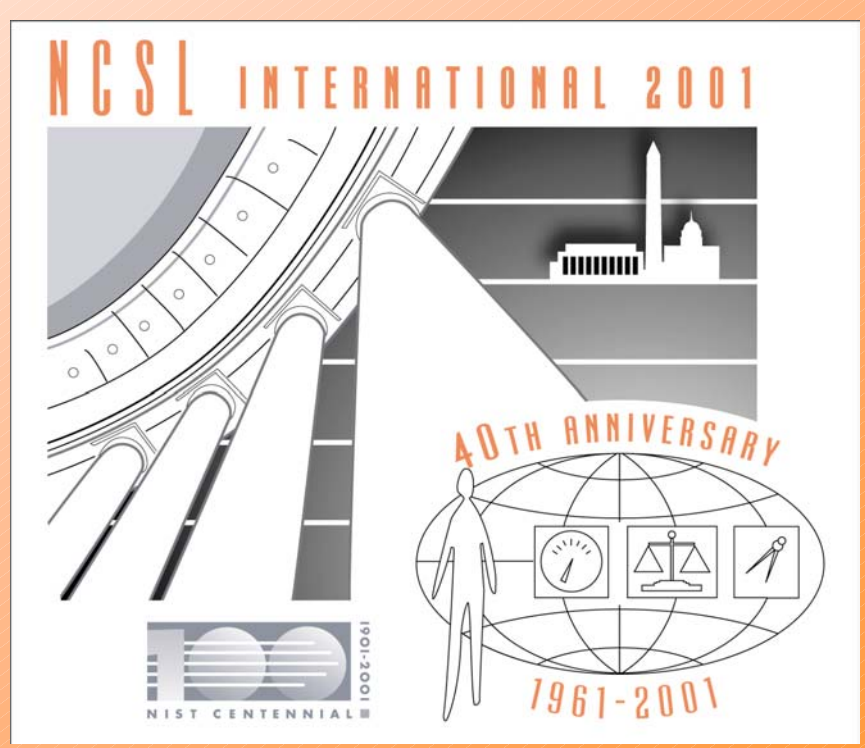
2001 NCSL International Benchmarking Survey

BENCHMARKING COMMITTEE CHAIRMAN
J. WADE KEITH III
The Boeing Company

PROJECT LEAD
ELISE CROCKER
The Boeing Company

SPECIAL ACKNOWLEDGEMENTS
CRAIG GULKA
NCSL International Business Manager
MARCIE LEVINE
SurveyConnect
JIM MASTRO
Mastro & Associates
JACK KRAMER
LOUBNA BENSAID
eDoc Publish Inc.

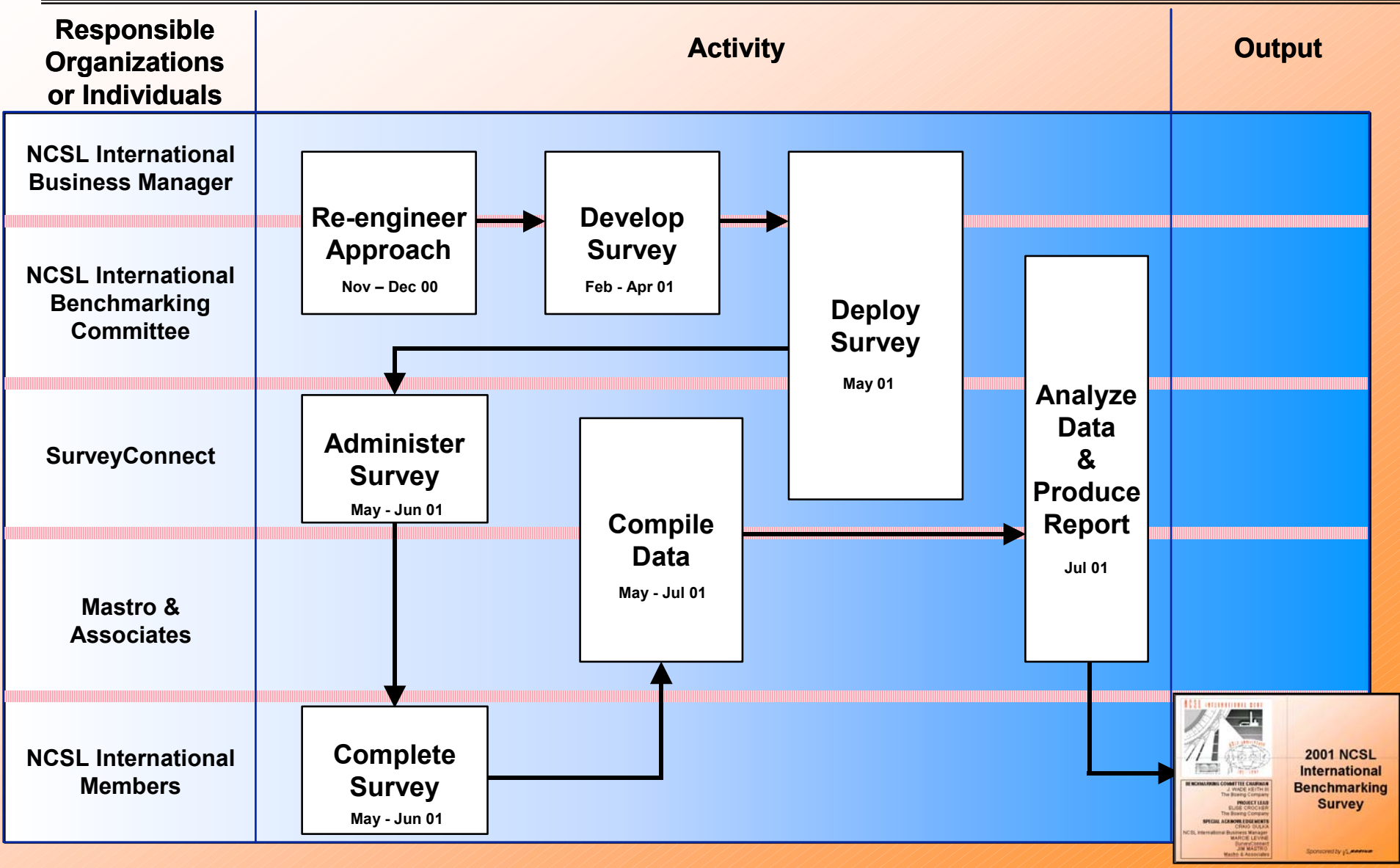


Sponsored by BOEING

Purpose

The purpose of the NCSL International's Benchmarking Survey is to provide the membership with high quality data for use as a documented resource to baseline personnel compensation, laboratory performance, industry compliance, and continuous improvement objectives for your business and the metrology industry.

2001 Benchmarking Survey Process



Web-based Survey

- Third-party website
  - Administered by SurveyConnect
- New capability:
  - Print and edit responses
  - Anonymous and secure information
  - Real-time feedback and data collection
- Hard copy surveys also available
  - 8 received

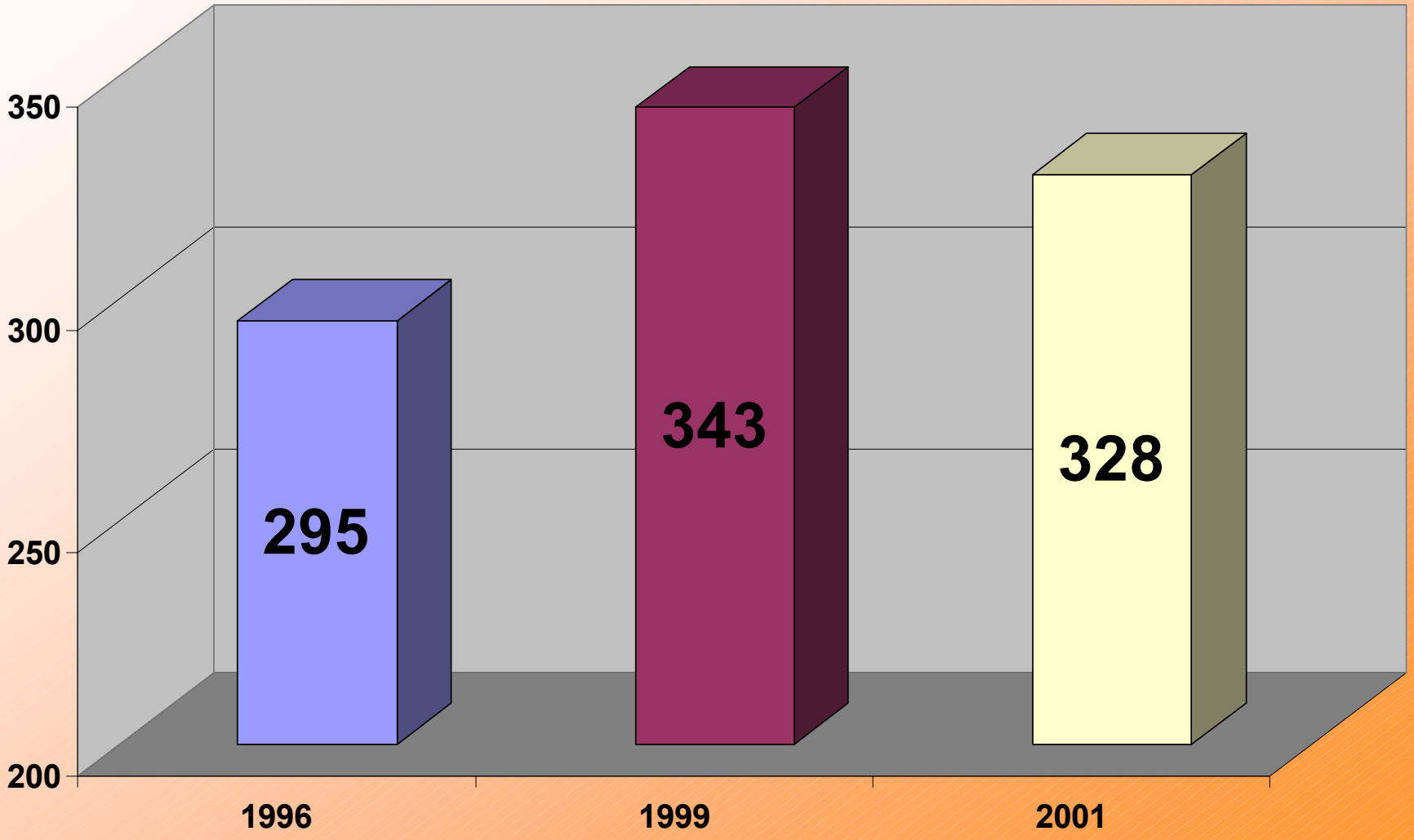
Survey Changes

- Changed for 2001:
  - Clarification of questions
  - Ranges for Personnel information
  - Offload work distribution
  - Definition of supplier equipment needs
  - Expected change in headcount
  - Training questions
  - Added open-ended comments
- Not changed for 2001:
  - Data accuracy
    - 3 sigma filter for salary information
  - Trends where possible

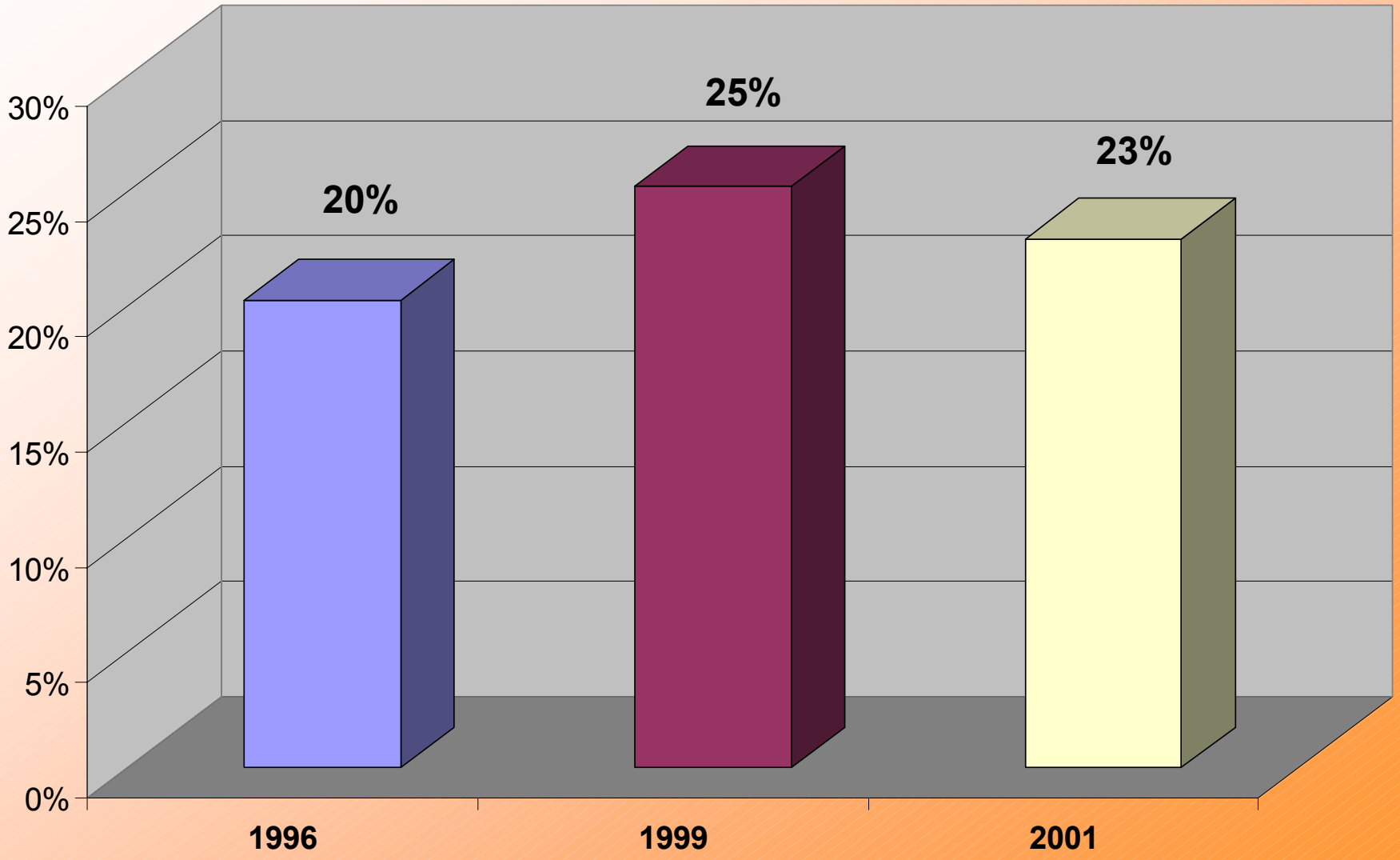
Summary of Survey Responses

- 1430 total survey notices sent
- 328 completed surveys received (22.9%)
- Results
  - Presented at 2001 NCSL International Workshop and Symposium
  - Also included in the upcoming members-only 2002 Laboratory Managers CD

Survey Responses



Completed Surveys vs. Total Sent

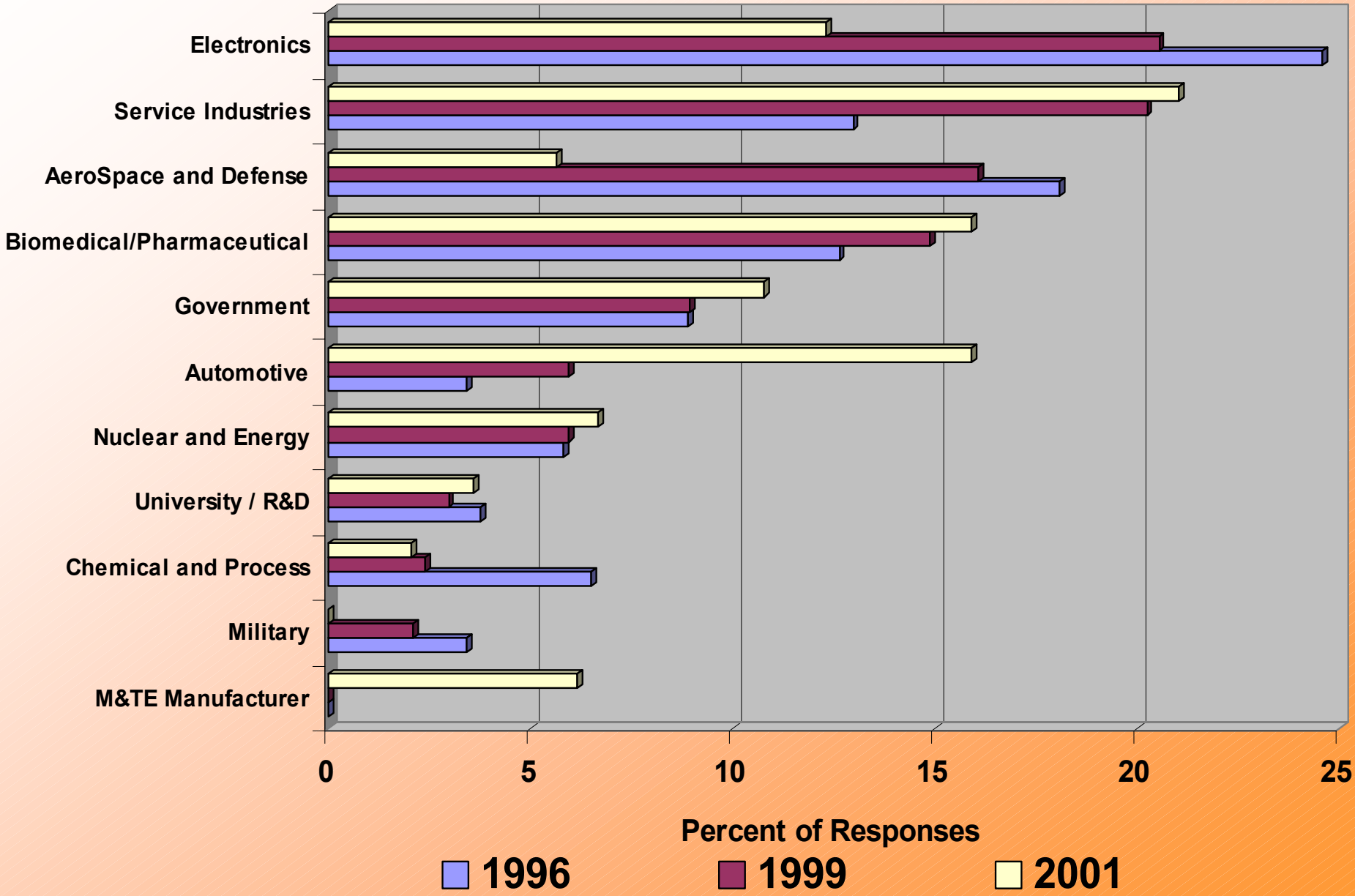


Scope of Survey

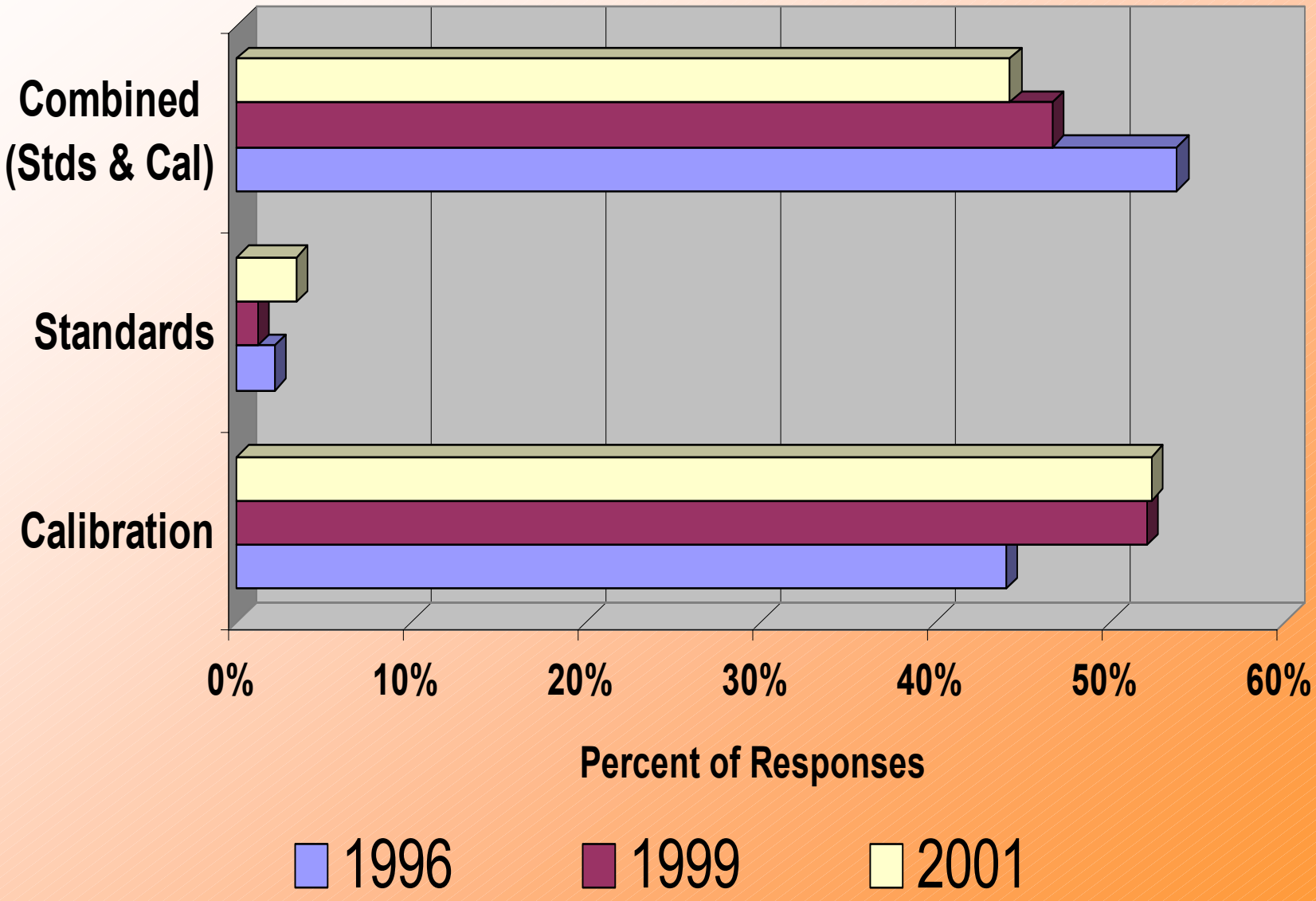
- Section A: Demographics
- Section B: Lab Capabilities
- Section C: Productivity
- Section D: Requirements/Compliance
- Section E: Personnel

Section A: Demographics

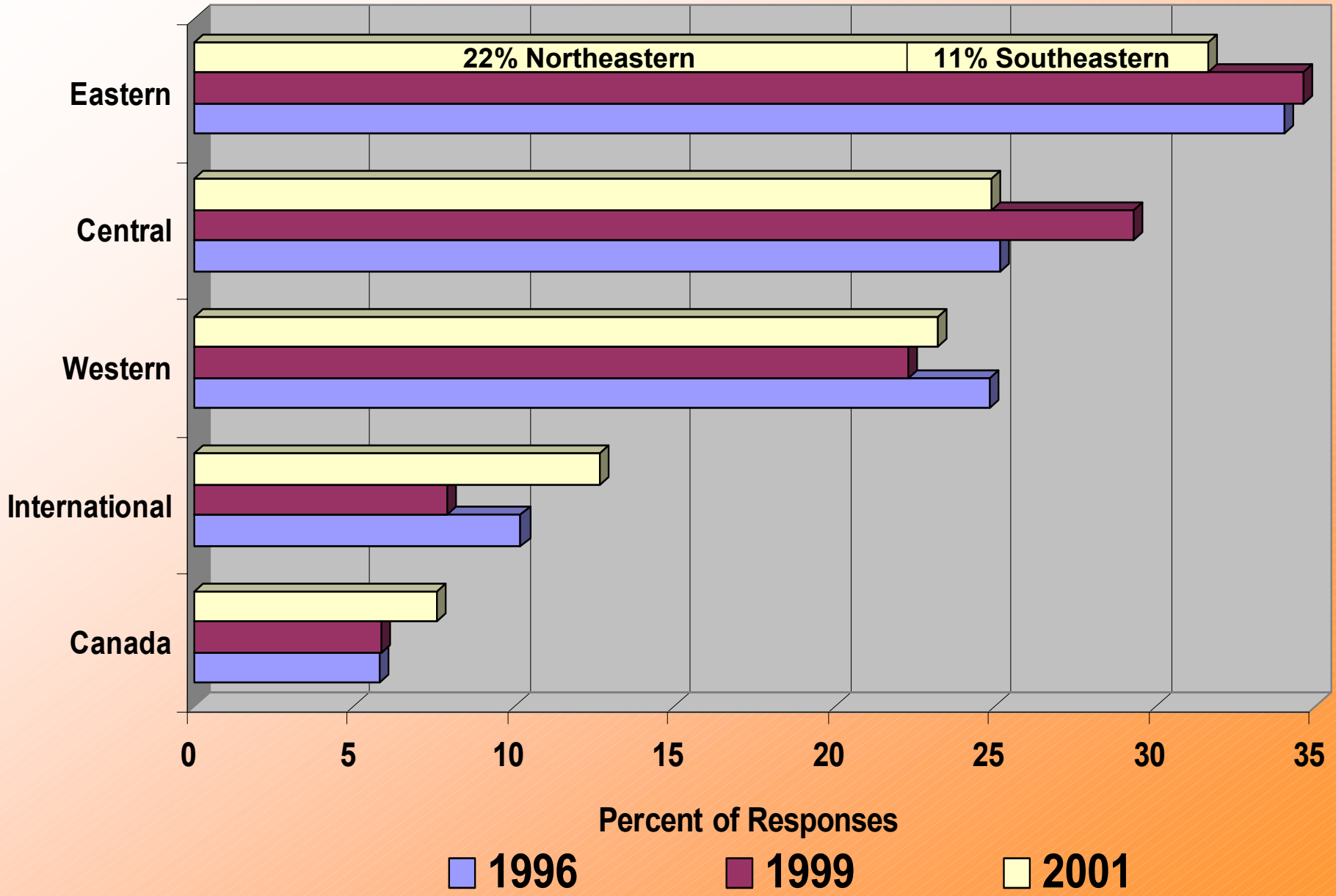
Industry


Electronics
Service Industries
AeroSpace and Defense
Biomedical/Pharmaceutical
Government
Automotive
Nuclear and Energy
University / R&D
Chemical and Process
Military
M&TE Manufacturer
0
5
10
15
20
25
Percent of Responses
1996
1999
2001

