

# Space Utilization

## Not just for classrooms anymore

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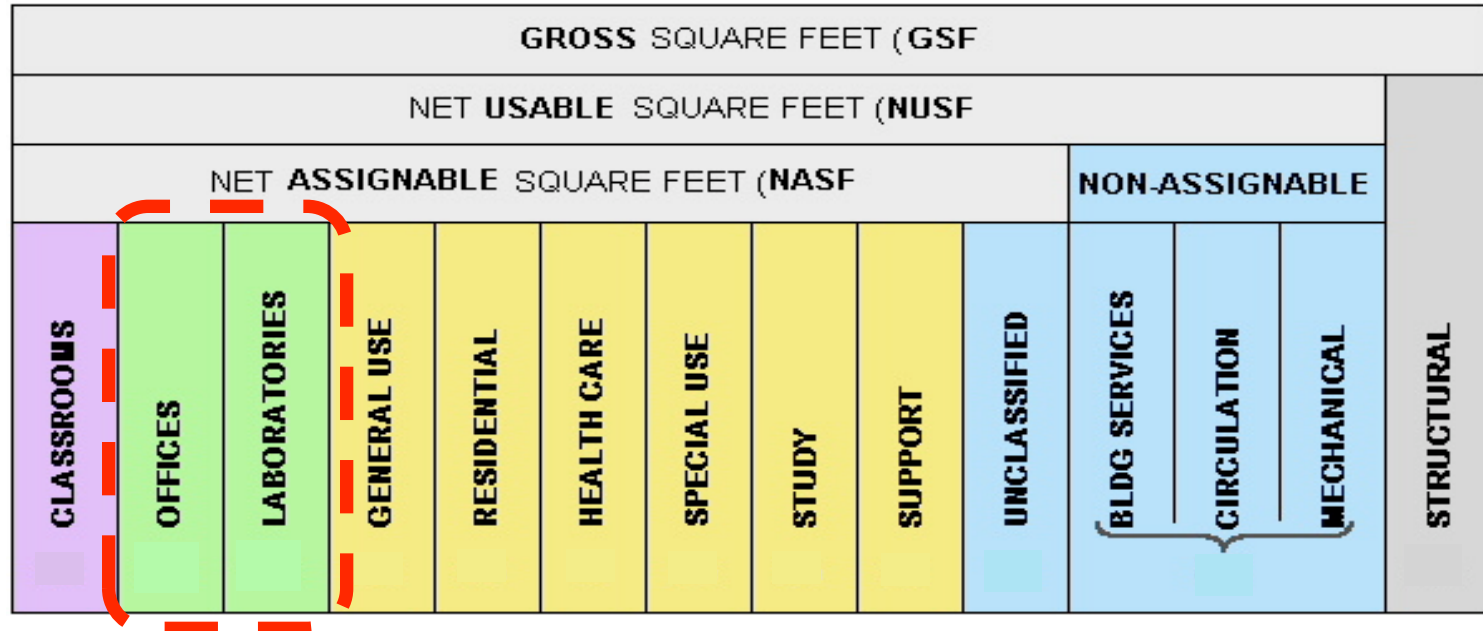
## Who's heard this?

- Campus research space is significantly overcrowded.
- I'm sure that *<your choice here>* is hoarding space.
- We just build two buildings; how can we be out of space?
- We can solve this if we tighten space standards.
- Why can't we use old warehouse for the neuroscience grant?

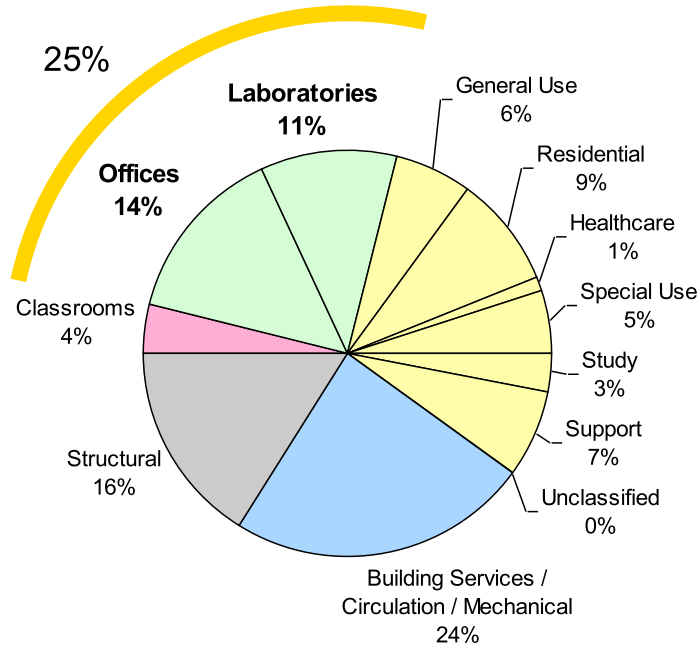
# The strategic view

- Identify your institution's strategic business goals, e.g.
  - Enrollment
  - Research direction
  - Strategic academic plans
  - Capital project strategy
- Relate space analysis specifically to those goals
- Where do you have leverage to further those goals?
  - Labs
  - Offices

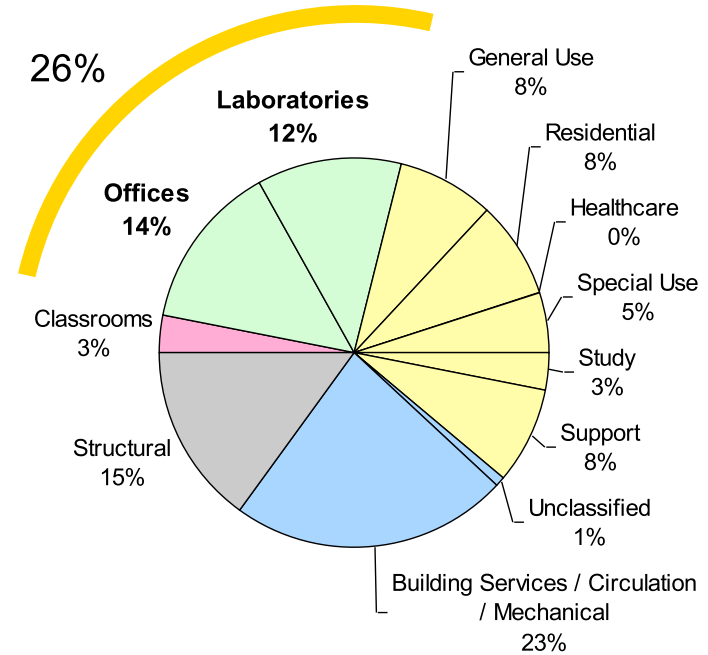
# What can you really work with?



