

CHALLENGES AND OPPORTUNITIES OF SMALL SCALE WIND ENERGY DEVELOPMENT IN NEPAL

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OUTLINE

- History and Lesson
- Institutions
- Challenges
- Prospect
- Public Acceptance
- Finance Model
- Conclusion

INSTITUTIONS

- **Alternative Energy Promotion Center (AEPC)**
- **Practical Action Nepal**
- **Nepal Academy of Science and Technology (NAST)**
- **Other organizations**
 - Private manufacturing company
 - Krishna Grill and Engg. Works,
 - Mirlung Electro-mech Concern
 - Ambica metals Bhaktapur,
 - Jaya Laxmi Iron Industries Biratnagar
 - CES / IOE
 - KAPEG / Private Research Centre
 - Others

HISTORY AND LESSON

○ **Early 70s**

- USAID supported to establish a wind mill at Rampur
 - Issue: Defects in pumping unit

○ **Late 70s**

- Local initiative by an individual in Ramechhap District (Eastern hilly region)
 - Issue: Broke down on next day of operation (structural)

○ **RECAST**

- Installed two wind mill for water pumping
 - RECAST : Blade out of shape, foundation failed
 - Jhapa: Operational issue, structural failure

HISTORY AND LESSON...

- **1985**
 - Feasibility study of wind power plant in Mustang and Myagdi
- **1989**
 - NEA installed and operated two (each 10 kW capacity) wind turbine generators in Kagbeni, Mustang: Resource Assessment and Design failure
- **1990-95**
 - Krishna Grill and Engineering Works (KGEW) fabricated and installed 3 wind pumps in the eastern region
- **2001**
 - National wind energy workshop jointly organized by ITDG, ICIMOD and AEPC.
 - WECS established five anemometer stations.
- **2010**
 - 2nd National Workshop for Wind Energy Program
 - Utility scale demonstration project: 1 MW in next 3 years

GENERAL CHALLENGE

- Turbine selection and Structure Design
- Upfront cost
- Management of Variable Electricity
- Post-Installation management and O&M
- Energy to Income-generation (end-use)
- Access to grid – net metering

TECHNICAL CHALLENGES

- Inadequate Resource Assessment: Bankable
- Certification of Turbine and Installers
- Limited hub height
- Turbine size (rotor diameter, capacity)
- Performance documentation
- Performance analysis and enhancement



MARKET BARRIERS

- Upfront Cost: Resource Assessment/ Wind turbine System
- Govt. Incentives: Not enough
- Public Awareness
- Detailed Wind Maps
- Net Metering

MARKET CHALLENGE

- Demand Generation and Supply Management
- Economic Viability
 - Return on Investment
 - Cost of Energy (NRs/kWh)
- Government Policy and Incentives
 - Inaccessible to grid
 - Insurance : Risk Mitigation/Management
- Reluctance of utilities to adopt Net-metering.
- Low demand - We have not been able to impress buyer

SMALL WIND TURBINE COST DRIVERS

- Upfront cost is the primary market barrier for small wind systems
- The major cost driver
 - Wind Turbine
 - Tower
- Post-Installation Management
 - Operation and Maintenance
 - O &M training and education

SOCIAL ISSUE

- Product reliability concern
 - Performance standard and testing
 - Consumer Rating
- Performance Characteristics
- O&M Expenses : Unpredictable
 - Bundle O&M
- Guaranteed performance and reliability
 - Energy Output (kWh)
- Public Awareness

PROSPECTS

- Necessity – Supply and Demand mismatch
- Policy
 - Develop/Promote local SW manufacturer
- Geographic
 - Mid hill and Mountains – for electricity
 - Terai (Plain) region – Water pumping
- Government exempt on Import TAX/VAT
- Government willing to share Resource Assessment cost and risk.
- Incentive based on no of household served
 - Model based on Micro-hydro subsidy

POLICY RECOMMENDATION

- Resource Assessment Equipment – Loan/Rent
- Up-front Incentives:
 - Helping people afford small wind systems
- Distributed Generation Feed-in Tariffs :
 - Excess electricity they generate – Annual Basis
- Public Education & Outreach Programs:
 - Letting people know that small wind is an option

BASIS FOR INCENTIVES

- Government or AEPC incentive should be such that Small wind energy system make sense on both perspective
 - Environmental
 - Financial
- Product life-cycle based strategies
 - Performance Guarantee and reliability
 - Production based incentives
 - Cost of energy
 - Predictable O&M
 - Liquidated Damage: responsible manufacturing.
 - Insurance : Peace of mind

FINANCING MODEL

- Channelized Bank investment in RE sector
- Low interest loan form ADB/WB, or other green energy fund: Clean Energy Development Bank
- Manufacturer & Community get a loan
 - Joint ownership
- Manufacturer guaranteed performance and availability (down time) and O&M
 - Sell Electricity and machine together
- Insurance : Develop market

PUBLIC ACCEPTANCE: DEMAND GENERATION

- Pro-active Marketing
 - Manufacturer – Energy Service Company
 - Plan, Achieve and Trade (PAT)
- Government Incentive
 - Make sense Economically
 - Insurance against risk
 - Upfront cost: low interest rate
- Wind Energy Market Development (PPP)
 - Educational campaign
 - Success history sharing – Media coverage

CONCLUSION

- Demand Generation: Public acceptance
 - Energy Service Company
- Policy – SWT to make sense Financially
 - Resource Assessment: Cost Sharing
 - Upfront Cost
 - Performance/Production based incentives
- Financial
 - Green Fund/ low interest loan from bank
 - Risk and uncertainty management - Insurance

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Thank You!

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