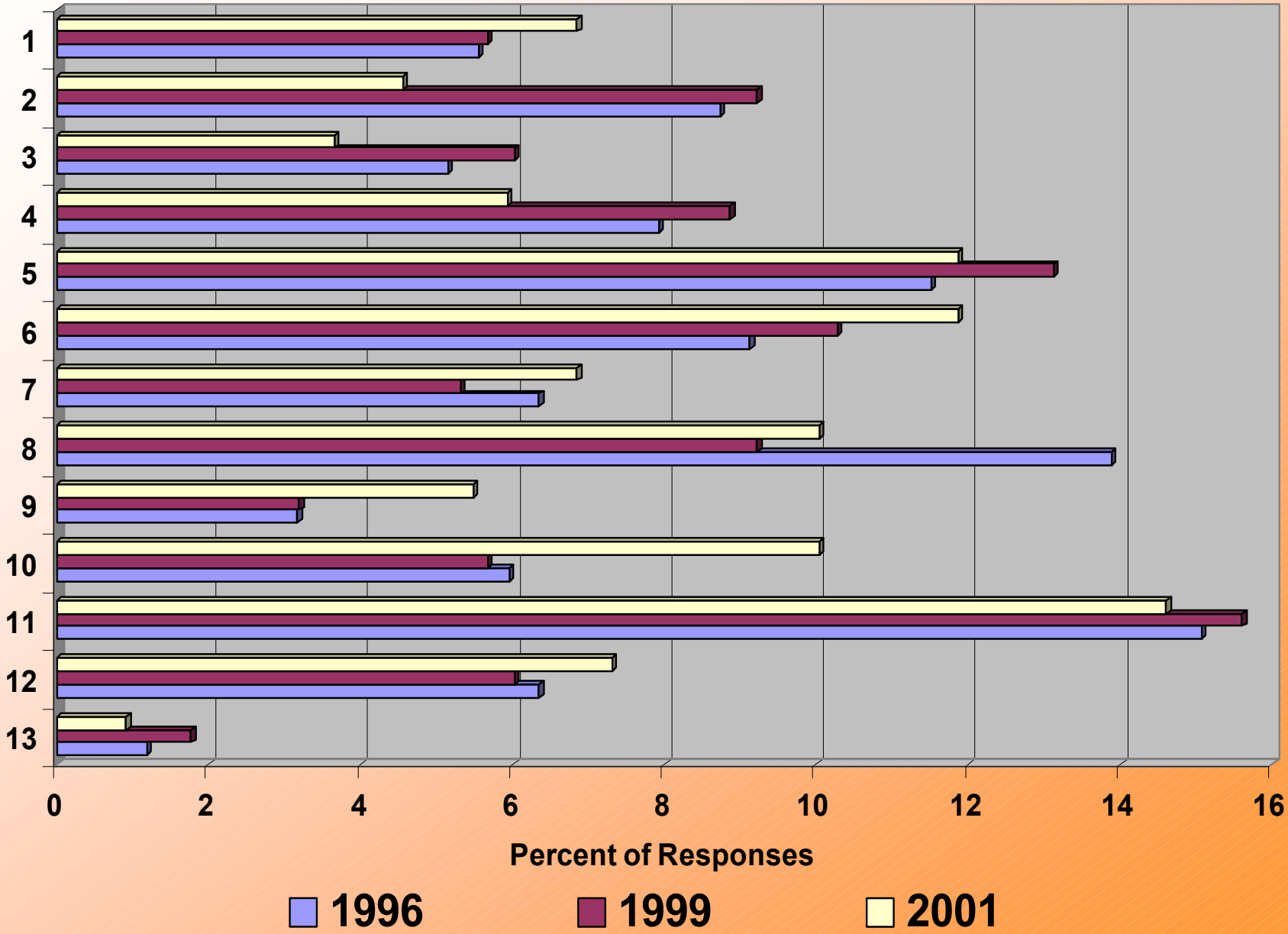
Lab Classification

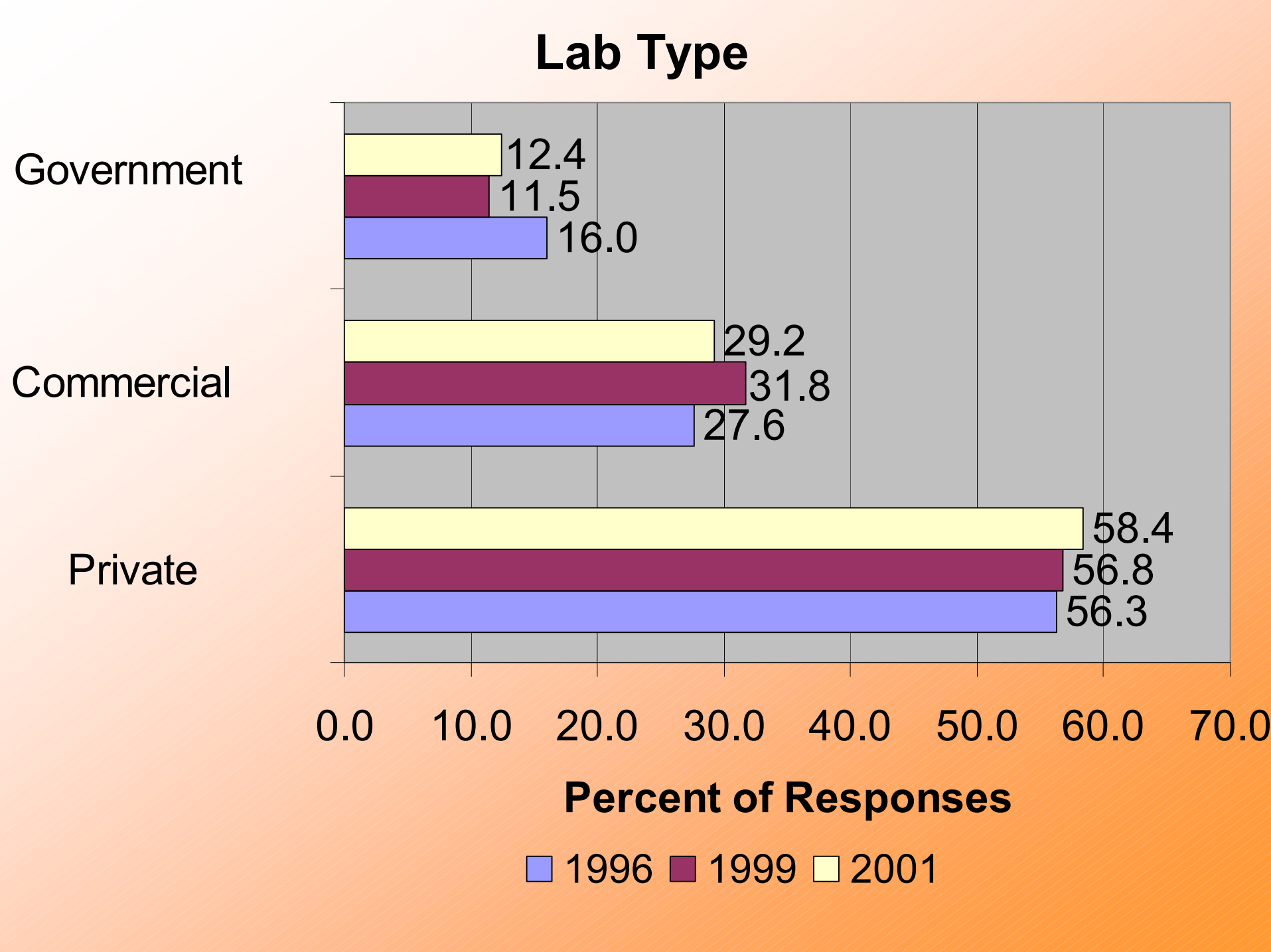


Geographic Location

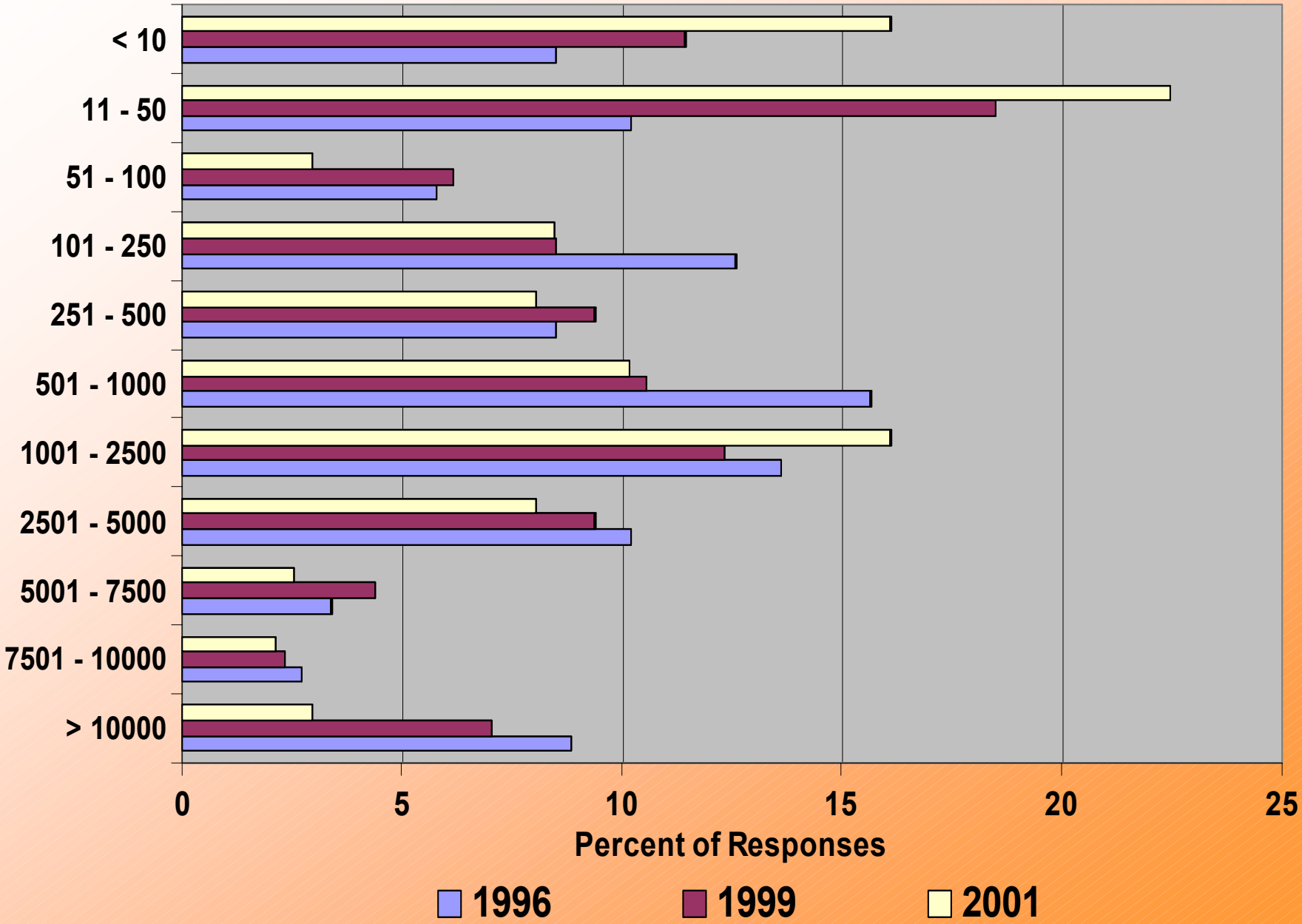


Region


1
2
3
4
5
6
7
8
9
10
11
12
13
0
2
4
6
8
10
12
14
16
Percent of Responses
1996
1999
2001

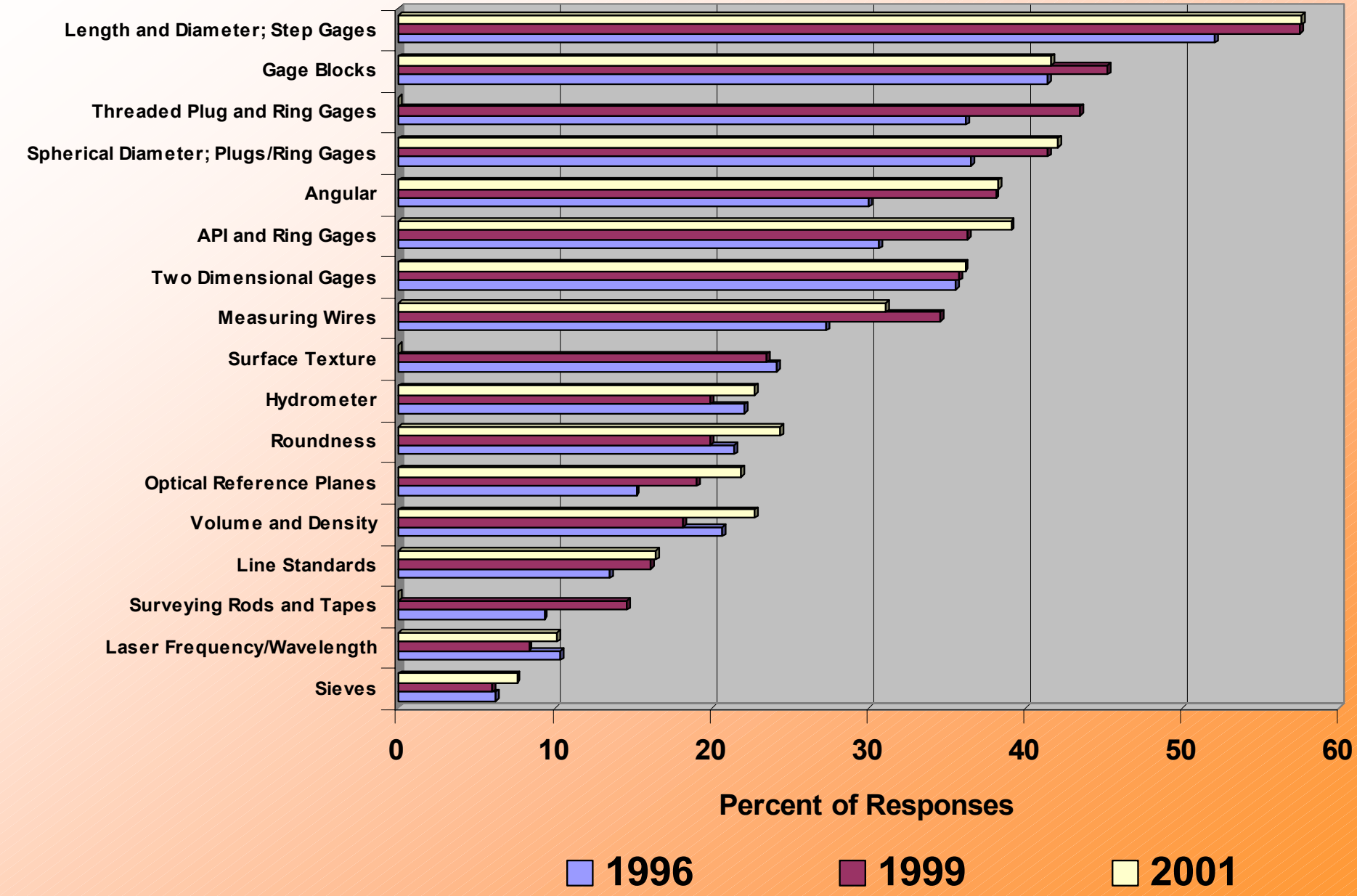

Lab Type
Government
Commercial
Private
12.4
11.5
16.0
29.2
31.8
27.6
58.4
56.8
56.3
0.0
10.0
20.0
30.0
40.0
50.0
60.0
70.0
Percent of Responses
1996
1999
2001