# Leverage



*Data taken from a study of 76 Colleges and Universities with enrollments less than 6,000 students*



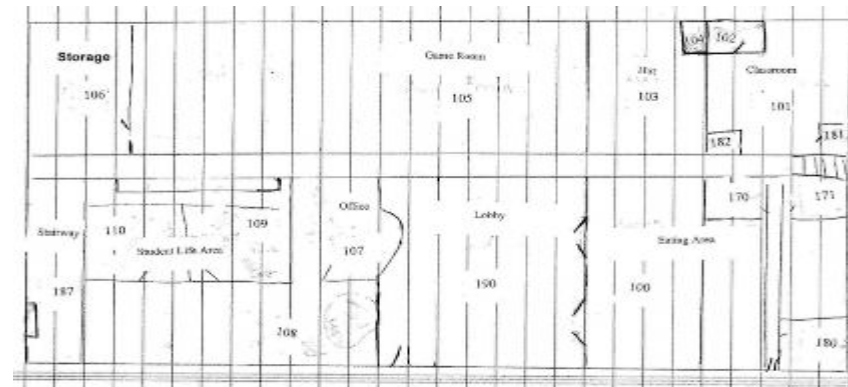
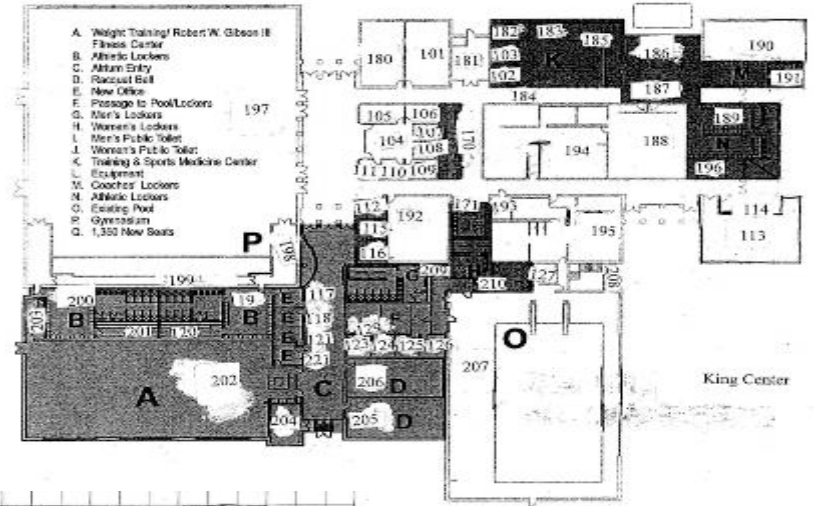
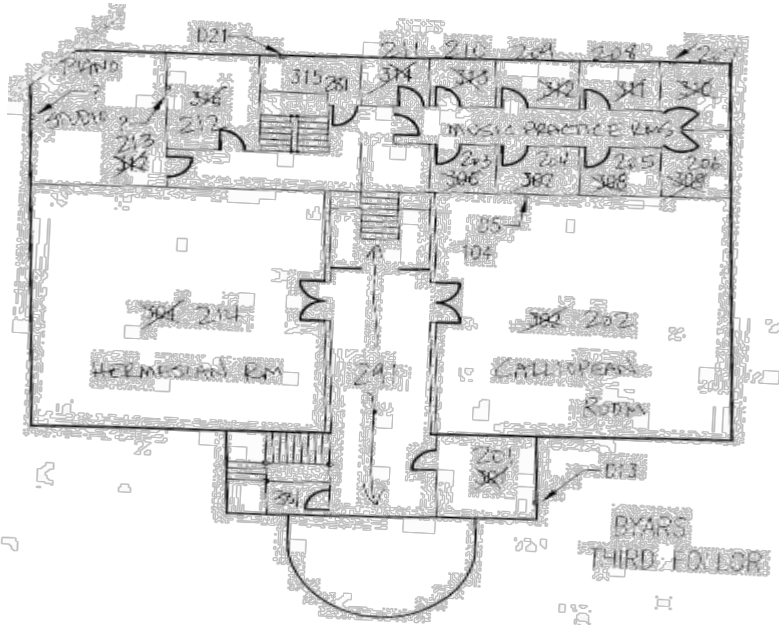
*Data taken from a benchmark of 13 doctoral/research institutions ranging from 3.4M – 12M GSF*

## Narrow the focus further

- Some lab space is relatively untouchable...
  - Teaching Labs
  - Research Labs
  - Open Labs
  - Highly specialized spaces (e.g. clean rooms, FMRI suites)
  - Undergraduate vs. Graduate
- Offices
  - Physical Reality vs. Guidelines

# What do you need to really manage your space?

- Accurate, complete, consistent data
- Utilization metrics
- Continuous space analysis
- Supportive space policies
- Integrated space, academic, & capital planning





# Building a space inventory

- Analyze best sources of information  
(finance, HR, IT, security, plant operations...)
- Assignable space first – consider residential life and athletics last
- Create a plan that produces results and build on it over time
- Partner with departments that have money to spend
- It's not rocket science – start with simple spreadsheets  
and move to CAFM when the time is right
- Determine the best group to own and maintain  
the data and drawings

# Facilities Inventory and Classification Manual (FICM)

US Dept. of Education National Center for Education Statistics (NCES)



