

# All Aboard the David Douglas Express



Tom Ullman and student put the finishing touches on the H40

A cold and rainy March day saw the culmination of six years of planning and hard work by the Industrial Engineering Systems (IES) students at David Douglas High School in Southeast Portland, Oregon.

In 1996, Mark Haner (IES Instructor) conceived an idea to assist David Douglas' physically challenged students make the 600 some-odd foot trek between the school's main educational building and the vocational building. Haner recalls that when he attended David Douglas High School in his youth how miserable was the long walk between the two buildings, especially when the cold east wind comes in. He couldn't imagine having to do it in a wheel chair, so he set in motion a plan. The

original concept was to obtain an electric golf cart, similar to the one used in airports, to transport physically challenged students to and from the vocational building and Haner thought it would be cool if this vehicle could be powered by renewable energy (RE). That was six years ago.

Today, the project has evolved into an \$80,000 renewable energy powered mass transit system, through the combined efforts of more than 400 students and the help of several contributing companies along with government and private grants. The City of Portland Office of Transportation (PDOT) received an award to "Envision the Future" with a renewable energy project that partnered with business, utilities, government, education and private citizens. Portland General Electric (PGE) got on board as part of their ongoing effort to support public education and awareness about the benefits of renewable energy. While at the same time many local and regional business, manufacturers and distributors pitched in with donated equipment and cash donations.

Using parts from two retired 1979 school busses the IES students built a solar/wind hybrid light rail system called the David Douglas Express (DDX). The DDX uses a 96 volt battery bank that is split into two 48 volt banks for charging by the RE system. On the RE side, power is generated by six used 250 watt PV modules donated by PGE (these modules were first used to power the White House Christmas Tree in Washington, DC). A new Whisper H40, 900 watt wind turbine donated by Southwest Windpower, Flagstaff, AZ balances out the system. Energy storage is accomplished the use of 16 Trojan T-105 "deep-cycle" storage batteries donated by Northwest Battery Supply of Portland, Oregon. When the wind and PV systems are producing more power than is required to operate the transit system, excess power will be inverted and fed into the local utility grid by a Vanner RE48-4500 sine wave inverter donated by Vanner Power Group of Hilliard, OH. The companion Vanner AC and DC Modules were donated by Energy Outfitters, Ltd. of Grants Pass, Oregon. The entire system was installed to code by the IBEW Portland Local Union 48 which donated the many hours of labor.



**The complete list of contributors and contact information for those concerned is as follows:**

**Local citizens (Portland, OR)** - \$5,000 in cash donations to meet the PGE Challenge Grant. Total Donations: \$5,000. + Many Volunteered Hours. And PACE Credit Union / 3010 SE Belmont Ave. / Portland, Or / 503.234.9851 for Donation Account

**League of Oregon Cities (Oregon)** - "Envision the Future" \$1,000 Award. Total Donations: \$1,000. Richard Townsend/Executive Director / P.O. Box 928 / Salem, OR 97308 / 1.800.452.0338

**Portland General Electric (Portland, OR)** - Six 250 watt photovoltaic panels (first used to power the Christmas Tree at the White House in Washington, D.C.) and \$5,000 Challenge Grant. Total Donations: \$13,500. Dr. Wayne Lei/Director of Environmental Affairs, Mark Fryburg / Renewable Energy Project Director/ 121 SW Salmon St. / Portland, OR 97204 / 503.464.8000

**City of Portland Department of Transportation (Portland, OR)** - Renewable Energy Facilitator Tom Ullmann / 2929 N. Kerby Ave. / Portland, OR 97227 / 503.823.6298 and Structural Engineer Calvin Lee 1120 SW Fifth Ave. / Portland, OR / 503.823.7063 Total Donations: Many Volunteered Hours. Charlie Hales/Commissioner, Vic Rhodes/PDOT Director / 1221 SW 4th Ave. / Portland, OR, Jeannie Nyquist/Bureau of Maintenance Director / 2929 N. Kerby Ave. / Portland, OR 97227 / 503.823.1798, Managers & Supervisor.

**Machinist & Aerospace District Lodge 24/Local Union 1005 (Portland, OR)** - 500 watts of photovoltaic panels and \$800. Total Donations: \$3,600. Brian Severns/Don Wheeler/Robert Petroff-Business Representatives / 3645 SE 32nd / Portland, OR 97202 / 503.238.5550

**IBEW Portland Local Union 48 (Portland, OR)** - Permitted Electrical Labor. Total Donations: Many Volunteered Hours. Brian Crise/Instructor / 16021 NE Airportway / Portland, OR 97230 / 503.262.9991

**Vanner Power Group (Hillard, OH)** - 4500 watt Sine Wave / Grid-Tied Inverter. Total Donations: \$5,000. Dave Rhodes/Western Manager / 4282 Reynolds Dr. / Hillard, OH 43026 / 888.227.6937 "Latest, State of the Art Grid-Tied Inverter"

**Northwest Battery Supply (Portland, OR)** - Sixteen deep cycle Trojan batteries and connection cables. Total Donations: \$1,500. Jim McCarter/Owner, Larry Weston/General Manager / 3750 SE Belmont St. / Portland, OR 97214 / 503.232.9002

**Energy Outfitters (Grants Pass, OR)** - AC & DC Electrical Modules. Total Donations: \$2,300. Ray Ogden & Bob Maynard, Owners / 543 NE "E" Street / Grants Pass, OR / 541.476.4200 "Oregon's Largest Distributor of Renewable Energy Products"

**Southwest Windpower (Flagstaff, AZ)** - 900 watt Wind Turbine & PV Charge Controller. Total Donations: \$2,000. Dav Calley /President / 2131 N. First St. / Flagstaff, AZ. 86004 / 928.779.9463

**Platt Electric (Portland, OR)** - \$500 credit for electrical supplies. Total Donations: \$500. Dawn Farrel/Manager / 3053 NW 29th Ave. / Portland, OR 97210-1707 / 503.274.1919

**Home Power Magazine (Ashland, OR)** - Electronic versions of all back issues, renewable energy project booklets and software program. Total Donations: \$250. Richard Perez/Editor/Owner / P.O. Box 520 / Ashland, OR 97520 / 530.475.3179 "Requested students to write their story for possible publication in Home Power Magazine"

**Curtis Instruments (Dublin, Calif.)** - Train Speed Controller. Anders Hultman / Manager / 235 E. Airway Blvd. / Livermore, Ca. 94550 / 925.961.1088

**Grainger (Portland, OR)** - \$200 cash donation. Total Donations: \$200. Dorian Taylor/Manager 6335 N. Basin Ave. / Portland, OR 97217-3996 / 503.283.0366

**University of Oregon / Dr. Frank Vignola** - Solar Curriculum Development / Physics Dept. & Solar Energy Center / 1274 University of Oregon / Eugene, OR. 97403-1274 / 541.346.4745 Jeanne Yerkovich/School-to-Work Coordinator, Mark Haner & Nancy Wunn / Industrial Engineering Systems Program Instructor / 1001 SE 135th / Portland, OR 97233 / 503.261.8339

Written and photographed by:

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