Employees at Site

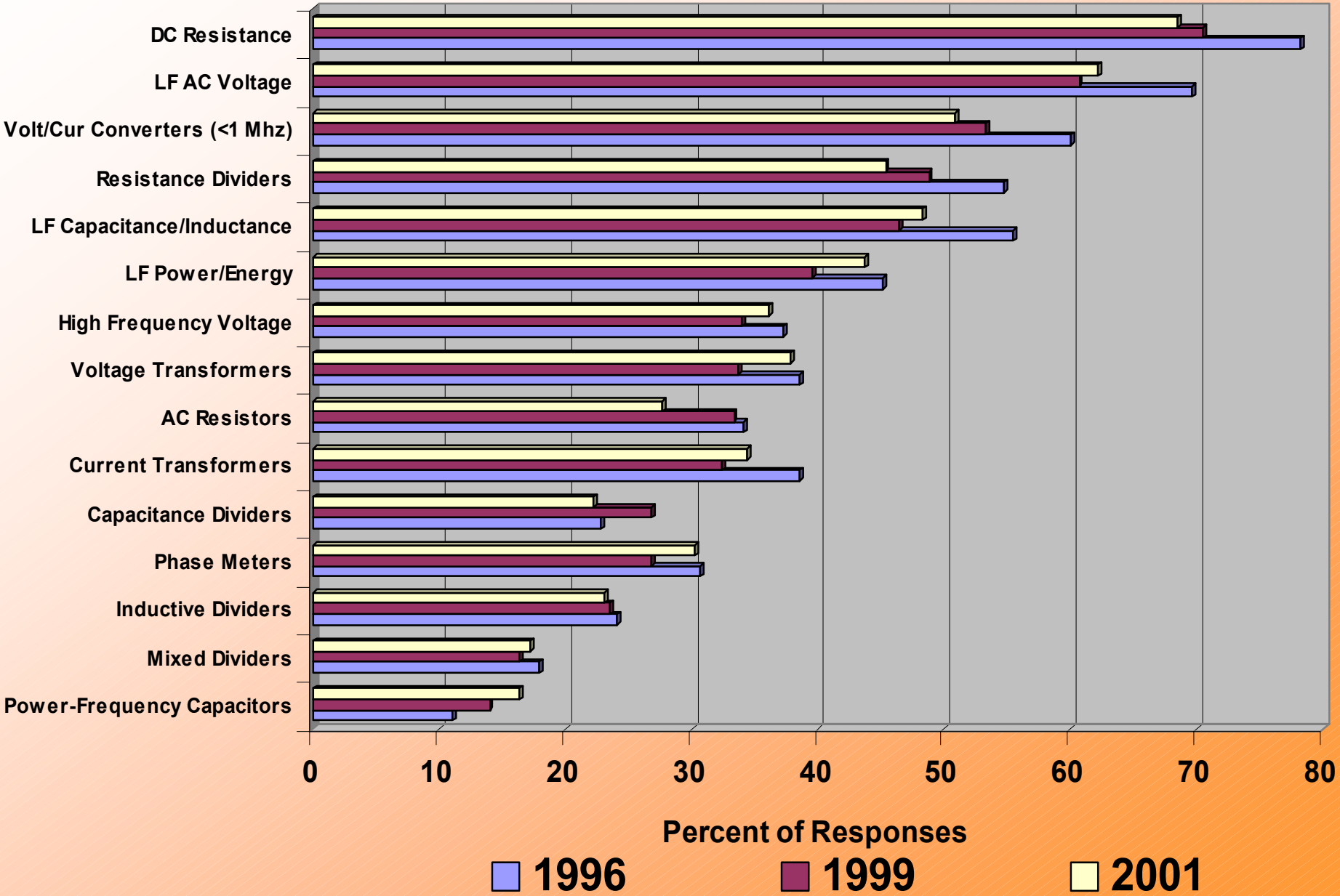


Section B: Lab Capabilities

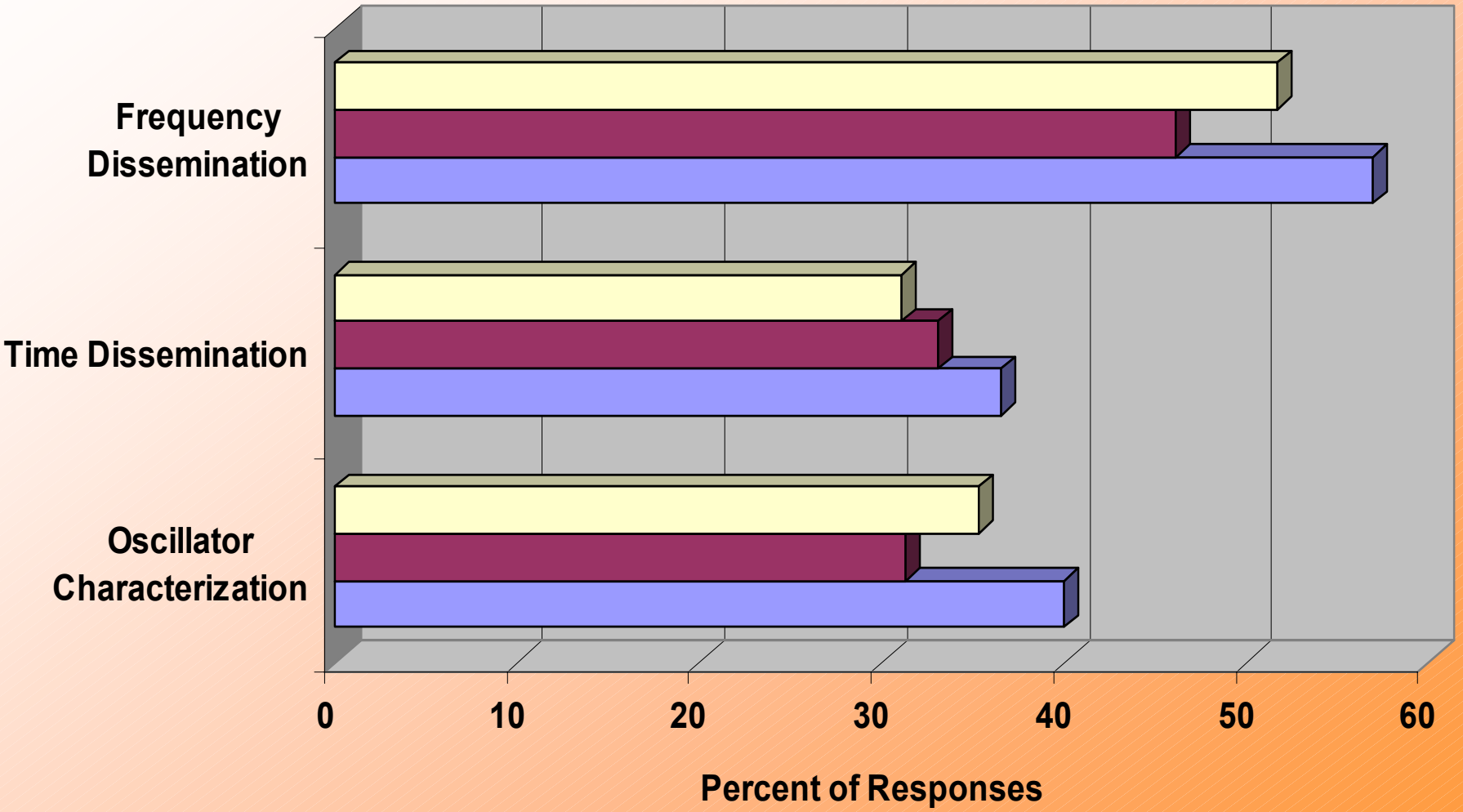
Dimensional Capabilities



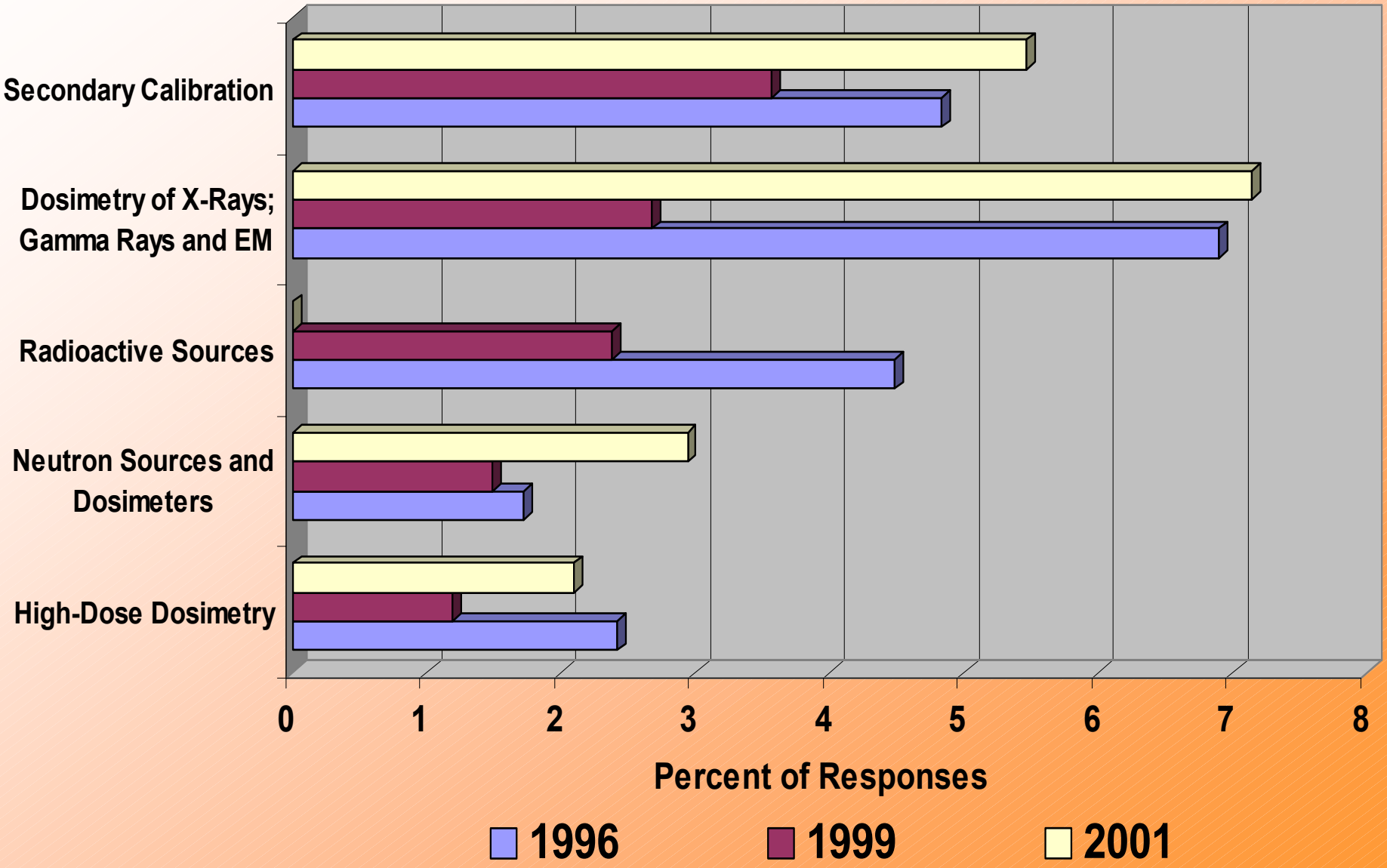
EM - DC/Low Frequency Capabilities



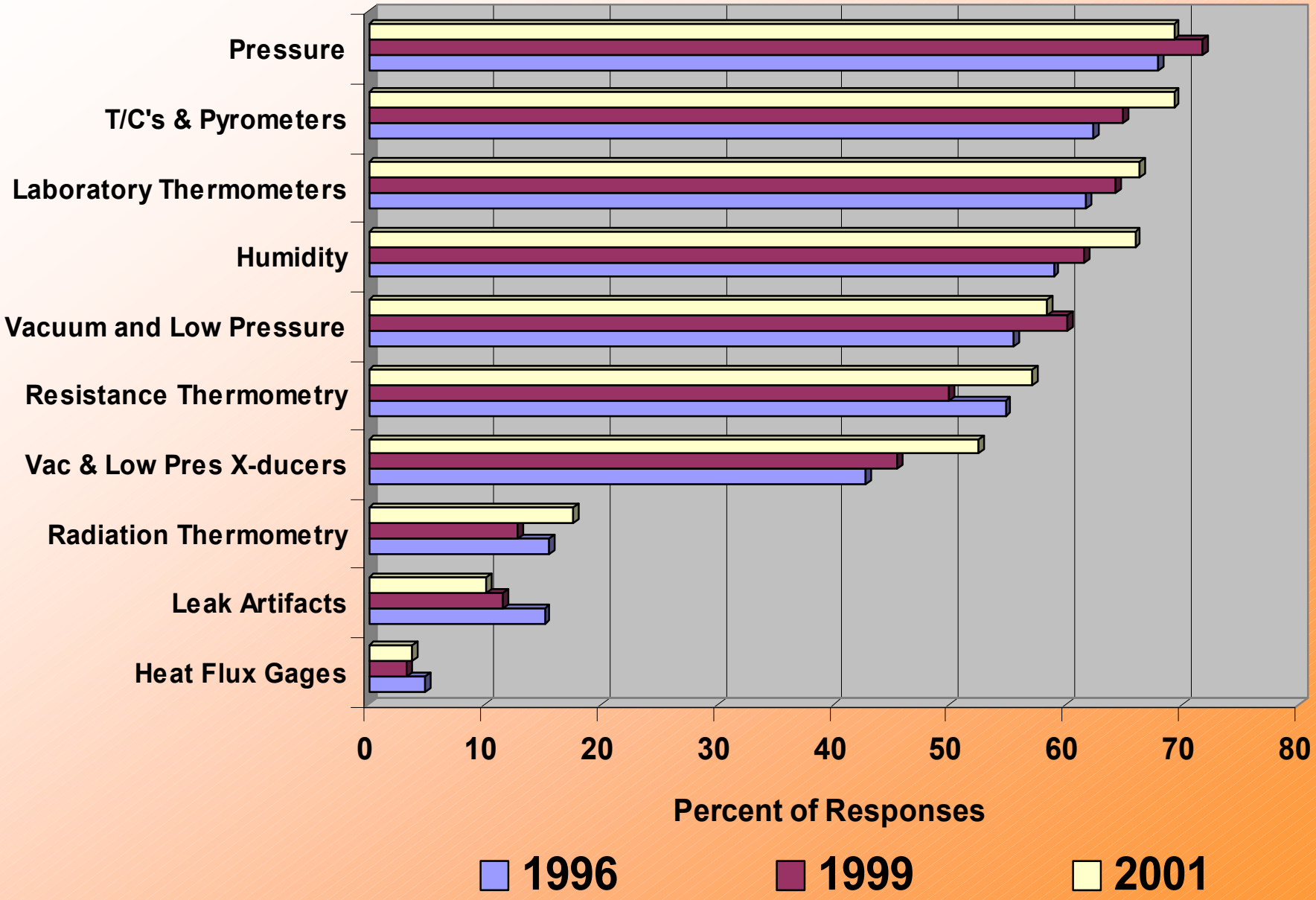
Time & Frequency Capabilities



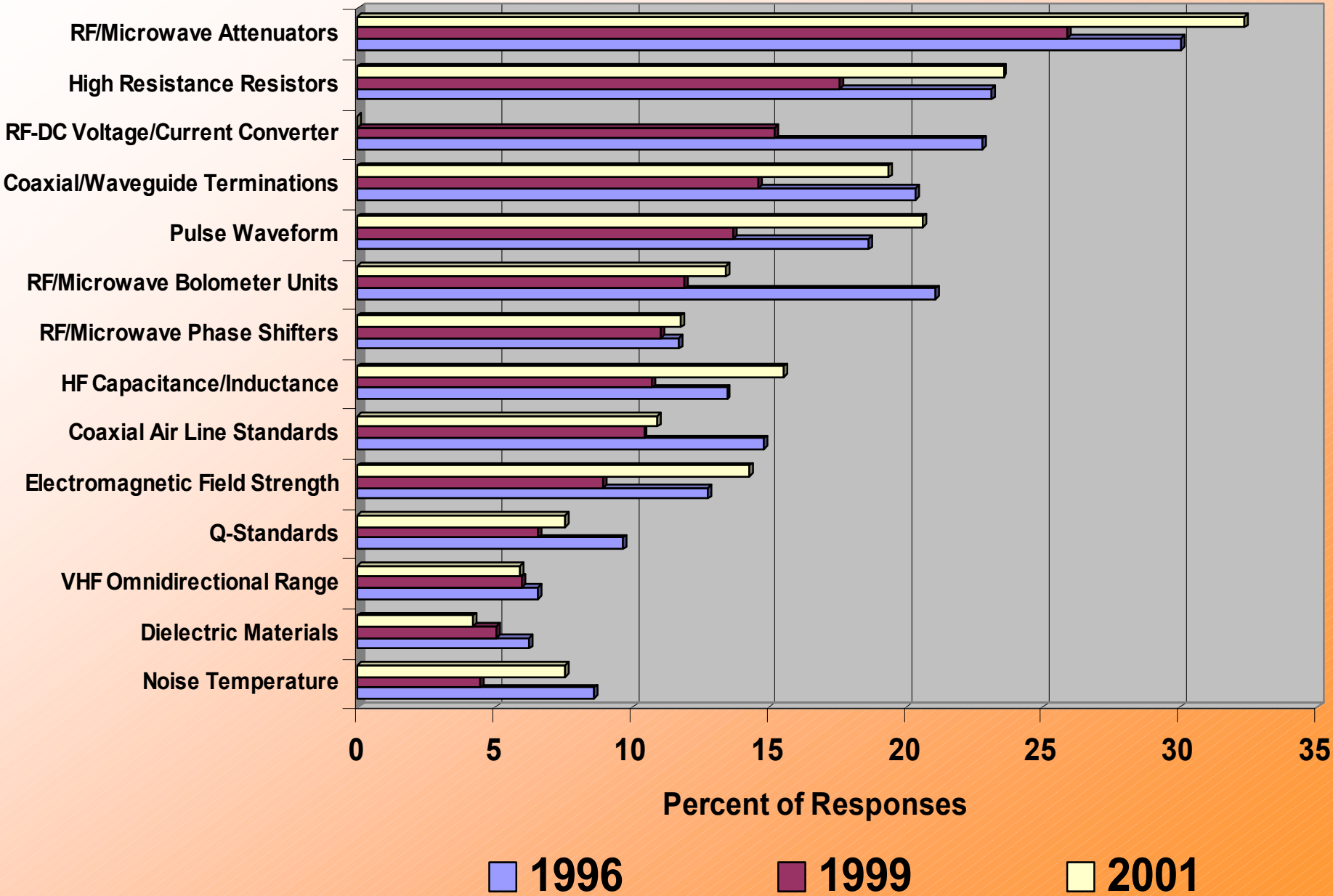
Ionization Radiation Capabilities



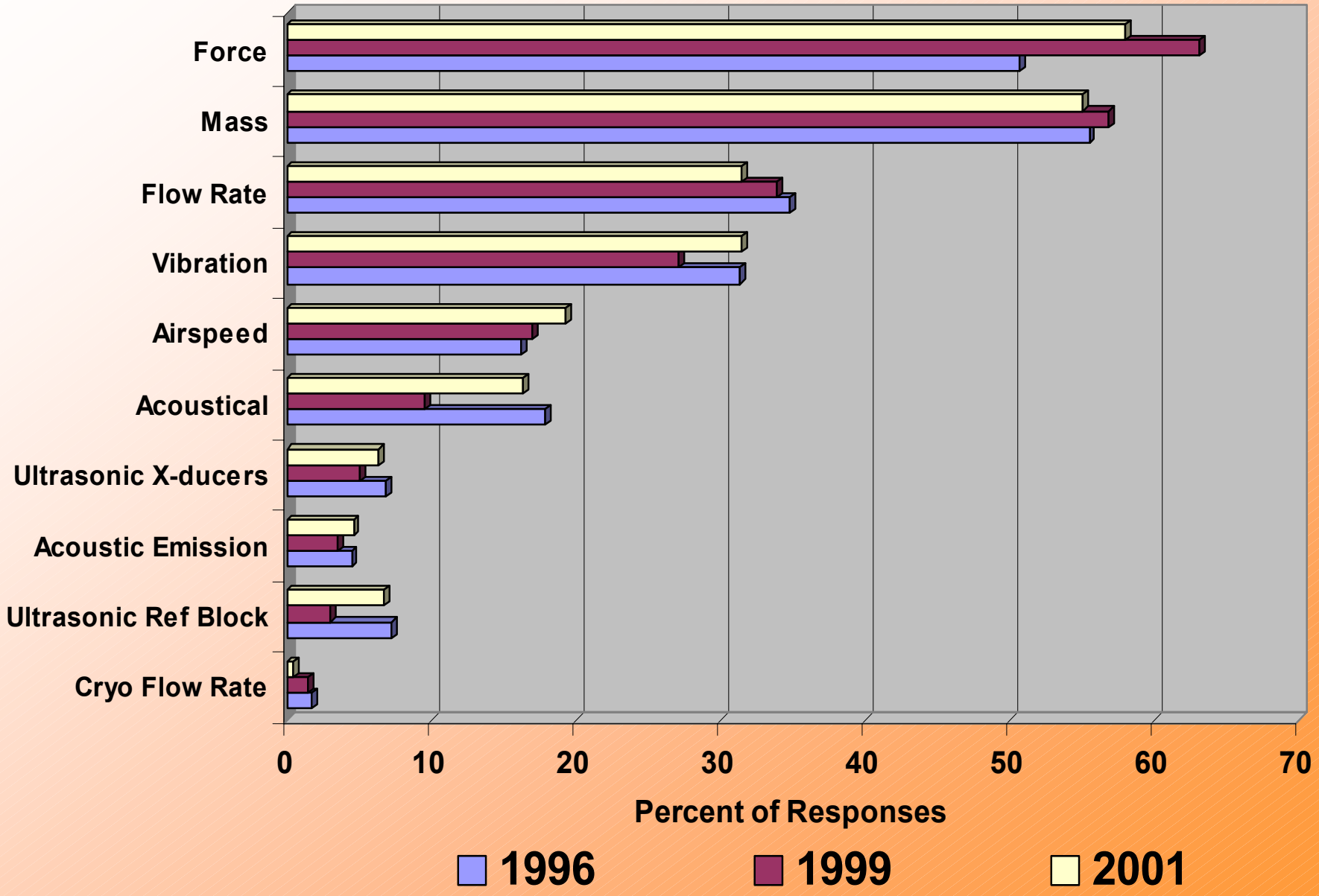
Thermodynamic Capabilities



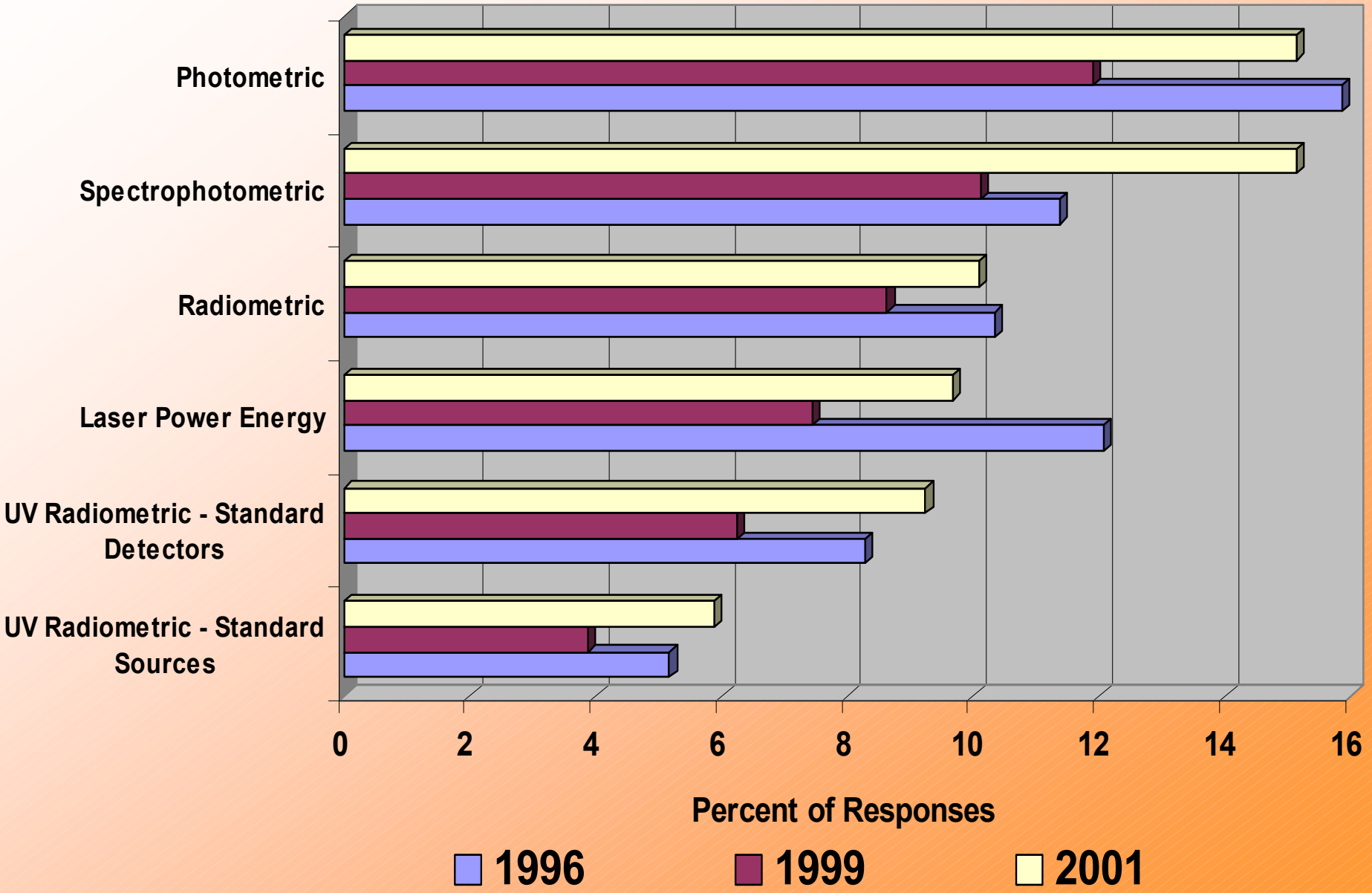
EM - RF/High Frequency Capabilities



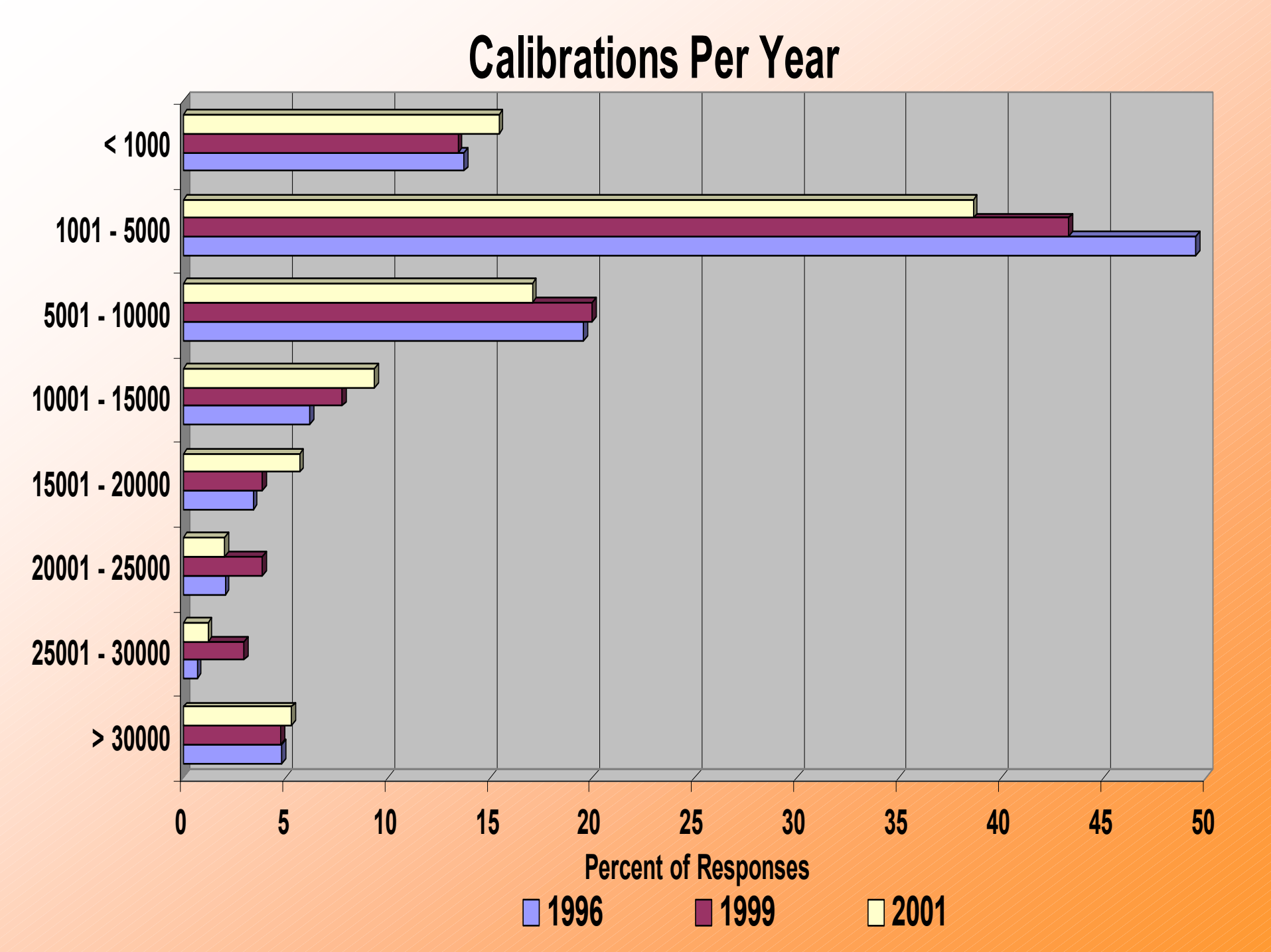
Mechanical Capabilities



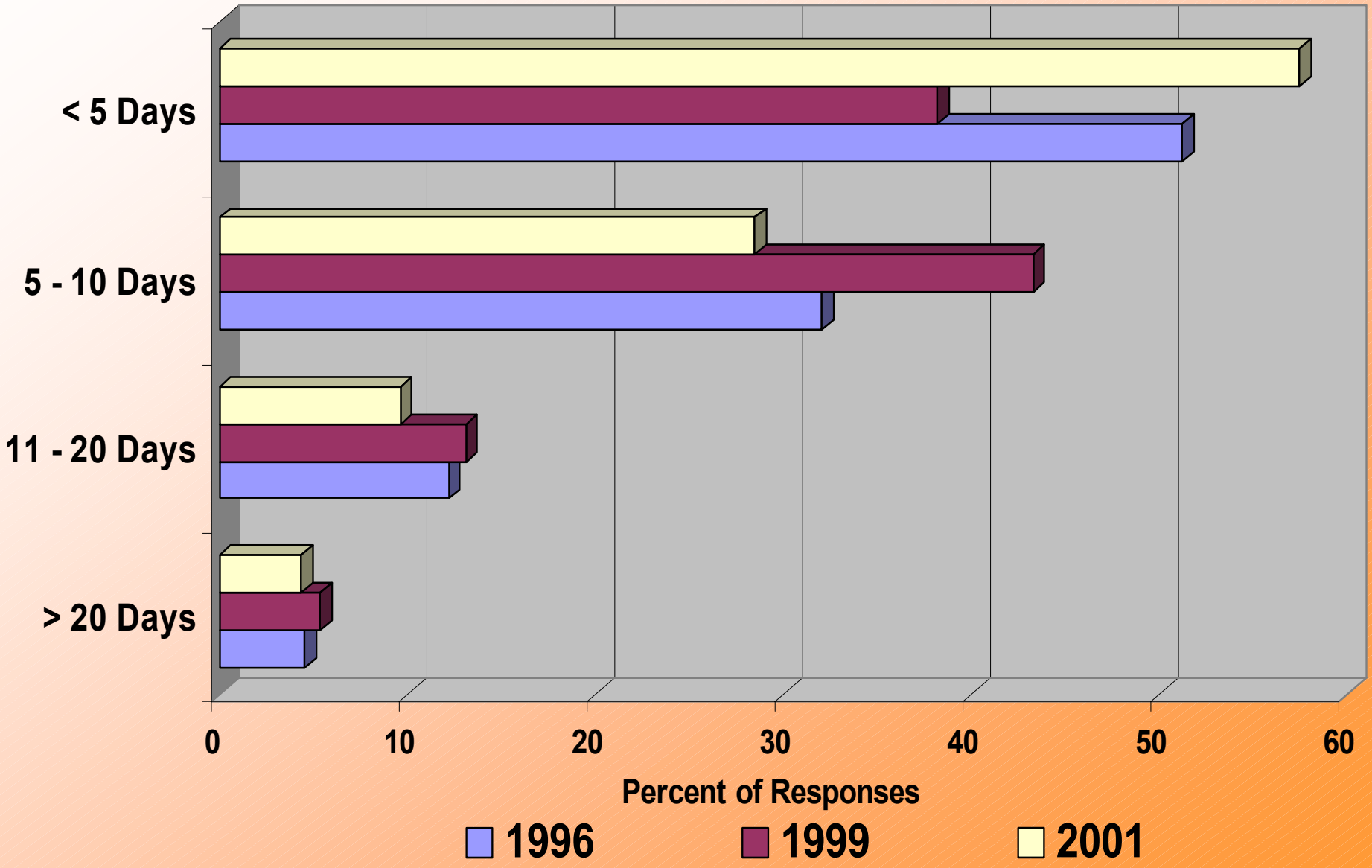
Optical Radiation Capabilities



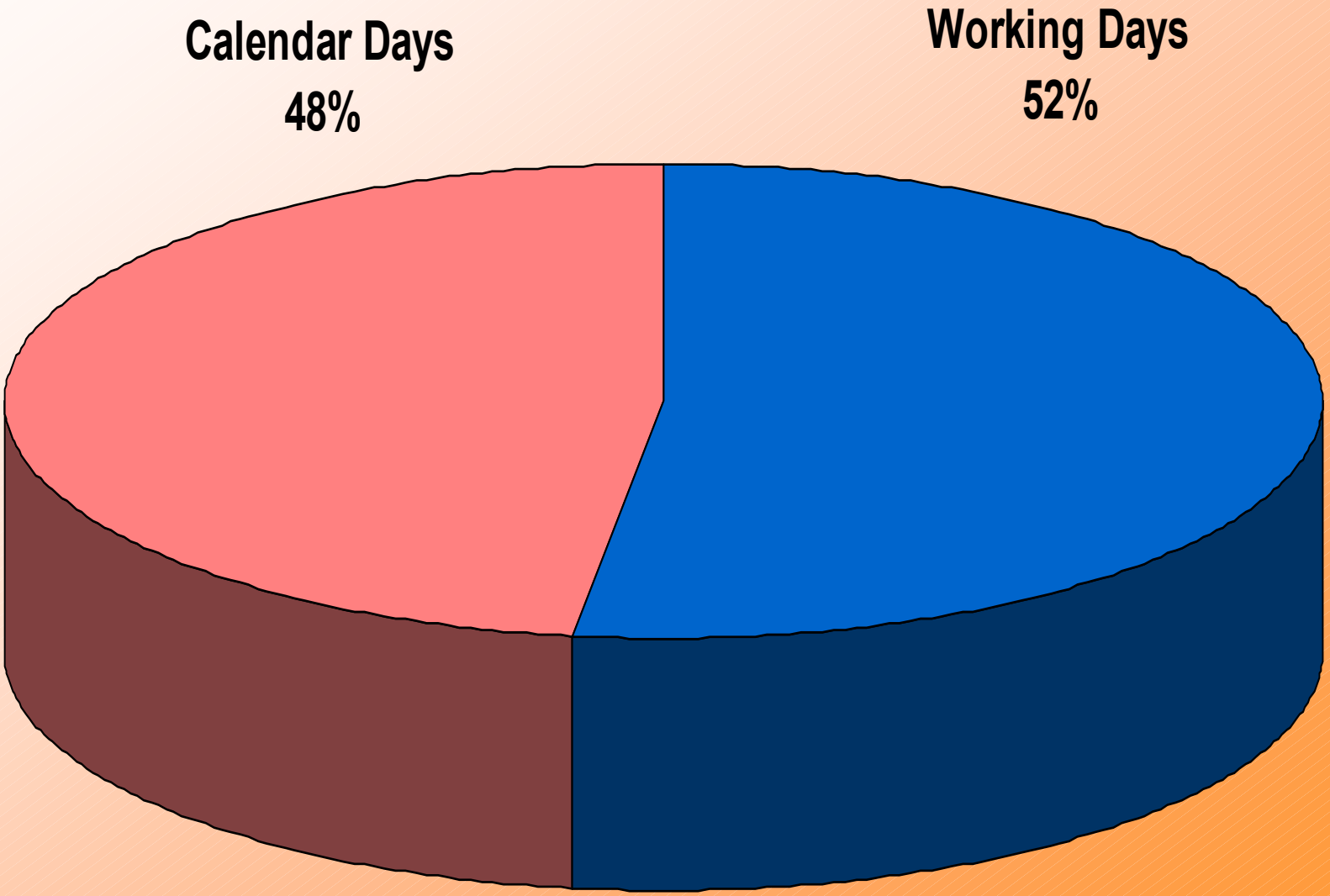
Section C: Productivity


Calibrations Per Year
< 1000
1001 - 5000
5001 - 10000
10001 - 15000
15001 - 20000
20001 - 25000
25001 - 30000
> 30000
0
5
10
15
20
25
30
35
40
45
50
Percent of Responses
1996
1999
2001

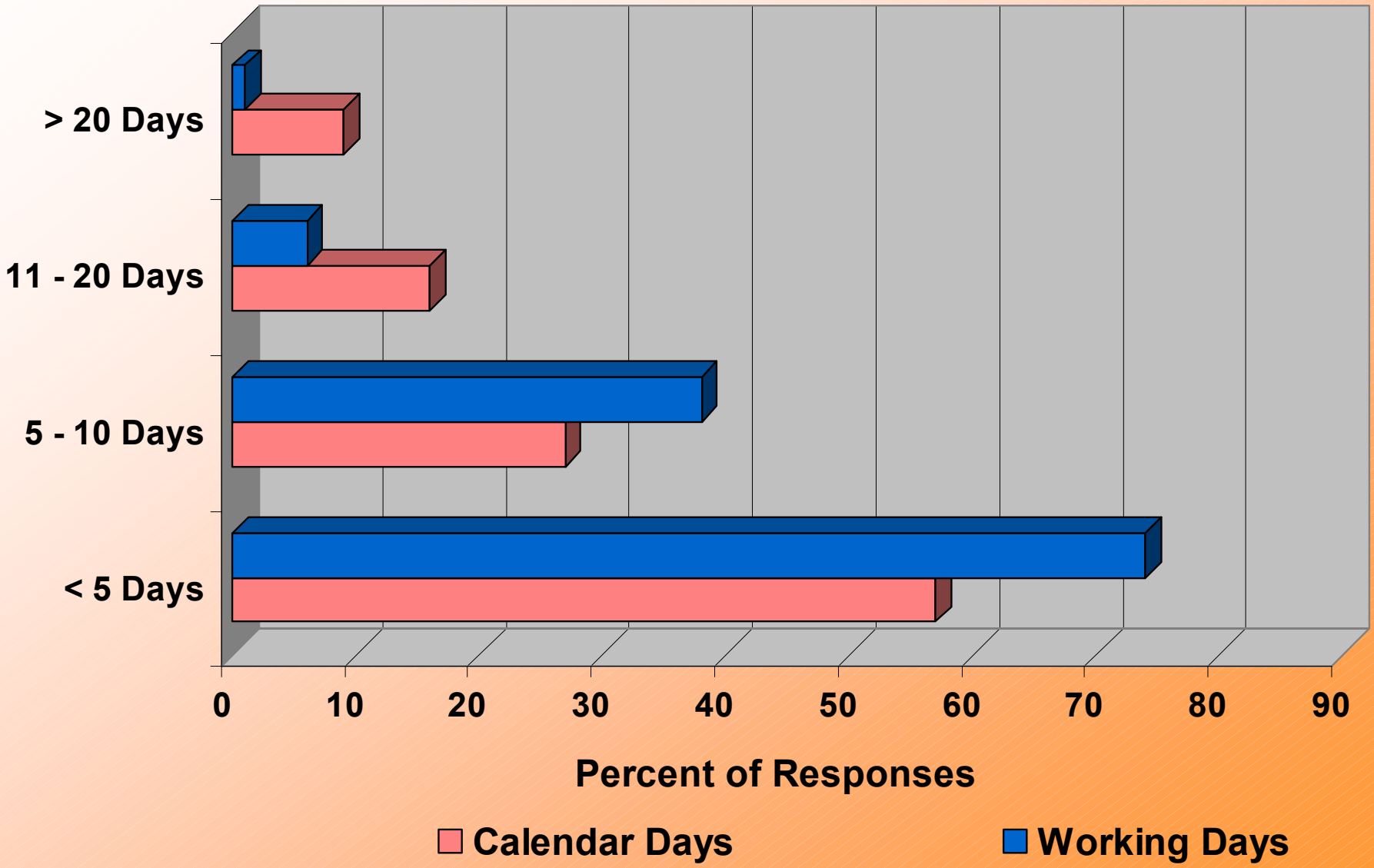
Average Cycle Time



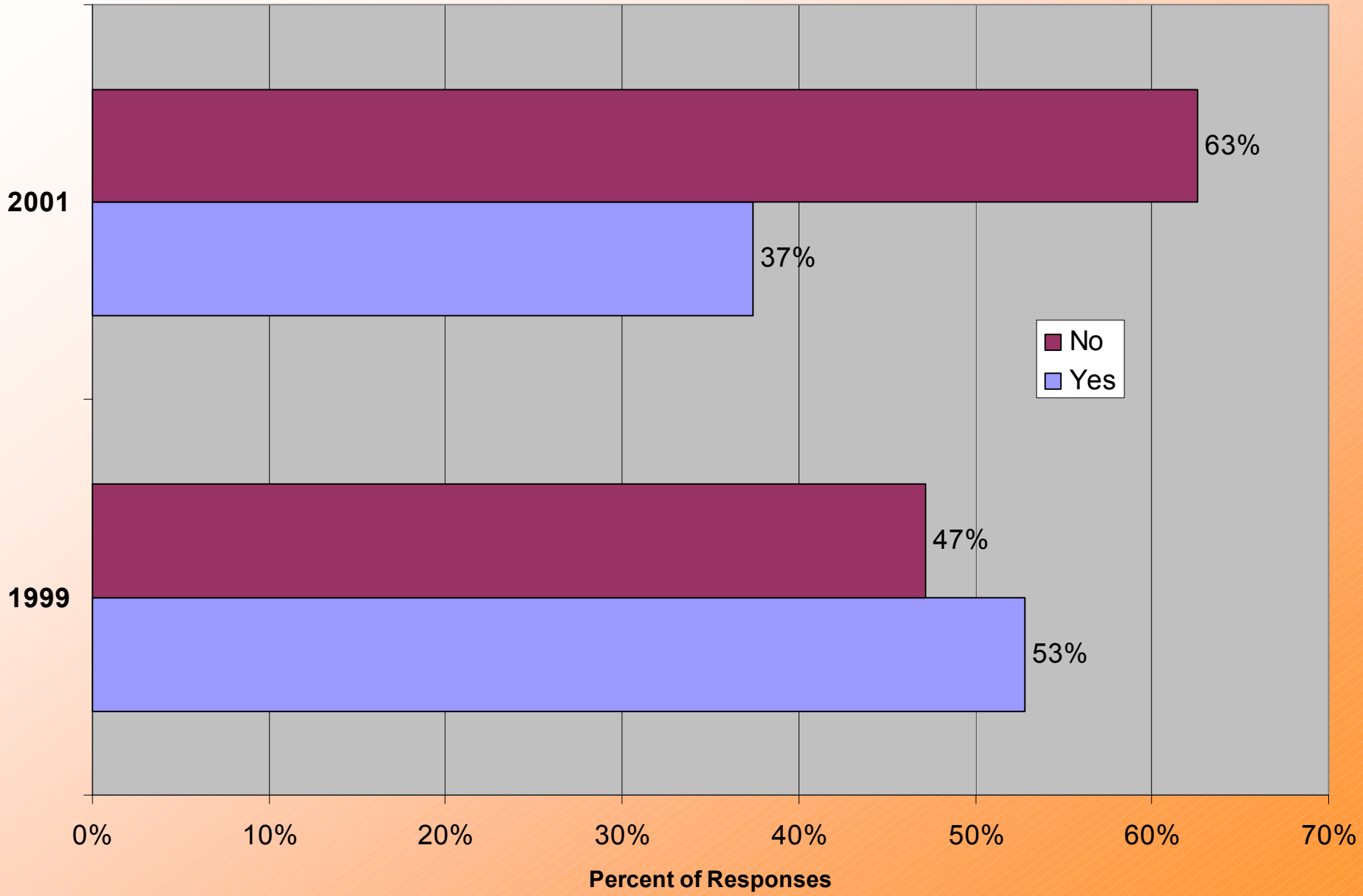
Day Type Used in Cycle Time



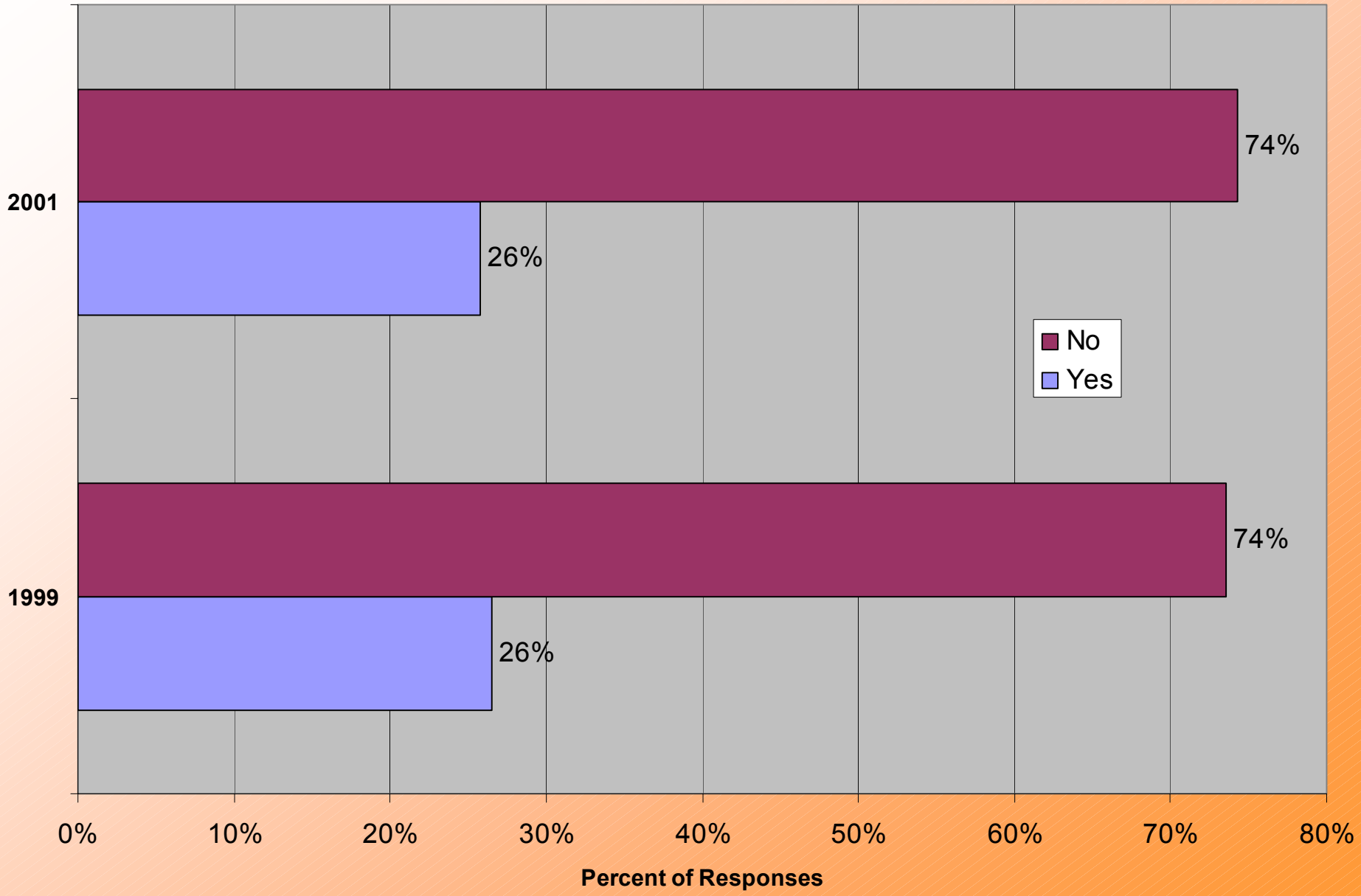
Cycle Time vs. Day Type



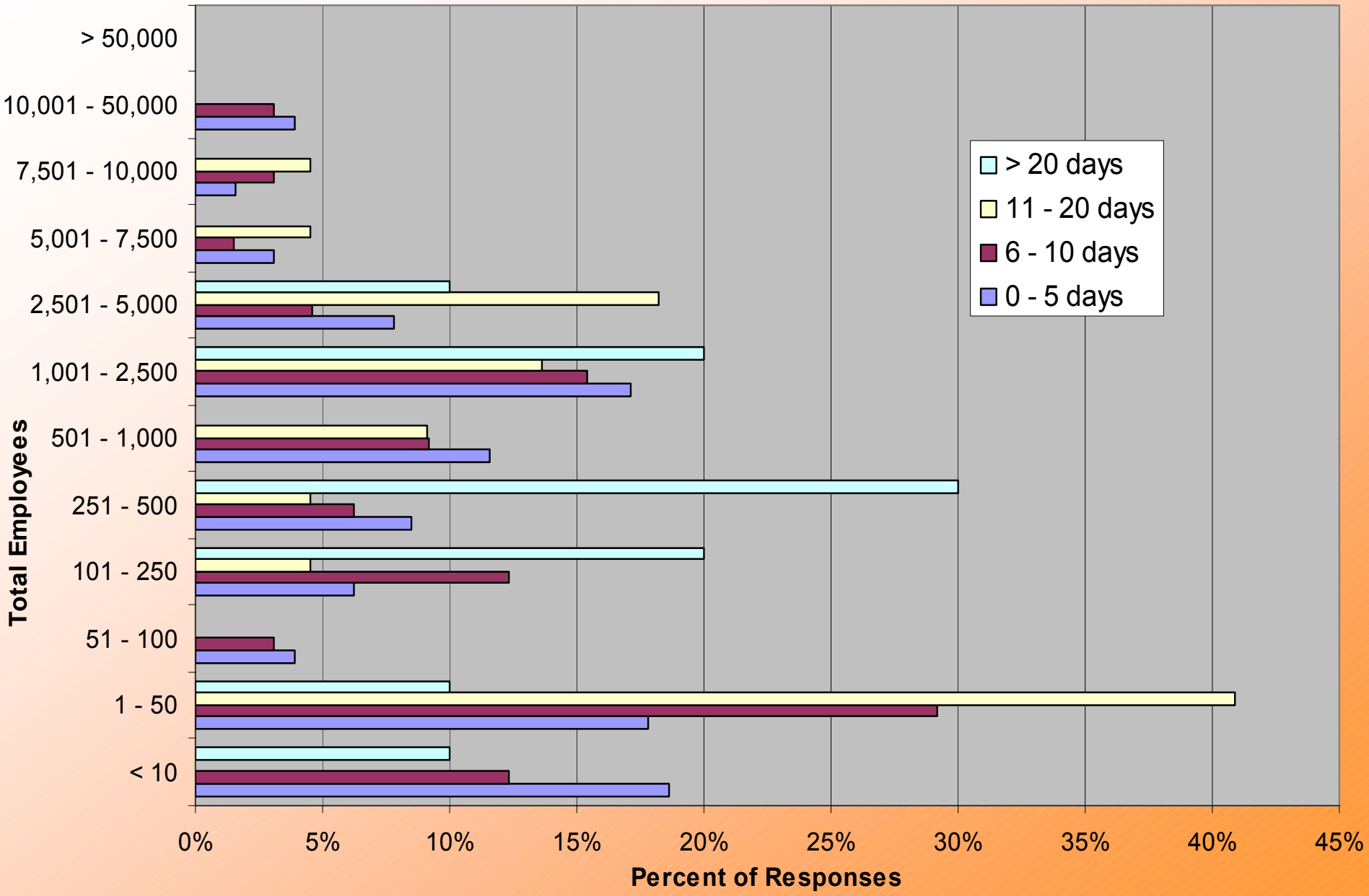
Repairs Included in Cycle Time?



