

Division Plan for 2009 and Beyond

Engineering Education and Centers

Spring 2007
A.L. Soyster

2004 COV Findings

(1) EDUCATION and HUMAN RESOURCES

“Strong sense that there is no overarching plan to specify goals and directions.”

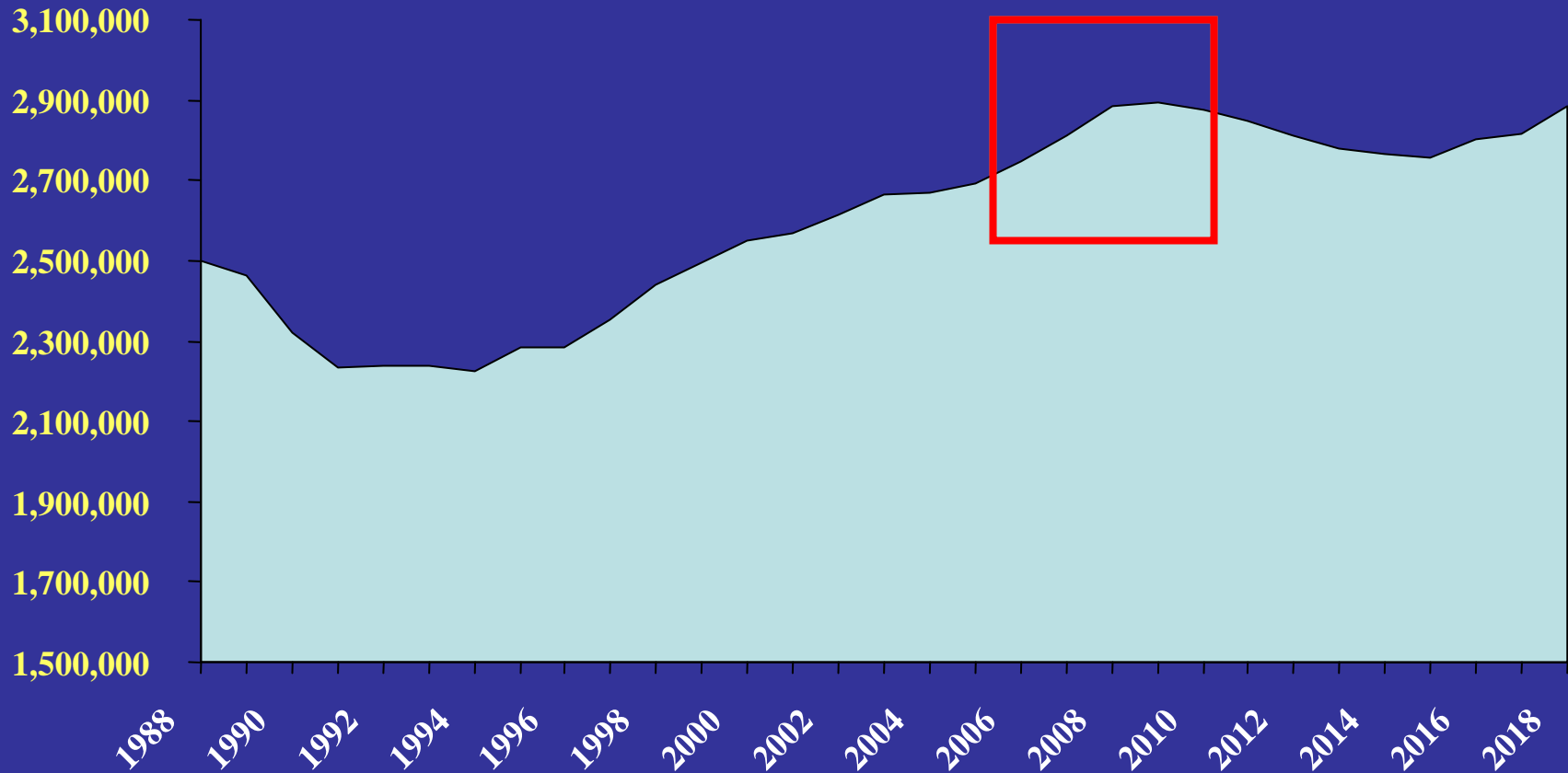
(2) ENG RESEARCH CENTERS

“ The COV observes that an overwhelming majority of EEC Awards are made to research intensive institutions and that more capacity needs to be built at other institutions.”

