



**Better
Buildings®**
U.S. DEPARTMENT OF ENERGY

**2016 DOE Summit Greening Grants Work Session:
Increasing Efficient, Effective Use of Federal Research Funding While
Minimizing Environmental Impacts**

Better Buildings Summit

Tuesday, May 10th

2:00 PM - 5:30 PM

Meeting Objectives

- To provide the opportunity for representatives from various federal agencies and universities to connect on this subject and discuss ways to connect sustainability and efficiency to federal research funding.
- To raise awareness that greening grants not only benefits reducing the environmental footprint of research but also benefits efficient, effective use of federal dollars to maximize research funded with federal research budgets.
- To find solutions that can be measured, avoid unwelcome administrative burden, and would be considered a win for granting agencies, a win for scientists, and a win for universities.
- To learn about any efforts underway addressing this topic.

Agenda

- 2:00-2:15 Introductions
- 2:15-2:45 Presentation: Why is there a need for connecting sustainability and efficiency to federal research funding for universities?
- 2:45-3:15 Panel: Introductions, Understanding present federal funding process...are there requests for efficiency and sustainability?
- 3:15-3:45 Break
- 3:45-4:30 Panel: Ideas for growing efficiency & starting to make the connections; identifying obstacles; actions needed to bring about ideas
- 4:30-4:45 Panel members summarize points of significance and suggestions for moving forward
- 4:45-5 Facilitator Summary
- 5-5:30 Next steps

Today's Presenters

- **Phil Wirdzek**, Founding President and Director of I2SL
- **Kathy Ramirez-Aguilar, Ph.D.**, Green Labs Program Manager at the University of Colorado-Boulder and Chair of the I2SL University Alliance Group
- **Hilliary Creely**, Assistant Dean for Research at Indiana University of Pennsylvania
- **Robert Kuchta**, Professor, Department of Chemistry and Biochemistry, University of Colorado Boulder
- **Brenda Petrella**, Biological Safety Officer, Lab Sustainability Manager, Dartmouth College
- **Jelena Srebric**, Professor, Mechanical Engineering, University of Maryland

Why is there a need for connecting sustainability and efficiency to federal research funding for universities?

Why is there a need for connecting sustainability and efficiency to federal research funding for universities?

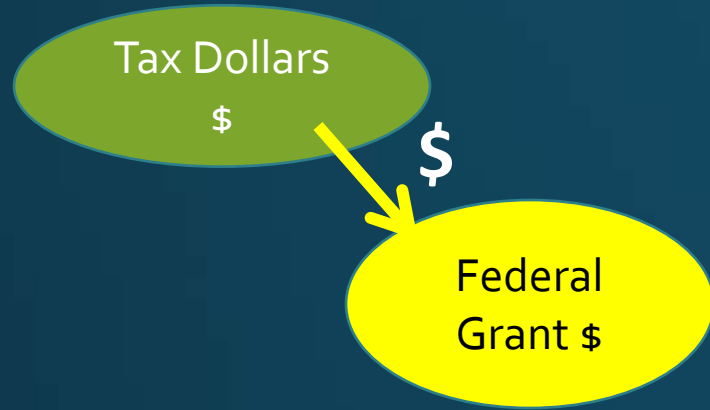
**Kathy Ramirez-Aguilar
CU Green Labs Program Manager
University of Colorado Boulder
kramirez@colorado.edu**

Majority of US University Research Is Funded by Federal Government

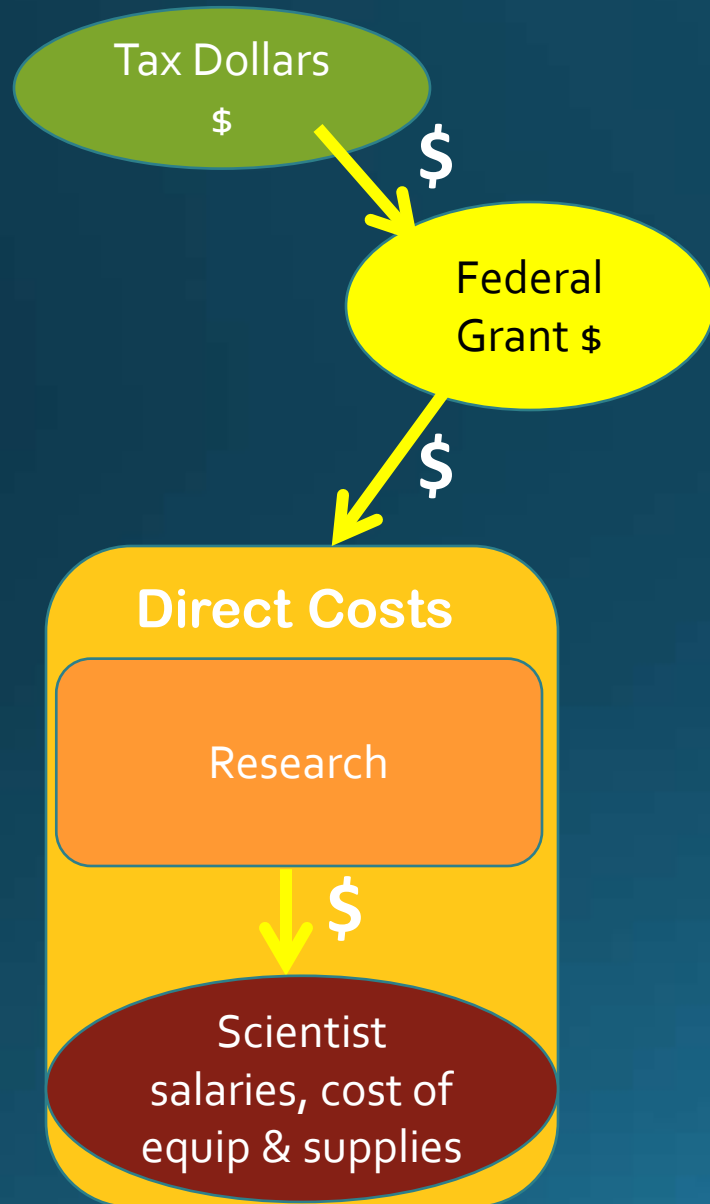
% research funding from federal govt.

CU-Boulder (FY14) = 80%
Univ. of Michigan (FY14) = 57%
Dartmouth (~FY14) = 86%
Stanford (~FY14) = 80%
Univ. of Florida (FY14) = 66%
Northwestern Univ. (FY14) = 73%
Univ. of Chicago (FY13) = 74%
Iowa State (FY15) = 53%
Penn State (FY14) = 62%
Rutgers Univ. (FY14) = 53%
UC-Davis (FY14) = 53%
UC-Irvine (FY15) = 66%
UC-Santa Barbara (FY15) = 78%
Univ. of Kansas (FY14) = 80%
Univ. of Minnesota (FY15) = 61%
Univ. of Oregon (FY15) = 90%
Univ. of Washington (FY15) = 80%
Princeton (FY14) = 72%
Univ. of Rochester (FY15) = 75%
Univ. of Wash.- St. Louis (FY15) = 75%

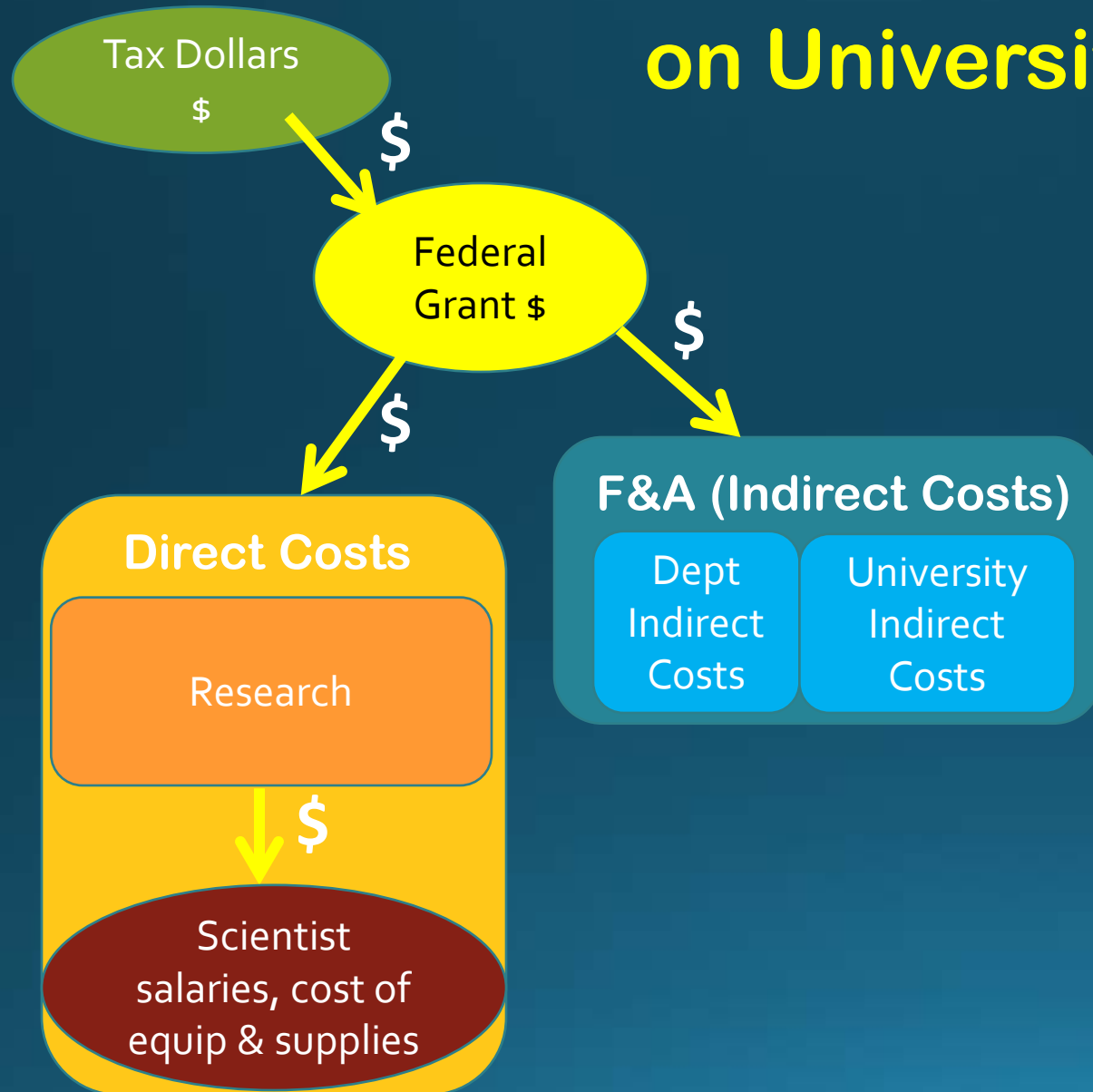
Federal Funding of Research on University Campuses