- **Basic Principals**
- **Room Type Definitions**
- **Room Use Codes**
- **Function Taxonomy**
- **Area Measurement Standards**

Free download from NCES:

<http://nces.ed.gov/pubsearch/pubsinfo.asp?pubid=92165>

# Refining room types

- What have you really got?
- FICM definitions can and should be adapted
- Consider finer room type definitions or additional descriptive fields:

<b>Offices</b> Faculty: Tenure track Visiting Adjuncts Emeriti Senior Administration Professional Staff Clerical Staff Technical Staff Student Employees Student Organizations	<b>Wet Labs</b> In Vitro (cells, tissue) In Vivo (live animals) Chemical <b>Dry Labs</b> Computational Imaging Cognitive <b>Core Labs</b> Shared space, often equipment-intensive	<b>Teaching Labs</b> Wet sciences Dry sciences Social sciences Art studios Music classrooms Dance studios
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# Examples of basic analysis

- Square footage by room type, department, building

GROSS SQUARE FEET (GSF)													
NET USABLE SQUARE FEET (NUSF)											NON-ASSIGNABLE		
NET ASSIGNABLE SQUARE FEET (NASF)										NON-ASSIGNABLE		STRUCTURAL	
CLASSROOMS	OFFICES	LABORATORIES	GENERAL USE	RESIDENTIAL	HEALTH CARE	SPECIAL USE	STUDY	SUPPORT	UNCLASSIFIED	BLDG SERVICES	CIRCULATION		MECHANICAL
3%	14%	12%	8%	8%	0%	5%	3%	8%	1%	23%			

- Average areas by room type, department, building
- PI research area / number of staff reporting to PI
- Research revenue per square foot (caution)
- Rolling window: reno expenditures / replacement value

## Educate your community

- Often very different perspectives
  - The Principal Investigator
  - The local space banker (dean, dept. head)
  - The desperate planner
  - The federal auditing agency
- Assigned space vs. available space
- Highest-best use
- The limits of planning standards
- Why the request and allocation process is critical

# Highest-best use of rooms

- All square feet (meters) are not created equal
- Rooms evolve over time
- Differentiate “as-designed,” “as-used,” and “best use”
- Align the institutional direction with hard inventory facts

# Utilization Management

- Search for quick, low cost opportunities
- Understand and document unassigned & underutilized space
- Develop quick metrics based on:
  - A space planner's view
  - A federal auditor's view (audits getting tougher)
- Conduct annual room-by-room audits

# Types of Metrics

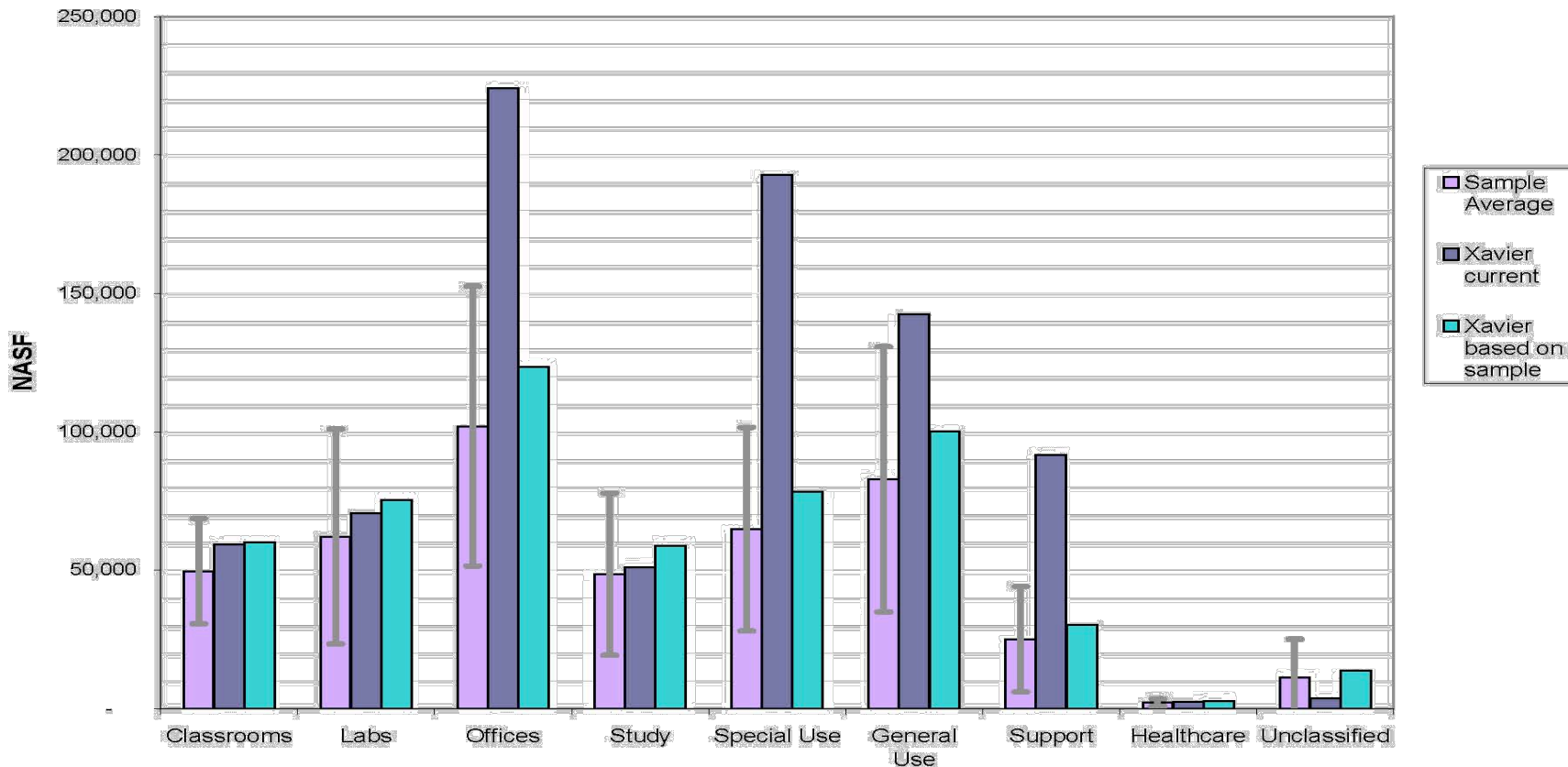
- Benchmarking
- Planning standards
- State guidelines
- Institutional standards