EEC Objectives for 2020

1. Enhance the K-12 Pipeline and its Diversity;
* 10% of all matriculates study engineering.
 2. Promote the Success of the Undergraduate Learning Experience;
* 3 of 4 students complete BS in engineering.
 3. Improve the Pathway to Graduate Engineering Programs for US and Permanent Residents;
* 5000 PhDs granted to domestic students.
 4. Build a Culture of Discovery and Innovation in Engineering through Multi-Disciplinary Centers;
* 1000 Center-related students graduate annually
- Enabling Objectives**
5. Formalize Partnerships with Organizations both within and External to NSF; and
 6. Promote the Critical Importance of EEC Programs and optimize EEC Team (staff, panels, reviewers) performance

U.S. Public High School Graduates 1988 to 2018



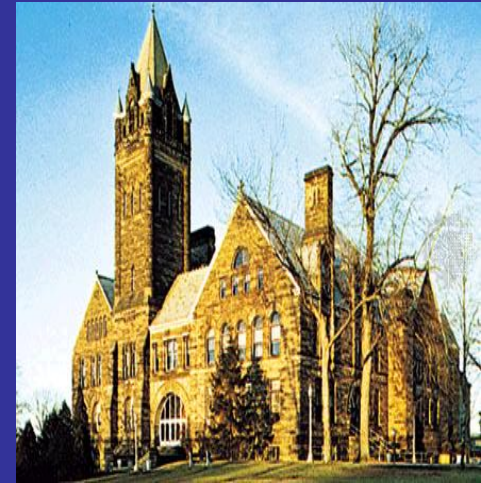
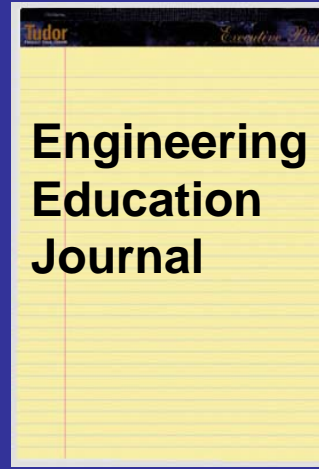
Source: "Knocking at the College Door – 2003"
Western Interstate Commission for Higher Education

Engineering Education~~~~~

New Initiatives

- Council of Undergraduate Associate Deans
(Clients for “How students learn” and other initiatives)
Meet with Engineering Deans and ASEE (April 07)
- “Business of Engineering Education”
(Summer Workshop, preliminary study underway)
- Renaissance of PhD Education – A New Strategy
(Too long, too narrow and too insulated)

Engineering Education Research



Engineering

Education

Who Does It?