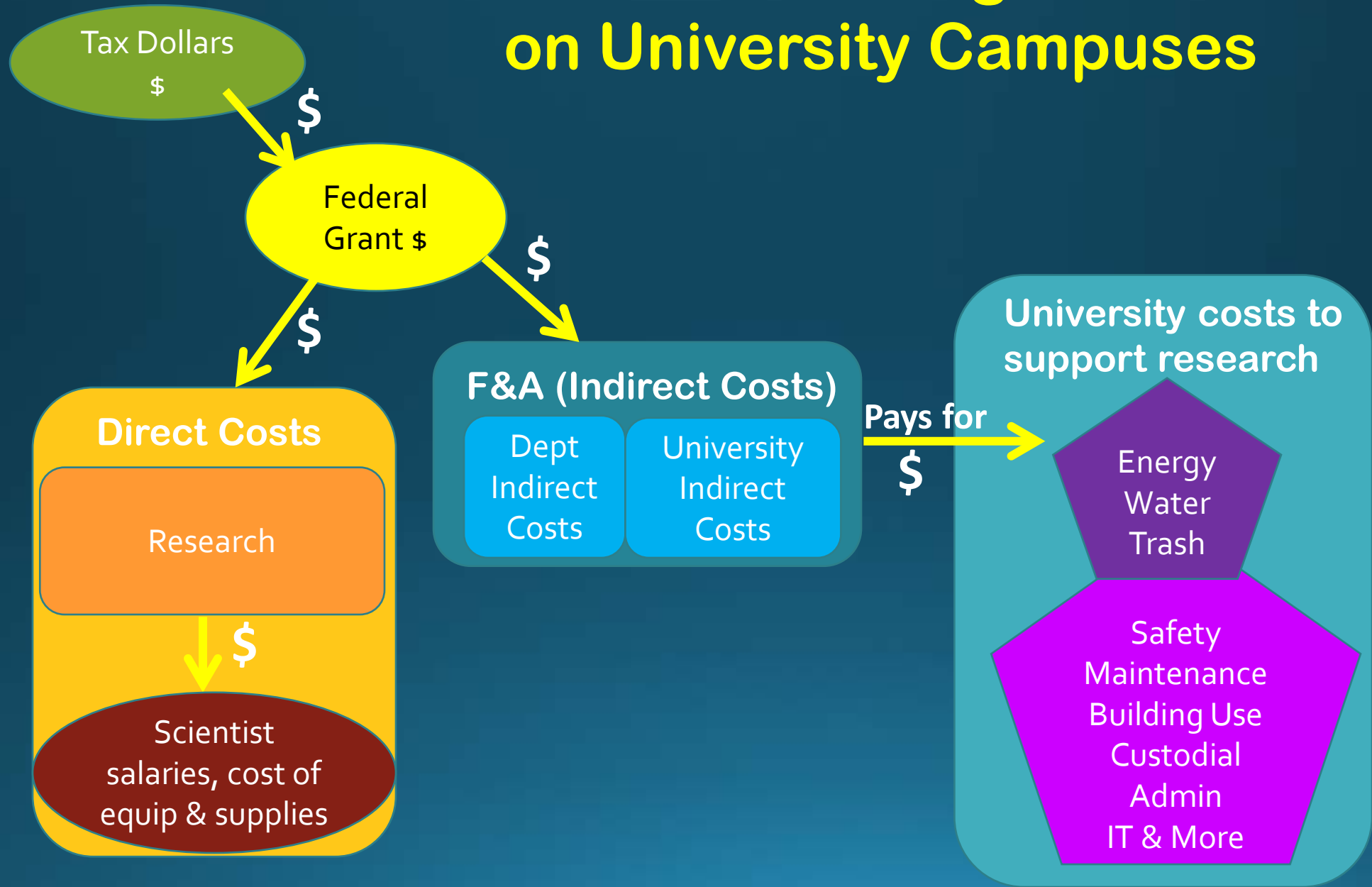
Federal Funding of Research on University Campuses



Federal Funding of Research on University Campuses



Federal Funding of Research on University Campuses



Scientists facing rising competition for federal funding

Lack of
increase in
federal
research
funding
(+ inflation)

+

More
university
scientists
competing
for federal
funding

+

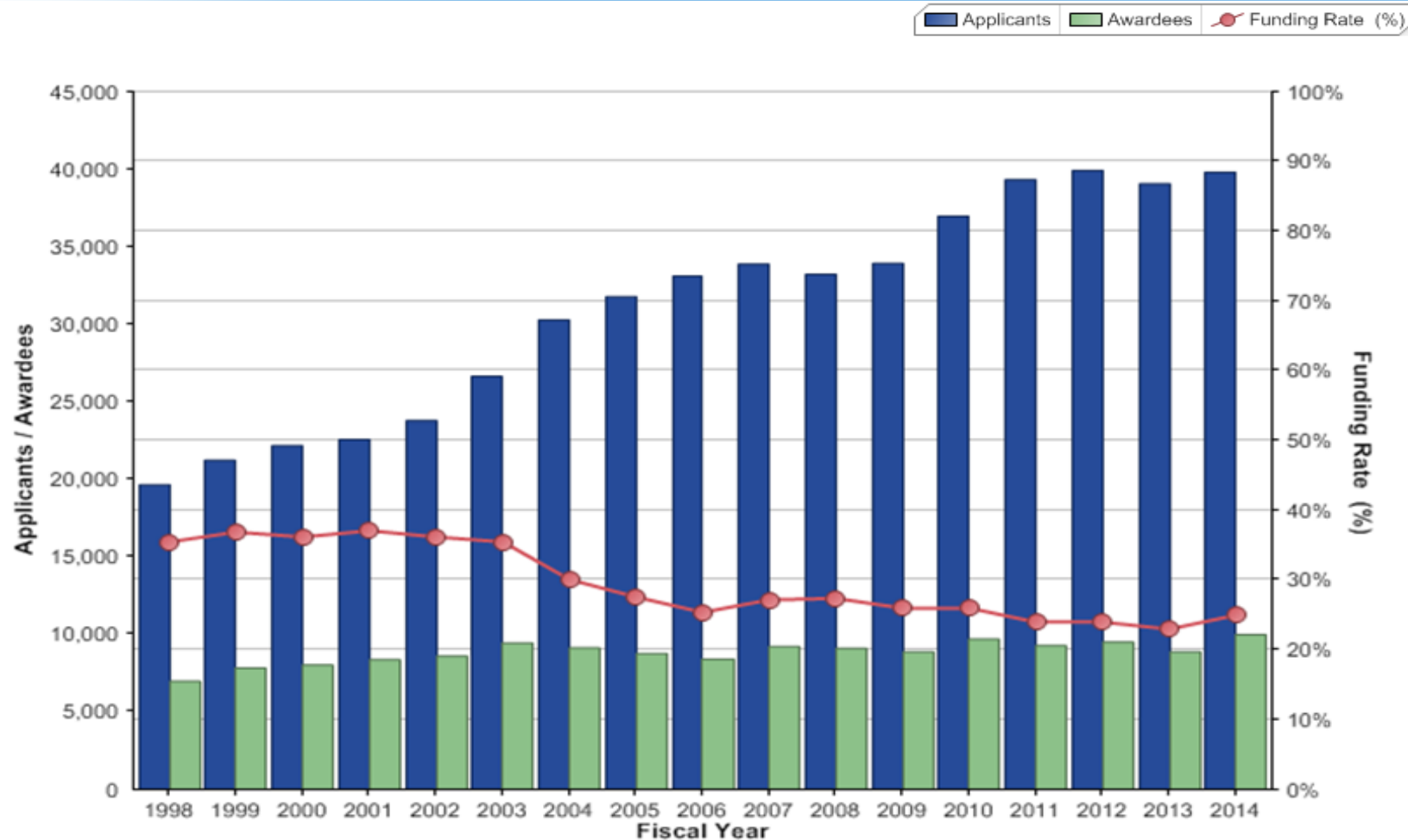
Rising fed.
\$ going to
overhead
as univ.
research
space
expands

=

Rising
competition
for federal
funding

Decreasing success rate for NIH grants

Research Project Grant investigators
Competing applicants, awardees, and funding rates



Will the competition continue?