# Benchmarking

- Value vs. effort
- The difficulty of obtaining data
- Apples vs. oranges
- Be cautious about self-reported data
- Know how participant data was collected and cleaned

# Comparing against benchmarking



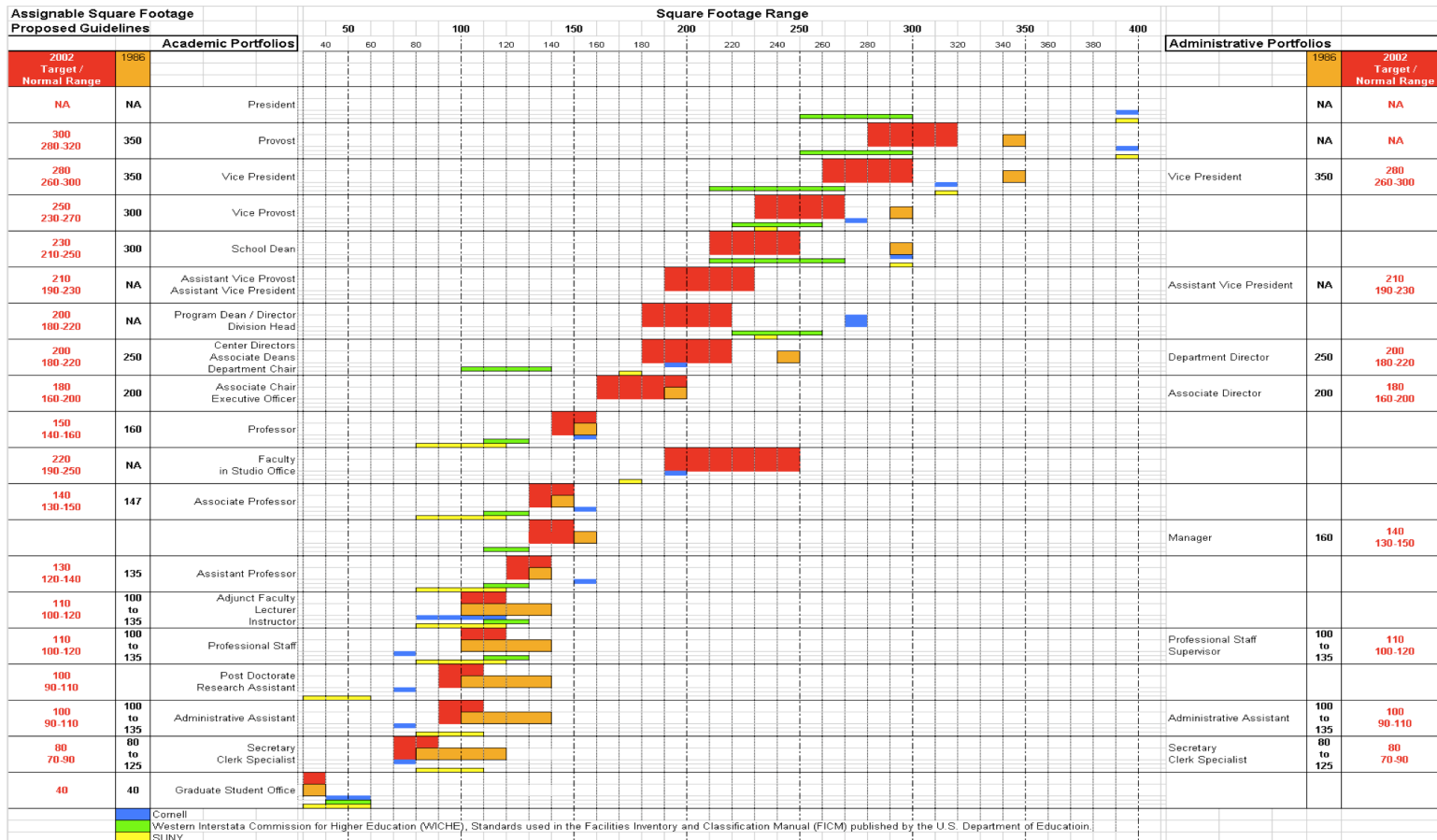
# Planning standard examples

Planning Standard Examples	Use	Additional sorts	Comments
NASF / person	lab, office	department, school	
NASF / rank or position	office	department, school	
NASF / Principal Investigator	lab, office	department, school	
Research \$ / NASF	lab	PI, department, school (check IR)	caution
Lab NASF / occupant	lab	lab type, type of science	
(Lab NASF / person) / Research \$	lab		
Time utilization (seats, week hours)	lab		
Class lab seats / students	lab		