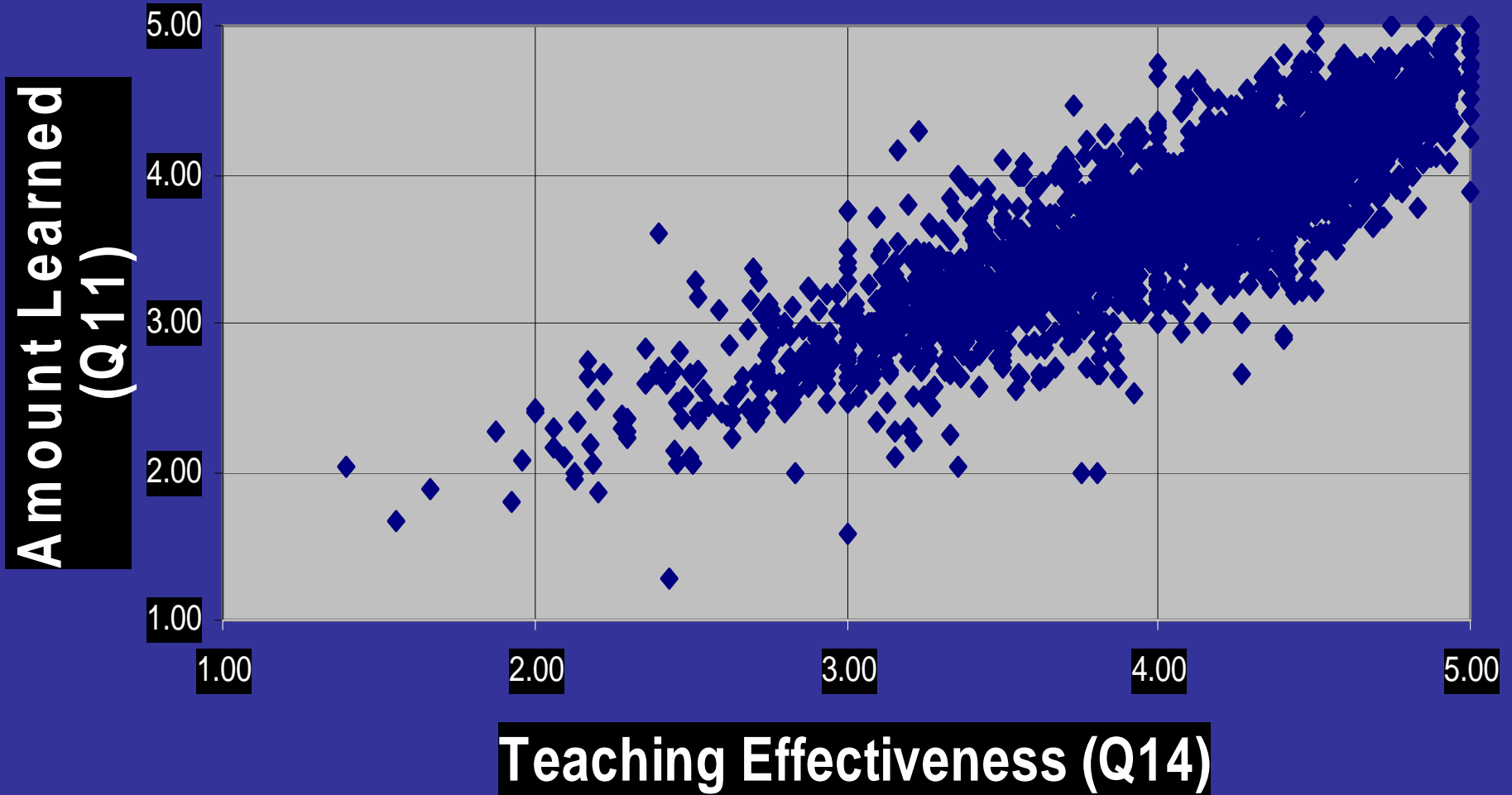
Who Gets It?

Who Needs It?