Yes!

- Federal government does not show signs of increasing funding for research at the rate that it did so prior to 2003
- Presently, universities are continuing to grow research on their campuses putting more demand on federal funds

So, how can we do more with existing federal funding?

NIH asking the same question:

Request for Information (RFI): *Optimizing Funding Policies and Other Strategies to Improve the Impact and Sustainability of Biomedical Research*

Notice Number: NOT-OD-15-084

Key Dates

Release Date: April 2, 2015

Response Date: May 17, 2015

Efficiency stretches research funding

Greening Grants is about connecting efficiency and sustainability with federal research funding

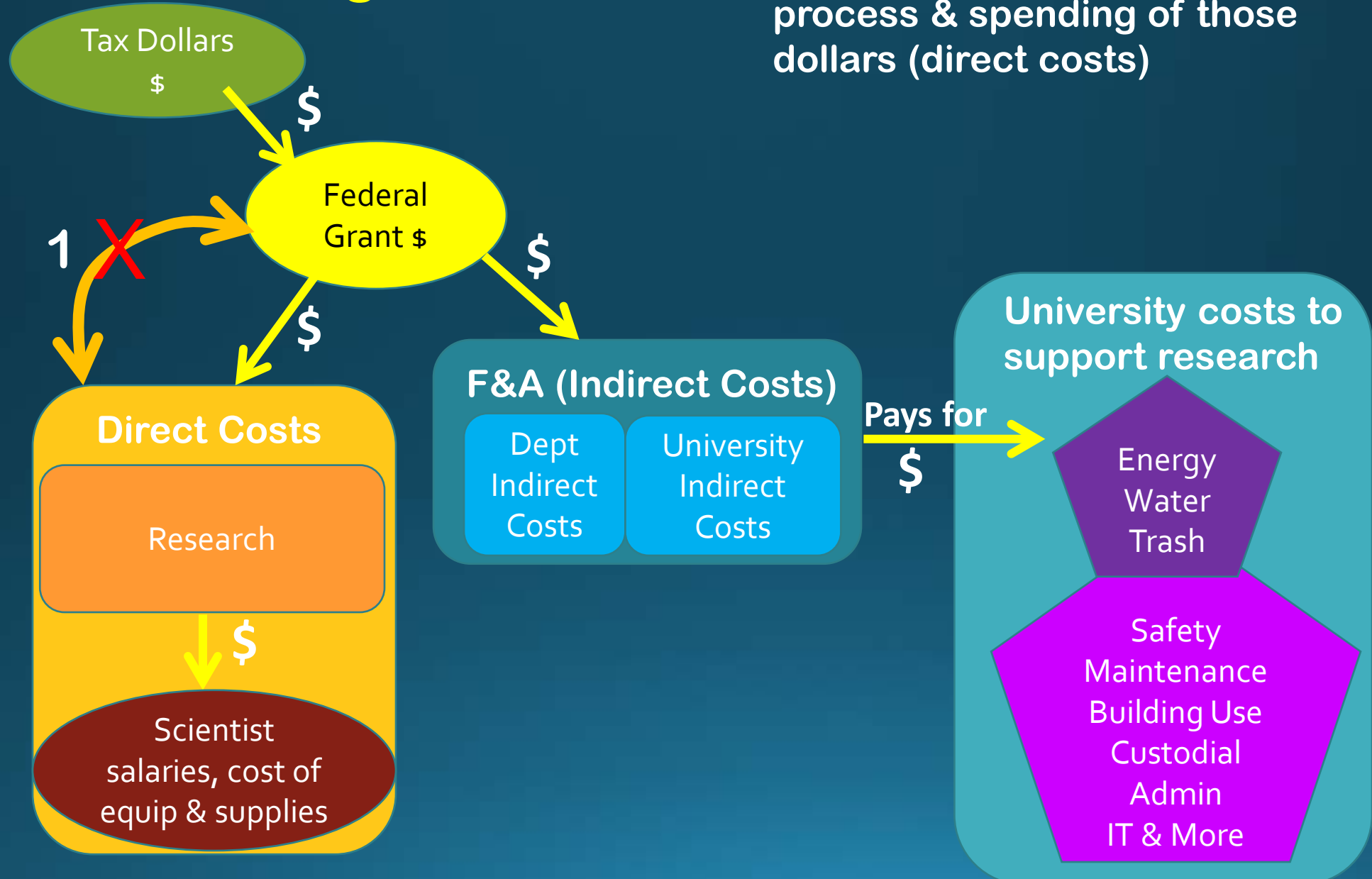
Efficient use of resources:

- Maximizing effective use of federal research funding
- Minimizing the environmental footprint of research



Missing Sustainability/Efficiency Connections in University Research Funding:

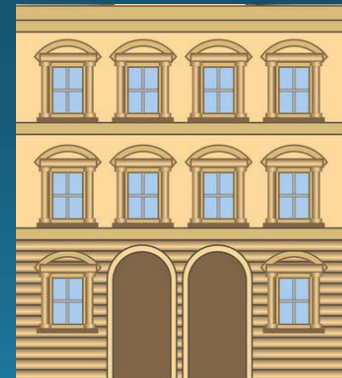
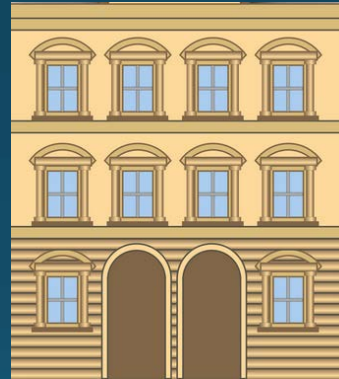
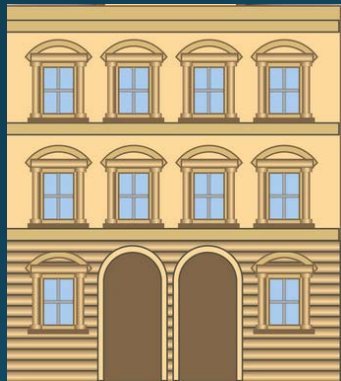
1. Federal grant application process & spending of those dollars (direct costs)



During the grant application process and spending of those dollars, there are missed opportunities for federal granting agencies to ask or encourage scientists to:

- 1. Share equipment and make use of existing equipment resources already on campus**
- 2. Use campus lab space and fume hoods efficiently & effectively that fit present researcher needs rather than historical needs**
- 3. Select lab equipment and processes that energy/water/material efficient where possible and that use green chemicals**
- 4. Encourage computer resource, software, & data sharing**

Individual space with individual resources leads to more space than necessary and duplication



Individual spaces with individual resources leads to “ownership” mentality for space and equipment, which leads to duplication

Duplication of Equipment



Lack of awareness of what equipment resources exist on campus



Uniform Guidance CFRs requiring equipment sharing & avoid duplication

Uniform Guidance CFR 200.313 c2

“must also make equipment available for use on other projects or programs currently or previously supported by the Federal Government, provided that such use will not interfere with the work on the projects or program for which it was originally acquired.”: http://www.ecfr.gov/cgi-bin/text-idx?SID=597cf895a4e1859ccf447c54c795d4b3&node=se2.1.200_1313&rgn=div8

