

Notes from the 1998 Hybrids Workshop

Held as part of the 1998 Village Power Conference
Washington D.C., October 5th, 1998

Please note that these were my personal notes and although I tried to catch what people were saying I did not always succeed. I have left out material that was already discussed in specific presentations but tried to cover all of the questions and answers that followed each presentation. Although I tried to credit specific people with comments I did miss some and I have left a blank beside the specific comment. In some cases I was forced to paraphrase, I apologize if I have miss-stated someone's argument.

In the following segments, I identify people by first name and a last initial. The first time their name is referenced the last name is also be given in full.

Ian Baring-Gould

Applications

Eco-tourism - Costa de Cocos Mexico: Dave Corbus – NREL

Isolated ranch systems: Luis Vega –PICHTR

Questions:

- Failure mode of inverters: Took a long time to have confidence. Control software. Bata system that was not ready for remote areas, Salt water
- Turbines: Damper problems. Salt and high wind.
- Day to day operation (charge): Fiji- publics work department w/ training

Small village, VLA Chile: Ian Baring-Gould – NREL

Medium sized villages: Gary Norton – Northern Power Systems

Questions:

- PV systems in AK – Some analysis was done and it came out competitive
- Why not use diesel in St. Paul: Political issues.

Large Communities, Kotzebue AK: Malcome Lodge – Island Technologies

Questions:

- Cost? Utility is not putting in much money. Lots of government. 3 turbines from State of AK, Utility and DOE. 7 additional from DOE.
- What is the penetration? Right now it is low but it will get larger – up to 30% in the next stage (600kW of wind). Plan on going up to very high penetration. Problems with larger diesels will start later.

Greek islands: V27-225kW turbines: Niels Anderson – Vestas

Questions:

- Do they plan on expanding the systems? Yes. Vestas is having a hard time finding the market for specialized turbines and are only installing grid connect
- Corrosion/lightning? Over voltage protection for lightning. Corrosion package increases price of turbine by 10k.

Technology

DC systems: Mike Bergey – BWP

Questions:

- How can you cut costs by 2? Production economies of scale. Production costs spread over more units
- When will the 30kW unit be ready? Year or year and a half.
- What is the basic advantage of DC over AC? Stability of the systems. There are enough of them out there so the industry is more advanced. AC's don't have this now.

- Why do you say inverters are working well? Have 800 units in the field and have not reported many problems.

AC bus systems\high penetration systems: Steve Drouilhet - NREL

AC bus and diesel battery systems: Steve Phillips – AES

Questions:

- Controls add a lot of cost to static inverters, will this come down? Controls are important added value, also get DAS and SCATA. Price will go down as numbers go up.
- You use gel batteries, are you ready to use Lead Acid? Yes, but wet cells are a problem. Gel cells also have better draw and discharge ability. LAS have better life.

Retrofitting Diesels: Ian Baring-Gould - NREL

K. Reiche – Hybrid PV systems for Rural energy – Fraunhofer-Institute

Mainly PV/diesel hybrid systems, but also use wind where applicable.

Questions:

- How do you monitor? Have automatic data logging via phone line
- Describe the way the design team works? Had 200 engineers and hired one sociologist.

Discussion Sessions

Storage: Steve Drouilhet–NREL

Types of storage: Looks at LA and NiCad bats, flywheel, pumped hydro, hydrogen. Also air and hydraulic accumulators.

Stuff is going forwards is Flywheel (Automotive and UPS industry)

General Discussion:

Per Lundsager: Not much direct work on Flywheels – Lester University.

Bob Surwin: Storage of fresh water and Desal in Europe.

Per: No one has really looked at different charge patterns for batteries from an economic point of view.

Kilian Reich: Fraunhofer inst. is doing some work in this.

Mike Bergey: Thinks that rapid cycling of batteries makes it work better

Steve Phillips: Battery throughput is fixed

Dave Corbus: Wind can equalize while PV can't.

Luis Vaga: Looked at 5 different manufactures and could not get a good life data or estimate of life.

Steve P: The battery is just too expensive, initially and in the life cycle.

Kilian R: Fraunhofer inst. has just reported a report on progress in batteries

Monitoring, communications and control: Jim Manwell –Univ. of Massachusetts

General Discussion:

Should there be a common language?

