

**ENGINEERING AND TECHNOLOGY INDUSTRY COUNCIL
RECOMMENDED INVESTMENTS FOR
2003-2005**

**November 20, 2003
Version 3.2**

Executive Summary

Continue the 10-year investment strategy established by the Oregon Legislature in 1997. Create job opportunities for Oregonians through investments that support the global competitiveness of the Oregon's industries and the technical skills of Oregonians. Invest \$21.4 million in public funds over the two-year period starting July 2003. Leverage this investment with over \$37 million in private funds – a dramatic increase over past years in spite of the current recession.

Use these funds to make targeted investments that enhance engineering education capacity and excellence. Measure the results against a detailed set of metrics including the number of technical graduates improvements in national rankings. Expand upon strong five-year track record, as evidenced by private funds exceeding forecasts and by major increases in both graduate rates and research programs.

Objectives

Stimulate economic development, create jobs, and increase tax revenues by continuing successful investments in the capacity and excellence of engineering education programs that will result in

- Dramatically increasing the number of engineering and computer science degrees granted by Oregon colleges and universities.
 - Improving the quality of all Oregon college and university engineering and computer science education programs, as measured by national rankings of select colleges, departments, and programs.
 - Providing and increasing opportunities to Oregonians whether they are new to the workforce, entrepreneurs, or displaced by changes in our economy.
 - Enhancing the technical readiness of all college and university graduates.
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Recommendations

Achieve the above objectives by investing \$21.4 million in public funding matched by over \$37 million in private funding during the 2003-2005 Biennium. Use these funds to:

- Support recently hired faculty and hire new faculty members.
- Enhance Oregon's ability to educate its young people and its working professionals in the areas of engineering and computer science.
- Generate additional research grants and contracts from federal and private sources that are greater than the salary costs of the new engineering faculty

- Make our programs more attractive to top-quality students and faculty and enhance their value to Oregon’s economy as key centers of innovation.
- Expand laboratories to serve the needs of the increased student population and ensure the quality of the educational offerings and the work-readiness of our graduates.
- Increase the quality and diversity of engineering and computer science students.
- Enhance programs in elementary, middle, and high school that allow young people to explore engineering and technology at an early age, thus increasing the likelihood they will pursue these careers in college.

The following table presents the proposed investments by institution along with the projected private support during the Biennium.

Summary of Investment Allocations by Institution			
	State Funds (\$M)	Projected Private Support (\$M)	Projected Support Ratio
EOU	0.25	0.08	0.30
OGI/OHSU	2.60	4.00	1.54
OIT	1.08	0.97	0.90
OSU	9.92	19.30	1.95
PSU	4.96	7.88	1.59
SOU	0.54	0.54	1.00
UO	1.80	4.24	2.36
WOU	0.25	0.08	0.30
Total/Average	\$21.40	\$37.08	1.73

Background

Starting in 1997 the Oregon legislature set Oregon on a course to address this issue by passing Senate Bill 504, establishing strategic goals for increasing investment in engineering education. Since that time, substantial progress has been made in increasing the capacity and quality of Oregon’s engineering education programs. Graduation rates are rising, strong programs are becoming stronger, and mileposts for strategic goals to move programs, departments, and colleges up in national rankings are being attained.

The Engineering & Technology Industry Council was established in 1997 to advise the Oregon University System on the needs of industry. It is made up of executives from Oregon's leading engineering companies. In addition to making recommendations it carefully monitors the progress of the engineering programs based on pre-established metrics aligned with these long-term goals.

Senate Bill 504 and the creation of the Engineering & Technology Industry Council were in response to dramatic changes going on in Oregon and the rest of the country. Over the last twenty years Oregon's economy has changed in several ways:

- It has gone from a resource-based economy to a diversified economy with the largest sector being high technology.
- Oregon's high technology companies compete with companies worldwide based on their ability to exploit new research and bring innovative and productivity-enhancing technologies to market.
- All of Oregon's industries have found access to technically skilled workers essential to their success now and looking into the future.

Ballot Measure 5 and other constraints kept Oregon's output of technical degrees relatively flat at a time when demand skyrocketed. Oregon's companies filled the growing skill gap by importing talent from out of state. Companies considering establishing operations in Oregon expected to do the same. In the short term this solution has seemed to work, but in the long run it is a recipe for disaster because:

- Many of the best opportunities go to those from other states rather than our own children and neighbors.
- The time and money required to import talent from out of state puts existing and prospective Oregon companies at a competitive disadvantage and gives these companies a reason to consider other locations for making new investments.
- The resulting shortage of in-state technical talent makes it more difficult to generate new technologies and grow new businesses.

These same constraints limited the depth and breadth of engineering research programs at Oregon's universities, forcing Oregon companies to go outside Oregon to find the research programs with which to form partnerships and in which to make investments.

A more effective solution is for Oregon to "grow" a majority of its own technical professionals while still recruiting some from out of state, thereby obtaining a diversity of technical skills and backgrounds. Investing in the capacity and excellence of our universities and college's engineering and computer science programs gives us several key benefits:

- The cost of hiring is reduced.