Uniform Guidance CFR 200.318 d

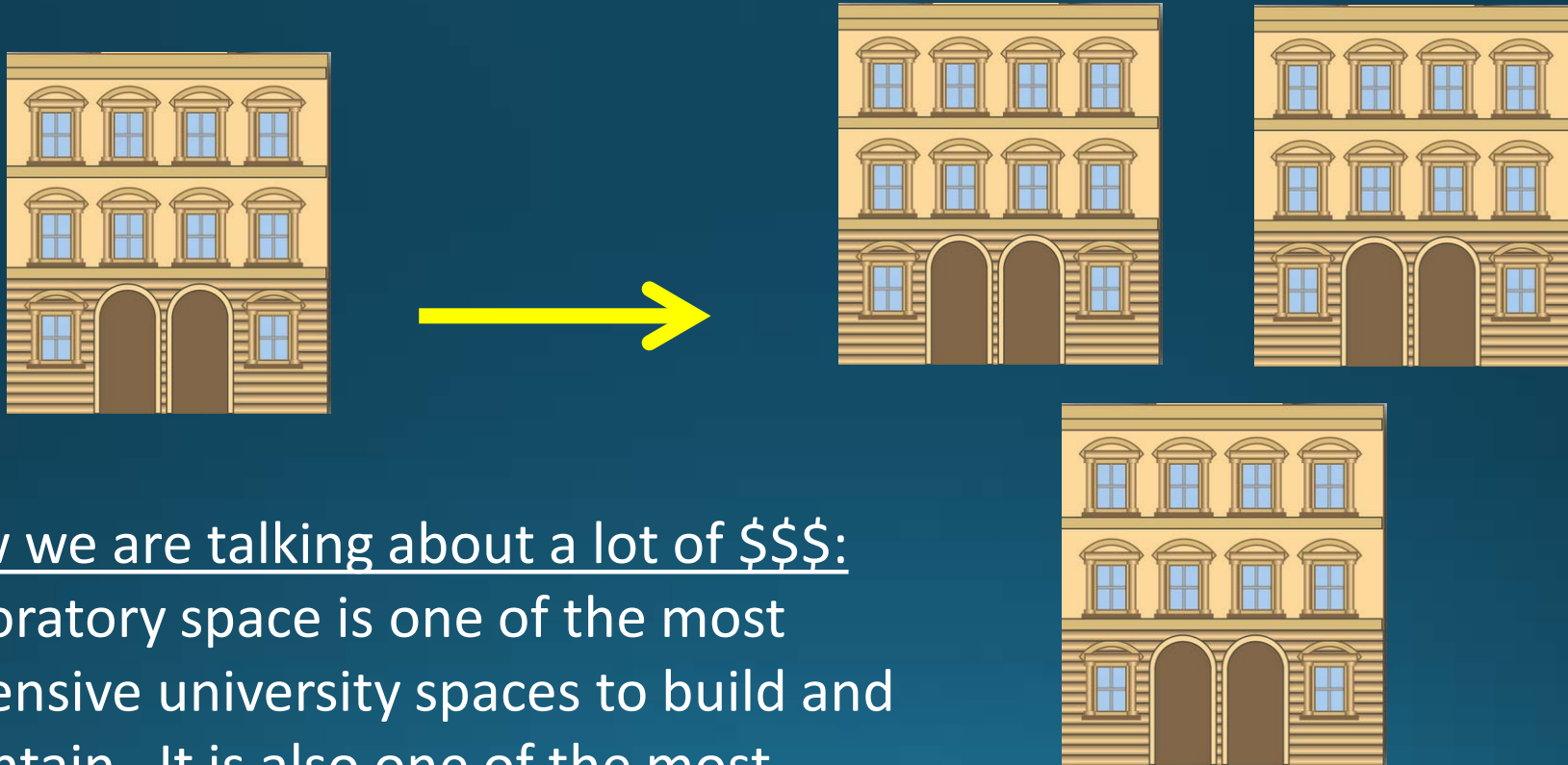
“must avoid acquisition of unnecessary or duplicative items” : <http://www.ecfr.gov/cgi-bin/text-idx?node=2:1.1.2.2.1.4.31&rgn=div7>

Lack of sharing results in equipment duplication



Some may say: But cutting back on the more general use equipment is not really going to saving a lot of federal research funding.

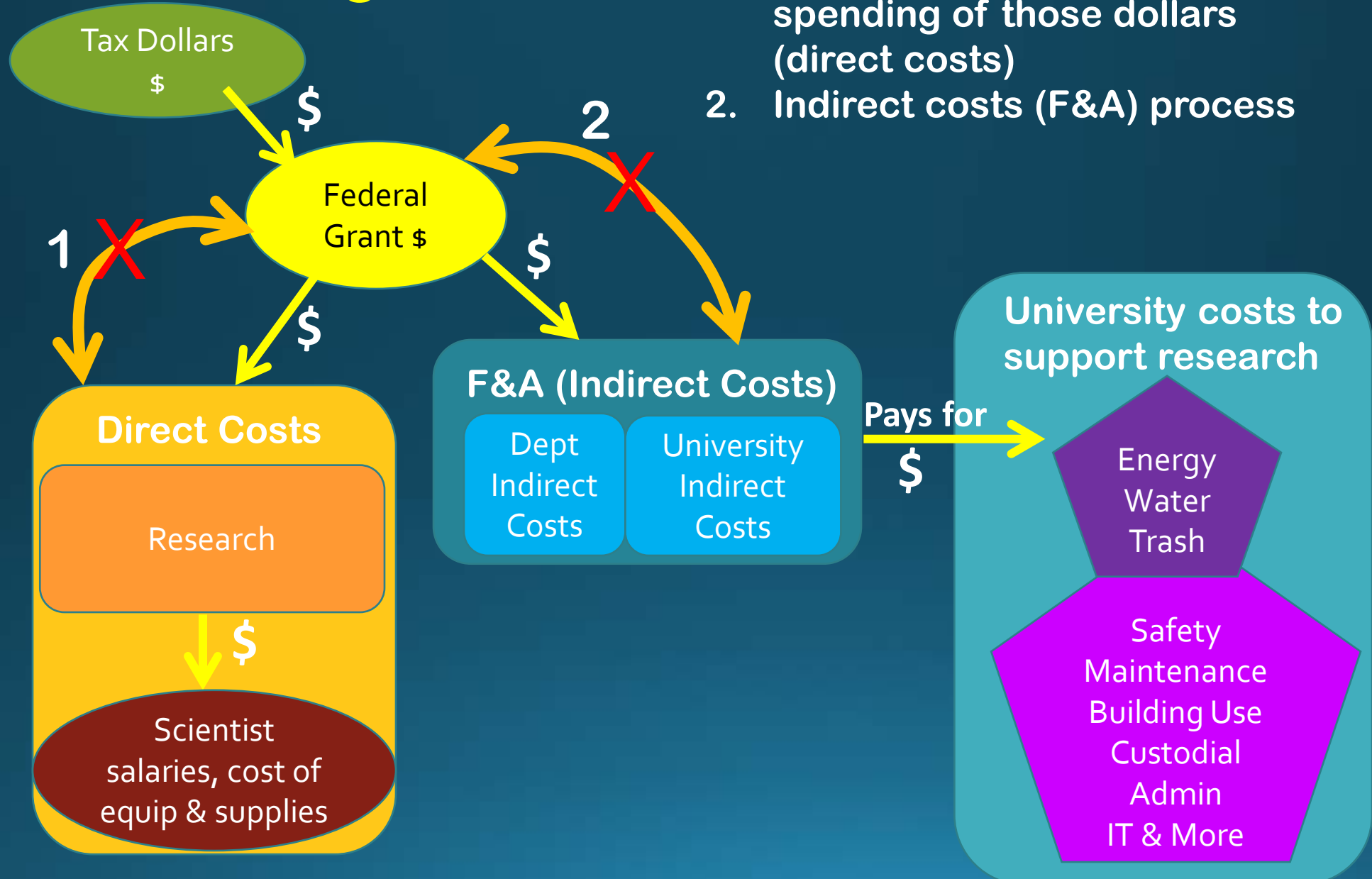
Equipment duplication leads to not only inefficient use of equipment resources, but importantly, space resources



Now we are talking about a lot of \$\$\$:
Laboratory space is one of the most expensive university spaces to build and maintain. It is also one of the most energy intensive spaces on campus.

Missing Sustainability/Efficiency Connections in University Research Funding:

1. Federal granting process & spending of those dollars (direct costs)
2. Indirect costs (F&A) process



Federal funding to universities for overhead costs is significant

Nature 19 Nov. 2014 “Indirect costs: Keeping the lights on”:

- 2013: \$5.7 billion of NIH’s \$22.5 billion went for indirect costs
- Facilities and Administrative Rate (or F&A rates) for universities are between 20% and 85%
- Typically F&A rates (a.k.a. Indirect Cost Recovery rate or ICR rate) are in the 40%s, 50%s, 60%s
- But, because there are expenses that do not qualify for F&A, average effective rate for universities is really 31%

More information on F&A (a.k.a ICR)

Negotiation between university and federal government occurs every 3-4 years. Universities create extensive report justifying the F&A rate request focused on a single base year.

How is it calculated?

$$\text{F\&A Rate} = \frac{\text{F\&A expenses supporting research}}{\text{modified total direct costs}} \times 100$$

How does rate work?

- Rate = 53%
- Grant for \$1,000,000
- University will receive \$530,000 for overhead costs (this in addition to the \$1,000,000 the scientist has been awarded)

Space is an important factor in the F&A rate calculation

Two general components of overhead costs:

1. Administrative costs (capped at 26%)
2. Facilities costs (not capped)
 - Building and equipment depreciation
 - Operations & maintenance of facilities
 - Other (library, interest on facility debt)