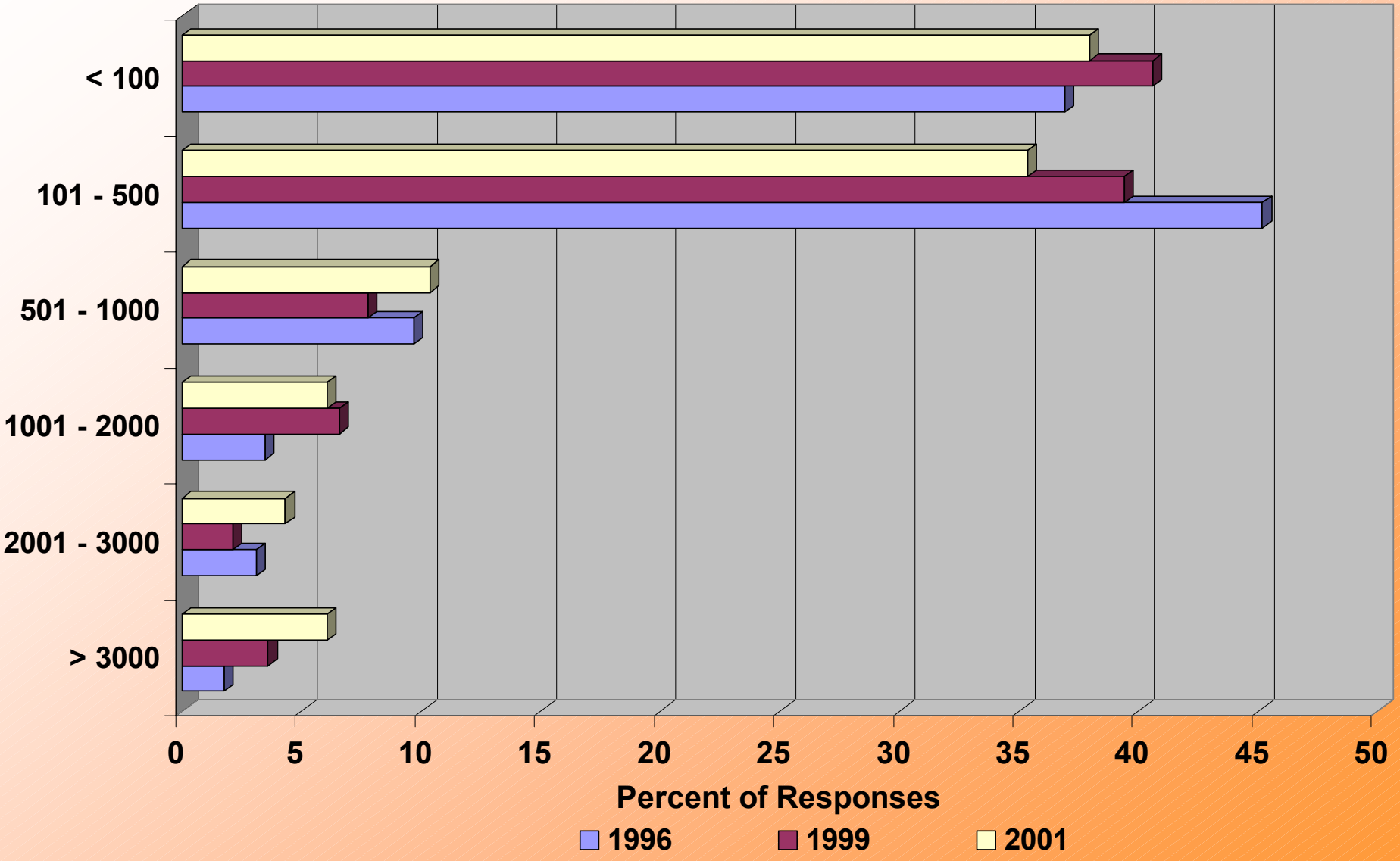
Vendor/Supplier Outsourced Work Included in Cycle Time?



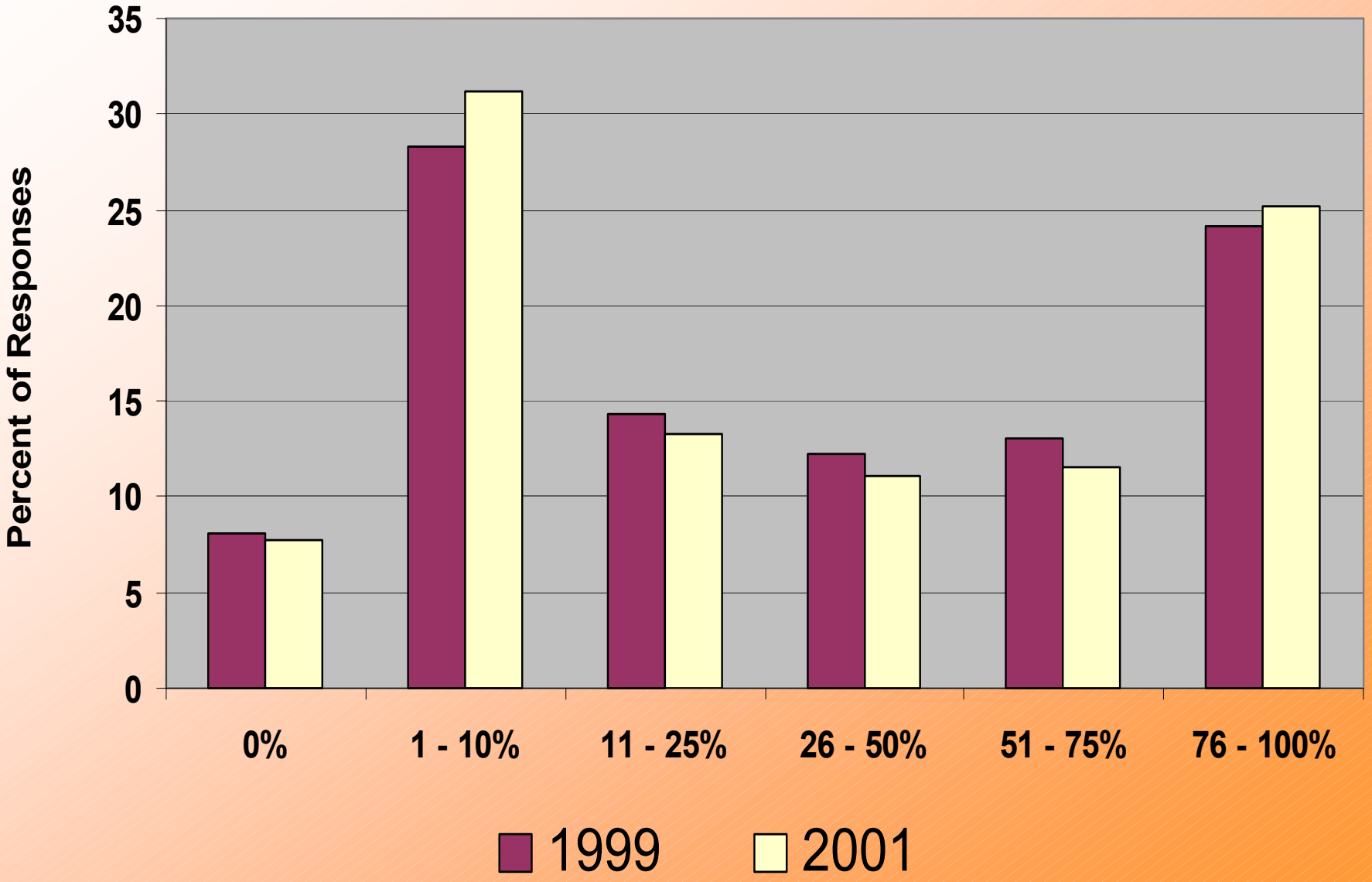
Cycle Time vs. Company Size



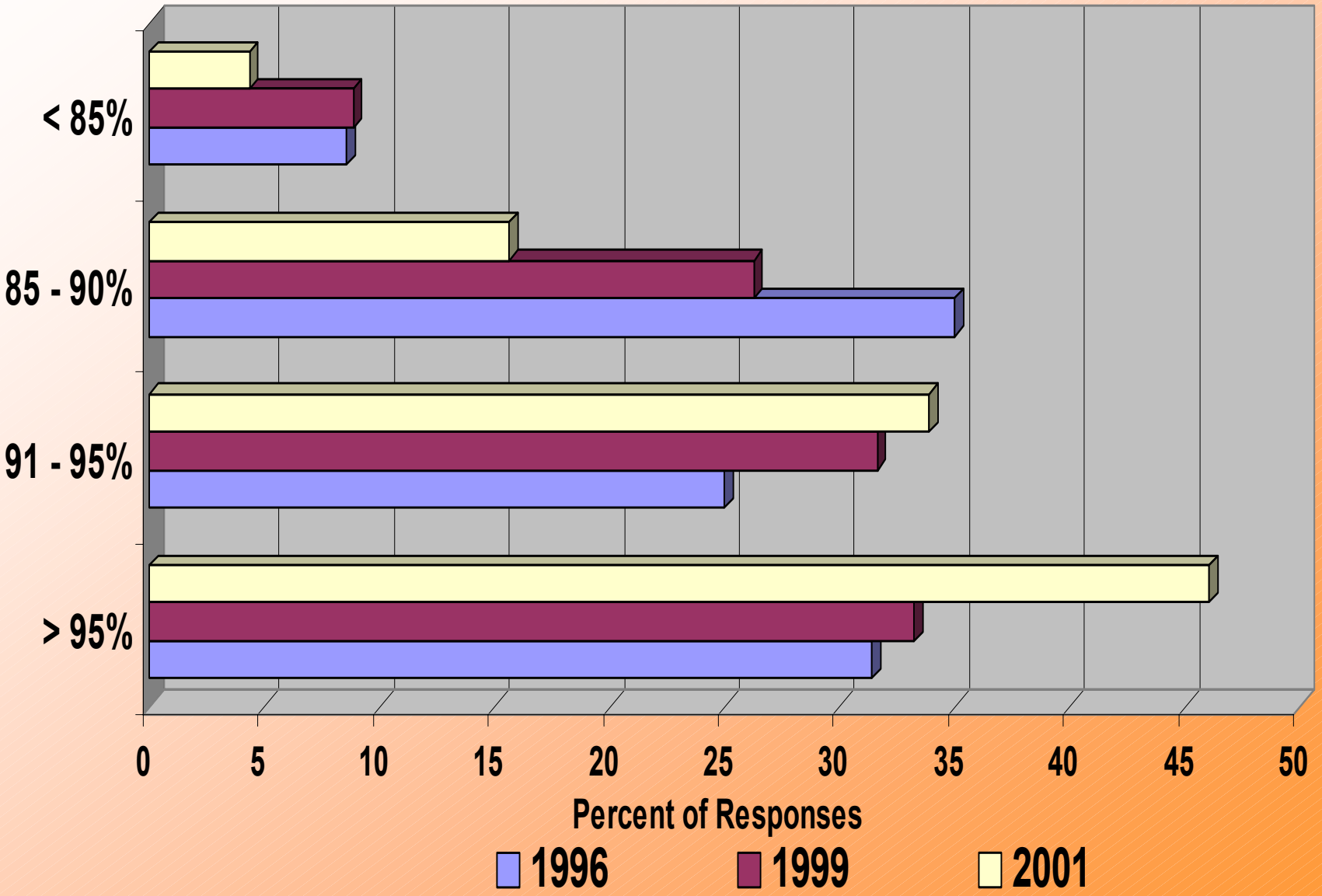
Active Items



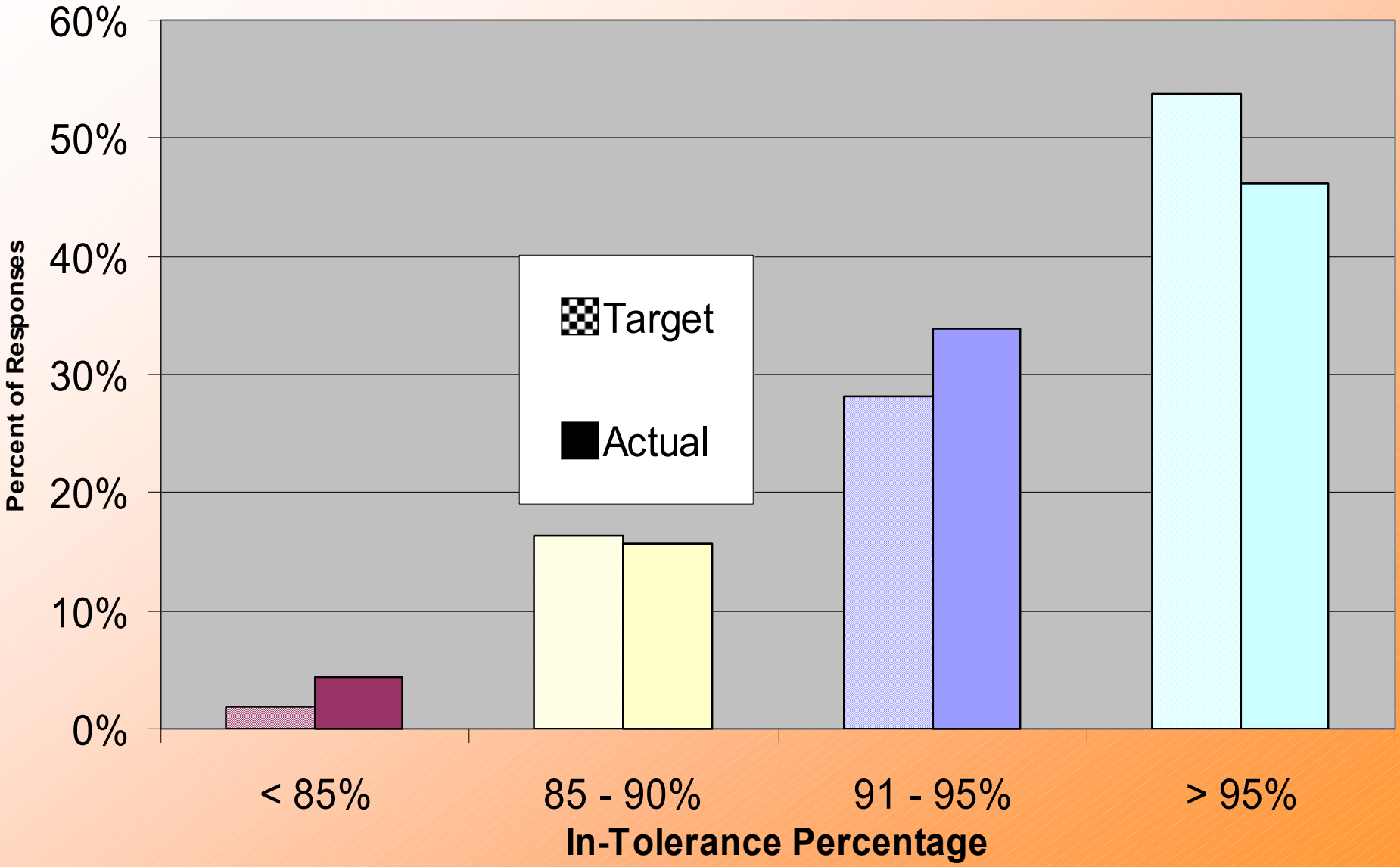
On-Site / In-Situ Calibrations



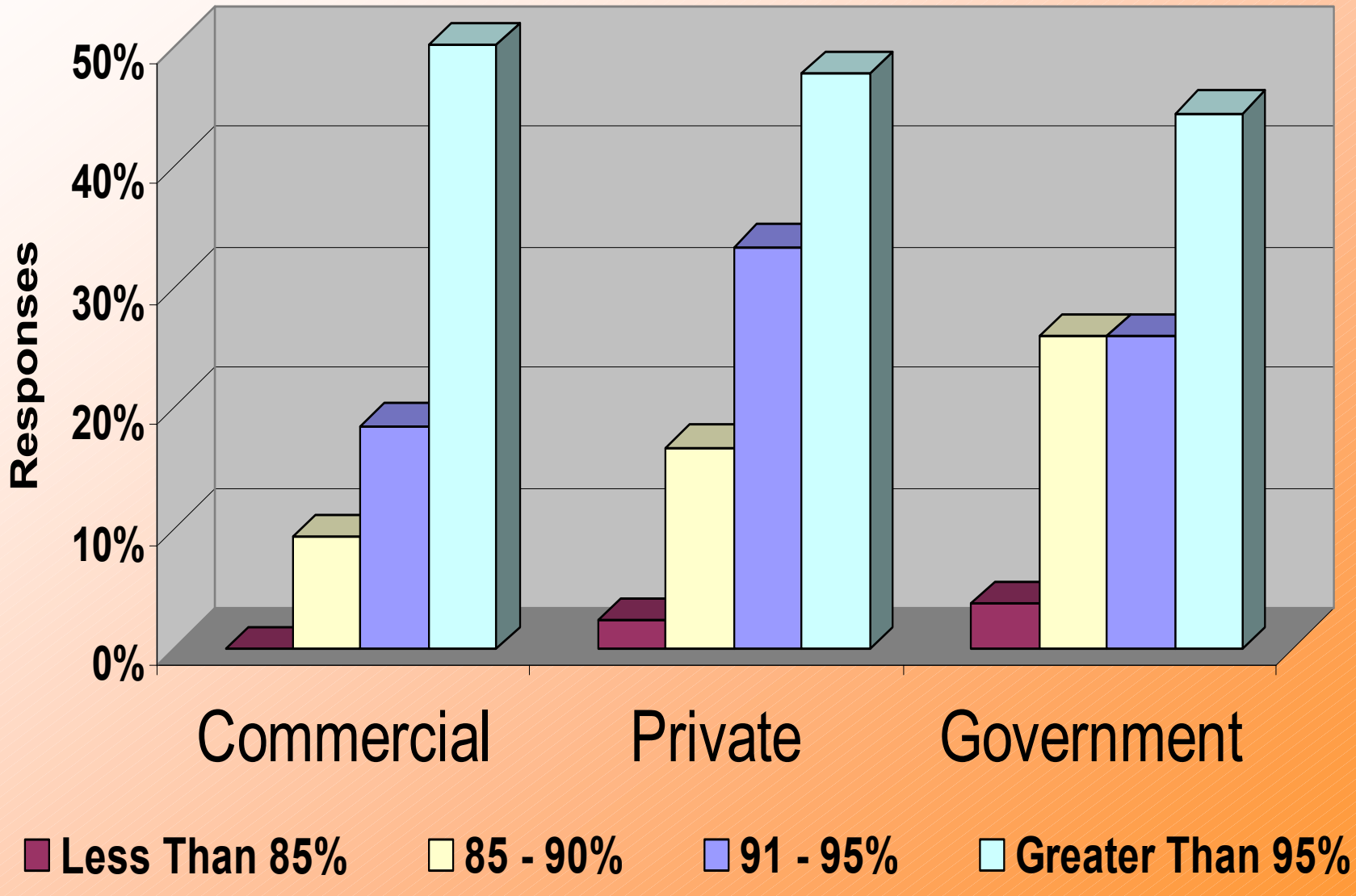
Actual In-Tolerance



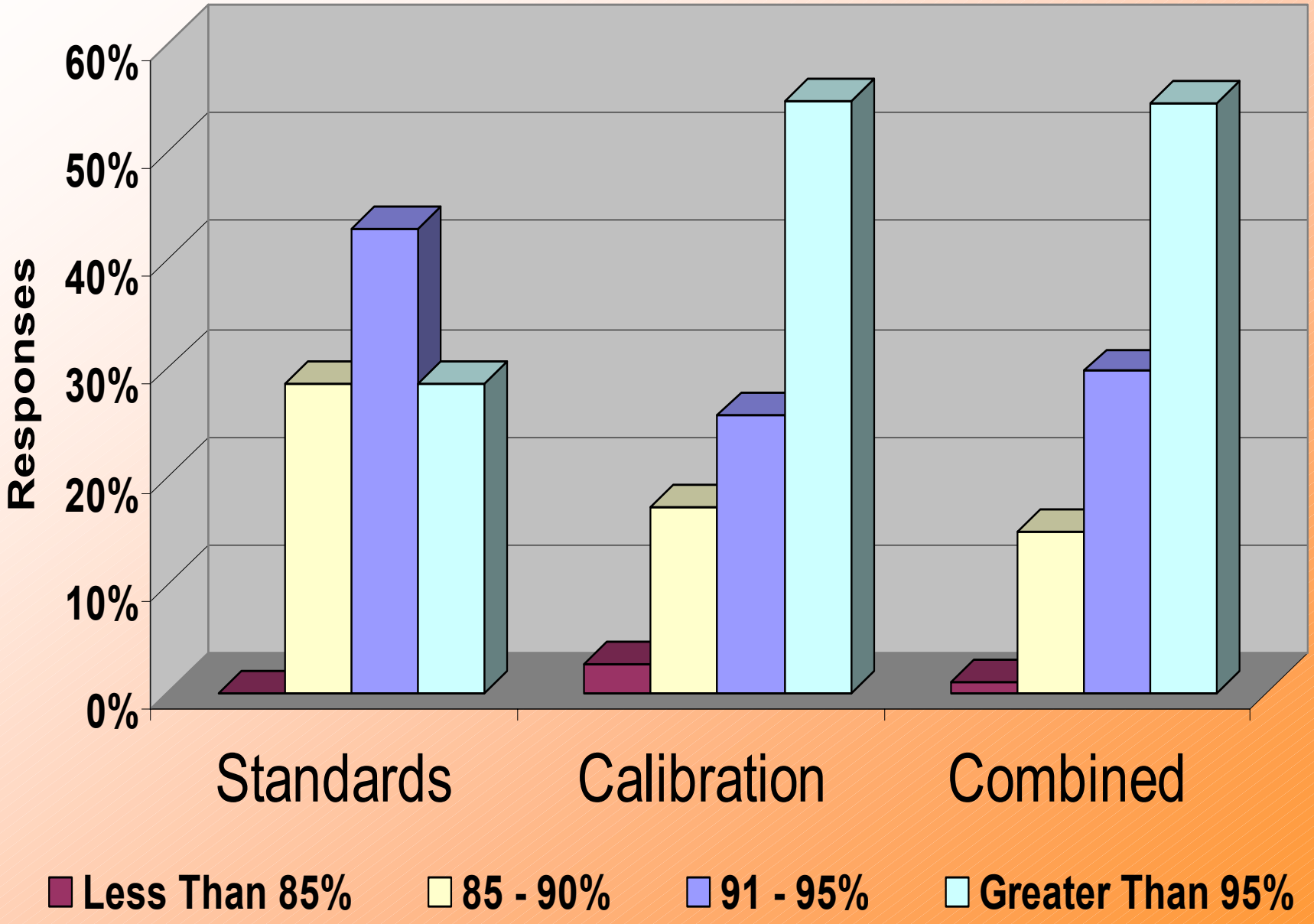
Target vs. Actual In-Tolerance



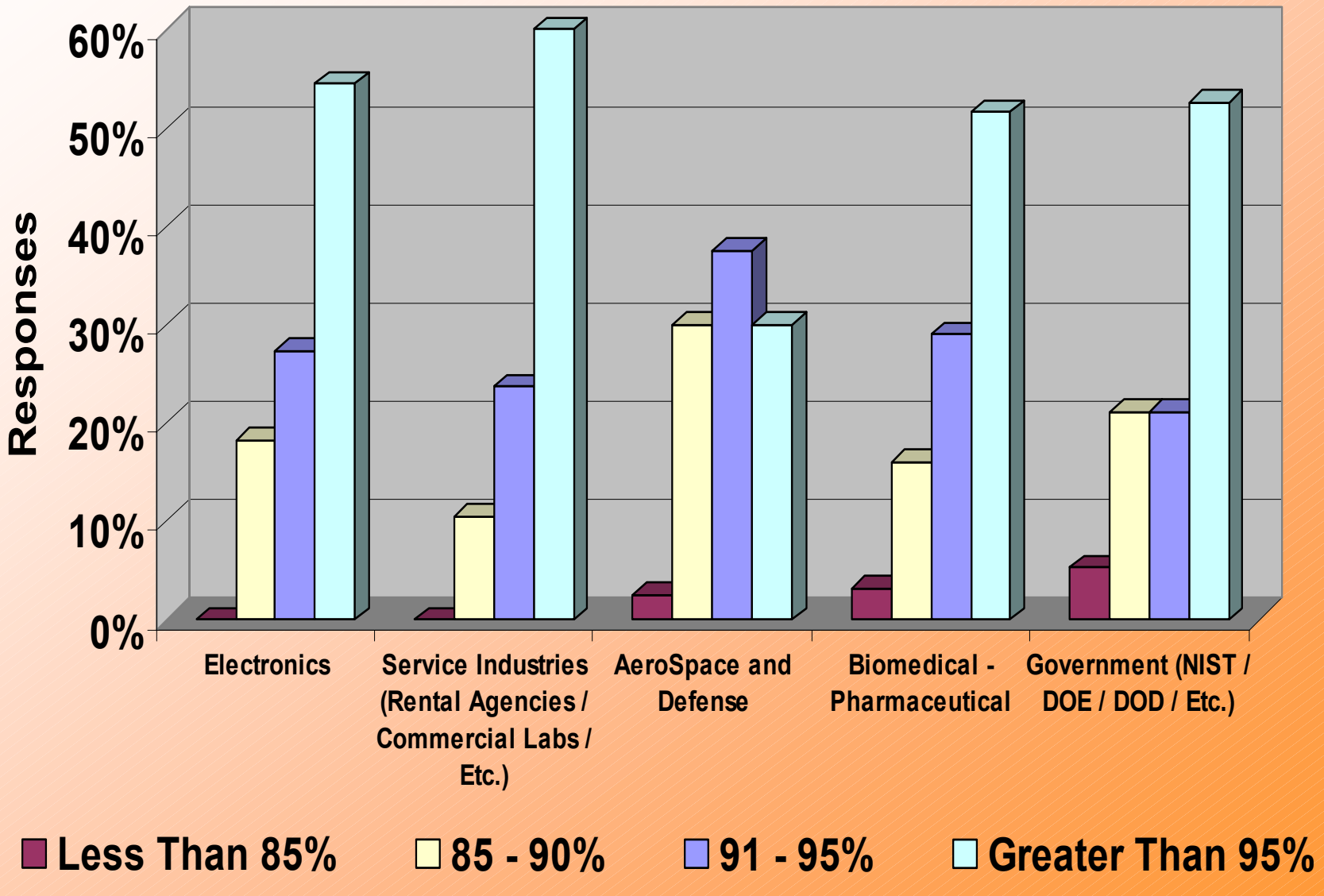
Target In-Tolerance vs. Lab Type



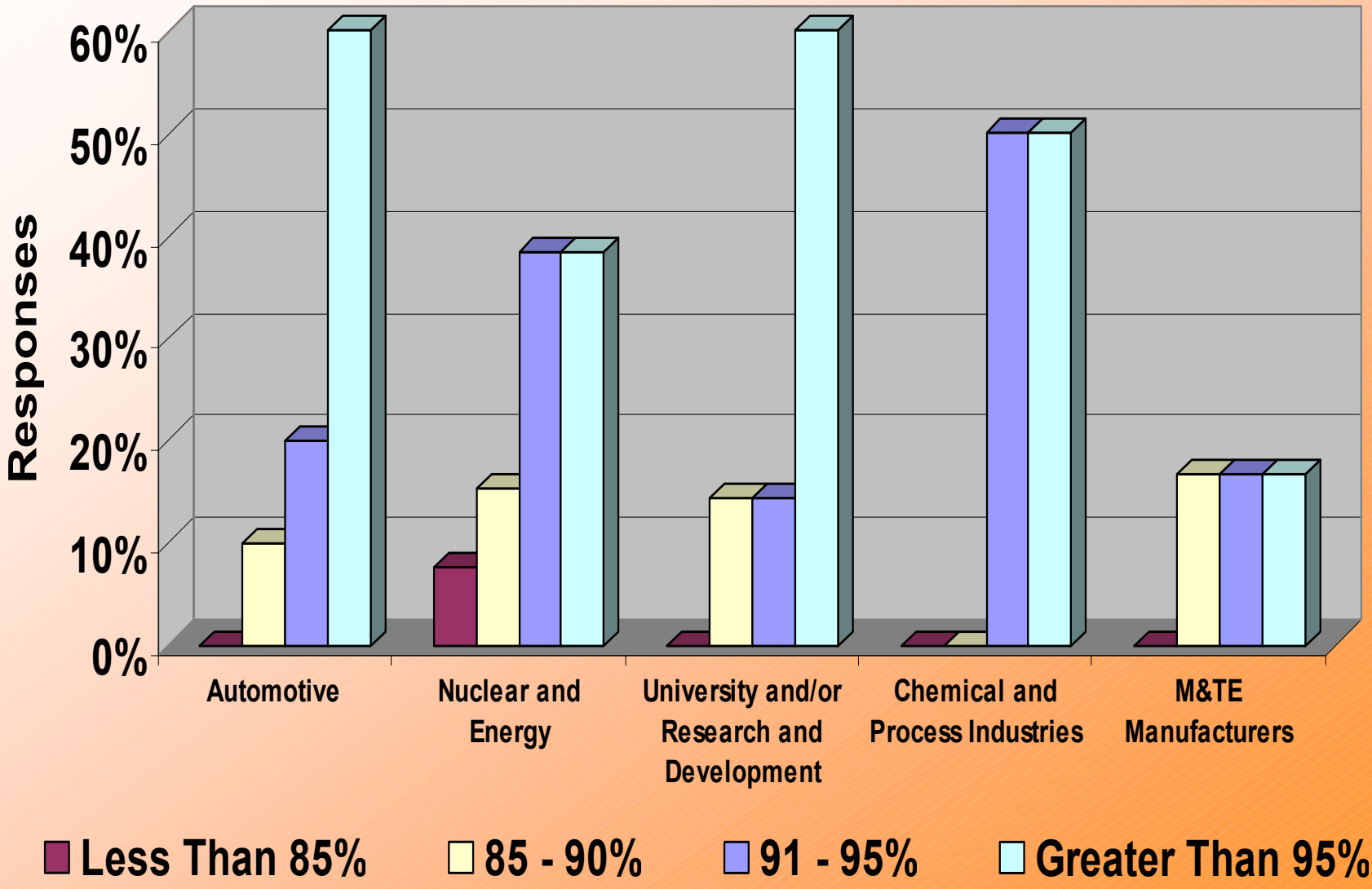
Target In-Tolerance vs. Lab Classification



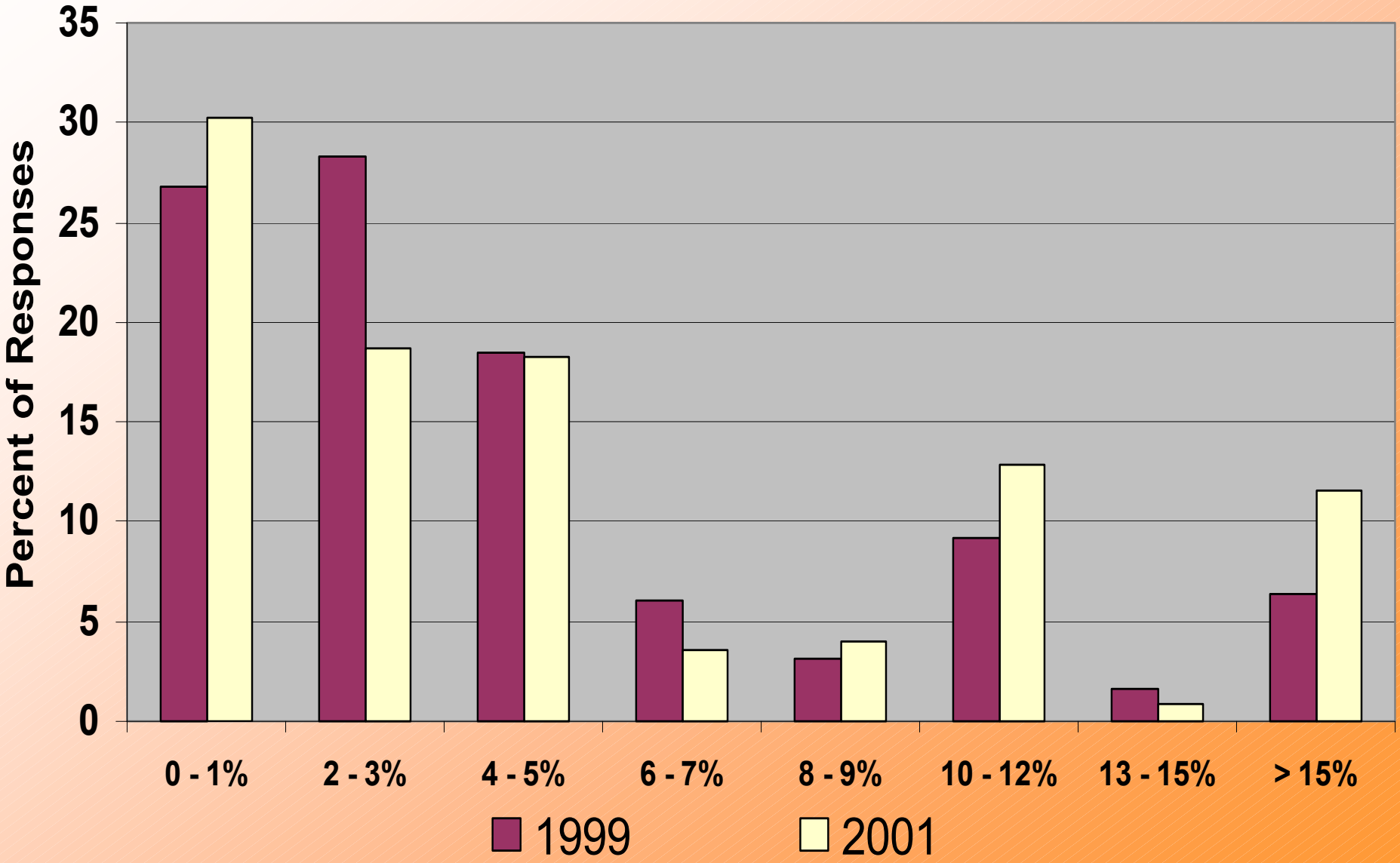
Target In-Tolerance vs. Industry (1 of 2)