# Relative cost of tightening planning standards

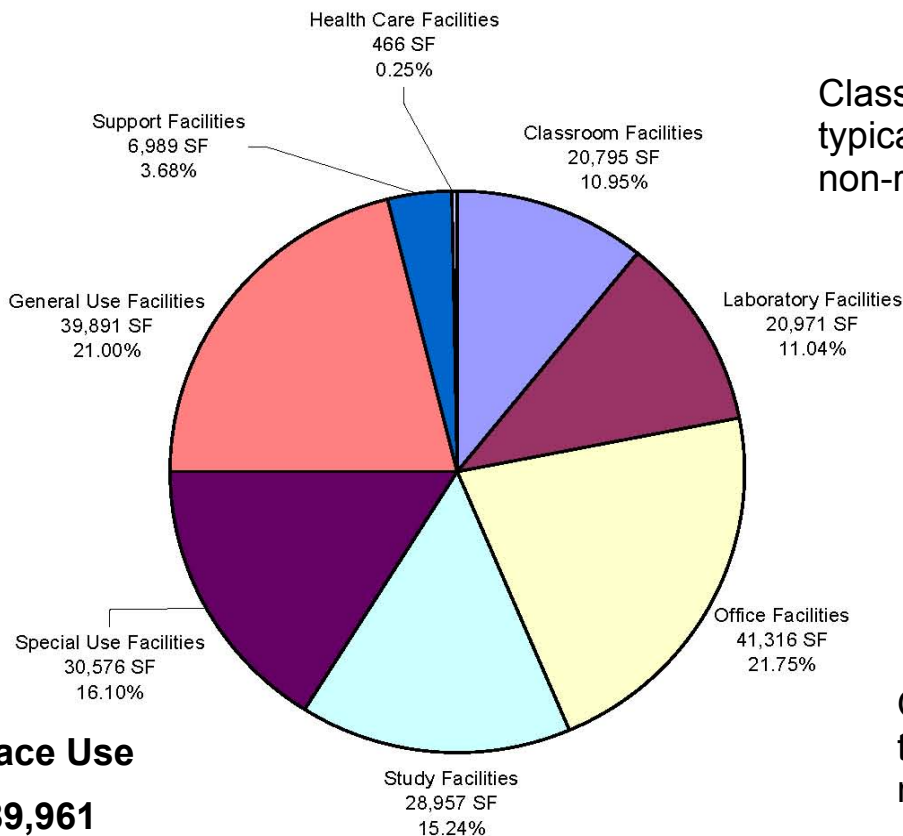
- High cost / foot unless done in context of major renos
- Long time-frame
- Can have a high political cost
- Offices and labs offer far more leverage than classrooms
- Facilities may already be tightening standards in new projects

# Migrating office space standards



■ Cornell  
■ Western Interstate Commission for Higher Education (WICHE). Standards used in the Facilities Inventory and Classification Manual (FICM) published by the U.S. Department of Education.  
■ SUNY

# Comparing against typical values



Classrooms:  
typically @15% of  
non-residential space

Class labs:  
16,036 NSF, 8.44%;  
typically @15% of non-  
residential space

Offices:  
typically @25% of  
non-residential space

**Total NSF by Space Use**

**Total NSF = 189,961**

# State guidelines



Office Space Standards  
*(for analysis purposes, upper  
 value used when ranges given)*

	Arkansas	Cal State Stanislaus	Central Conn State	Colorado-Boulder	Cornell	CPHE	Dalhousie	Georgetown
President		300			400			600
VP/Dean		200	150	200	320		301	350
Assist/Assoc Dean/VP		180	150	150	280		129	250
Academic Dept Head	180	150	150	150	200		193	150
Nonacademic dept head	180		150	150	160			200
Faculty	135		120	120	180	160	118	150
Administrator/Professional Staff	135	110	120	120	120	110	129	150
GA	60	60		60	50			
Clerical	90	80	120	80	80	80	56	
Office Support						6		

# Comparing against planning guidelines



Space Use	Space Use Code	Actual existing ASF	Calculated ASF for Fall 2006	Calculated ASF for Fall 2012 Projection	CEFPI formula used
Open Lab.	220, 225, 235	6,411	8,869	10,006	ASF = Space Factor x Fall FTE ASF = 4.9 x 1,810
Research Lab.	250, 255	243,657	305,600	385,200	ASF = Space Factor x FTEF ASF = 400 x 764
Office & Conf. Room	310, 315 & 350, 355	606,061	446,590	502,275	ASF = Space Factor x (FTE Faculty & Staff Requiring an office) ASF = 185 x (764+1,650)
Study Space	410	10,295	23,510	26,700	ASF = Space Factor 35 x (variable %age of FTE + variable %age of FTEF) ASF = 35 x (35% of 1,810 + 5% of 651)
Study Service	455	1,168	2,821	3,204	ASF = Study Space ASF x variable %age ASF = 12% of 23,510
Processing Room	440	2,085	7,498	7,498	ASF = Stack Space(420+430) x variable %ages ASF = 18% of 41,654
Athletic	520, 523, 525	13,506	50,000	50,000	ASF = Core for FTE up to 3000 ASF = 50,000
Media Production	530, 535	4,946	1,810	2,042	ASF = Space Factor x Fall FTE ASF = 1 x 1,810
Demonstration	550, 555	91	181	204	ASF = Space Factor x Fall FTE ASF = 0.1 x 1,810
Animal Quarters	570, 575	66,771	10,860	12,252	ASF = Space Factor x Fall FTE ASF = 6 x 1,810
Assembly	610, 615	5,678	14,000	14,000	Assembly Space = Core for FTE up to 5,000 Assembly Space = 14,000
Lounge	650, 655	9,907	6,958	8,052	Total Lounge ASF = (Space Factor x Fall FTE) + (Space Factor x Fall FTEF)