Observations

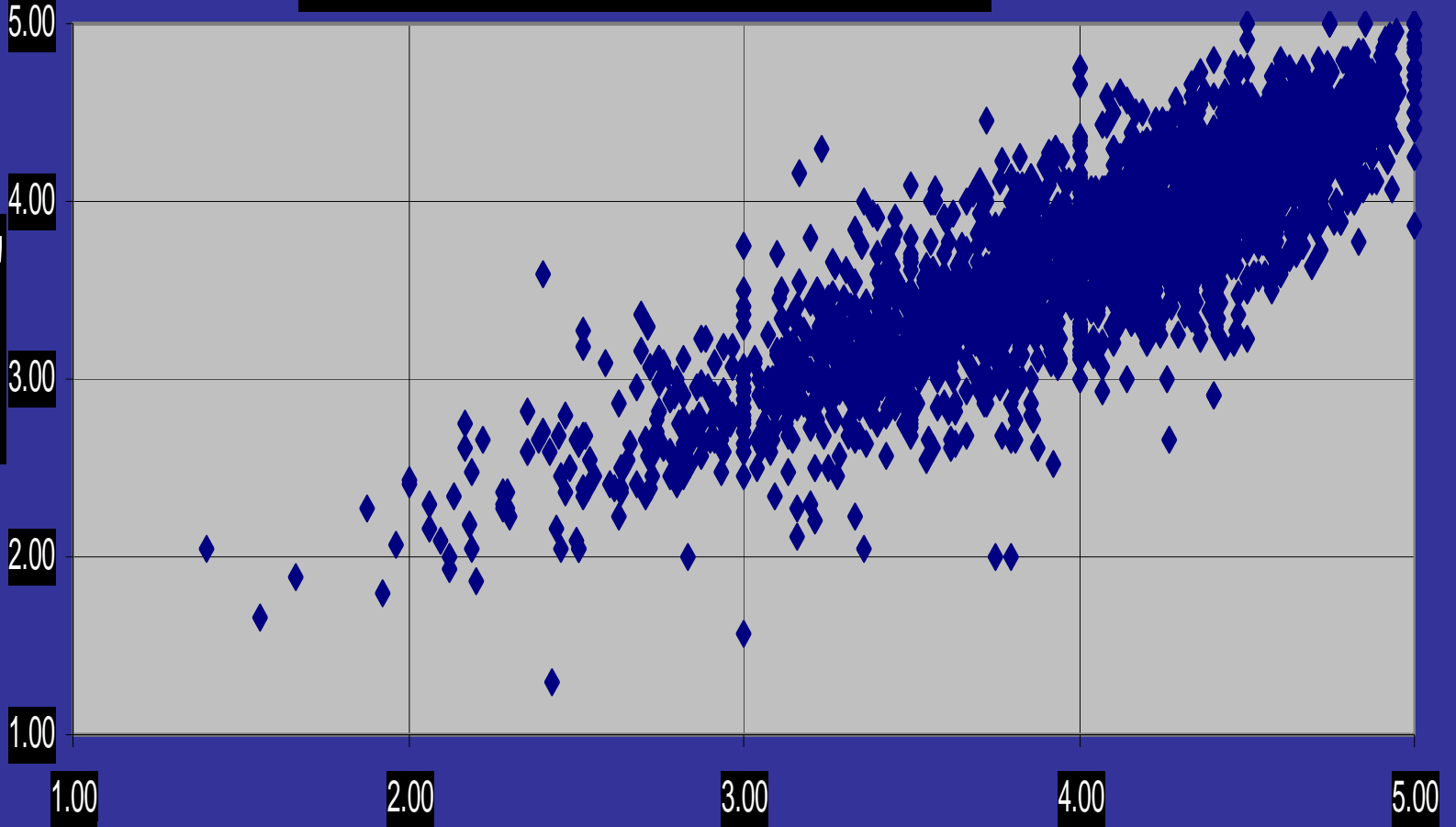
- Supply-side Driven
- Where is Demand-side?
ASEE Undergrad Council