Steve P: ModBUS communication software is used by AES. This can

Lewis V: thinks that AES has got this done.

Dave C.: we are still in the one off days. Are we ready to give packaged control and data collection.

Steve P.: Bugs come because everybody wants their own stuff with their specific functions. Small companies can't do this

Bob S.: People cause problems when they go in and rewrite the software. Bob thinks that this should be kept hands off and would worry about a common language.

Need simple systems, more complex

Technology Needs: Mike Bergey –BWP

General Discussion:

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Bruce L: feels the real problem is the cost of the power, not the people stopping the project. – for utility and industrial processes. Privat sector is not the problem because they are \$ oriented, governments do not do this.

Steve P. Every part of the industry needs innovation. Sell the same thing for two years and then upgrade. Everybody needs technology improvement.

Luis V: You need to have economy of scale to make the systems work. Gensets are cheap and so is fuel. Need to look at what people can afford. Prepayment meter to supply day by day power.

Per L: Many opinions about what the Europeans need. Make the simple system work the way that we want them to. Use this to create the credibility for the industry. How do we do this in an industry that is not presently cost competitive. The perfect system does not work and we have made a failure.

Tariffs, metering and economics: Peter Lilenthal – NREL

Questions:

Are tariffs market based on national standards? They should be whatever the market can bare.

Luis V: Financing failure is a problem

Peter L: We need financing

Art L: There are lots of communities / people that want power without subsidies

Per L: in the beginning you need to subsidize this stuff, once the subsidies start to increase, you are in trouble. So, we can keep going as long as the subsidies are decreasing.

___ Need a competitive subsidy program that is designed to eliminate itself.

Peter L: As a premature industry you do need subsidies but these things should be targeted and then removed from the subsidy when it is not needed.

Steve P. Use a three stage structure were AES charges a monthly fee that covers all of

Institutional aspects: Ron Orozco – Energia Total

Questions:

Gary Norton: Exactly who do you need to get involved with

Ian Baring-Gould: Where do you stop working with the people and start working with the utility

Ron O: When you have a strong utility (usually small)

Raj Rangi: In northern Canada you do have problems because there is no benefits. Price of power is fixed and so there is no real savings to the people by the addition of the renewables.

Peter L: New technologies incur costs and need money

Ron O: need to keep in mind

___: Need to target specific areas, we are in part of the solution

___: We need to develop market so we can develop the technology

Reliability & track record: Per Lundsager – Darup Associates

Nils Anderson: Real price of power in Europe is going down, Wind is now competitive compared to coal plants. Using the standard conditions, wind is actually lower cost than coal plants for a site of 6.5 m/s. – Grid connect.

Bruce L: Cost is going down because of gas plants. Also wind can't be dispatched so it has lower value. They are only add-on's to the existing power grids. Work great in the developed world but the developing world is a different question.

Nils A: From an environmental side it is better and Europe has the ability to pay for the environmental aspects of renewables

Malcome L: Utilities do not work in the area if environment when they have to.

Per L. Cost of energy from wind has decreased over time with Grid connect, why cant we do the same thing for the village market.

Bruce L: If this is the case, why has the development of the small turbine been abandoned?

Per L. Because people have not seen the market.

Jim M. These type of systems work best if they are larger. Maybe we should be looking at some small number of large systems on week grids

Per L. How do we make the village market follow the grid market

Kilian R: there is a market for green power in the developing world.

Credibility: Bruce Levy – BPG Development

General Discussion

Luis V: Who are the “They”

Bruce L: General folk, any body

____: Needs to be automatically controlled to reduce labor costs.

Bruce L: Hybrids will work in very specific places, just need to look for these systems.

Describes the St Paul system. Total cost of 1million, to eliminate all power from the grid as well as thermal loading. Funded by a local bank.

Luis V: This is stuff that costs \$1000/kW installed, this is too much money and too large a turbine

Bruce L: I can't compete with you, this is a system that would work and you are working in another type of system.

Gary N: Hybrids are not necessarily village, hybrids will be implemented in the industry and other reasons. Village is only a subset (a hard subset) of the whole market.

Discussion: Panel

Larry F: How do we develop the market? We are in this one's and two's donor market, how do we go to the commercial market. Water, Schools, healthposts, Eco-tourism, diesel retrofit. PV is putting systems everywhere, even if it does not make sense so that there is an industry for hybrids.