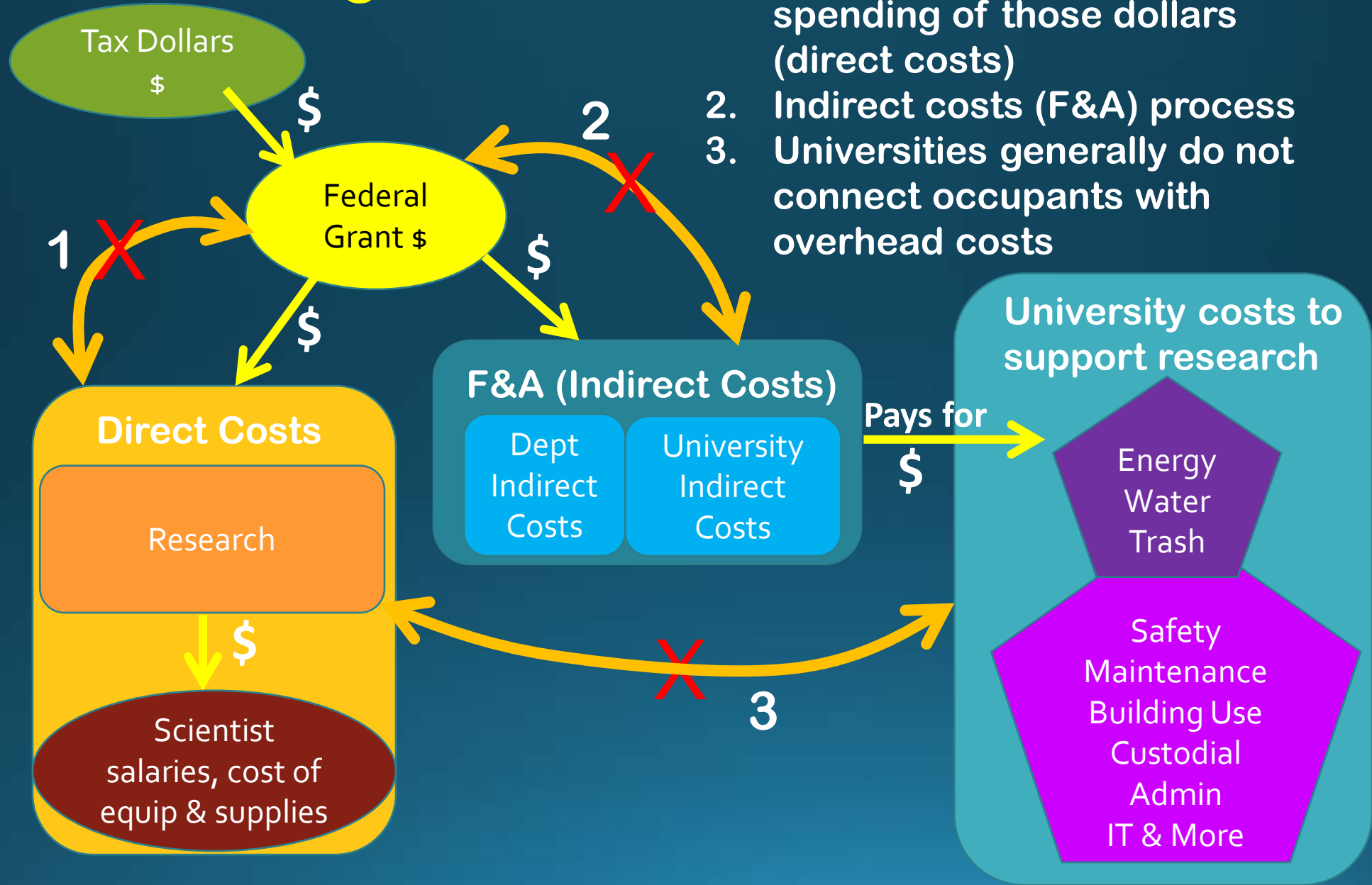
Facilities costs calculation greatly depends on space assigned to federal funded research:

- the greater the space
- the higher the F&A rate
- The higher the F&A rates for universities, the less federal funding available for direct costs of research

The F&A process requires universities to report costs, but misses opportunity to ask for efficiency

1. Lacks asks for efficiency in the use of energy, water, etc.
2. Lacks requests for efficient, effective use of research space

Missing Sustainability/Efficiency Connections in University Research Funding:

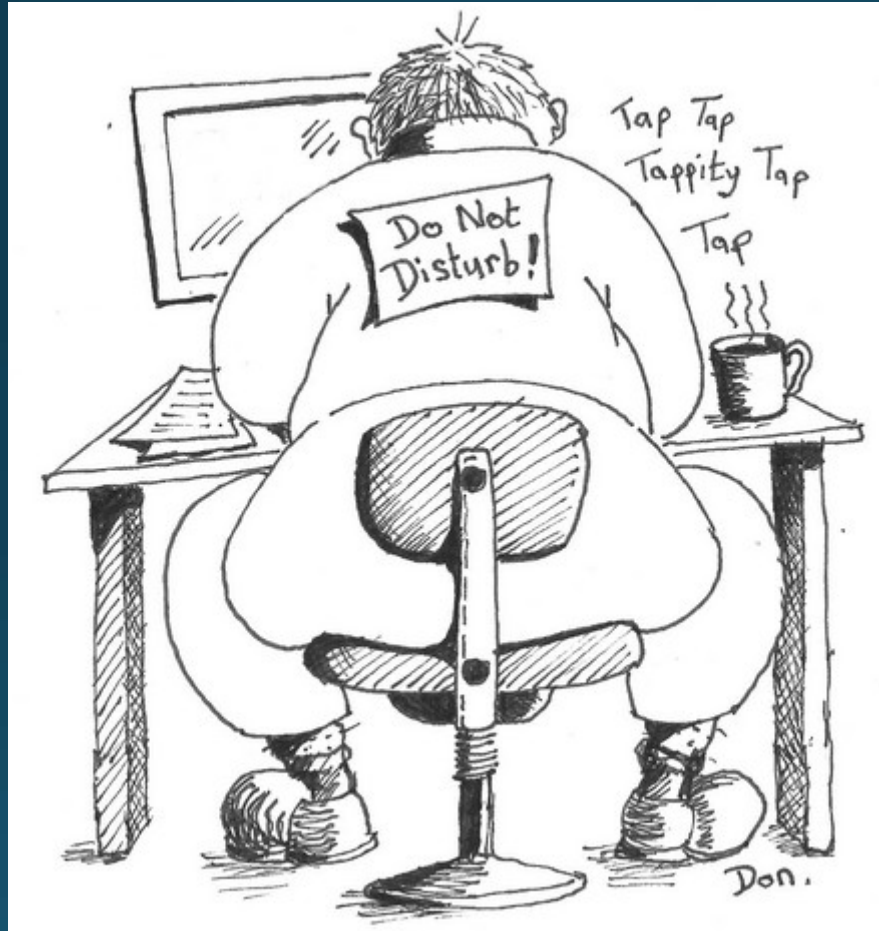


1. Federal granting process & spending of those dollars (direct costs)
2. Indirect costs (F&A) process
3. Universities generally do not connect occupants with overhead costs

Inefficiencies mean a greater environmental footprint for research

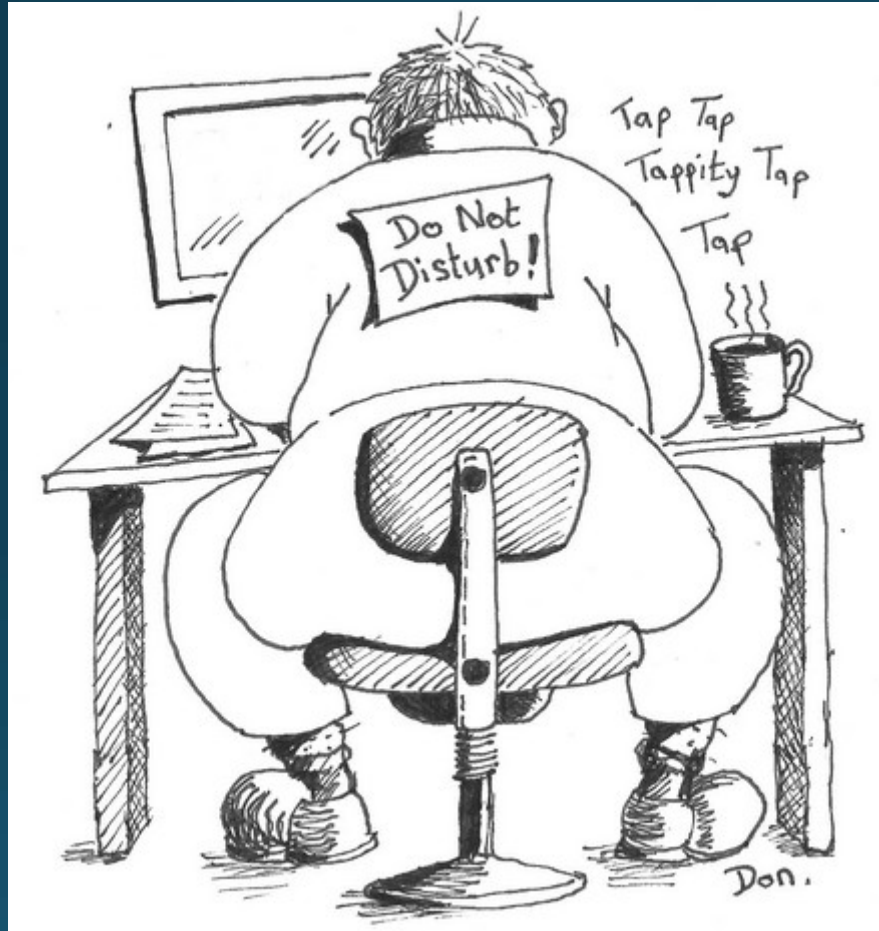


Inefficiencies mean scientists spending more and more time writing grants



Less time doing
research
+
Focusing on
projects that are
likely to get
funding

Greening Grants would improve both of these issues



Greening Grants: Are there connections to federal funding that can encourage:

- 1. Sharing equipment and making use of existing equipment resources already on campus**
- 2. Use of campus lab space and fume hoods efficiently & effectively that fit present researcher needs rather than historical needs**
- 3. Selection of lab equipment and processes that energy/water/material efficient where possible and that use green chemicals**
- 4. Encourage computer resource, software, & data sharing**
- 5. Other ideas**

Some Considerations in Greening Grants

1. Should it avoid the selection process for grants?
2. How to implement without unwelcomed increase in administrative burden?

