems off-grid requires attention to energy needs.
- Careful consideration must be given to the use of energy-efficient components.
- ICT compromises may need to be made
- Need for assistance, guidance materials, data on ICT power consumption

