

Alaska Remote Area Power Program

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Summary of Approach and Rationale

- PEMFC stacks require hydrogen--preferably high purity
- NPS fuel processor combines reforming, heat generation, and hydrogen purification
- Device is efficient and compact
- Multi-fuel capability

Past Results

- Not applicable--program initiated July 15, 1998

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Current Year Results

- K1 kerosene fuel processor delivered to SNL on time
- Demonstrated 12 std. L/min product hydrogen, >99.8% purity with <3 ppm CO

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Current Year Results (cont.)

- Test stand fabricated and delivered to SNL
- Trained two SNL scientists
- Procured and delivered two PEMFC stacks to SNL

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Plans for Future Work

- Develop and deliver second-generation fuel processors (2) to SNL/UAF
- Lab automated control system will be developed and delivered to SNL/UAF
- Catalyst screening will be conducted-- will include Argonne catalyst

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Plans for Future Work (cont.)

- Diesel testing will begin--to include alternative diesel formulations
- Automated fuel processor and PEMFC stack will be coupled

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Status of Economic Evaluation/System Analysis

- No detailed analysis at this time--system design and specs are required
- In general, NPS fuel processor is projected to cost between \$150/kW and \$350/kW when manufactured in volume
- Cost of PEMFC stack and BOP not readily available at this time

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Goals and Basis for Goals

- To see the commercial introduction and acceptance of PEMFC systems for residential and related application in Alaska

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Goals (cont.)

- Practical and reliable fuel processor
- Practical system incorporating fuel processor and PEMFC stack--includes heat recovery
- Successful demonstration at appropriate sites

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Basis for Goals (cont.)

- PEMFC systems must include feedstock reformation
- Systems must be designed with end use and requirements in mind

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Major Barriers to Meeting Goals

- Appropriate selection of feedstock
- Volume manufacturing of appropriately designed PEMFC stack
- Significant reduction in the cost of PEMFC stacks

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Major Barriers to Meeting Goals (cont.)

- Support for field testing of early (pre-commercial) systems
- Volume purchase agreements to enable volume manufacturing

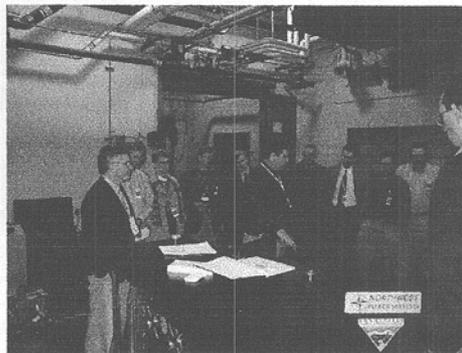
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Residential PEMFC System Road Tour



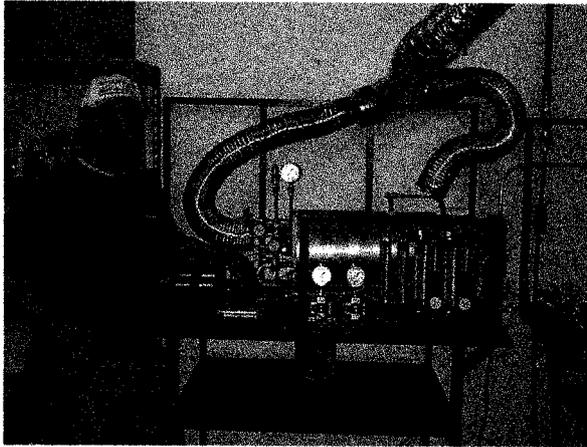
Providing power to home of General Manager, EPUD--
Eugene, OR
January 1999

Demonstration to BPA Account Reps, BPA Headquarters--
Portland, OR
December, 1998



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Test Stand and Fuel Processor



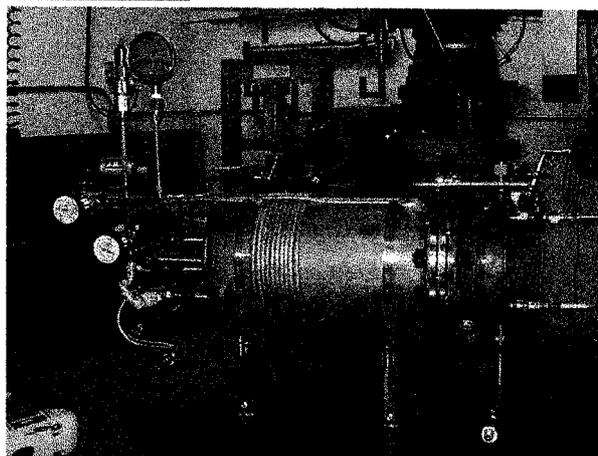
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Evolution Continues Toward A Residential Product



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Integrated Hydrocarbon Fuel Processor



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