60,000 Student Evaluations Northeastern University



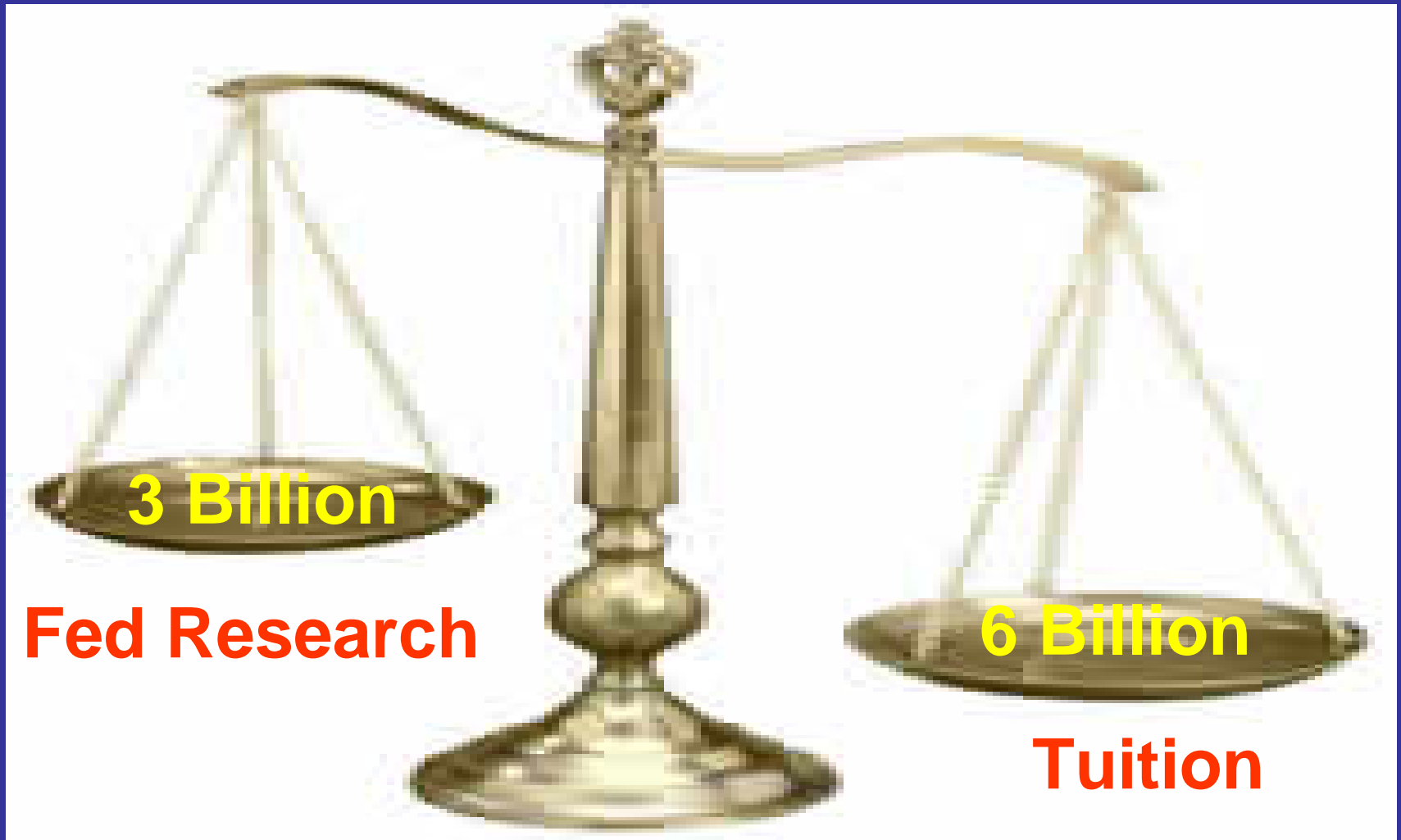
60,000 Student Evaluations Northeastern University

**"Tuition"
Income**



Teaching Effectiveness (Q14)