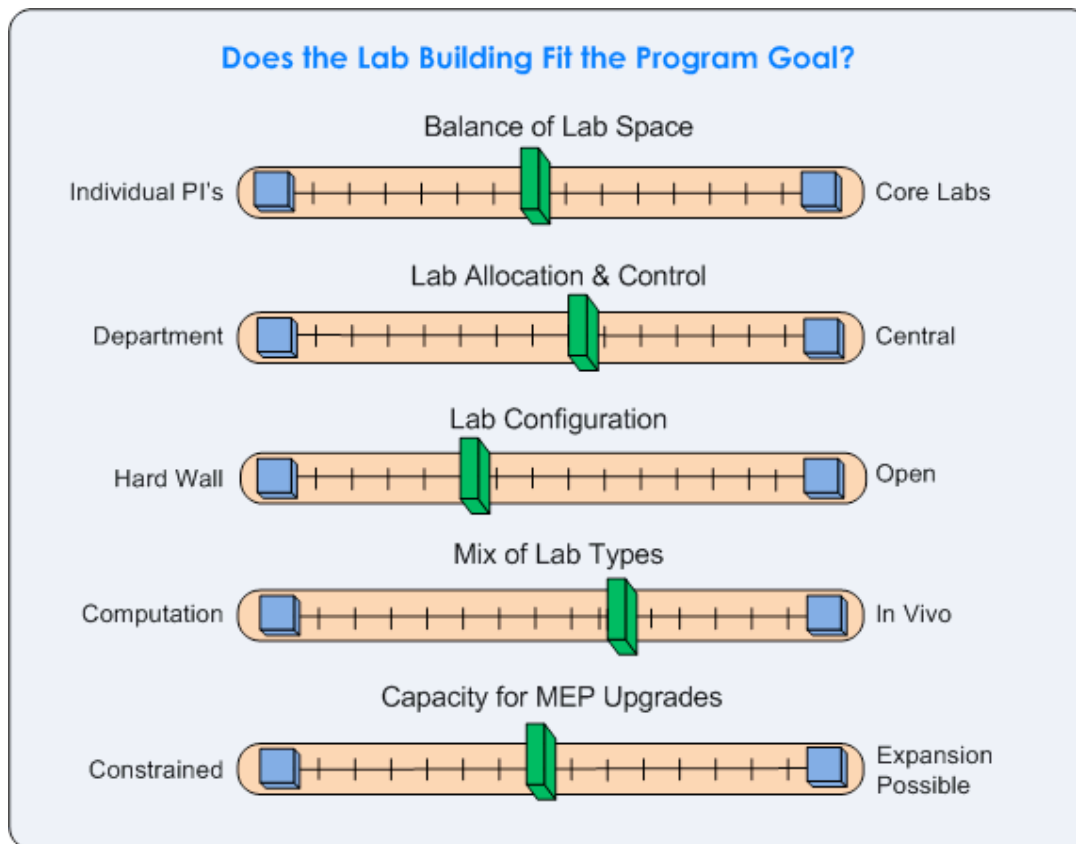
# Comparing within the institution

Department	Number of faculty	% of total # of faculty	Dept. SF / # of faculty	% +/- average
Ocean	9.5	12%	1,943.16	43%
Civil	12	15%	1,846.92	35%
Chemical	12	15%	1,446.92	6%
Industrial	7	9%	1,441.43	5%
Mechanical	15.5	19%	1,412.32	4%
Electrical	25	31%	818.16	-40%
<b>Total</b>	<b>81</b>			
<b>Average</b>			<b>1,363.22</b>	

## Some other things to check

- Centrally- vs. departmentally-scheduled classrooms
- Space “loans” across organizational boundaries
- Institutional memory of loans and allocation promises
- Space devoted to highly specialized equipment
- Amount of highly specialized space (e.g. clean rooms)
- Quality of fit of program to space. For example:

# A lab is not a lab is not a lab...



## Nor do all offices have the same rules:

- Assignment vs. occupancy vs. utilization
- 2<sup>nd</sup> (or 3<sup>rd</sup>) offices
- Emeriti
- Nobel Prize winners

# Realistic supply and demand

- Available space = inventory x utilization rate
- Defined need vs. programming formulae
- Jurisdictional envelopes
- Demand prioritization on the way up
- Annual capital budget cycles
- Space demand forecast process

# Space audits

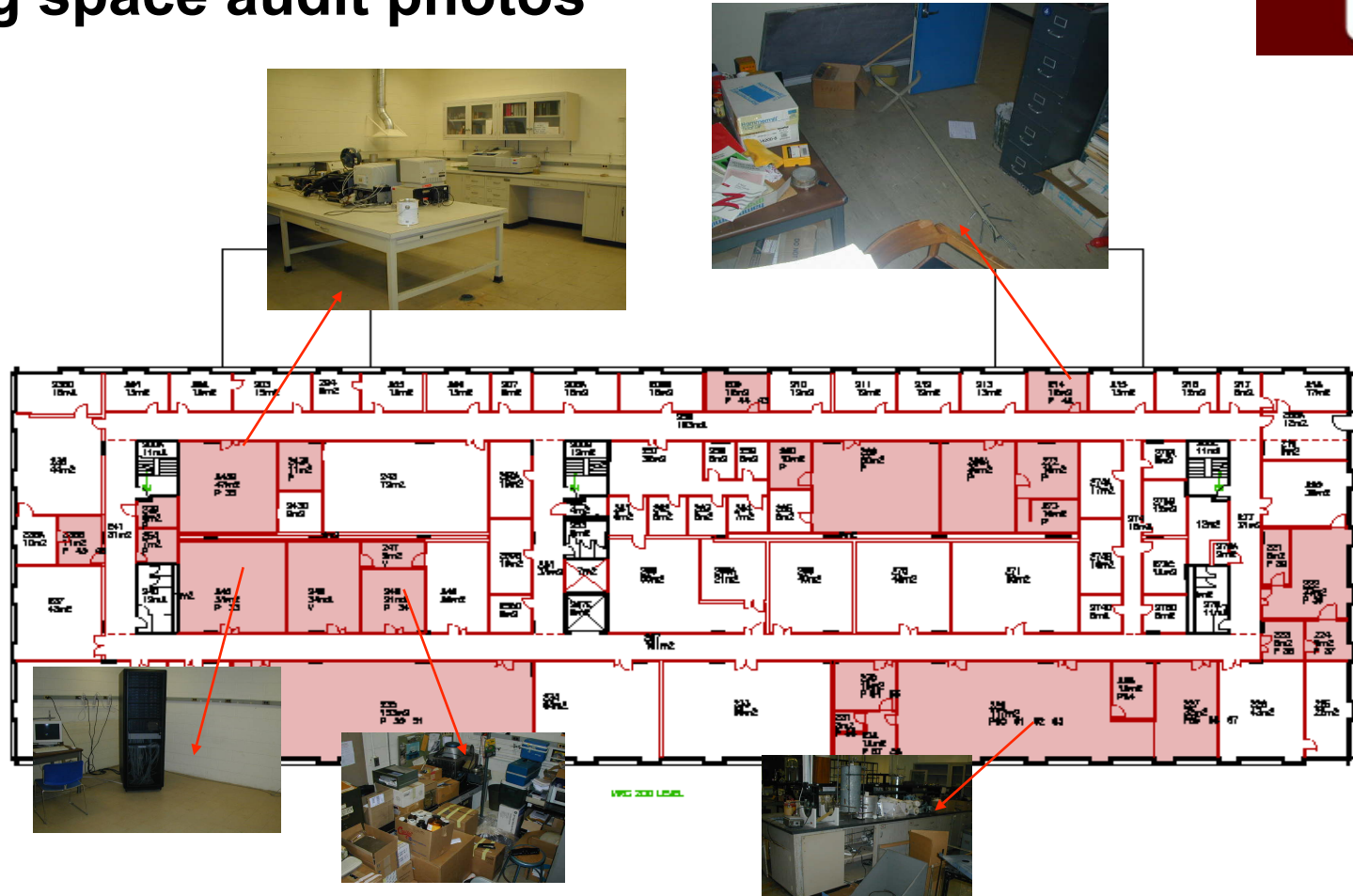
- Audit Types
  - Inventory accuracy (partitions, room type)
  - Occupying department (self-reported?)
  - Basic utilization
  - Appropriate use
  - Condition
- Audit frequency
- Audit photos
- Efficient data handling techniques
- Track audit GSF / day