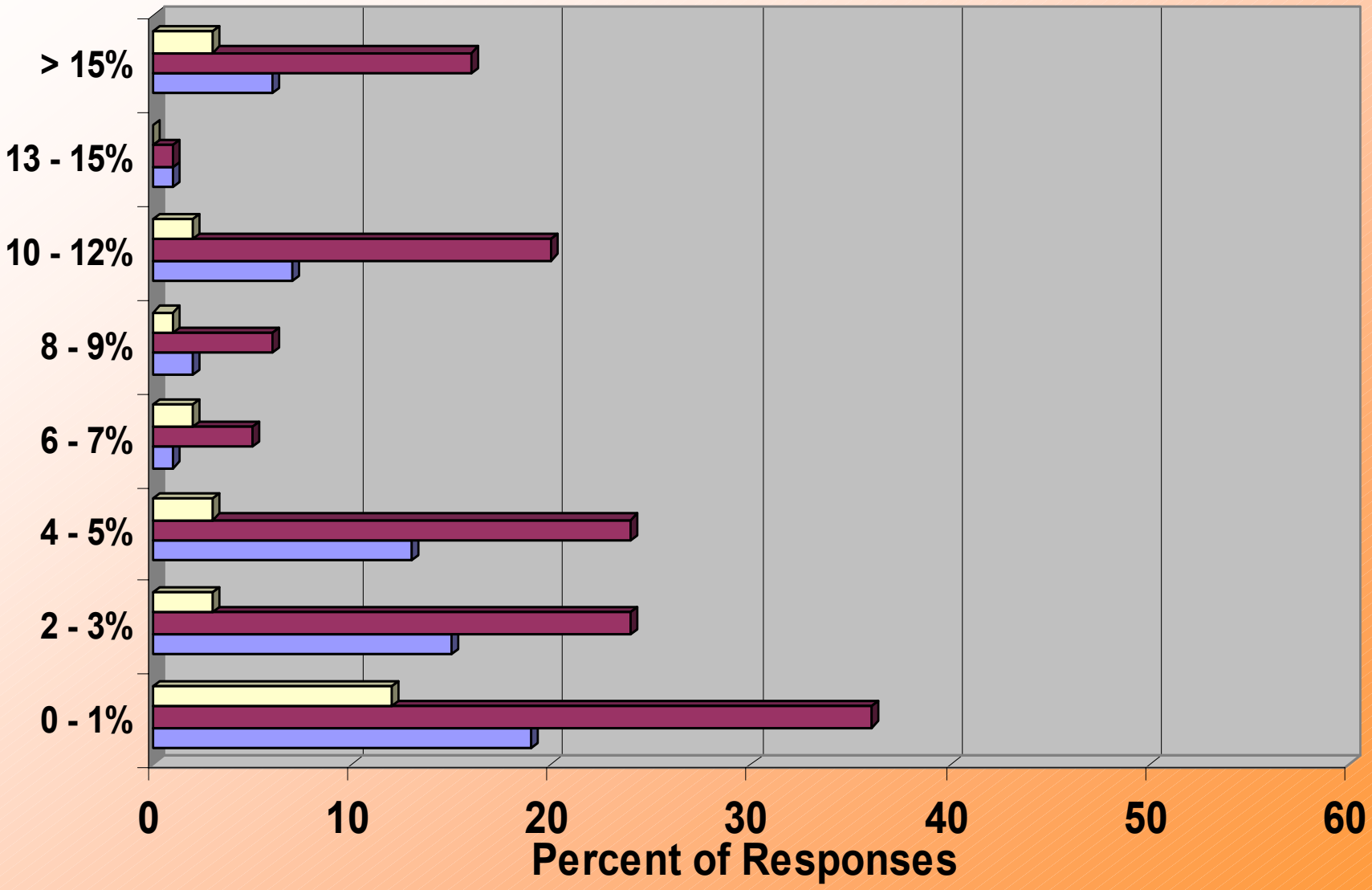
Target In-Tolerance vs. Industry (2 of 2)



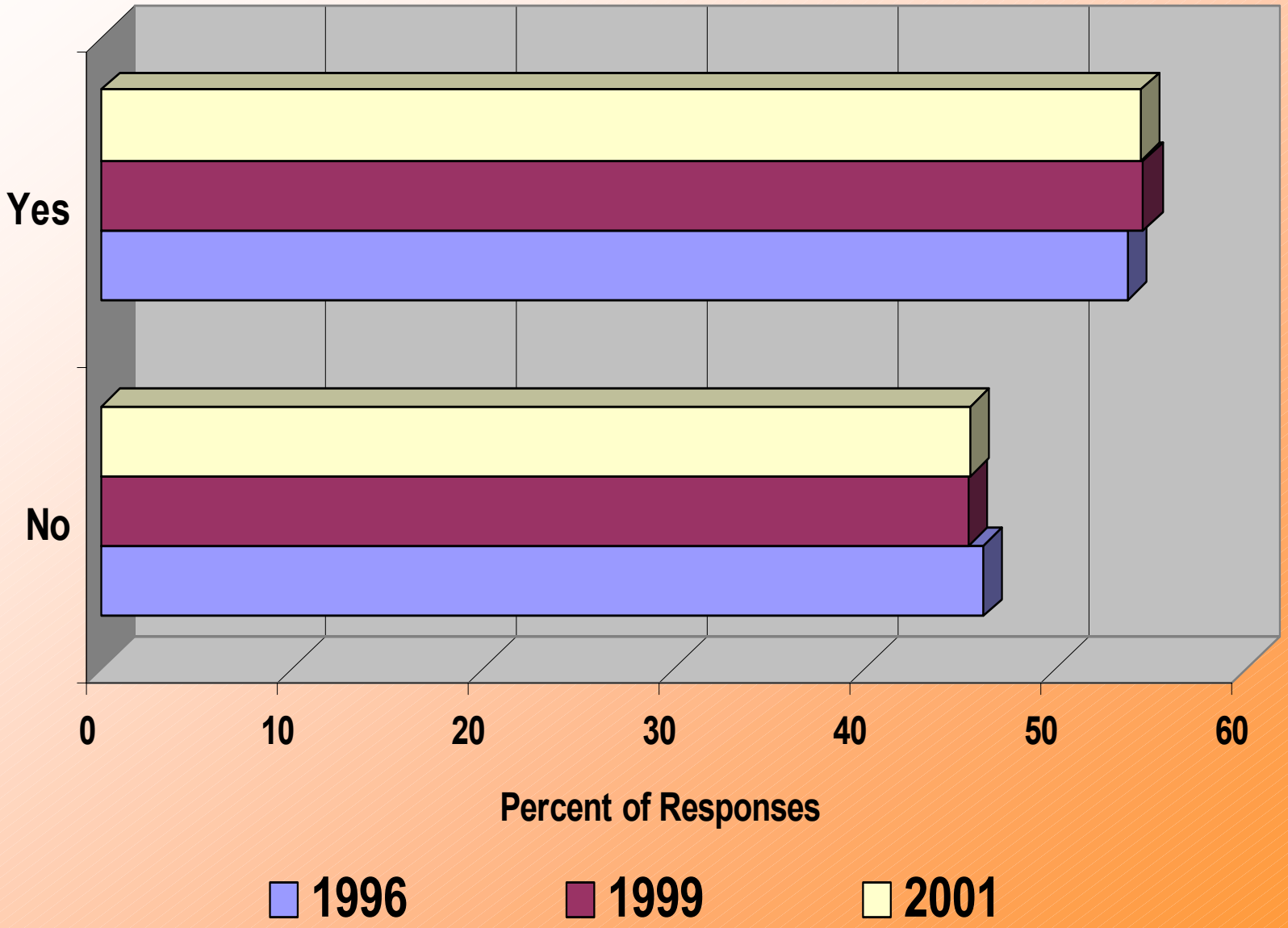
Average Delinquency Rate



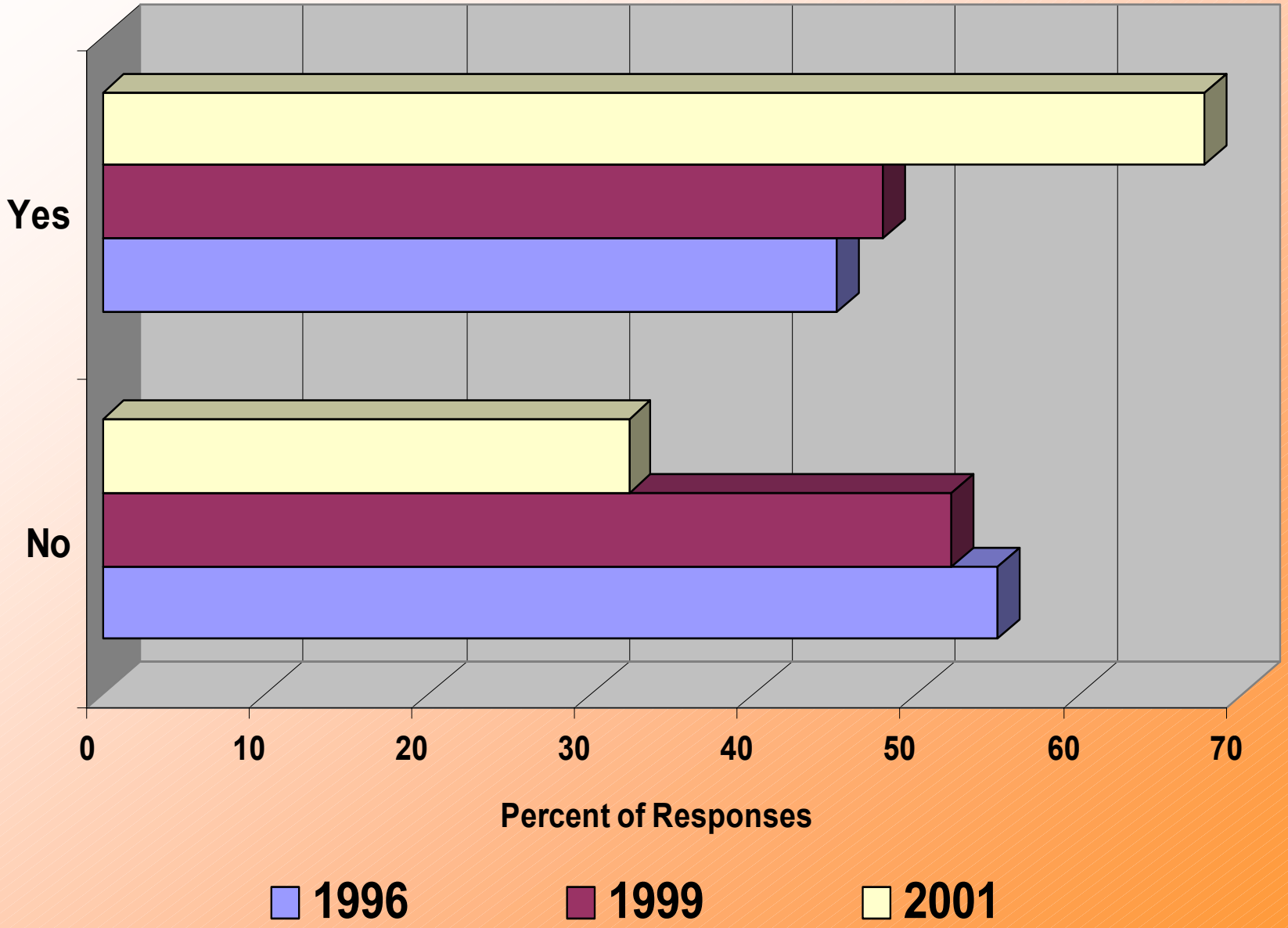
Lab Type vs. Delinquency Rate



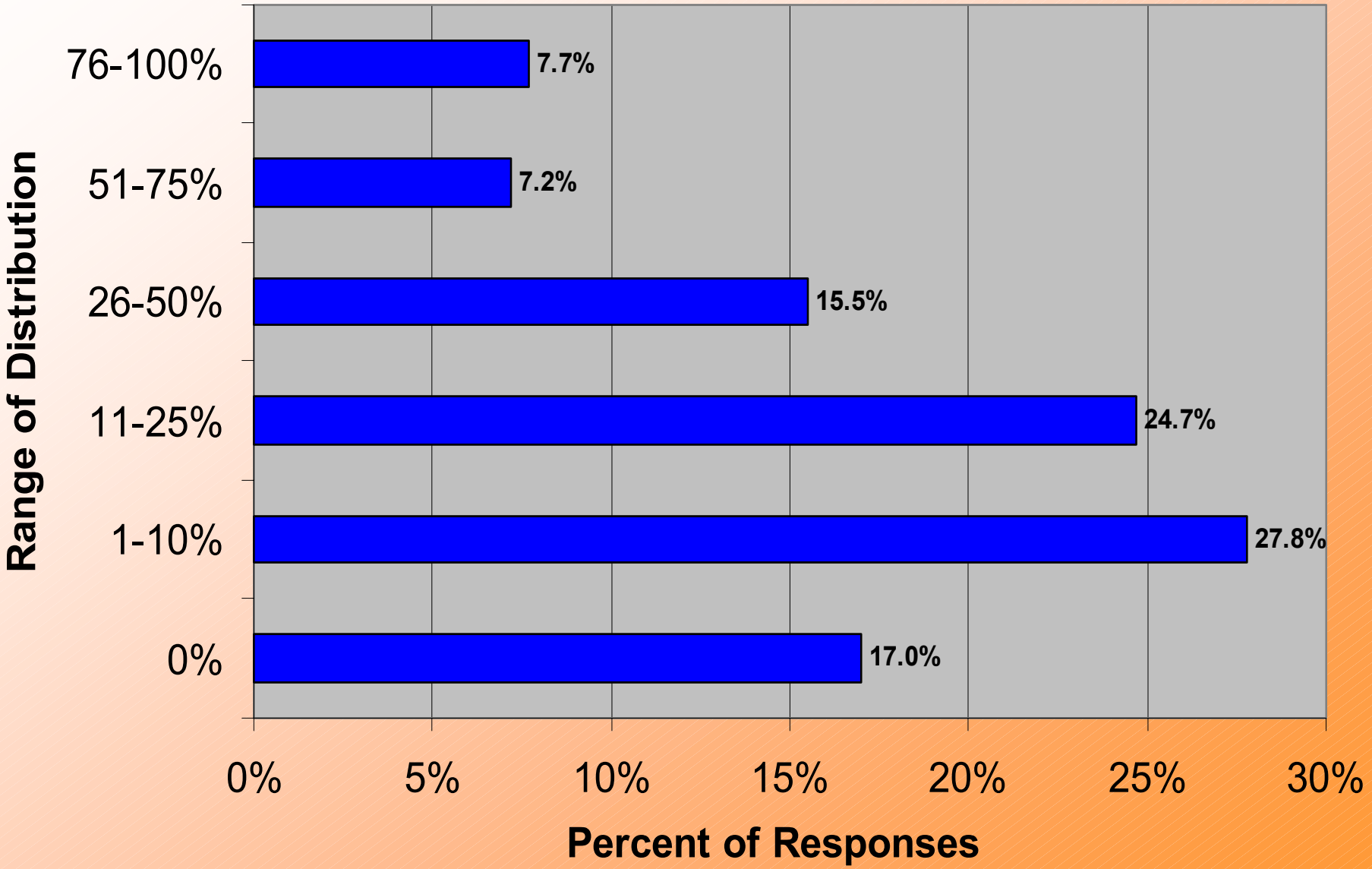
Pick Up & Delivery Service Offered?



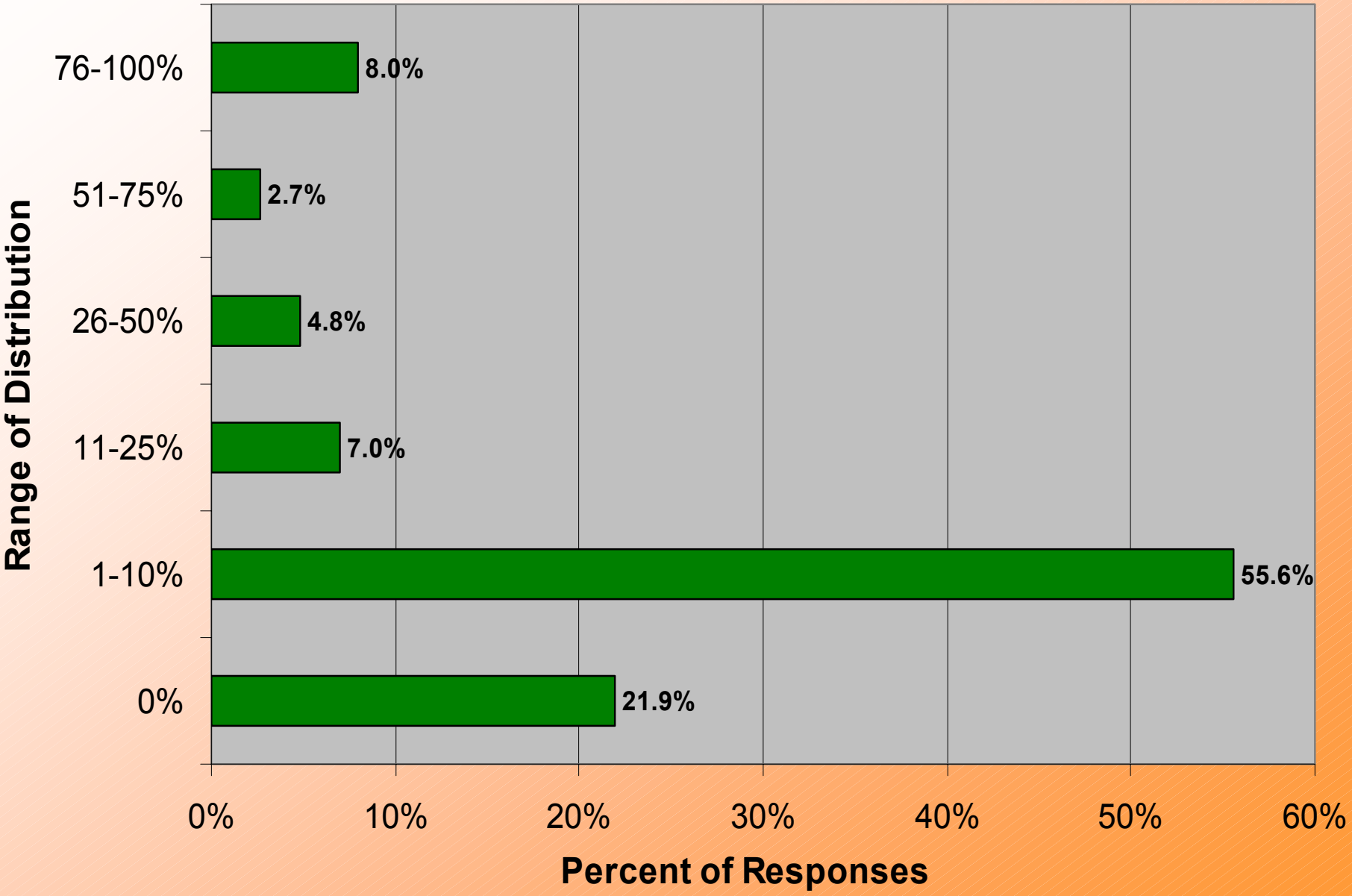
Do You Offer An Equipment Mgmt. Function?