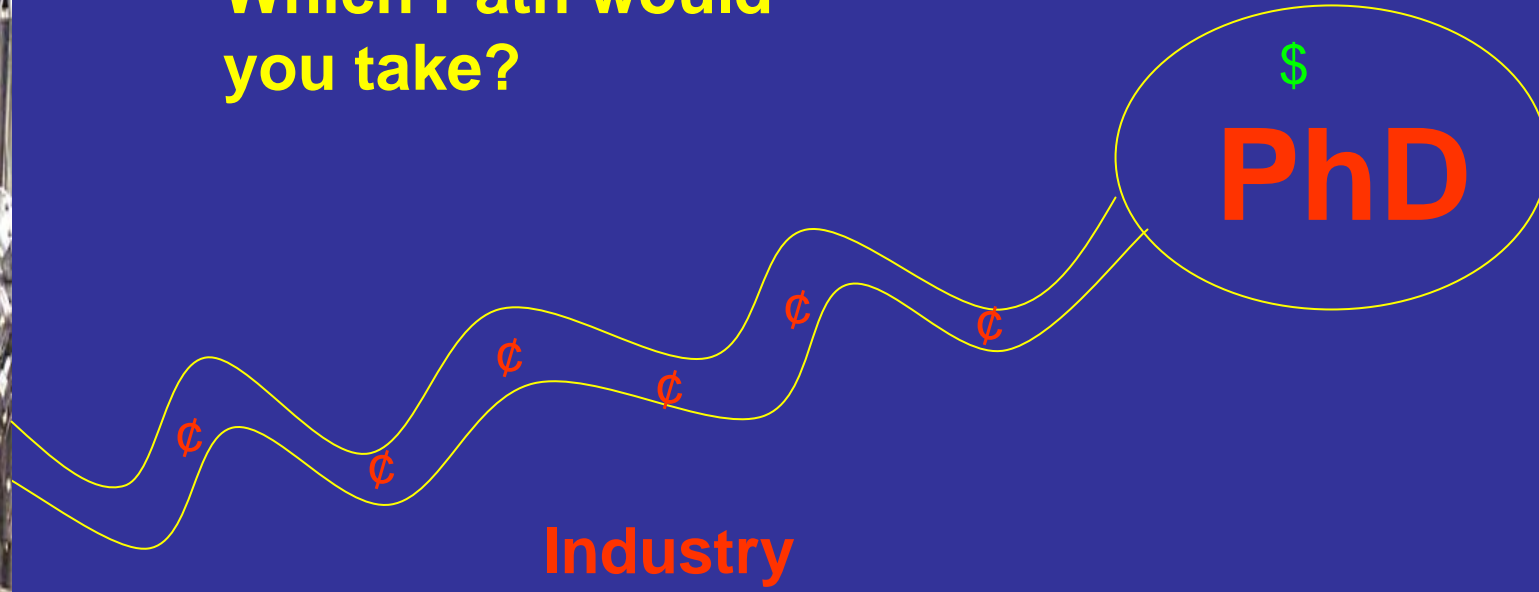
Eng College Revenues



Renaissance of PhD Education



Which Path would you take?