Need to avoid or minimize administrative burden

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FEDERAL DEMONSTRATION PARTNERSHIP
Redefining the Government & University Research Partnership

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"The University community has a crucial role to play in support of the President's goals for stimulating innovation and competitiveness in science and technology and developing the next generation of scientists and engineers. The Federal Demonstration Partnership provides a valuable forum through which Federal science and technology agencies can work creatively with University partners to reduce administrative burdens while advancing scientific discoveries and increasing transparency and accountability." ~ Dr. John Holdren, Director, Office of Science and Technology Policy

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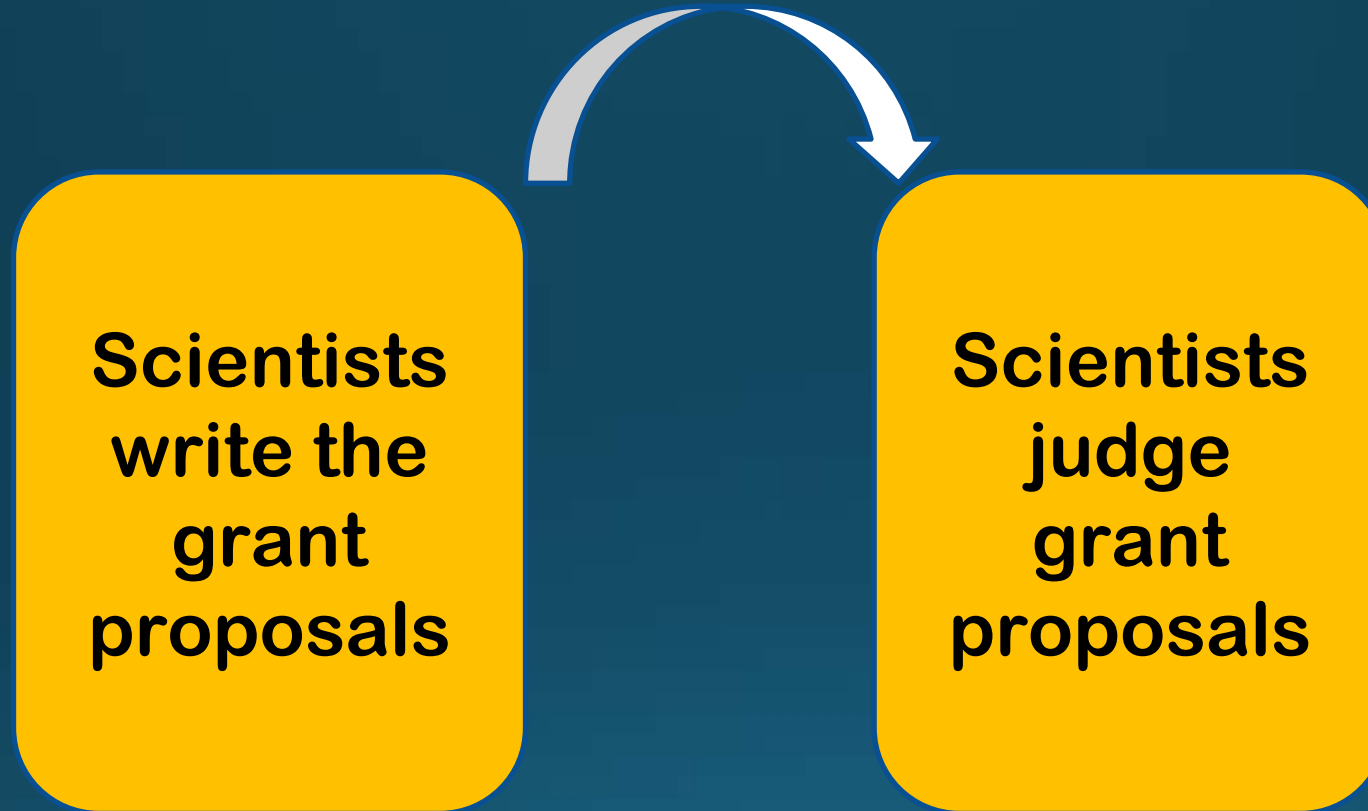
155 universities, 10 federal agencies

“purpose is to reduce the administrative burdens associated with research grants and contracts.”

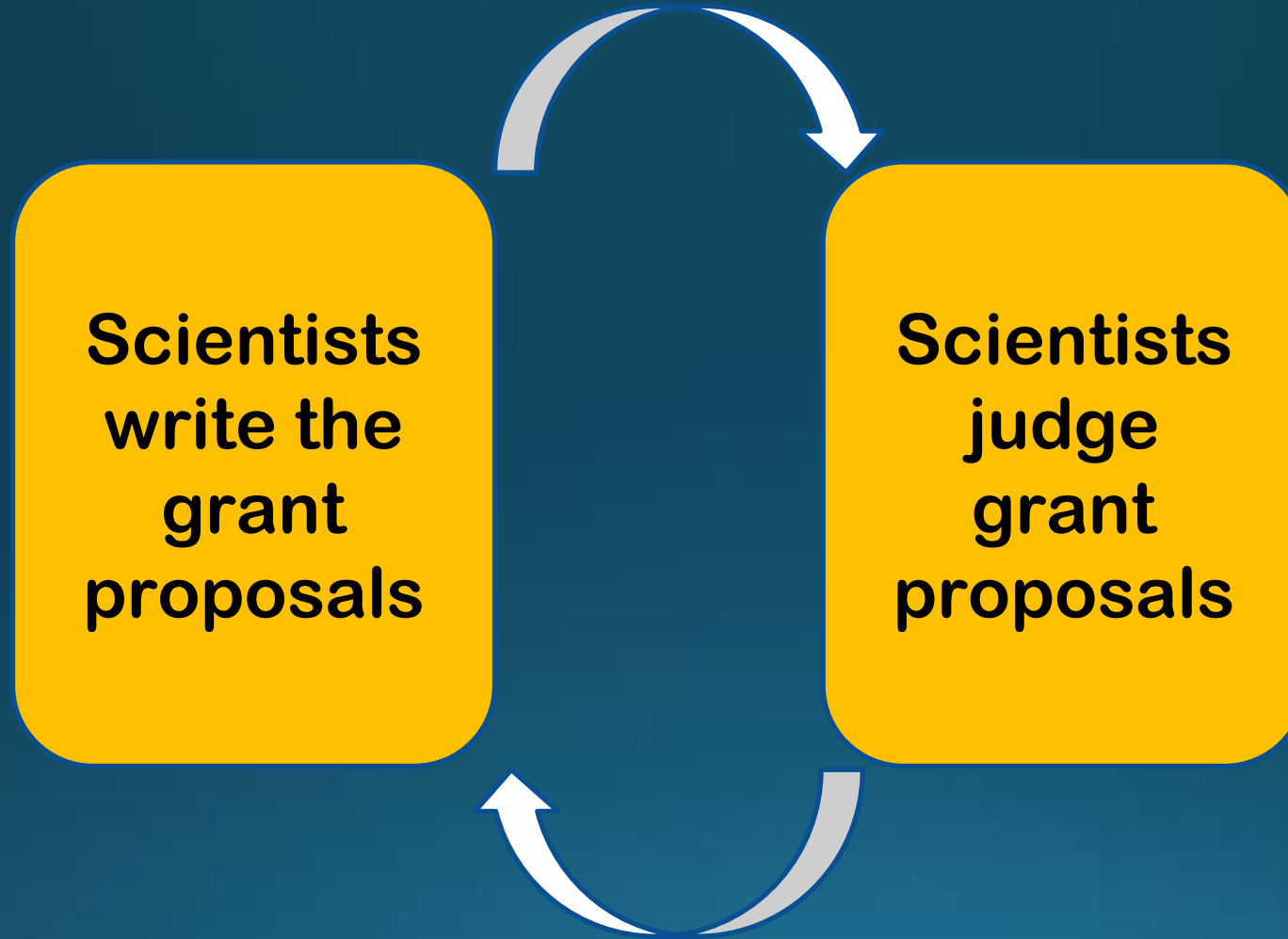
Some Considerations in Greening Grants

1. Should it avoid the selection process for grants?
2. How to implement without unwelcomed increase in administrative burden?
3. Can encouragement alone have impact?