# Quick utilization audits

- Use on targeted subset of rooms
- Goal:  $\leq 30$  seconds per room
- Identifies underutilization ranges
- Criteria of interest to both planners and federal auditors
- Basis for further investigation, not an indictment (many justifiable cases)
- Compare to sponsored research cost recovery room lists

Code	Utilization Audit Checklist
O	Fully occupied
V	Vacant
P	<b>Limited personnel</b> in rooms
E	<b>Limited equipment</b> present and/or functioning
S	Significant space taken up by packing cases or other <b>storage</b> material
U	<b>Use discrepancy</b> (e.g. lab used as office)
I	<b>Inappropriate</b> materials (ping pong tables, couches in labs, arcade games)
D	Considerable <b>disarray</b> , trash on floor or work surfaces, heavy dust

# Using space audit photos





# Research space utilization audits



# Who makes space decisions on your campus?

- Space Committee
- Provost
- President
- Dean
- Whoever played golf with the President last
- Nobody
- Anybody
- It depends

# Policies protect the institutional prerogative

- Strategic space policies
  - Differentiate ownership vs. occupancy
  - Annual space and capital planning
  - Formal space change process
  - Mandated space inventory
- Tactical management policies
  - Reallocation of underutilized space
  - Space request and allocation process
  - Control of partition and MEP changes
- Data integration policies
  - Mandatory common taxonomy
  - Explicitly assigned responsibility for data sources
  - Business planning for any integration

## Some key control points

- Central request and allocation process
- Jurisdictional envelopes
- Departmental space plans
- Single campus source for basic space data
- Continuous utilization monitoring
- Building code compliance process
- Integration with strategic academic planning

## Policies and Politics

- Visiting and adjunct professors – unique needs and requirements
- Emeriti and 2<sup>nd</sup> offices for professors - implement policies to take back the spaces when they are needed
- Again, focus on highest best use
- Suitability and utilization ratings for spaces in question
- Ranks of the occupants of spaces on campus
- Distill job types to a list short enough to use in analysis
- Be aware of contract employee space requirements
- Without political muscle don't bother trying to make your case.

## Policies and politics, cont.

- What is the cycle of review for research space?
- If looking at \$ / SF, do you look at one year or an average of multiple years?
- Research expenditures vs. total grant award?
- How soon after funding loss do you think about taking space back?

## Articulate the cost of underutilization

- Acquisition or replacement cost vs. better utilization
- Impact on recruitment, retention, and enrollment
- Constraint of program growth or new initiatives
- Analyze and explain current occupancy patterns
- Problematic business cases for new capital projects
- Optimize sponsored research cost recovery while ensuring an audit-ready stance

# Numbers that get attention

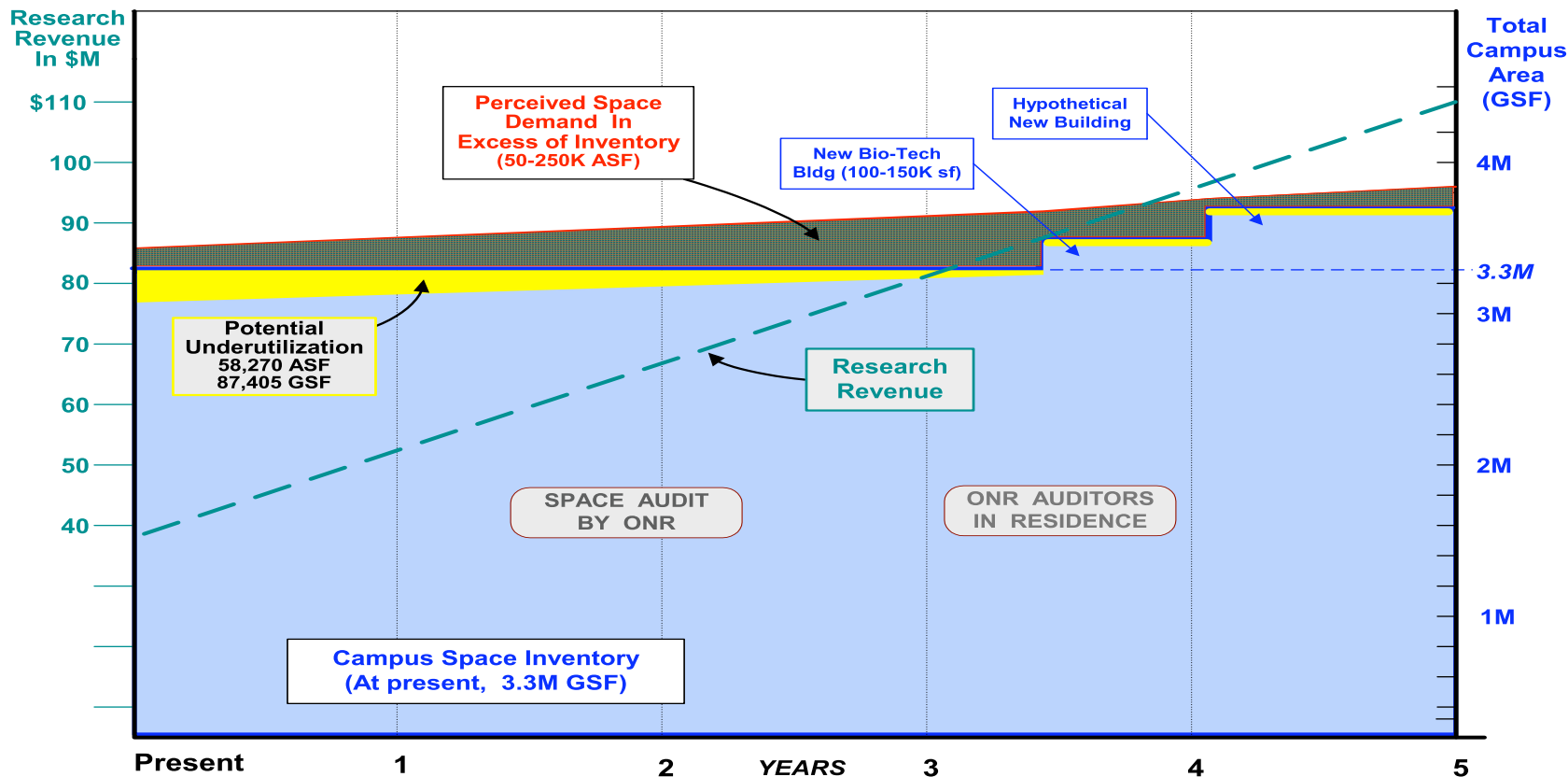
*<n> Underutilized ASF x 1.5 x <construction cost rate>*