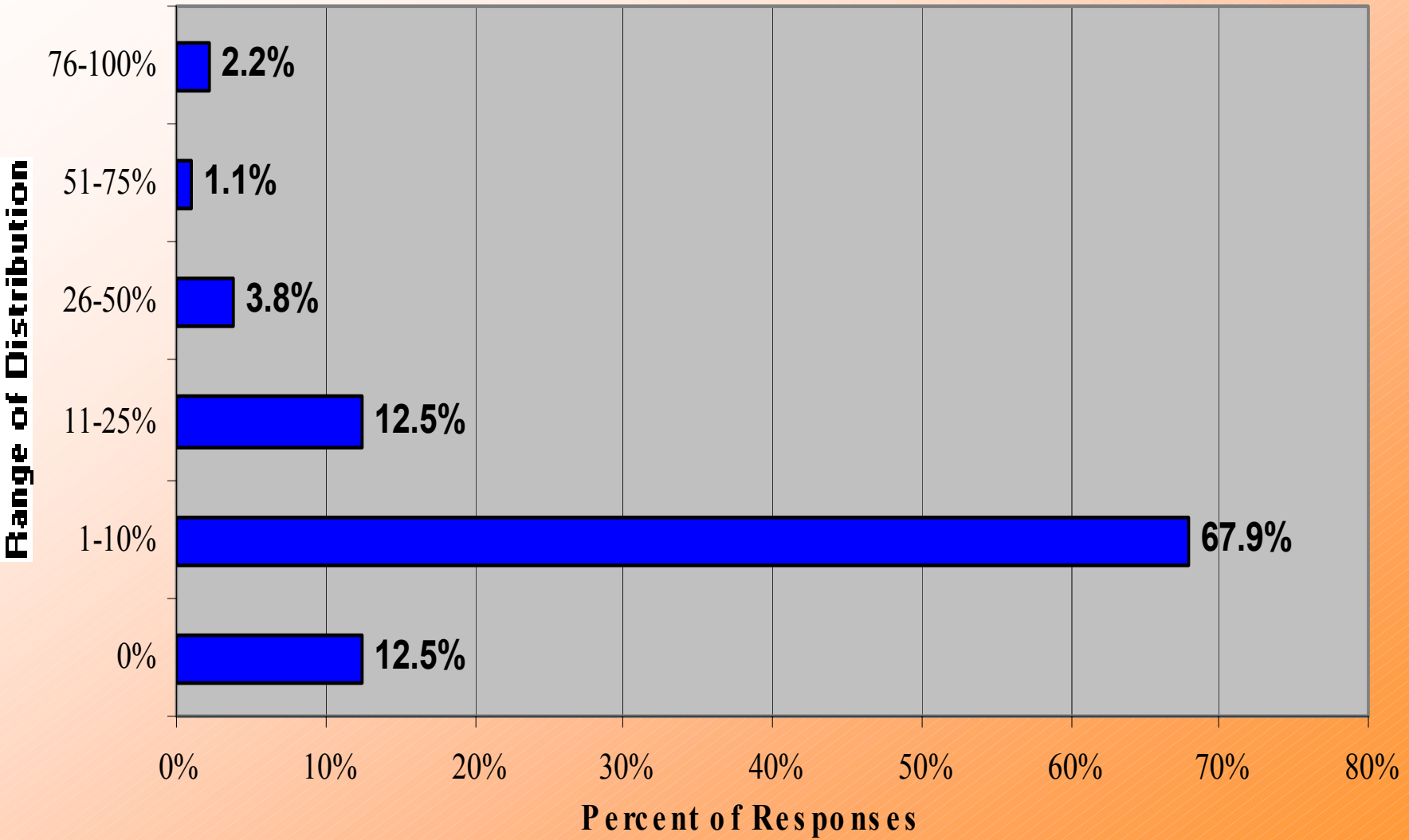
Dimensional Workload



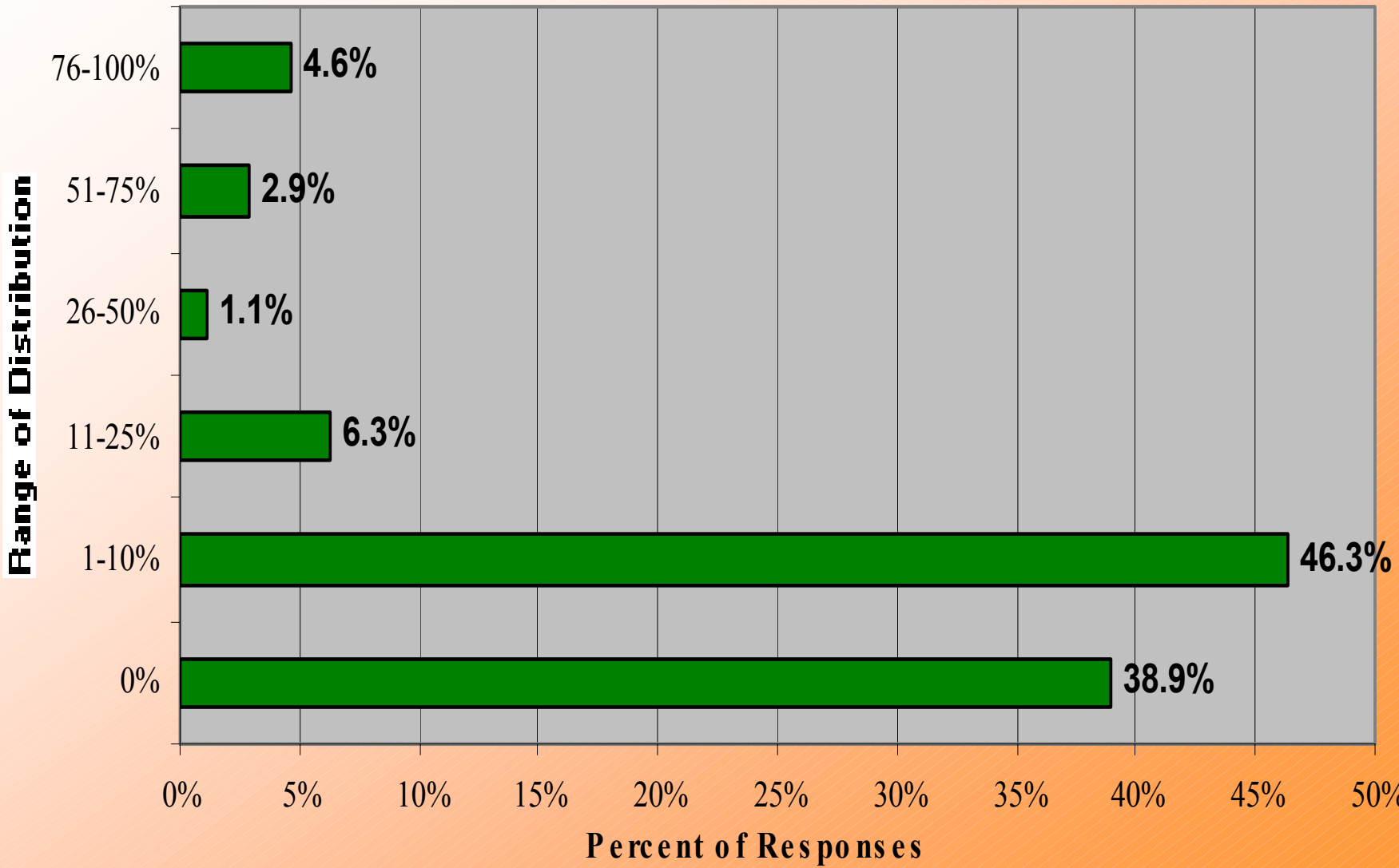
Dimensional Offload



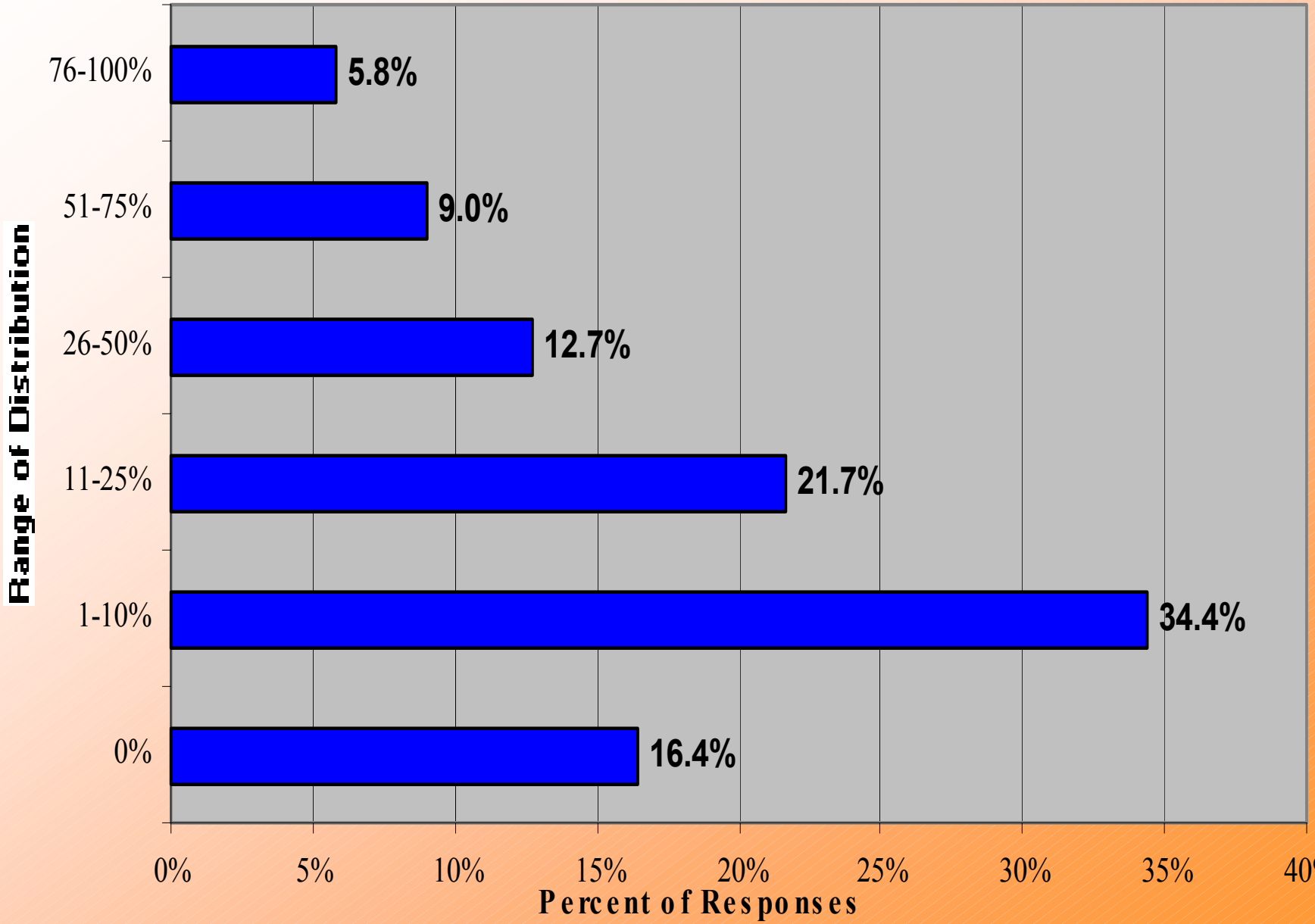
Time & Frequency Workload



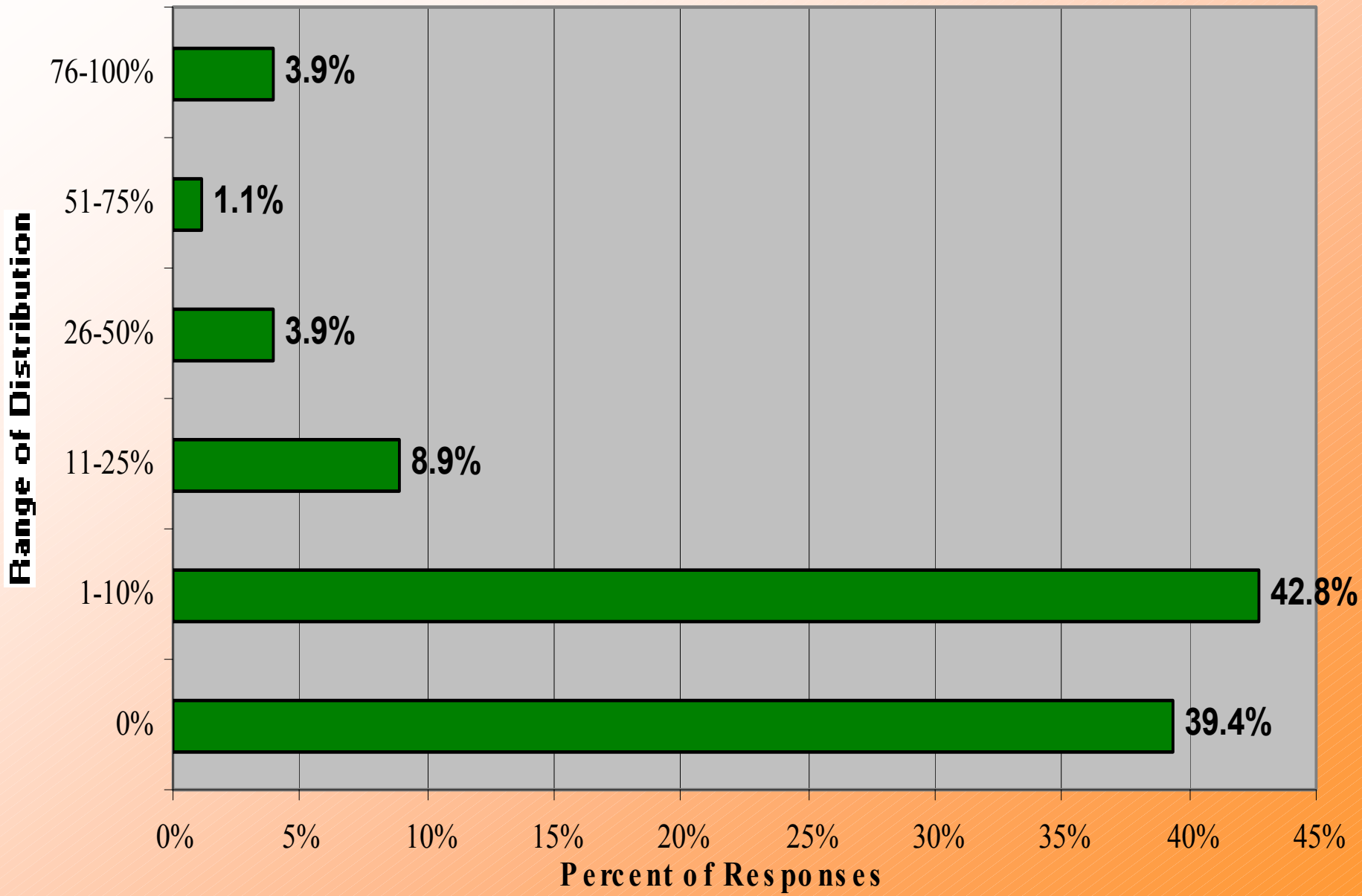
Time & Frequency Offload



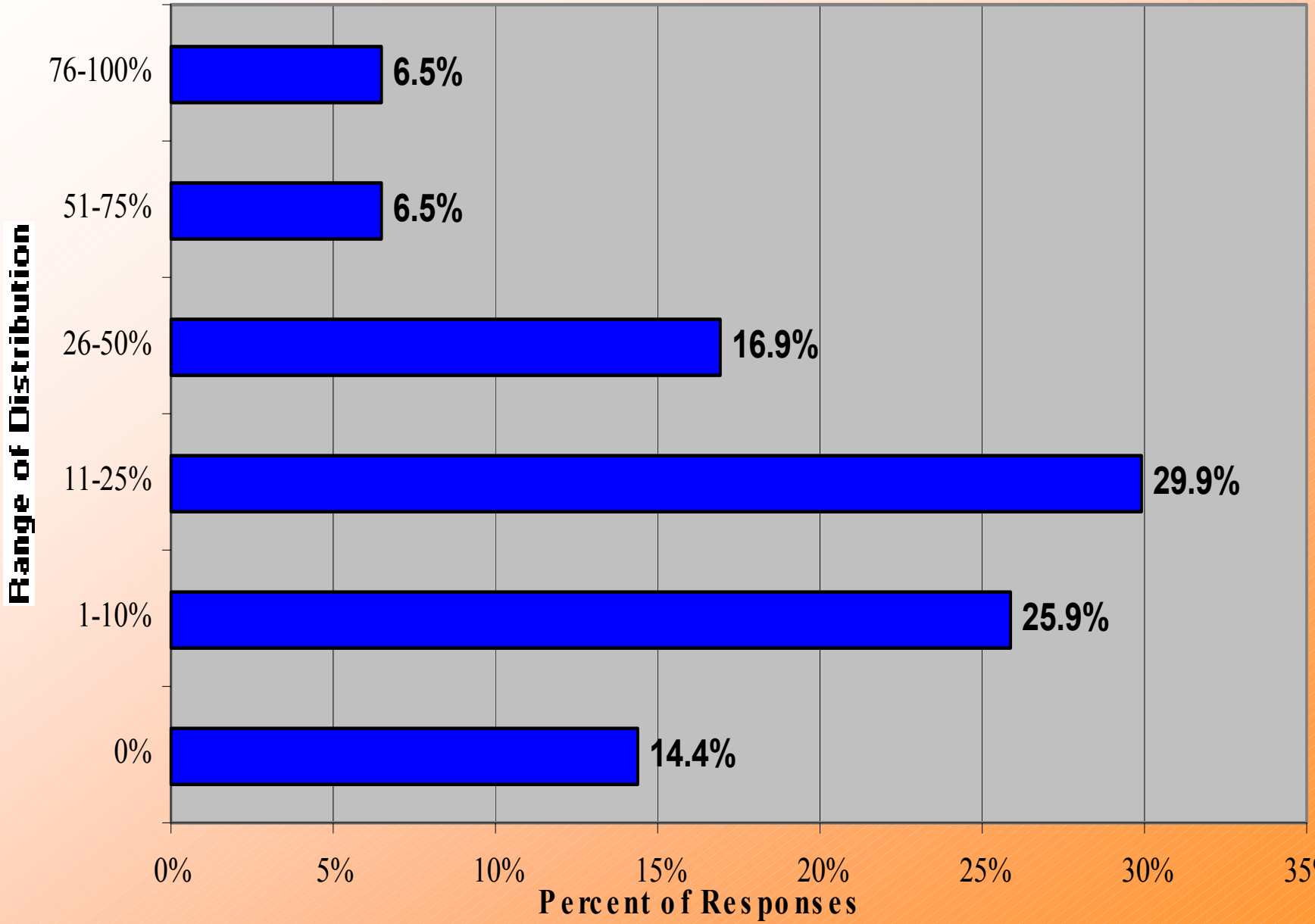
Thermodynamic Workload



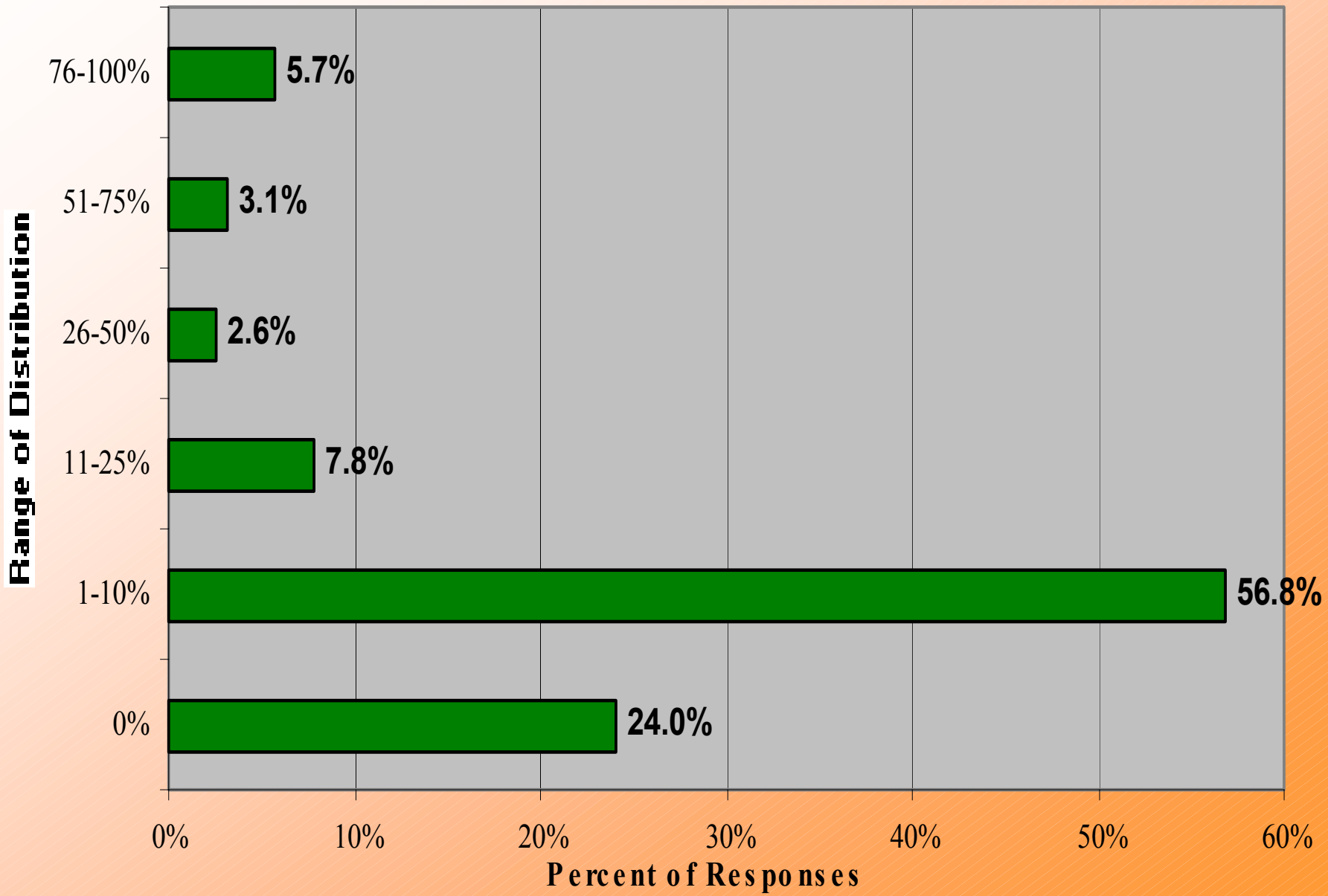
Thermodynamic Offload



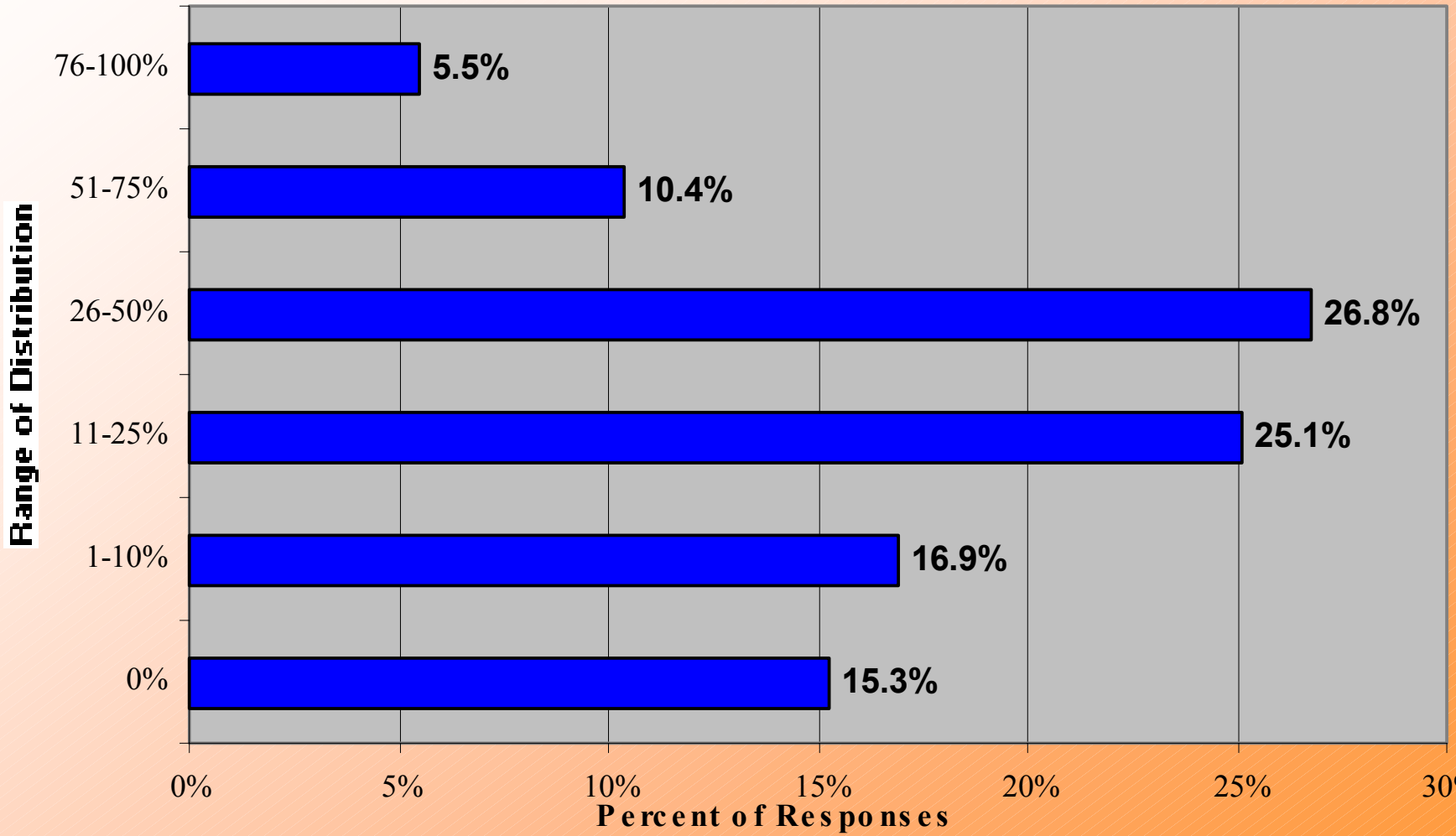
Mechanical Workload



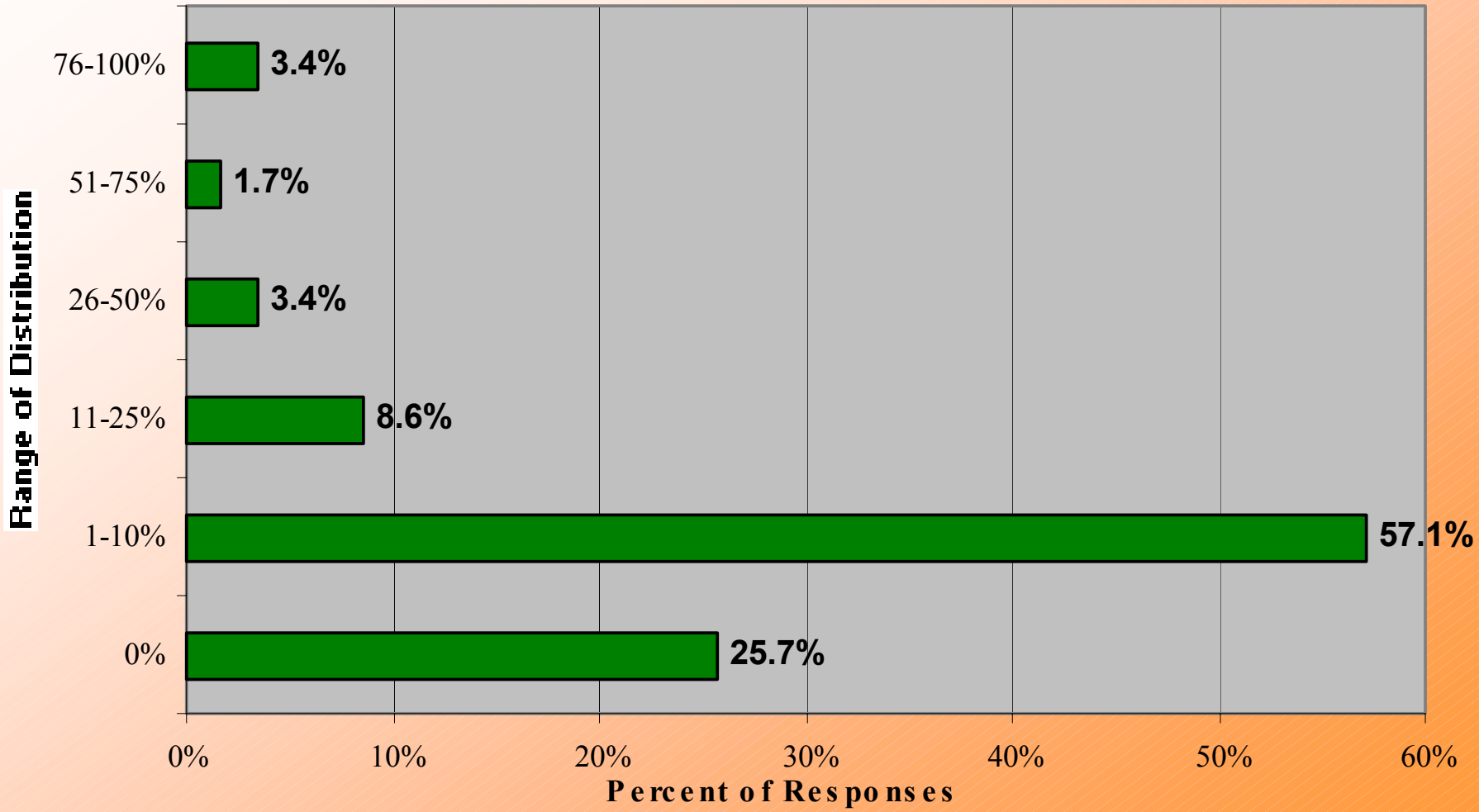
Mechanical Offload



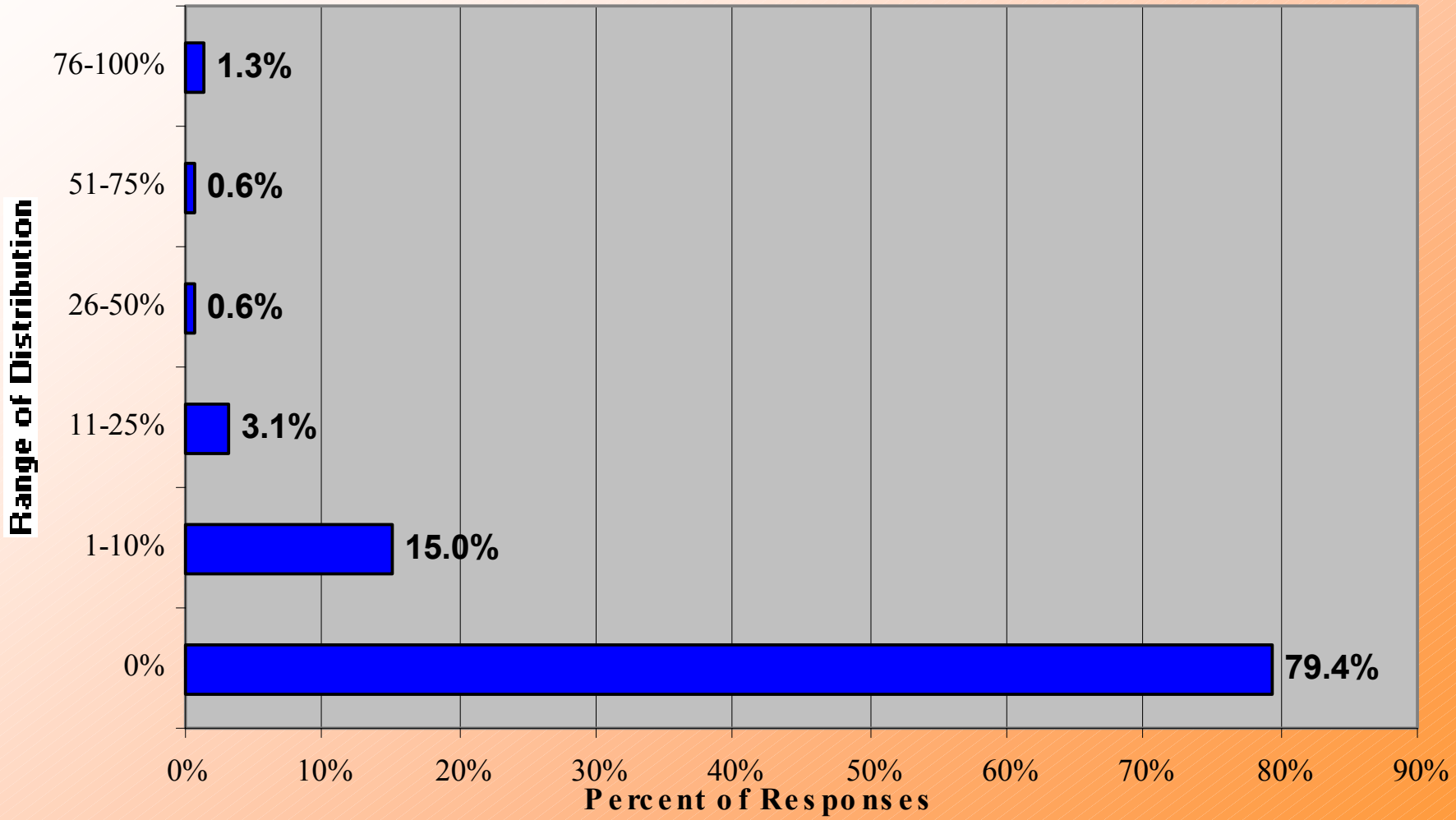
EM - DC/Low Frequency Workload



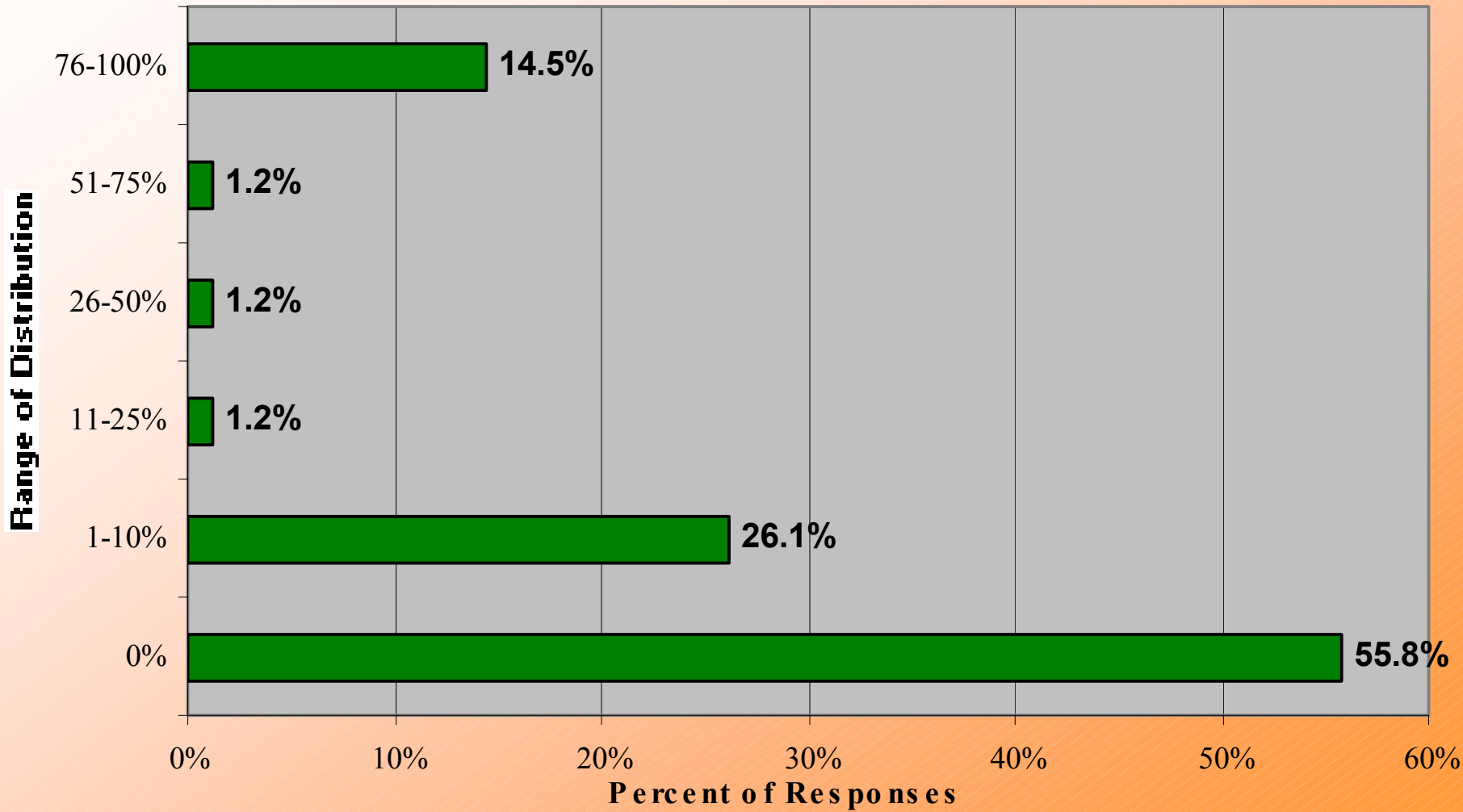
EM - DC/Low Frequency Offload



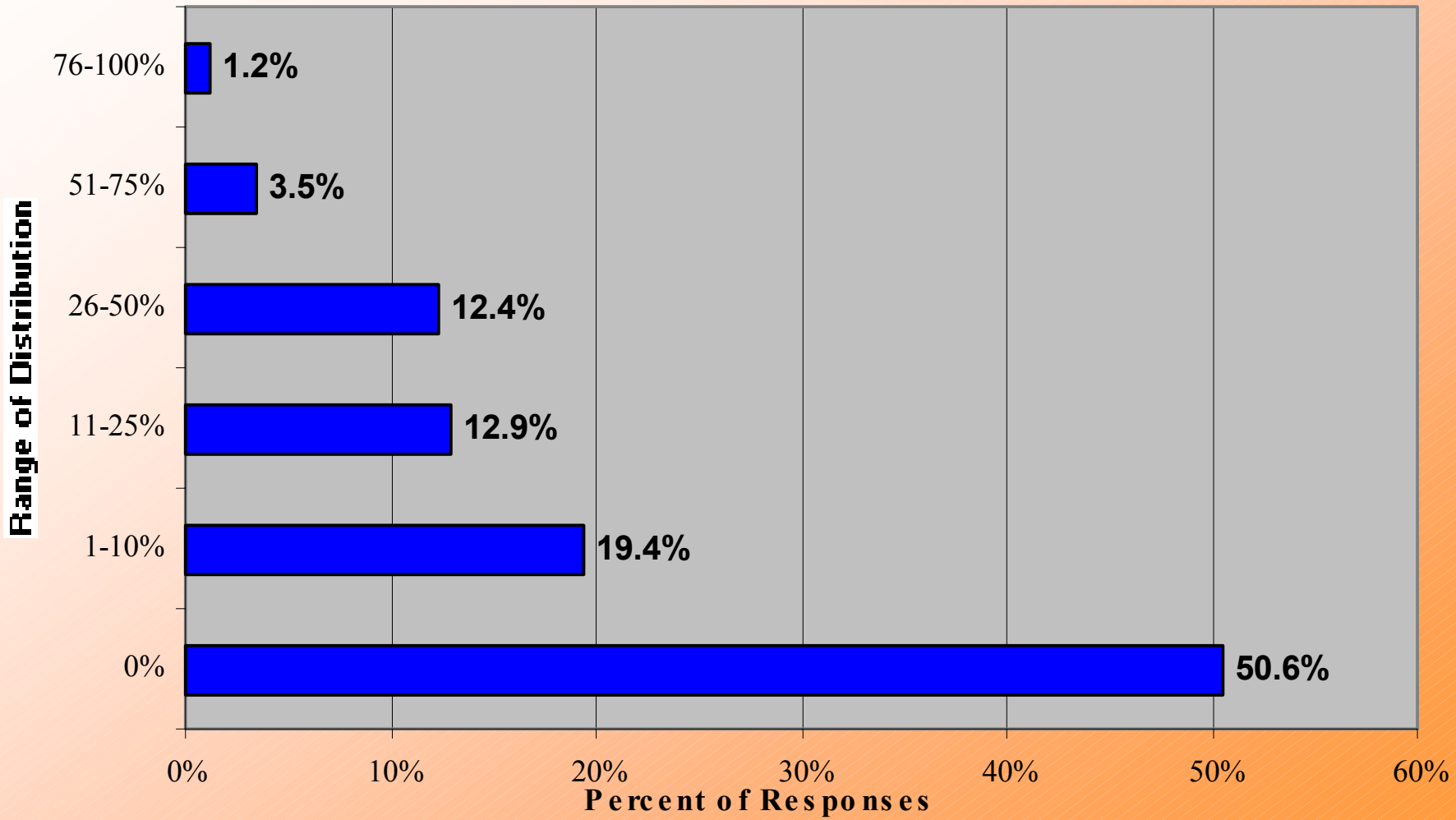