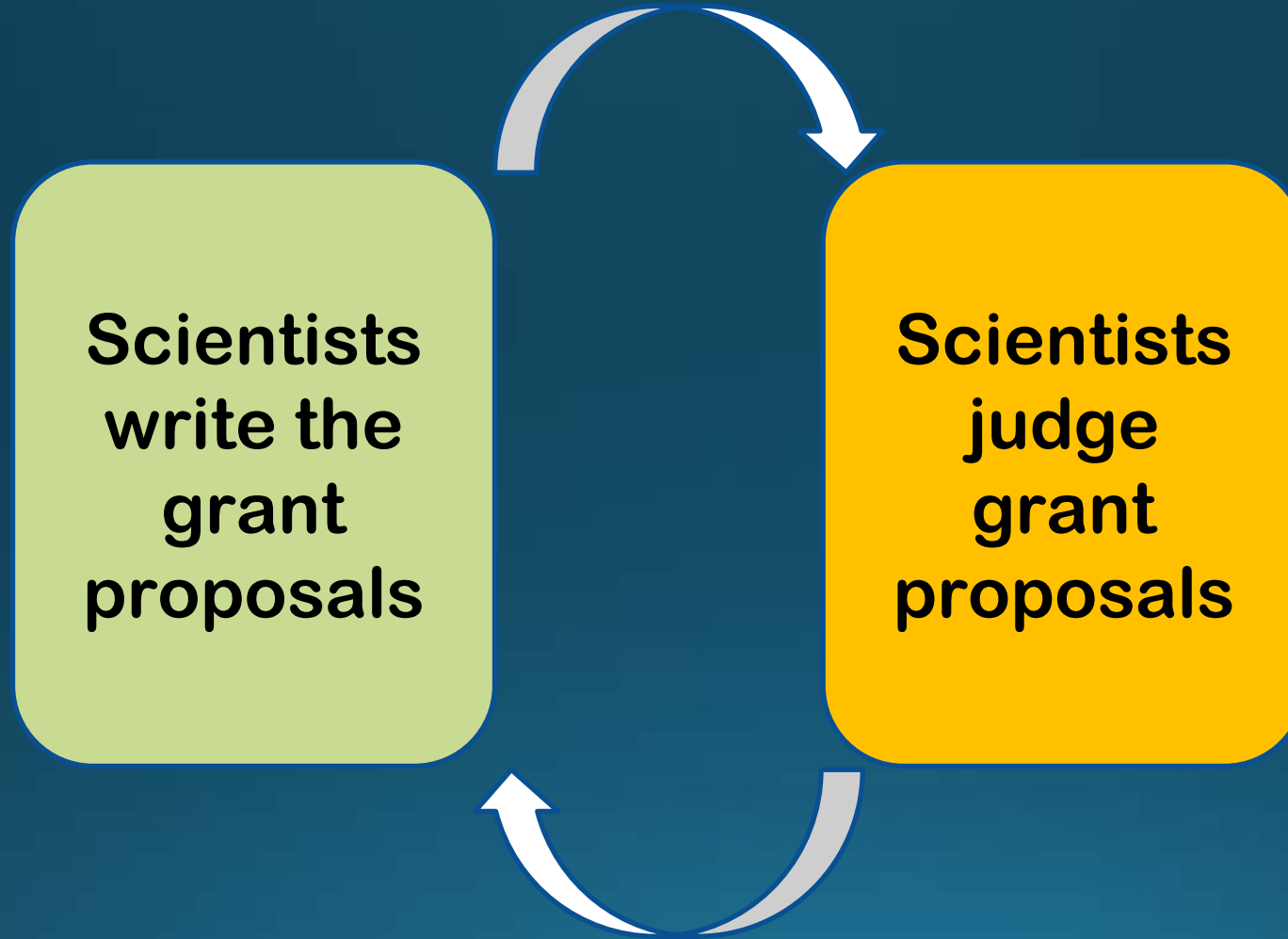
Scientists can influence the culture...



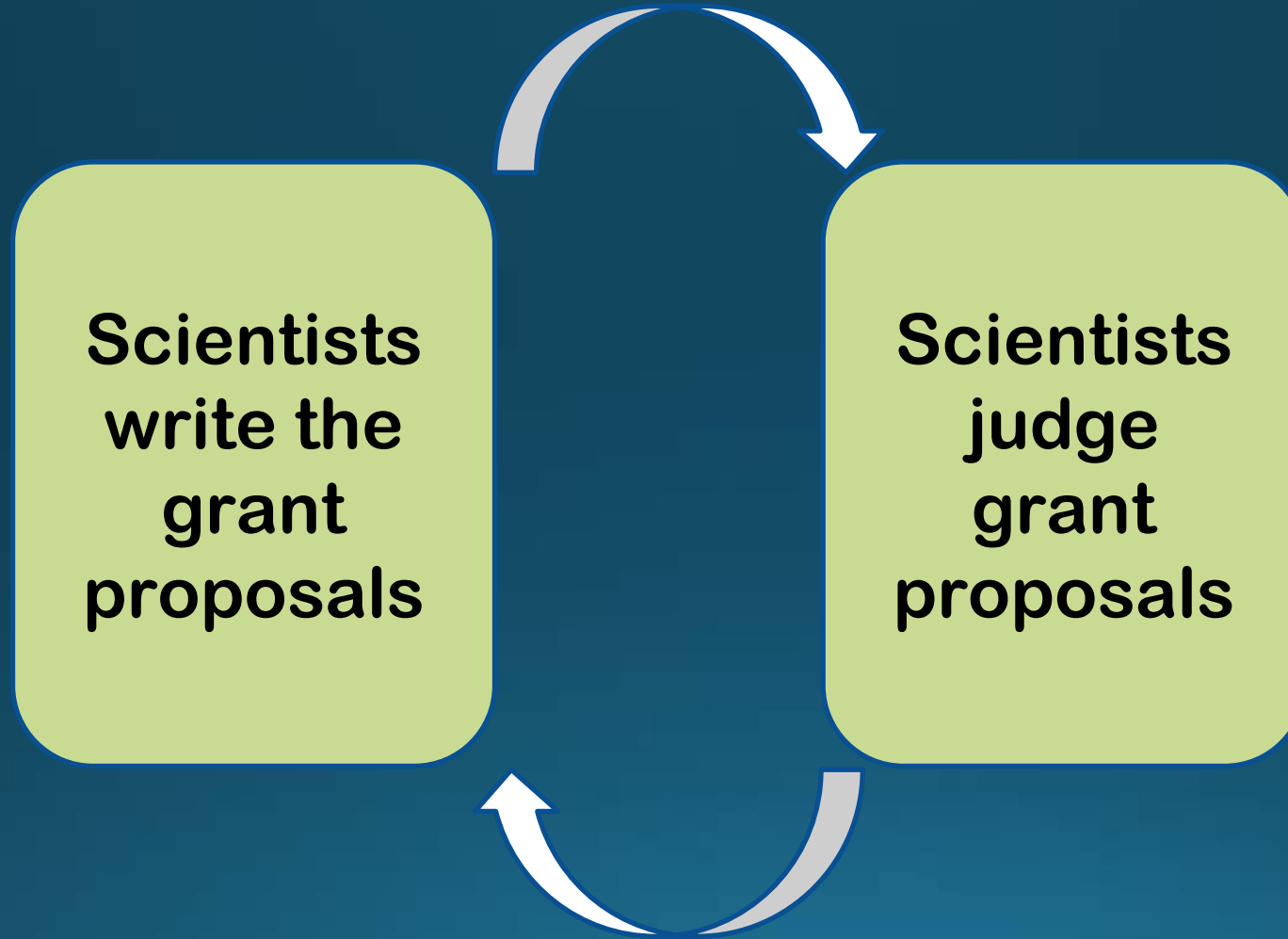
Scientists can influence the culture...



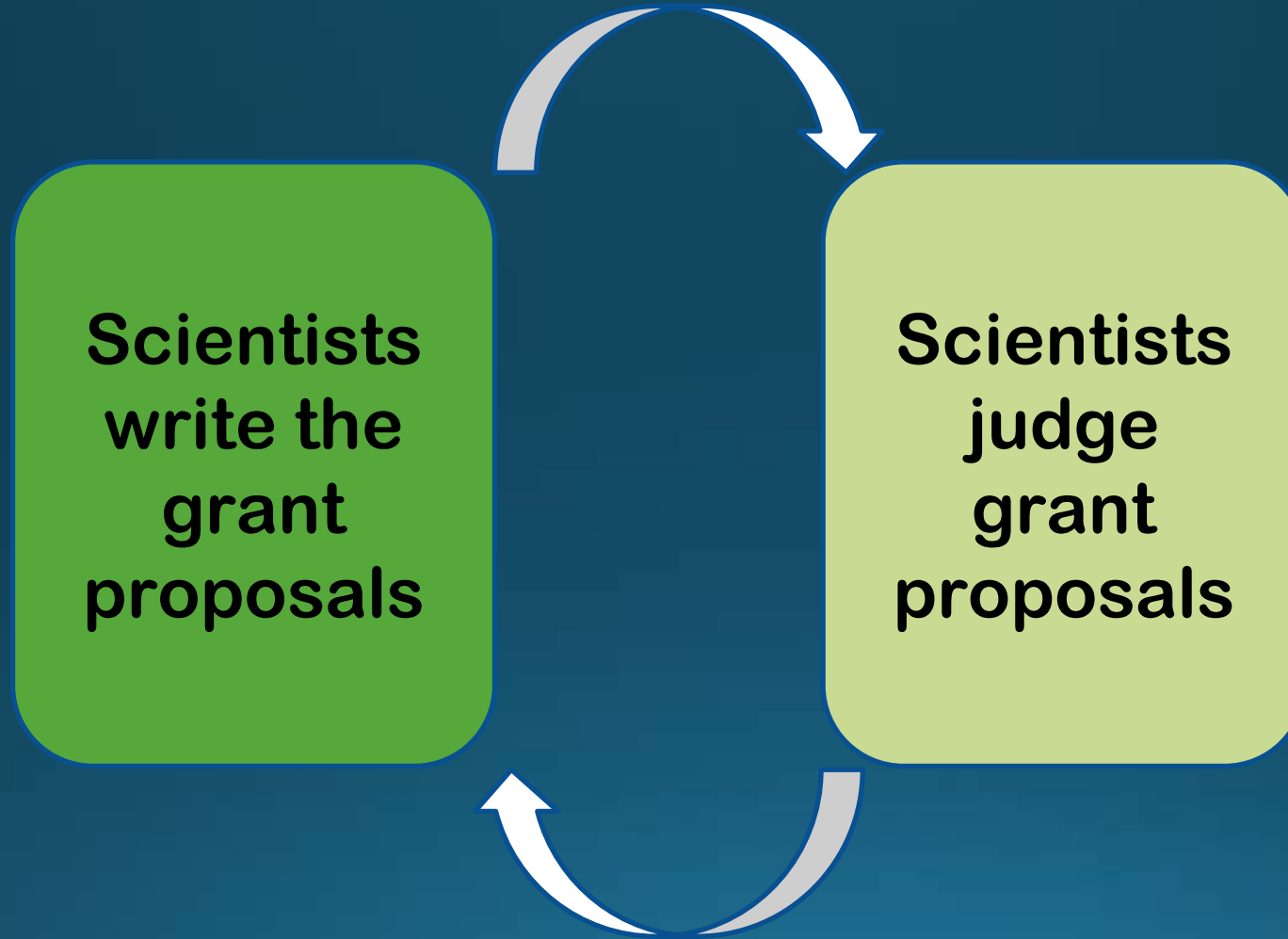
Scientists can influence the culture...