Industry



\$ \$ \$

\$\$\$\$
\$\$\$\$

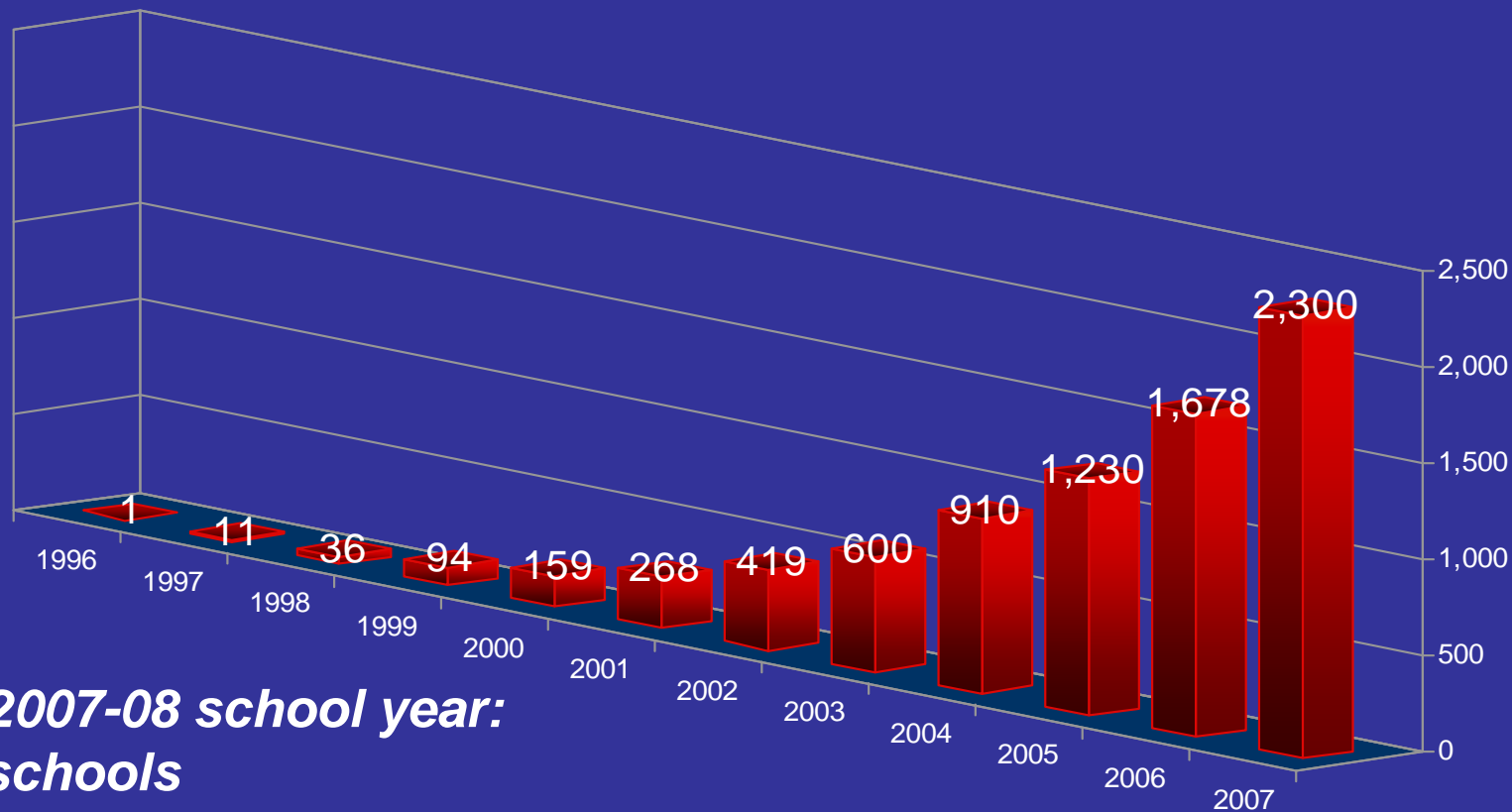
**B.S.
ENG**

Human Resources

New K-12 Partnership Initiatives

- Project Lead the Way (curricular)
FIRST Robotics (extra-curricular)
- Pre-AP Engineering (curricular)
- School Superintendents (meet with VA group in May 07)

Growth in PLTW Schools



***For the 2007-08 school year:
2300 schools
250K students
7000 Trained Teachers
49 states & DC***

STUDENT PIPELINE



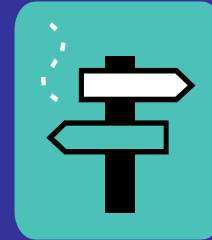
K-12

School
Board
Advisory



University

Industry
Advisory
Board



Industry

Engineering Research Centers

(A) Continuing Efforts

- **207 Letters of Intent for 2008**
- **5 “Gen 3” Centers to be funded 2008**
- **NSECS, NCN**

New Key Features of Gen 3 ERCs

- **Engage small innovative firms in the ERC's research teams**

Build **partnerships** with at least one academic, state and local government, and other program designed to stimulate entrepreneurs

- **Engage ERC students in all phases of innovation**

- **Strategically design education programs** to produce creative, innovative engineers

- Provide faculty and students with **cross-cultural, global research experiences** through **partnerships with foreign universities**

- Build **long-term sustained partnerships** with a few pre-college institutions

ERCs

B) New Initiatives (2004 COV Recommendations)

- ⇒ “While praising the ERC Program..., the COV recommends that smaller interdisciplinary teams be funded...”
- ⇒ “The COV observes that an overwhelming majority of EEC Awards are made to research intensive institutions and that more capacity needs to be built at other institutions.”

ERC DEMOGRAPHICS

- 25% of all engineering students study at schools in EPSCoR states
- 45% of all engineering students in non-EPSCoR states study at schools that are ERC Leads or Core Institutions
- 8% of all engineering students in EPSCoR states study at schools which are ERC Leads or Core Institutions

Proposed EPSCoR Plan

- **Hold “small” Center EPSCoR Competition “in between” ERC bi-annual competition**
- **EPSCoR Small Centers at \$2 Mil per year**
- **EPSCoR Small Centers for 5 years**
- **EPSCoR Awards total \$10 Mil**

Human Resources
Strong Pipeline



**GRADUATE
EDUCATION**
**World Class PhD
Programs**



EEC in 2020

**Undergraduate
Education**
Improve Retention



Centers
**Innovative
Graduates**