Ionization/Radiation Workload



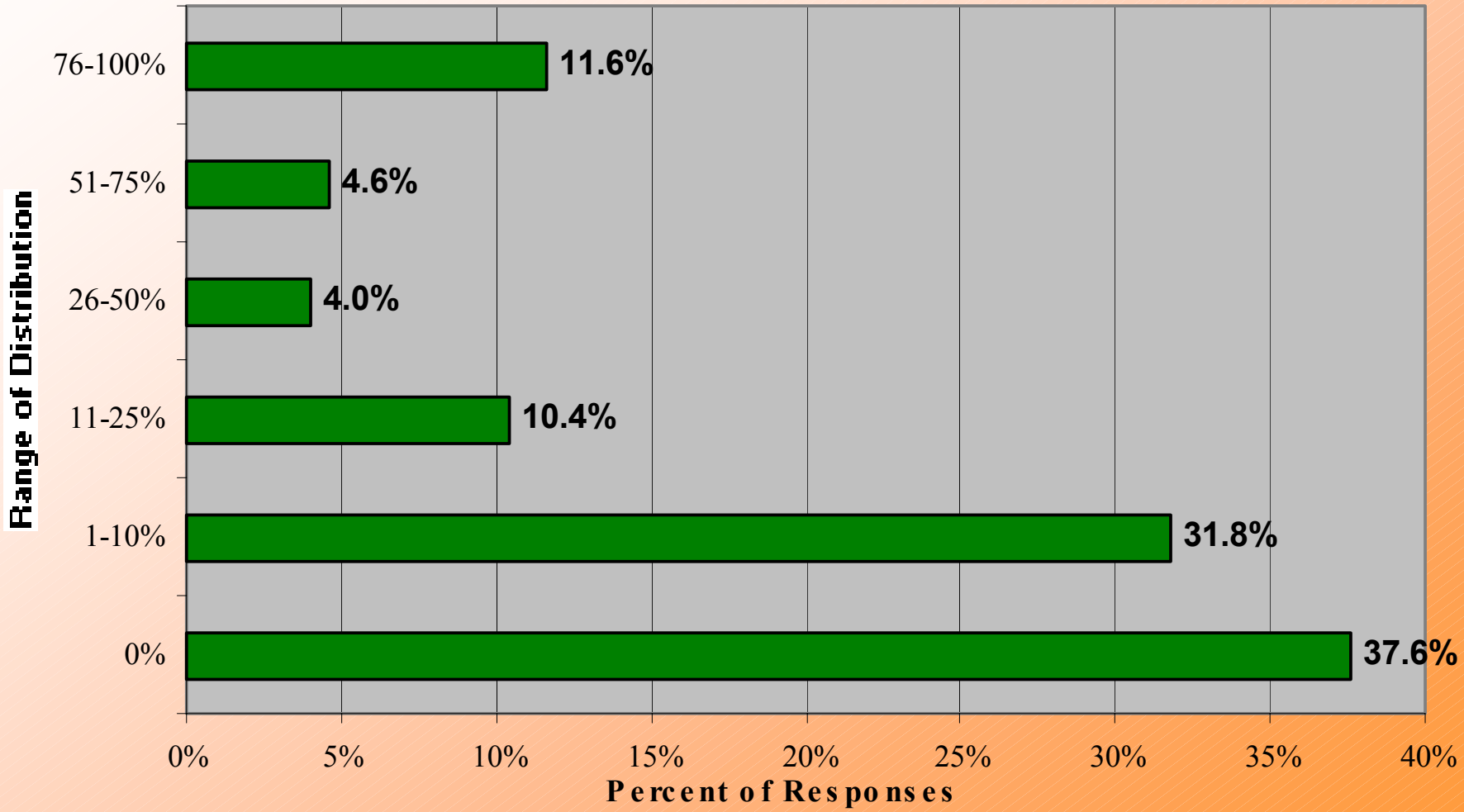
Ionization/Radiation Offload



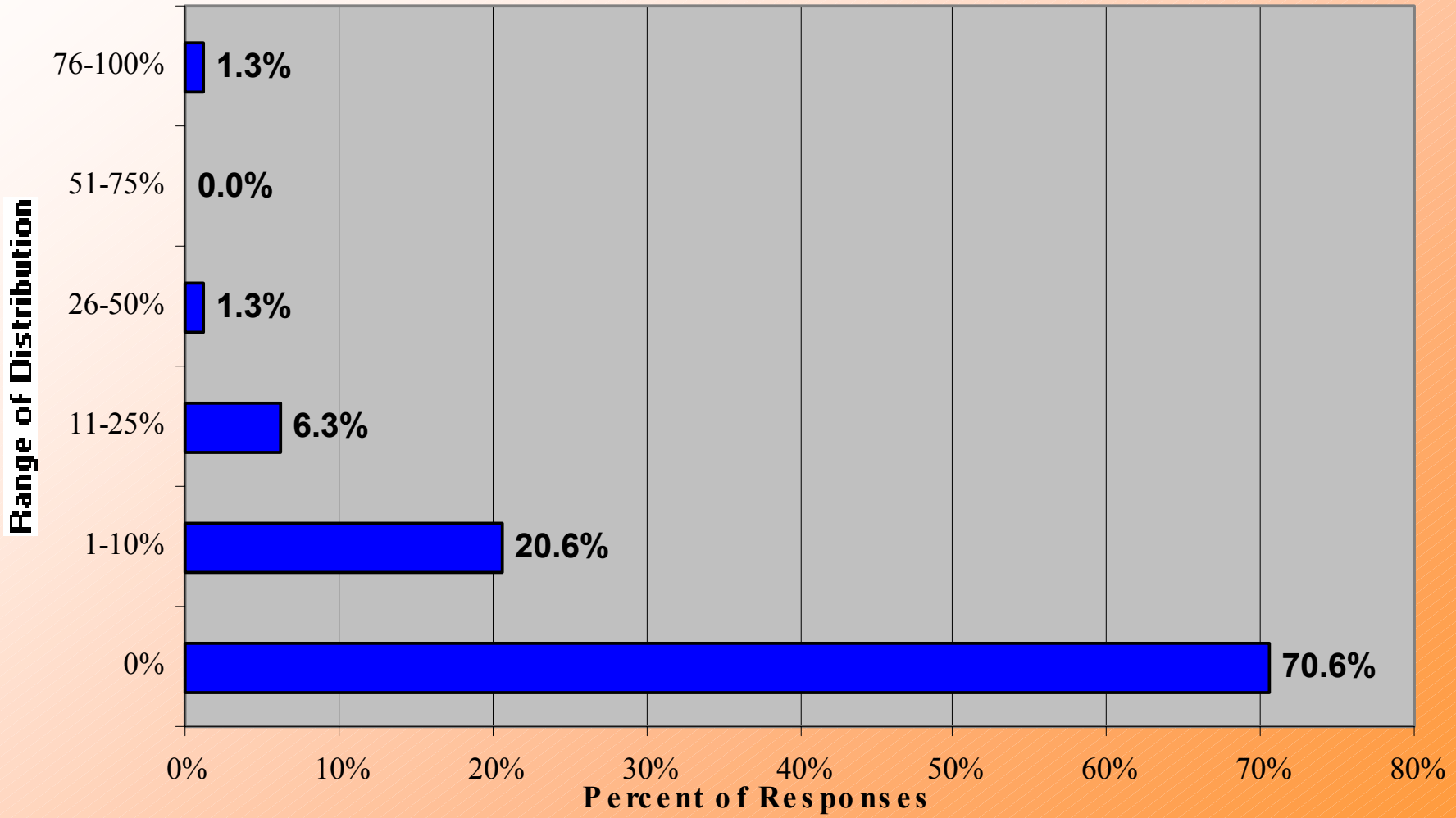
EM - RF/Microwave Workload



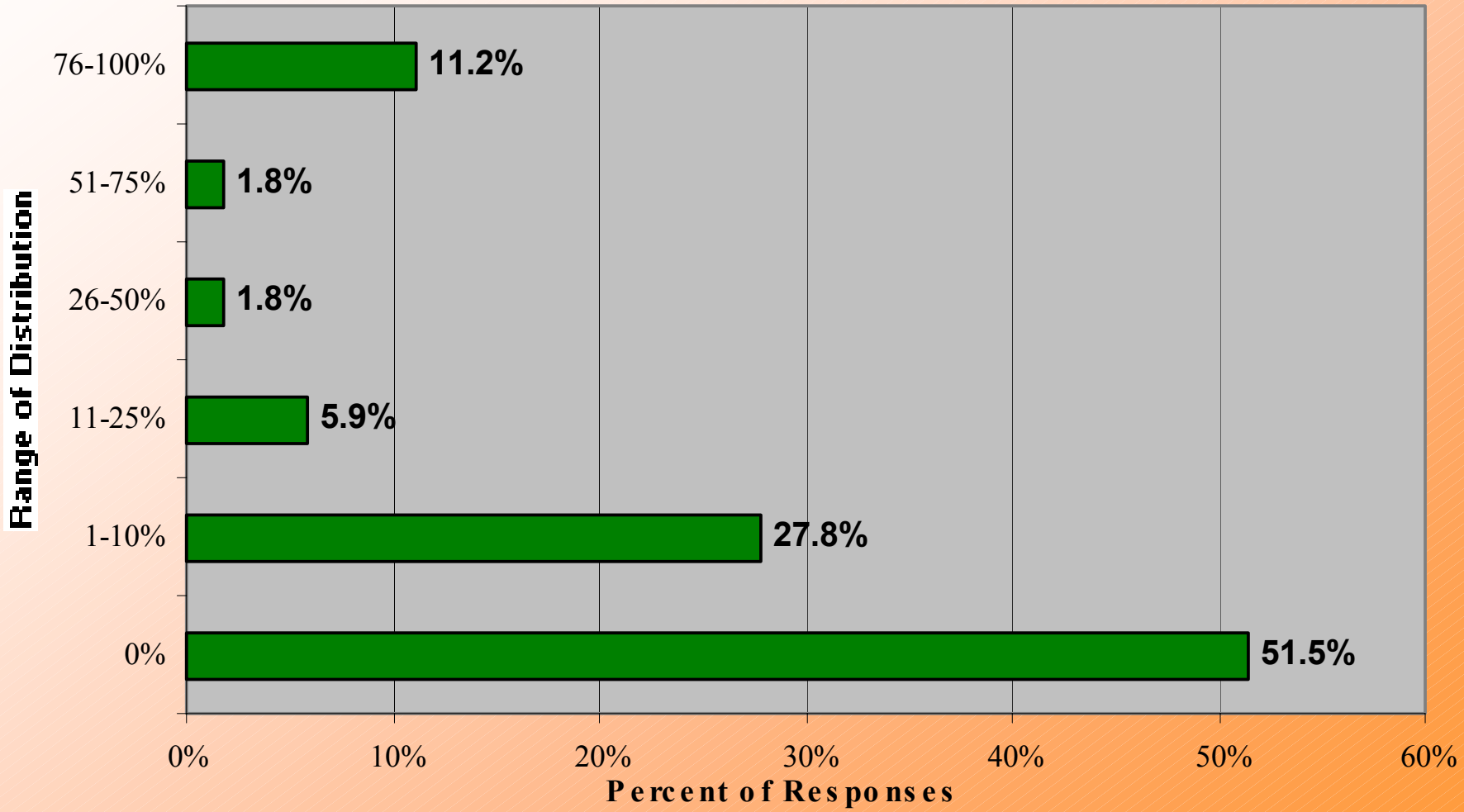
EM - RF/Microwave Offload



Optical Radiation Workload

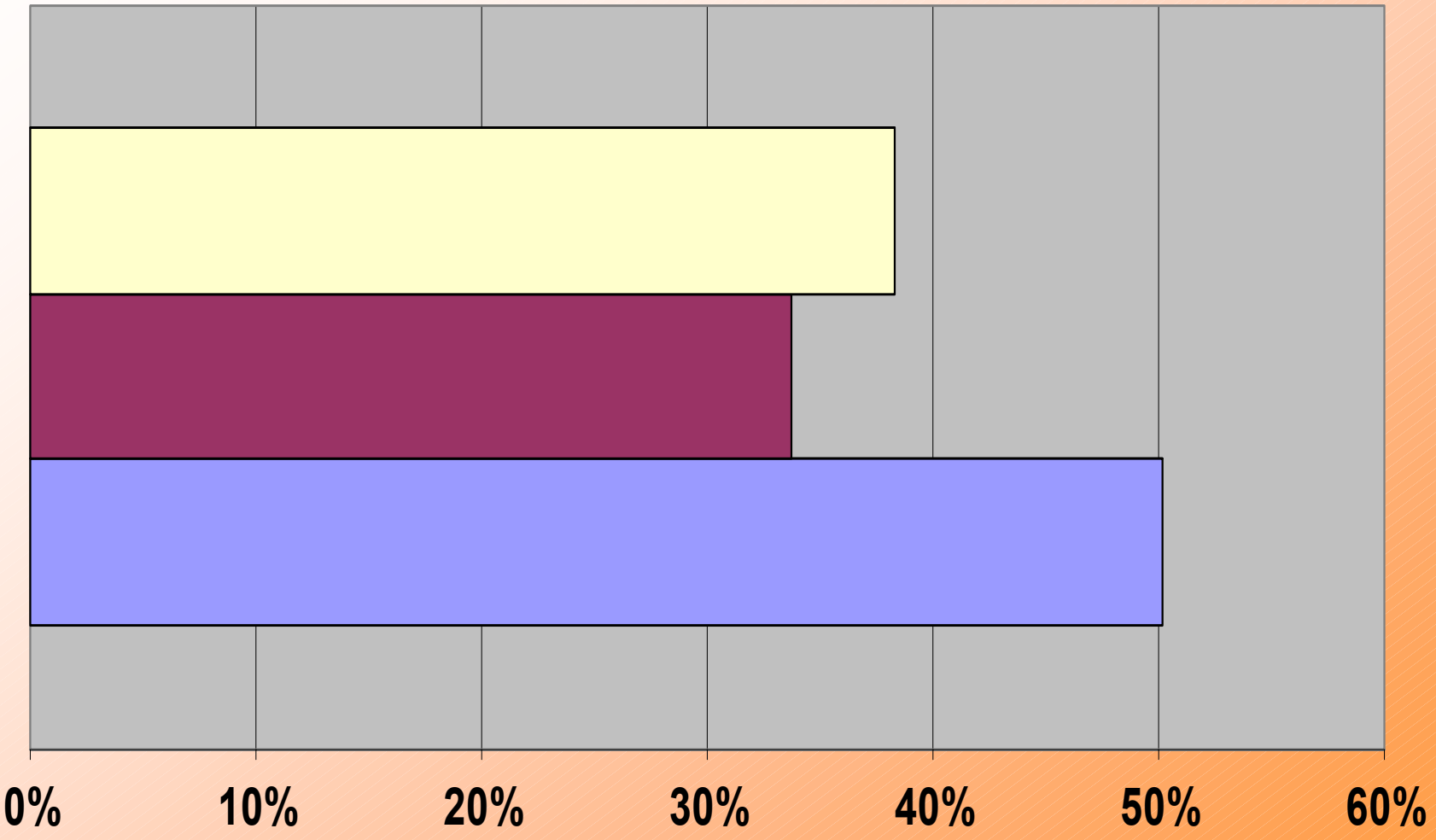


Optical Radiation Offload

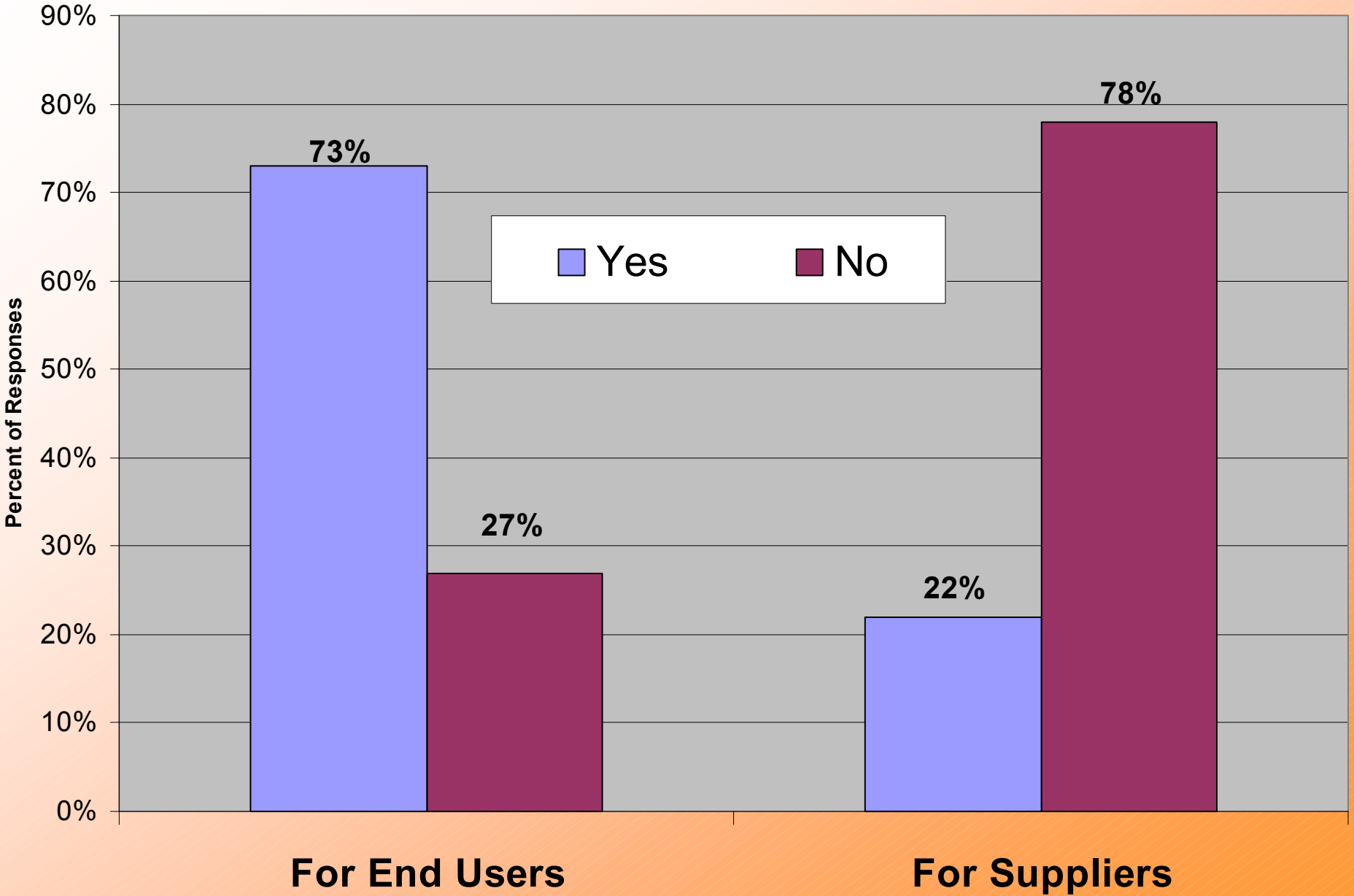


Section D: Requirements/Compliance

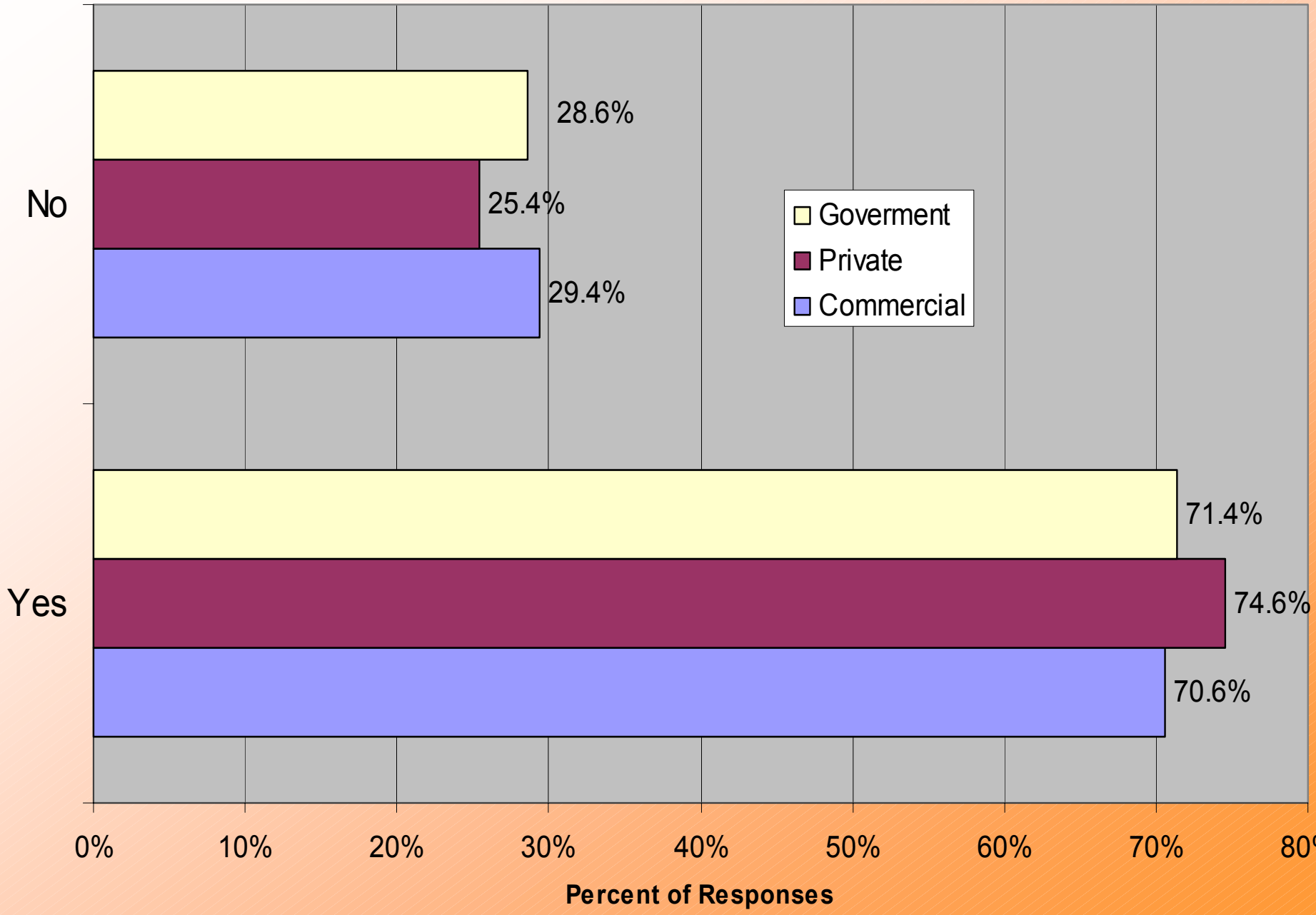
Measurement Assurance Program Participation?



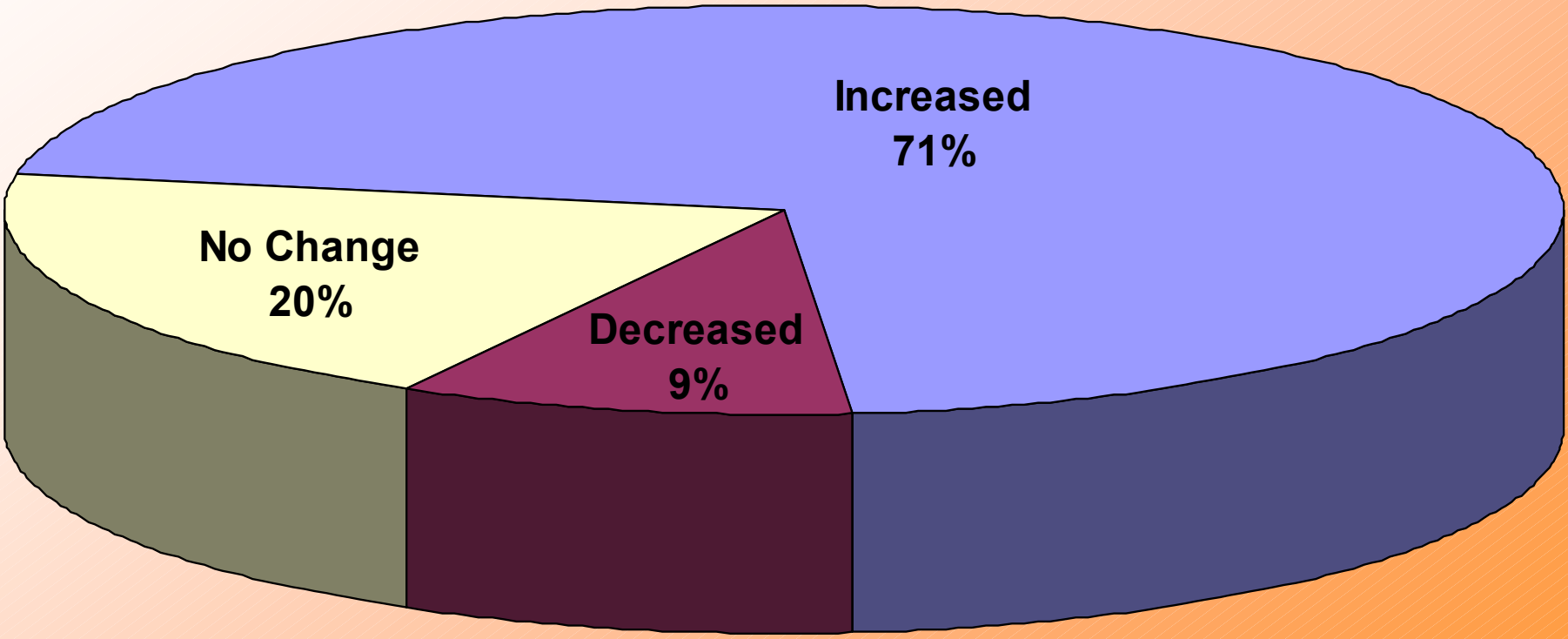
Does Your Lab Help Define Equipment Needs?



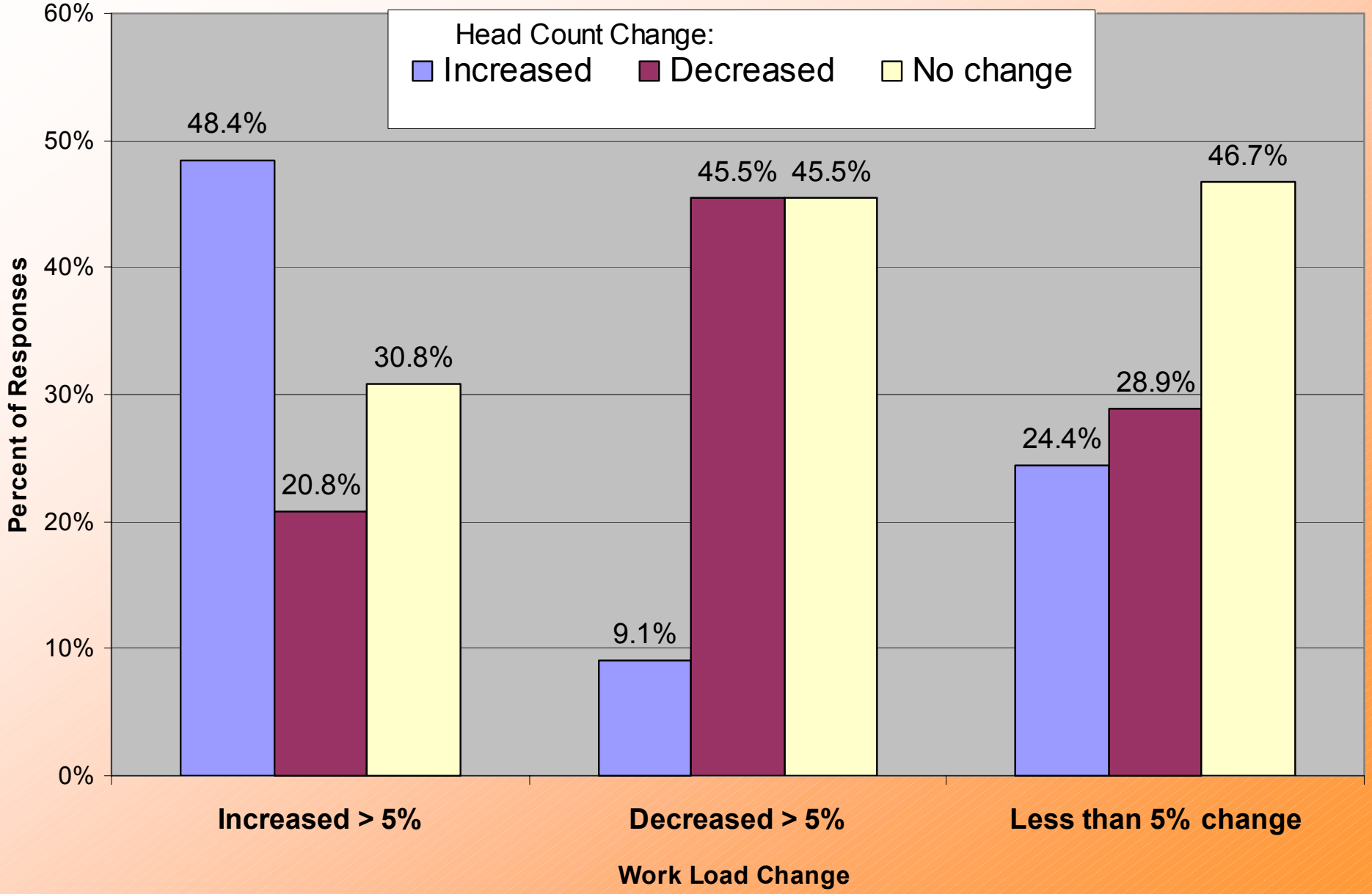
Definition of End User Equipment Needs By Lab Type