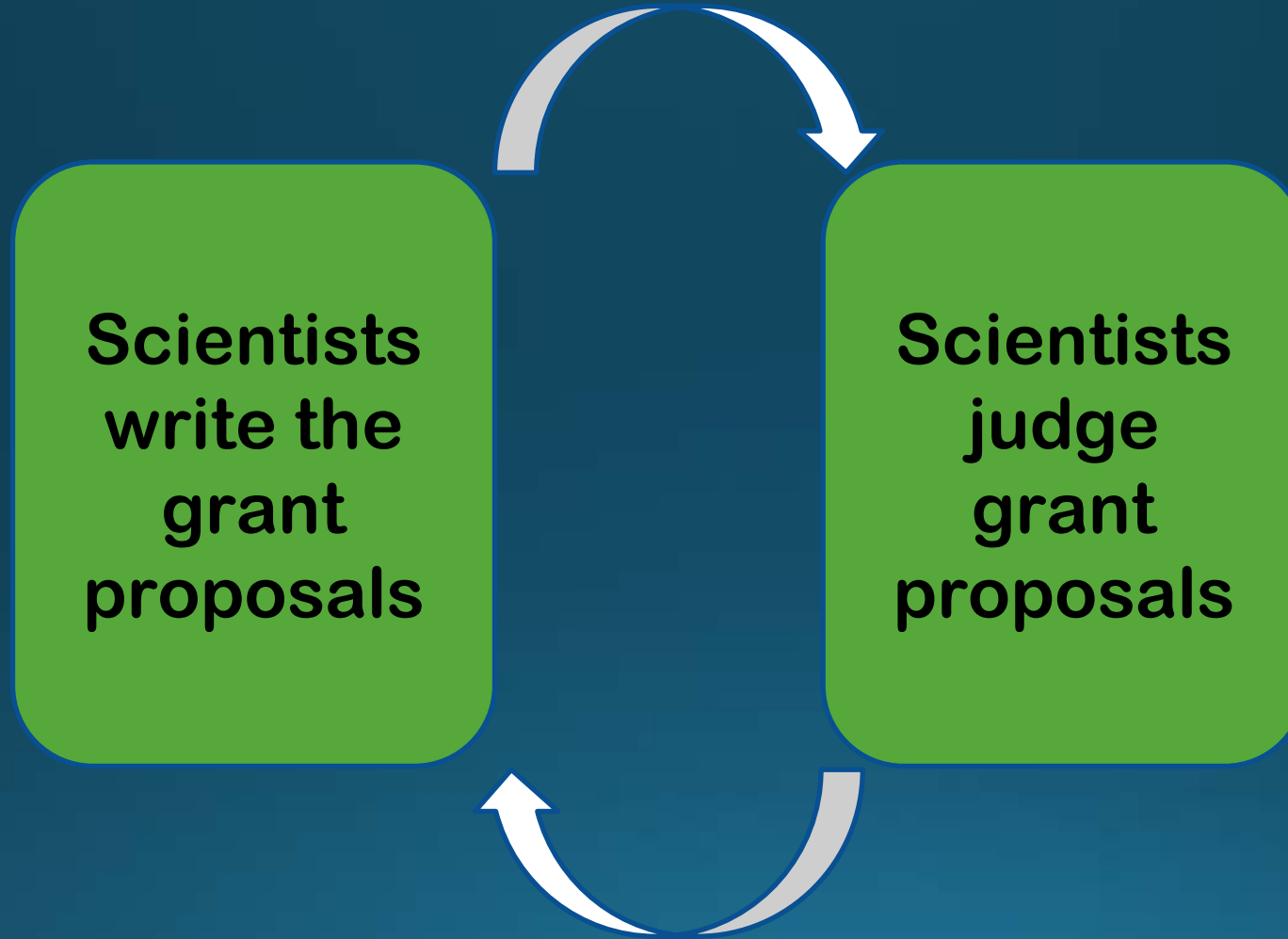
Scientists can influence the culture...



Scientists can influence the culture...



Scientists can influence the culture...



Greening Grants is a win-win. It is in everyone's best interest.

1. Scientist → more money for research & easier access to equipment resources
2. Tax-payer & government → better use of federal dollars
3. University → resource efficiency and financial benefits
4. Environment → reduced research footprint



Tools and Resources

1. Greening Grants webpage, example initial actions for making the connection:
<http://www.i2sl.org/working/greengrants.html>
2. Green Lab Assessment for laboratory occupants:
<http://www.mygreenlab.org/green-lab-assessment.html>
3. Laboratory Continuous Performance Improvement Tool (LCPI) for campus-wide best practices
4. Best practice resources on I2SL, S-Lab, university websites (<http://greenlabsplanning.org/innovators>)

I²SL's Laboratory Continuous Performance Improvement Program (LCPIP)

Provides laboratory managers a gauge by which to measure laboratory performance in new and old buildings.

Evaluation Categories	
Engagement	Fume Hoods
Green Chemistry	Metering
Ultra-Low Freezers	Water

L-CPIP Tool—a management map

← Stakeholders or Systems →

Progress

1

2

3

4

5

Stage	Facilities--Mechanical; PM	%	Automation & Software	%	Safety	%	Researcher Engagement	%	Building Design	%	Purchasing	%	Finance & Contracts	%	End of Life	%
1	Most Freezers removed from hallways/alcoves, some rooms designed for ULT Freezers	100%	Individual alarms or monitors. Temp Only	1	Some published disposal guidelines	100%	Simplest sample management with spreadsheets, no filter or coil cleaning.	100%	HVAC adequately handles heat load, little air management	0.95	No procurement standards; Take ULT inventory by counting or through Materiel Management office > \$2,000 items	0.8	Some Finance or Special Contracts for energy efficiency	100%	All Refrigerants recovered	100%
2	Freezers hooked up to emergency backup	0.6	Individual alarms or monitors. Temp & Power	1	Biohazard and Hazardous waste guidelines published	100%	Some Sample Management and Consolidation, Maintains Freezer filters and coils	0.6	HVAC oversized, no air management	0.8	Established list of energy and space efficient ULT freezers that have been measured through a 3rd party	0.2	On site incentives for Energy Efficiency; Capital equipment costs directed to Energy Efficiency purchases	100%	All cabinets and metals recycled	100%
3	Freezers are connected to emergency liquid nitrogen backup, or there are 1-2% freezers available as back-up	0.8	>25% alarmed	100%	Central Collection points for Biohazards	100%	DNA regularly kept at -20 or above; Using Room Temperature Storage (RTS) for Shipping; or > 25% of inventory in database	0.2	Good Air Management - Supply Air introduced in the front and Exhaust Air is pulled from the rear (hot & cold aisles)	0.2	Centralized strategy of targeted models	0%	Utility incentives available for purchases	0.2	Reusing a lemon freezer as a backup freezer	20%
4	Centralized Freezer Farms for Archival Storage of Samples, or there are 5-10% freezers available as back-up with defined incentives to move out of back-up.	0.4	>50% alarm; 5% Monitoring	0.8	Organized regular collection events	100%	~80% DN storage at -20 or above AND Utilizing RTS for > 5% of samples; or > 50% of inventory in database	0%	Coordinating HVAC design into freezer procurement and sample storage methods; Air economizing, water cooling considered	0.2	Phased replacement of ULT freezer reaching end of life	0%	Incentives available for repairs and commissioning; Coordinating HVAC savings into freezer procurement and sample storage methods	0%	Materials value PAID for decommissioning; free process to researcher; all materials collected; some salvage of parts	0.8
5	Centralized Freezer Farm designed with good air management, and support staff to respond to freezer failures, maintain freezers, and manage samples	0.6	>90% alarm OR Monitoring	0.6	Disposal staff assistance available	0.2	No DNA storage below -20 AND Utilizing RTS for > 10% of samples; or > 75% of inventory in database	0%	Items above plus using reject heat.	0%	Purchase of alternative ULT freezers such as water cooled, liquid nitrogen, and Stirling Engine	0%	Energy Savings Contracts to design adequate facilities to support ULT Freezers	0%	Vendor take back program to recycle used parts	0.2



(filled in for ULT freezers at a hypothetical site)

Panel: Introductions, Understanding present federal funding process...are there requests for efficiency and sustainability?

Panel: Ideas for growing efficiency & starting to make the connections; identifying obstacles; actions needed to bring about ideas

Summary and next steps

Thank you!

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