John A. Two questions. 1) how do you do the economics of the small users – Art 2) Opportunities for large systems in specific places.

Bruce: All it takes is someone with money, nerve and the ability to get financing. There is a market, there is a technology.

Art: How do we get hybrid into village power. Don't build it on Subsidy. Art goes to the consumer who is spending \$12/month. We need a lot of those people and some financing for the initial installation. We need to move on to replication.

Steve P. Technology is secondary, we need a customer. Need to know the Customer. Need to keep up on regulation and other artificial constraints.

Mike B: It is inevitable that the market will come about. Feels that our technology is at the short end of the Subsidy chain. We have good technology and so it is a question of political mandate. Everything is a subsidy issue and we are at the short end of the stick. Pilot projects help.

Kilian R: The CO2 issue is more important in Europe than it is in the US. They are thinking about CO2 emissions and the taxes that will follow. Fraunhofer is getting a lot of calls about this issue. This will increase the market for renewables. It is a political statement and the market will follow.

Steve P. Planning on a long-term subsidy is playing on thin ice. The projects need to be bankable and there are many markets where this will not happen.

Bob S. Domestic market did not materialize and it is on hold. AOC was thinking of this as a testing ground. Domestic market is a vacuum and so we are going to places that we were not ready for. Have had to move to other areas.

Larry F.: Brazil what is keeping this market opportunity down

Ron O. The market is still open. They are willing to take on the investment (350M/year in diesel subsidy) but people need to step up to the plate with a technology that will work.

Gary N: It is there but it needs to be from the power perspective, not a renewable energy system

Dave Sutton: Need to be an IPS, can't be an equipment supplier. Have to do stuff with productive use. Have to make the power real, bring in \$\$\$. Need to get by the transaction costs, need to do a region not a village.

Bruce L.: Need funded developers and they will pull the equipment (if it is good equipment)

Larry F.: Why is this not happening in Canada

Malcom L. They are the richest rural communities in the world why not renewable. They get it all for free. No incentive to do anything because there is no value of money, it is just given to them by the government. Any change will take a political act in deciding that they can not waste .5 Billion a year funding healthcare and energy in the northern regions. Now that the government is moving to the regional level, things will change but there is no motivation from the population. Also a bunch of inside infrastructure that is resistant for change.

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- Luis V.: Diesel prices wont change, batteries won't change. WTG-PV is the only way to make them feasible. We need to reduce cost by 2. Need to have at least 10 systems to make it work from an O&M point of view. Putting in 10 systems can take 5 years and will need subsidy for those 5 years to make the project feasibility.
- Larry F.: Richard Hanson has worked the PV side of things and was able to squeak by. Is there a way to make this work for hybrids?
- Mike B. Yes, but with subsidy it will work faster. If you take away the infrastructure (background work, lawyers, NGO's) cost (which is subsidized) then you don't get anywhere fast. What Richard has done is a good job with sustainability and ownership.
- Peter L. Market development, environment and poverty elevation are all reasonable rational for subsidies. What is the difference between what Bruce and Art are proposing?
- Mike B. Trend is the push to private sector development
- Bruce L.: We can't go the PV route because every system will different. We are starting down that trial because we are standardizing in some ways but we will never get to it
_____: Why should we do hybrids – why should it be subsidized
- Lots of clarification discussion
- Kilian R: Want to reduce effects on environments
- Patricia Delano, WP technology: Need a developer in country
- Luis V.: There are private people out there
- Larry F.: This is a valid point. We do not have enough people in the world doing this.
- Mike B. The PV people have helped this because they have the industry.
- Art L.: CPC was started to do act between the technology industry and the customer. The biggest problem has been finding the risk capital even though there is poof that it works and it is safe money. Things need to be aimed at replication with people a commercial stake in the project. This will bread success.
- Kilian R: We are going into a solar century, wind, PV etc. Each success story helps us all and so these should be publicized.
_____: Many countries have plans for renewable development. How much of the project is the cost of Money because these countries have access to cheep money. Development companies should look at these kontras to development potential.
- Larry F.: Recognize Javier Castio who is working for replication in Chile. We are trying to make a partnership between Europe, Australia and the US looking at the operation in hybrids. If you have operating systems with advanced data collection come talk to Larry.