- For a 5,000,000 GSF Campus:
- Lab & Office space  $\approx$  1,250,000 GSF (about  $\frac{1}{4}$  of campus)
- New construction cost = \$800 / GSF  
(or, \$800,000 per 1,000 GSF)
- 1% underutilized lab & office space = 12,500 GSF
- New construction cost:  $12,500 \times \$800 = \mathbf{\$10,00,000}$

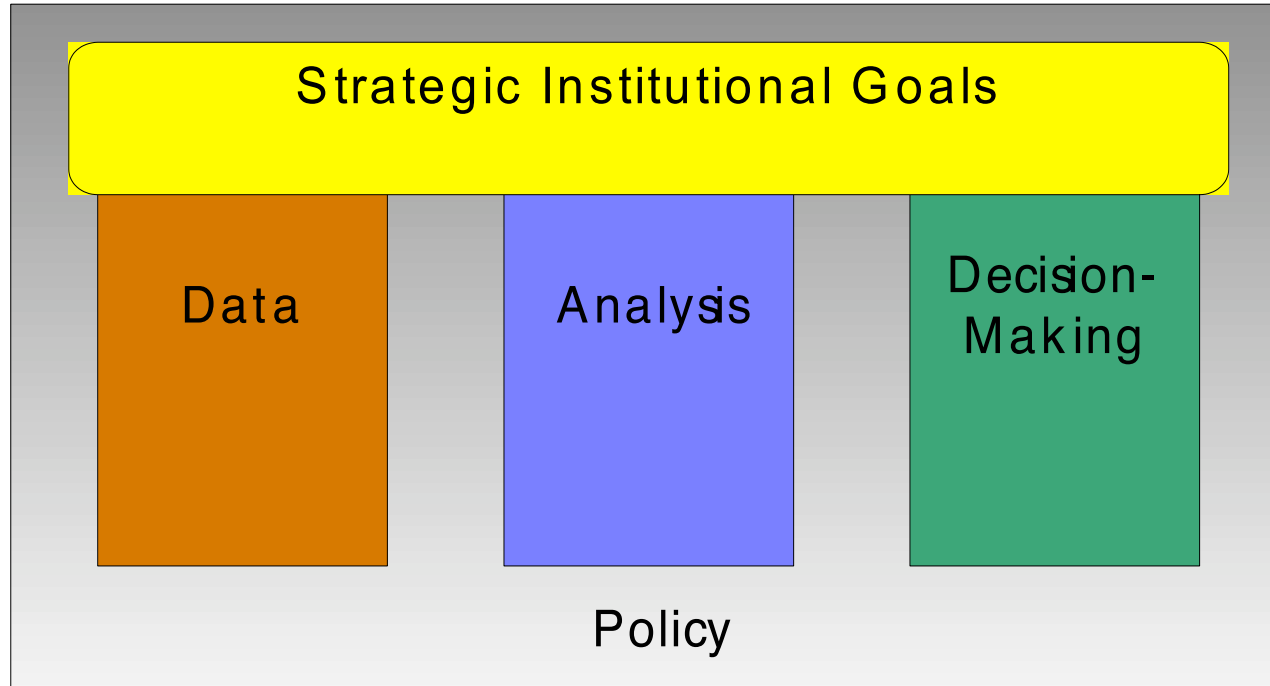


# Put underutilization in perspective

## Factors In Space Needs Forecasting



**If your institution really wants to manage space:**



**“Data and reporting don’t change business practice and process. Policy does.”**

## The basis for change

- A real need for institutional leadership
- Articulation of current situation
- Interpreted analyses supported by trusted data
- Acknowledgement of common problems
- Differentiation of “ownership” and occupancy
- Shared problems require shared solutions



"Our space utilization study revealed that you have two square feet more than is allotted, so we're going to keep the office recycling bin in here."

## Some Take-Aways

- Develop defensible, compelling data
- Steal data from anyone
- Always question benchmarked data
- Walk your space
- Beware of self reported data
- [http://www.scup.org/resources/topic\\_issue/managing-space.html](http://www.scup.org/resources/topic_issue/managing-space.html)