- The professionals hired from Oregon's colleges and universities are more likely to stay in Oregon as their professional skills grow, further benefiting Oregon's economy.
 - Opportunities are available to those who are already residents of the state, whether our young people starting their first career or those displaced by changes in the economy.
 - Companies considering establishing facilities in Oregon are confident that they can hire the people they need to grow their business in Oregon.
 - World-class research helps Oregon's existing companies compete more effectively, attracts new businesses from out of state, and provides the genesis for start-up companies through technology transfer and "spin-outs."
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ETIC -- The Engineering and Technology Industry Council includes executives from some of Oregon's top high technology employers, key public organizations and education partners.

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| <ul style="list-style-type: none"> • CH2M HILL, Inc. • Gunderson Inc. • Hewlett Packard Company • Intel Corporation • LSI Logic Corporation • Mentor Graphics Corporation • Network Elements, Inc. • Tektronix Inc. • Xerox Corporation | <ul style="list-style-type: none"> • Eastern Oregon University • OHSU/OGI School of Science and Technology • Oregon Institute of Technology • Oregon State University • Oregon University System, Chancellor's Office • Portland State University • Southern Oregon University • University of Oregon • Western Oregon University |
| | <ul style="list-style-type: none"> • American Electronics Association, Oregon Council • Software Association of Oregon |

Process -- Each of Oregon's higher education institutions has carefully analyzed how it can contribute to the goals described above. The members of ETIC have reviewed each institution's analysis for relevance to industry needs and the ability to contribute to a dramatic growth in degrees awarded. This review process has resulted in the investment initiatives described in this document. The members of ETIC are committed to the success of this effort.

Results -- As shown in the tables in the Appendix to this document, the proposed investments will produce:

- increases in number and quality of faculty to teach and conduct research;
- increases in externally funded research;
- increases in student credit hours and degrees granted; and
- increases in the quality and diversity of engineering and computer science students.

For details on the proposed investments for each educational institution, see www.oregonetic.org/03-05

Appendix – Metrics Forecast

Following are the metrics forecasts associated with this proposal.

Table 1 Faculty Supported by ETIC Funds			
	Hired in Previous Biennia	To be Hired During 2003-2005 Biennium	Total
EOU	0.0	1.0	1.0
OGI	4.0	4.0	8.0
OIT	4.0	1.8	5.8
OSU	16.75	6.25	23.0
PSU	10.0	1.5	11.5
SOU	2.32	1.69	4.01
UO	1.0	1.3	2.3
WOU	2.5	0.0	2.5
Total	40.57	17.49	58.1

**Table 2
Total Research (\$M)**

	AY99 Baseline	AY06 Forecast	Gain
EOU	n/a	n/a	n/a
OGI	15.0	17.8	19%
OIT	1.2	2.2	83%
OSU	12.3	23.2	89%
PSU	1.8	4.5	150%
SOU	0.05	0.15	233%
UO	6.1	10.9	79%
WOU	n/a	n/a	n/a
Total	\$36.4	\$58.8	61%

Table 3 Engineering & Computer Science Undergraduates						
	Credit Hours			Degrees Granted		
	AY99 Baseline	AY09 Forecast	Gain	AY99 Baseline	AY09 Forecast	Gain
EOU	1,417	3,150	122%	0	21	#N/A
OGI	no undergraduate program					
OIT	23,263	44,890	93%	128	306	139%
OSU	52,690	69,000	31%	389	545	40%
PSU	20,785	38,874	87%	157	294	87%
SOU	6,406	8,500	33%	33	77	133%
UO	13,925	16,000	15%	58	131	126%
WOU	7,170	9,863	38%	40	50	25%
Total	125,656	190,277	51%	805	1,424	77%

Table 4 Engineering & Computer Science Graduates						
Credit Hours			Degrees Granted			
	AY99 Baseline	AY09 Forecast	Gain	AY99 Baseline	AY09 Forecast	Gain
EOU	no graduate program					
OGI	13,202	18,000	36%	131	200	53%
OIT	49	n/a	n/a	-	-	n/a
OSU	12,870	23,600	83%	154	240	56%
PSU	8,685	22,447	158%	109	235	116%
SOU	128	550	330%	5	12	140%
UO	2,444	4,100	68%	21	61	190%
WOU	no graduate program					
Total	37,378	68,697	84%	420	748	78%

**Table 5
Combined Undergraduate and Graduate
Degrees**

	AY99 Baseline	AY06 Forecast	'99-06 Gain	AY09 Forecast	'99-'09 Gain
EOU	0	16	N/A	21	N/A
OGI	131	155	18%	200	53%
OIT	128	243	90%	306	139%
OSU	543	763	41%	785	45%
PSU	266	420	58%	529	99%
SOU	38	80	111%	89	134%
UO	79	148	87%	192	143%
WOU	40	46	15%	50	25%
Total	1,225	1,871	53%	2,172	77%

**Table 6
Test Score and Diversity Summary**

<i>(weighted averages of all institutions)</i>	AY99 Baseline	AY06 Forecast	Gain
Avg. SAT/ACT percentile of freshmen	64.7%	72.3%	11.7%
Avg. GRE percentile of graduate students	69.8%	81.7%	17.1%
Women graduating from ECS	12.6%	17.0%	34.9%
Minorities graduating from ECS	14.3%	15.3%	7.2%

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