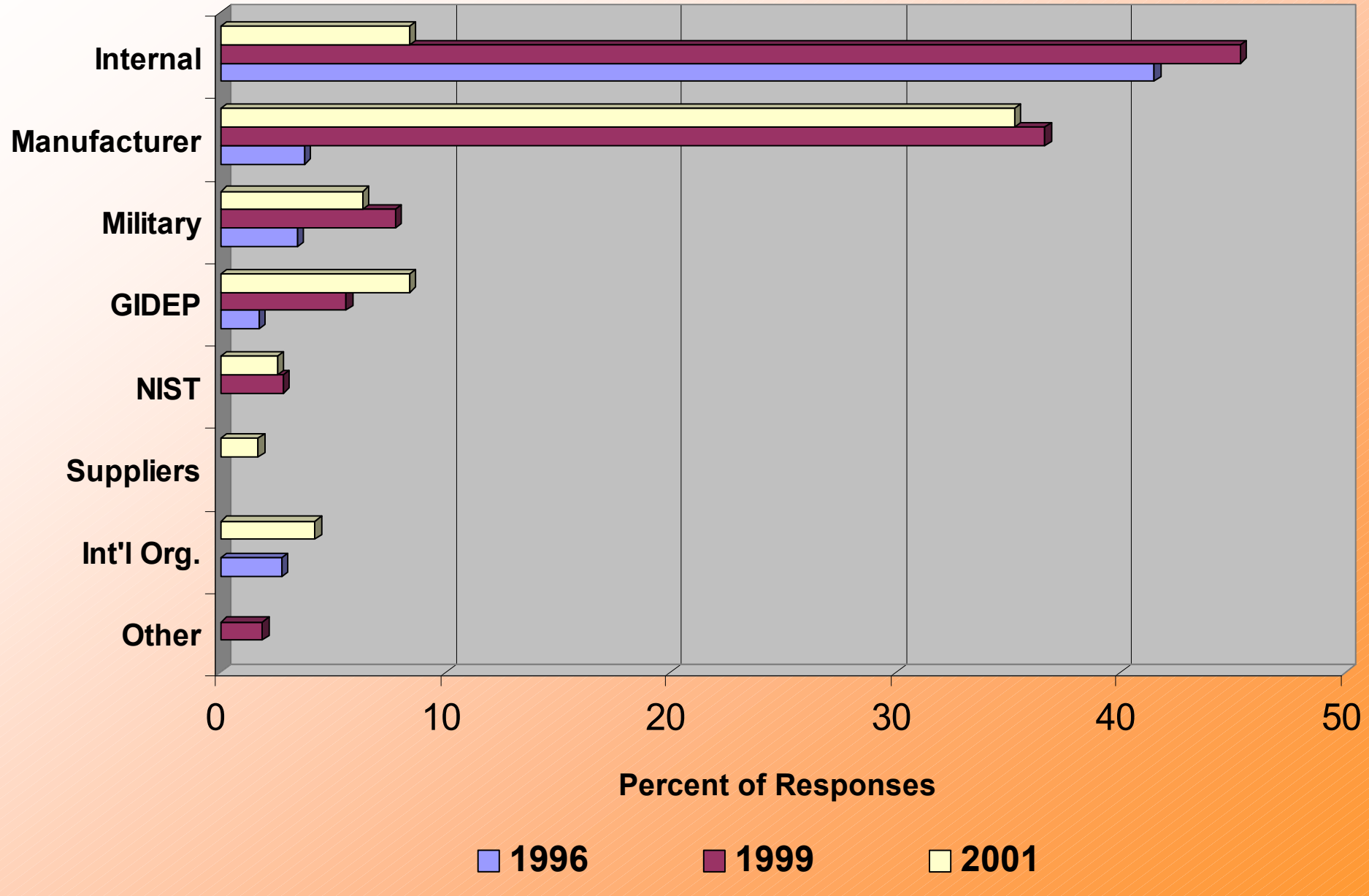
Work Load Change Since 1999



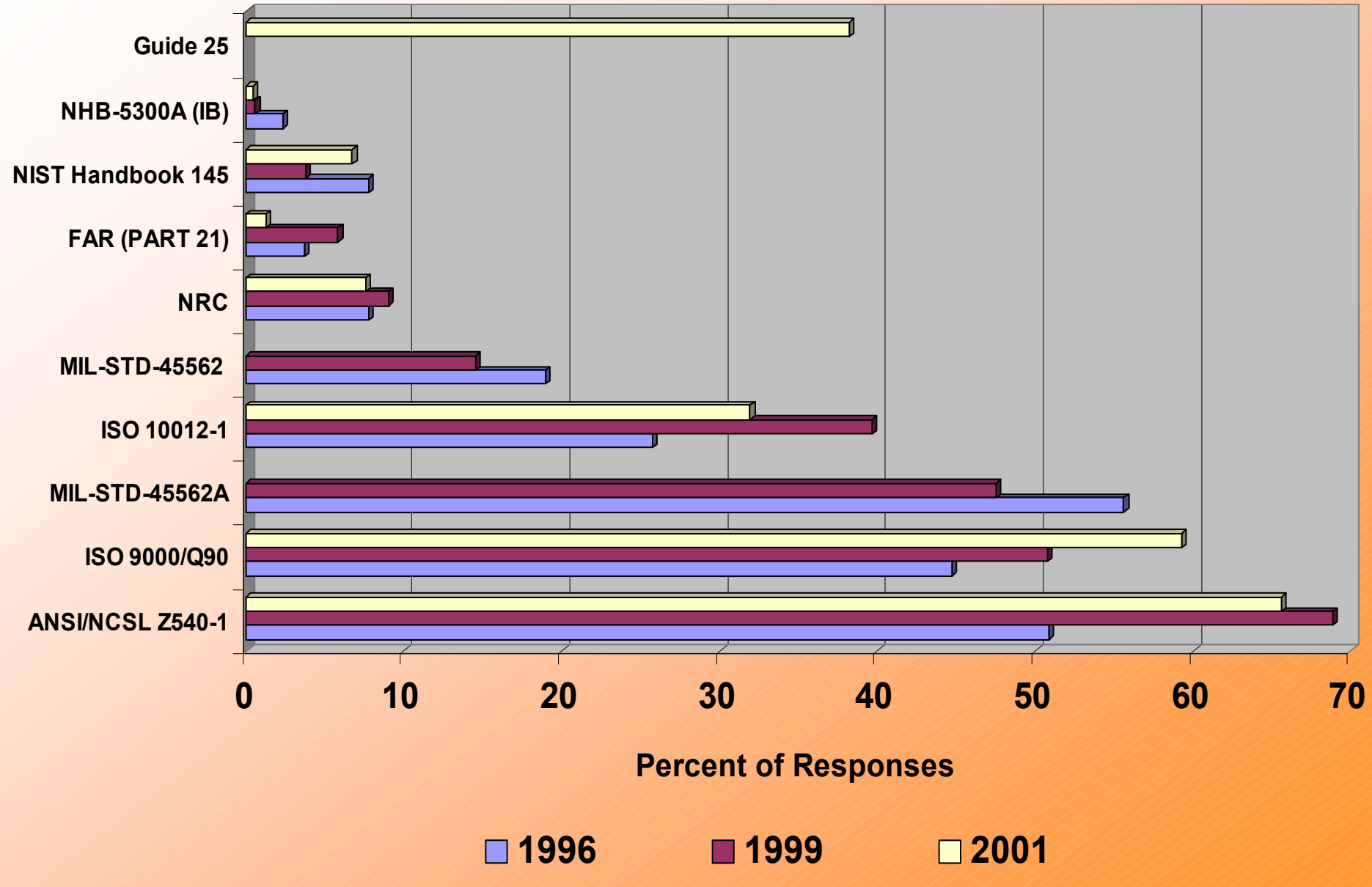
Work Load vs. Head Count Since 1999



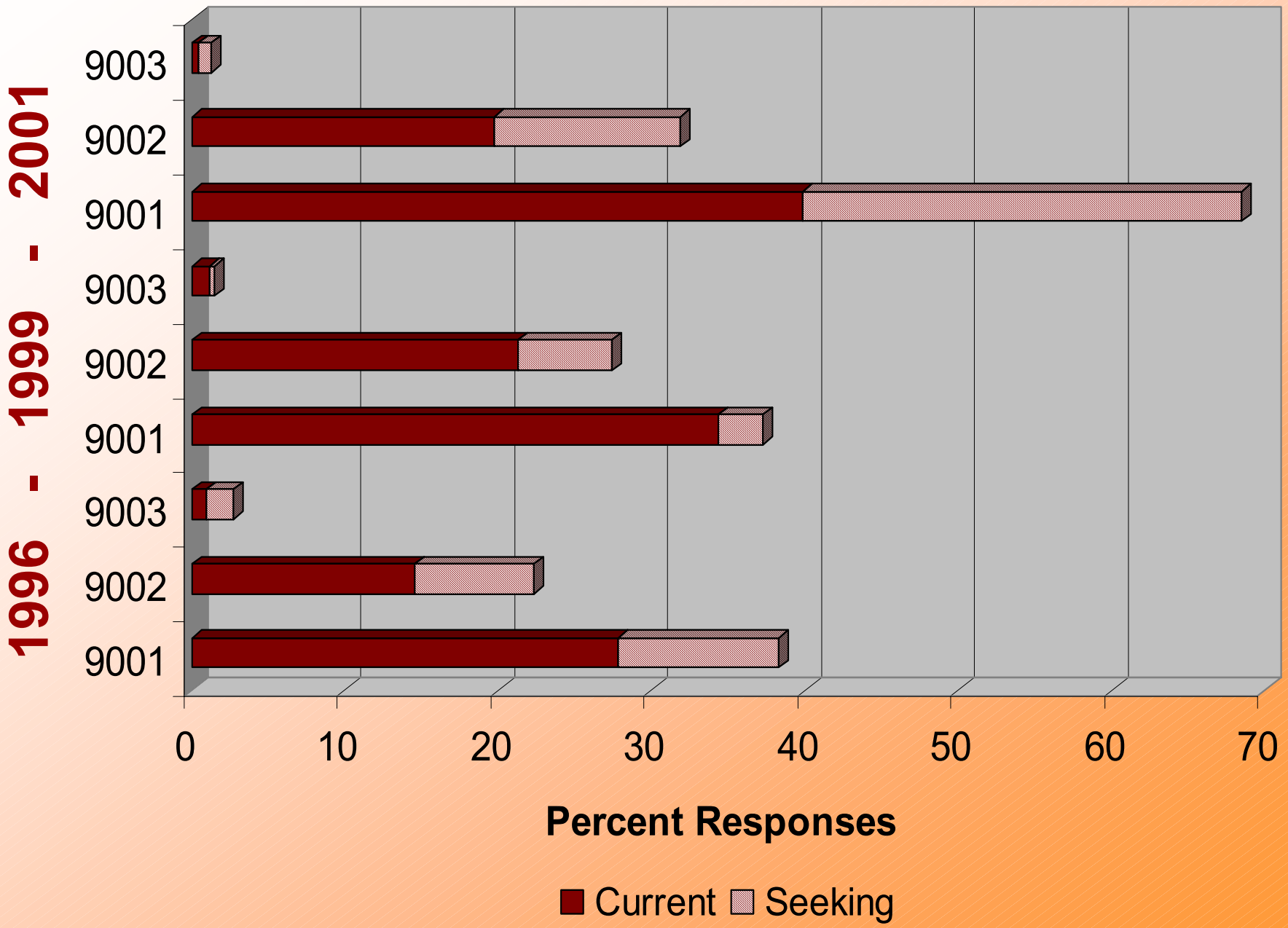
Calibration Procedure Source Most Used



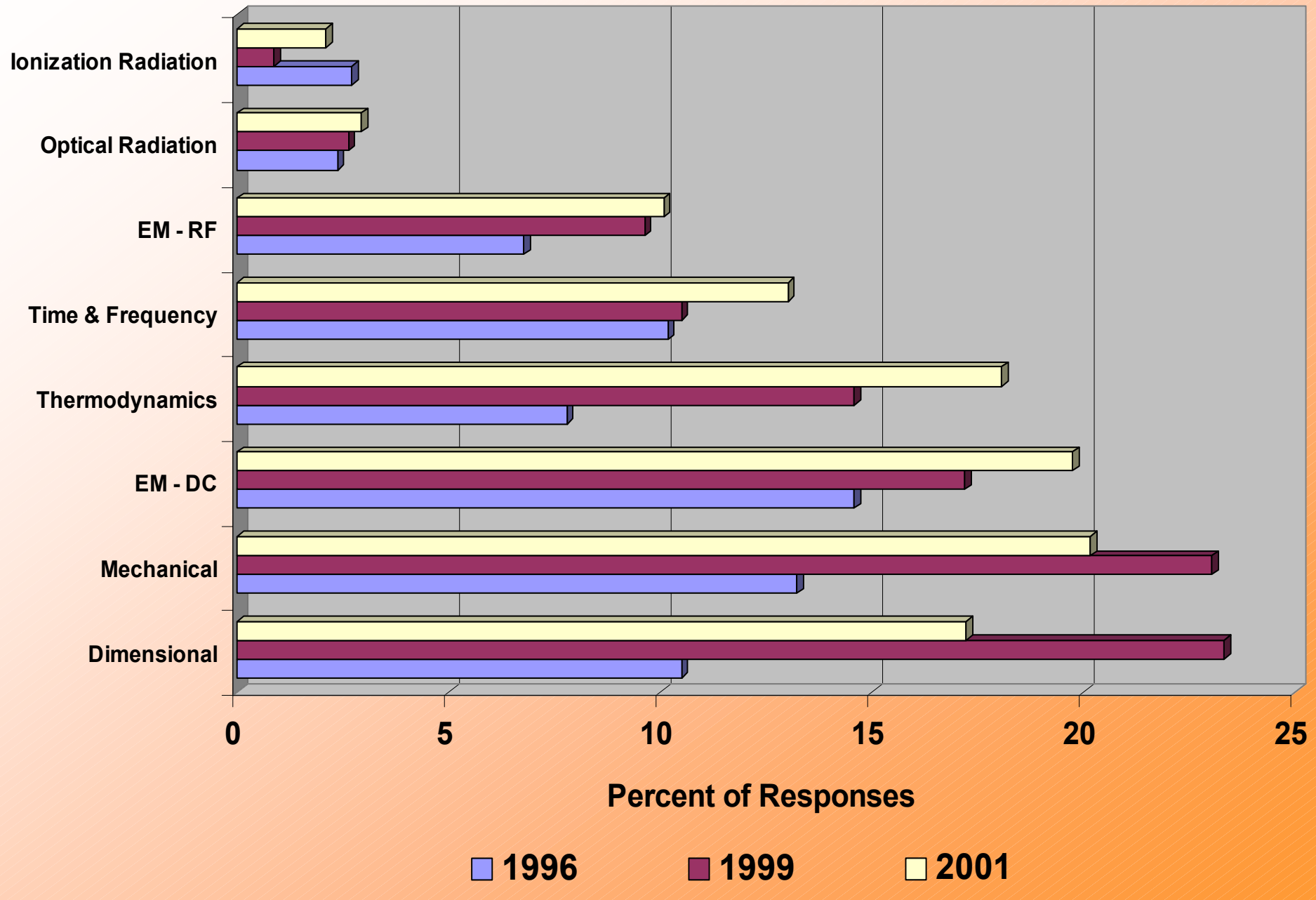
Requirements Followed



ISO Registrations Current and Seeking

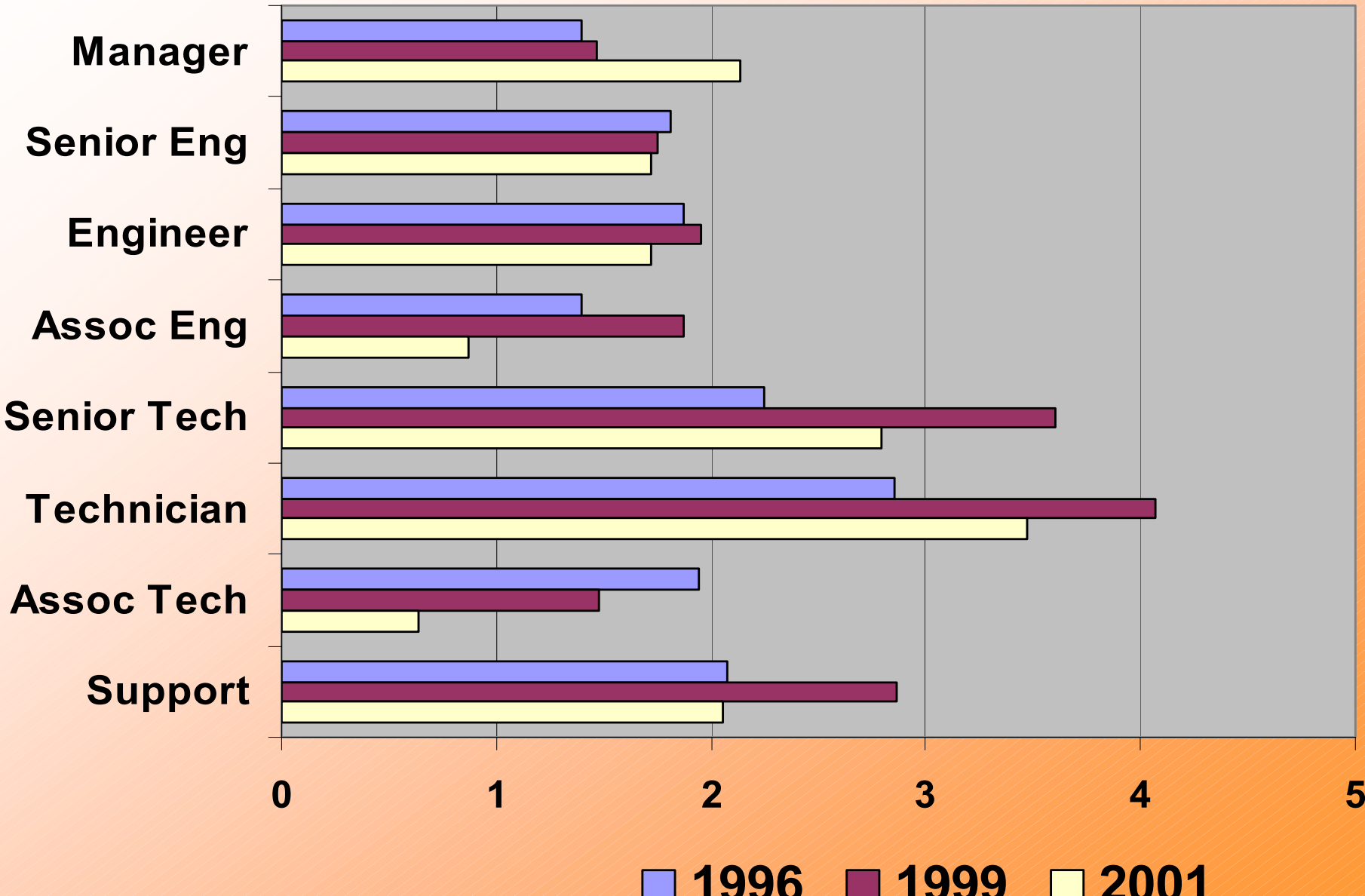


Upcoming Voluntary Accreditations

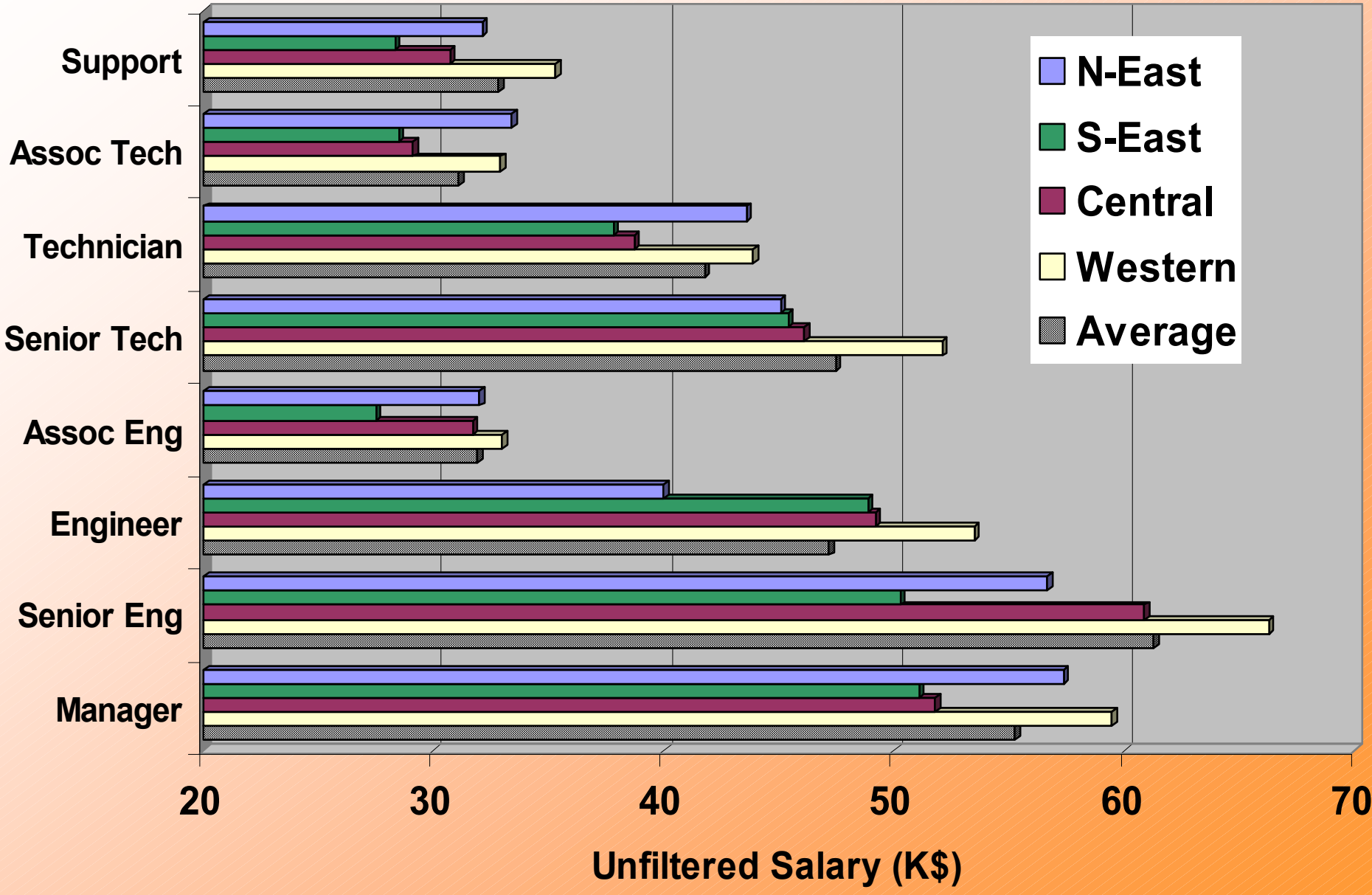


Section E: Personnel

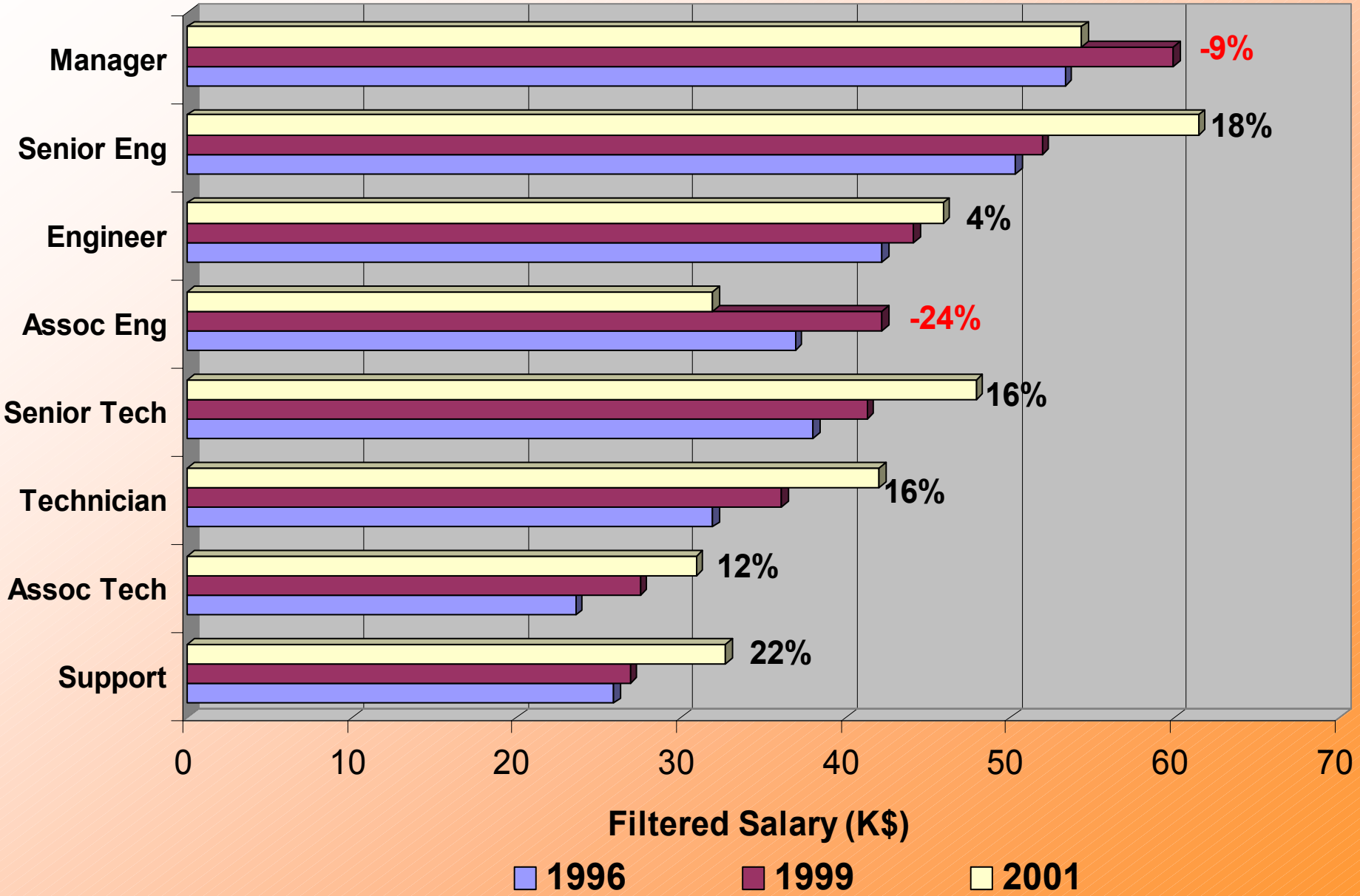
Personnel Per Job Classification 1996-2001



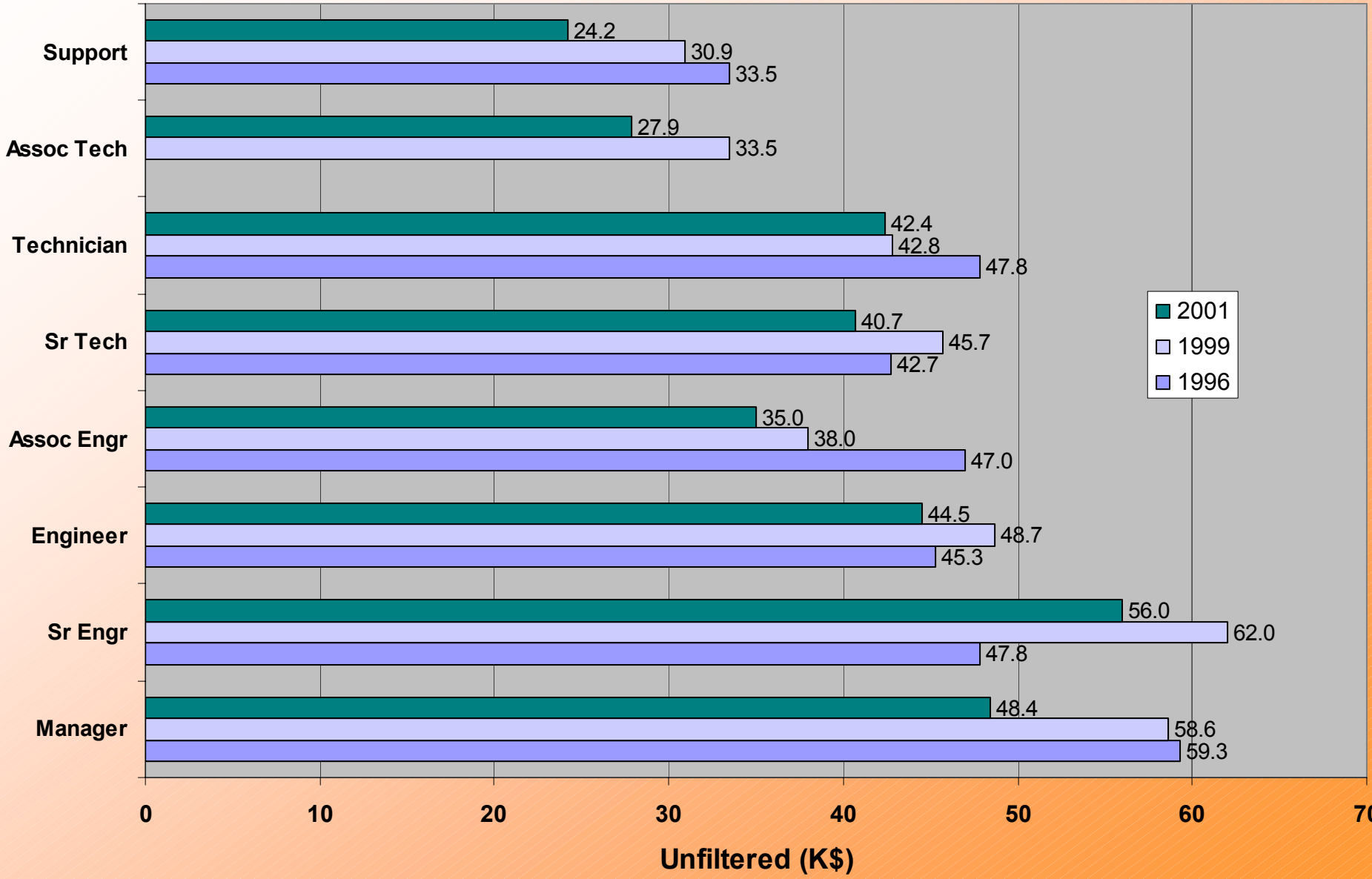
Salary By Geographic Location 2001 & Job Classification (USA Only)



Salary By Job Classification 1996-2001 & Percent of Salary Change (USA Only)



Salary By Job Classification 1996-2001 (CANADA Only)

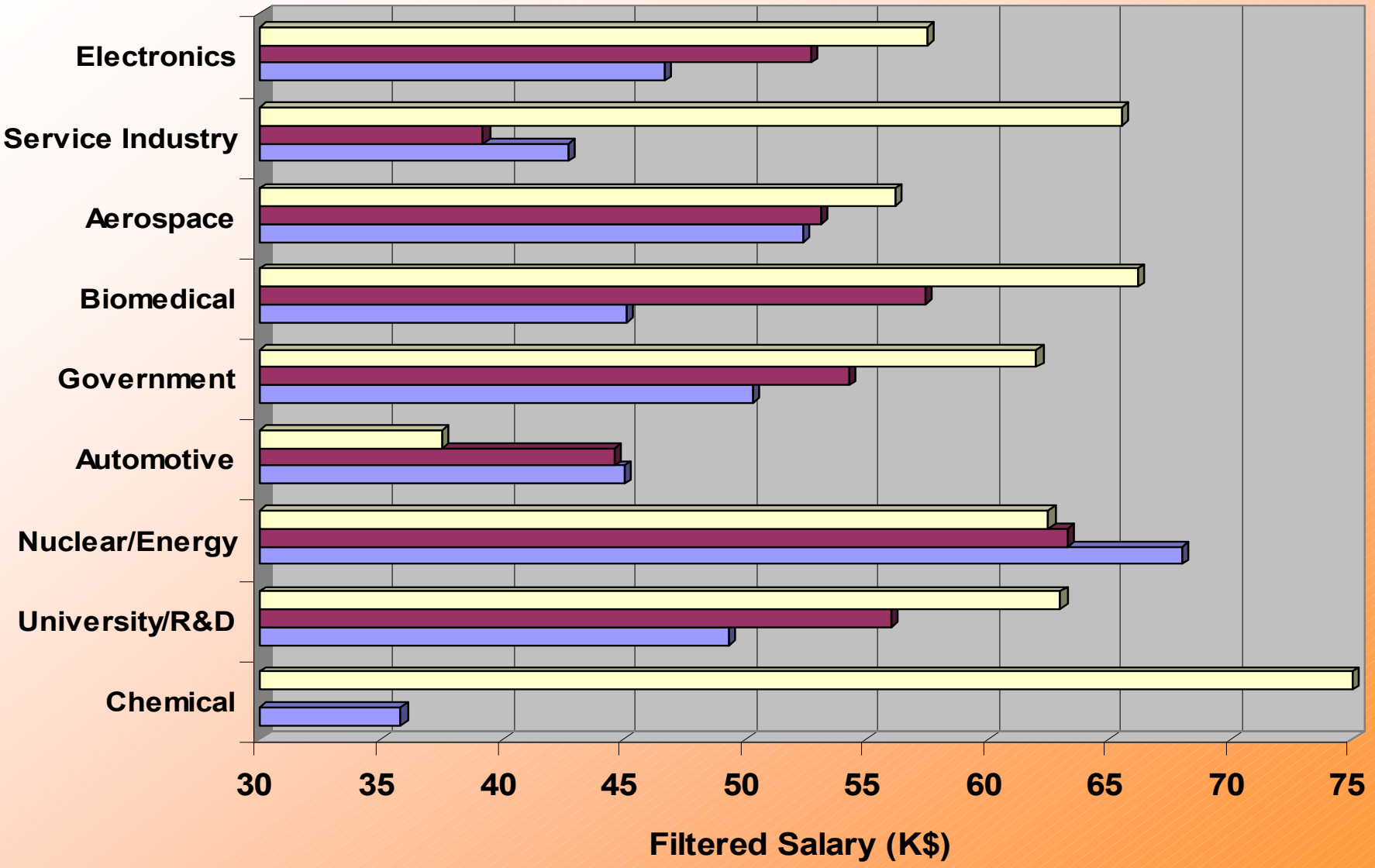


International Salary Ranges

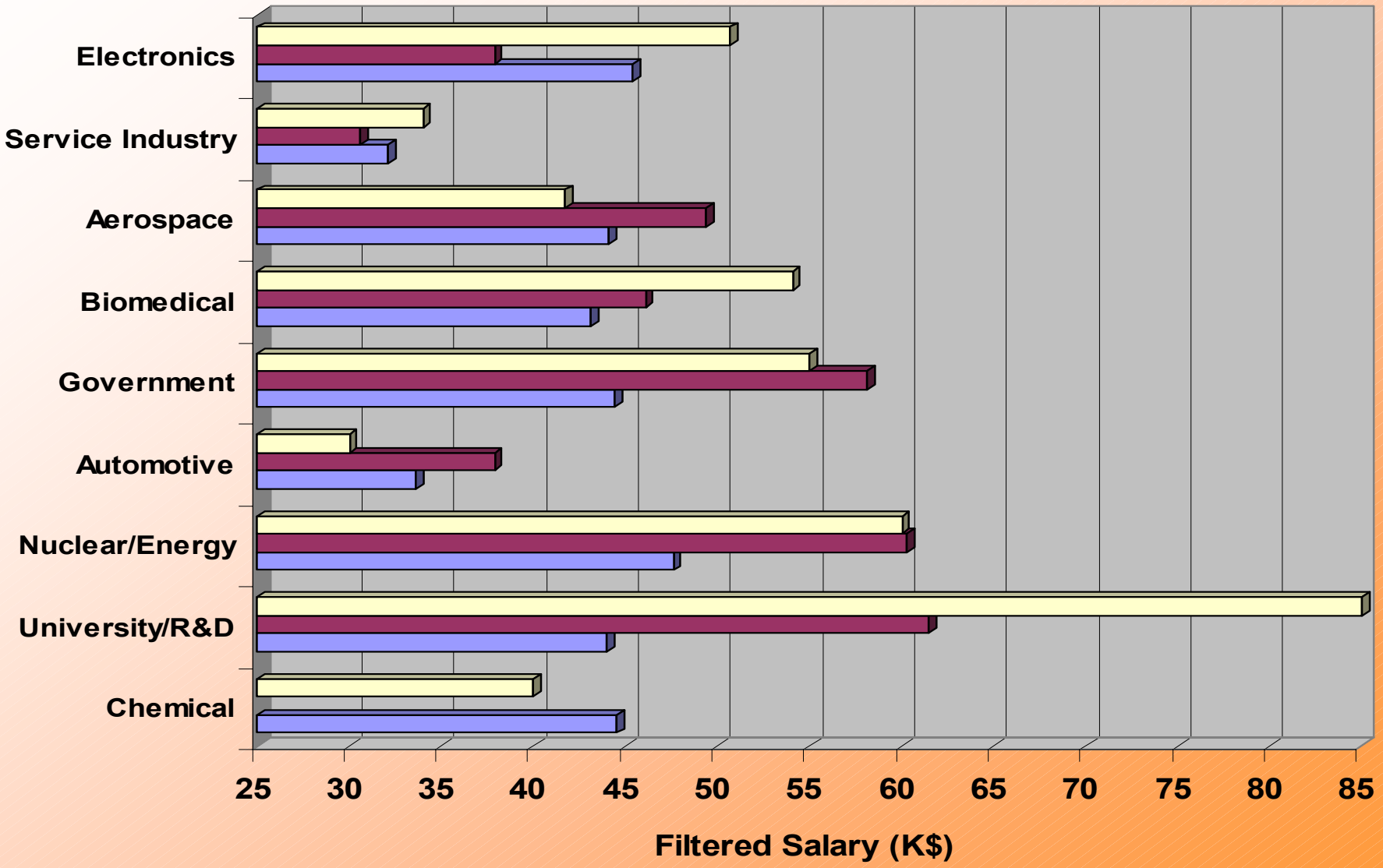
Job Classification	Low	High	Std. Dev.
Manager	$10K	$125K	10.7
Sr. Engineer	$10K	$120K	4.5
Engineer	$10K	$80K	2.3
Assoc. Engineer	$10K	$55K	2.7
Sr. Technician	$10K	$65K	3.1
Technician	$10K	$70K	2.7
Assoc. Technician	$10K	$50K	9.2
Support	$10K	$50K	2.2

Manager Salaries By Industry (USA)

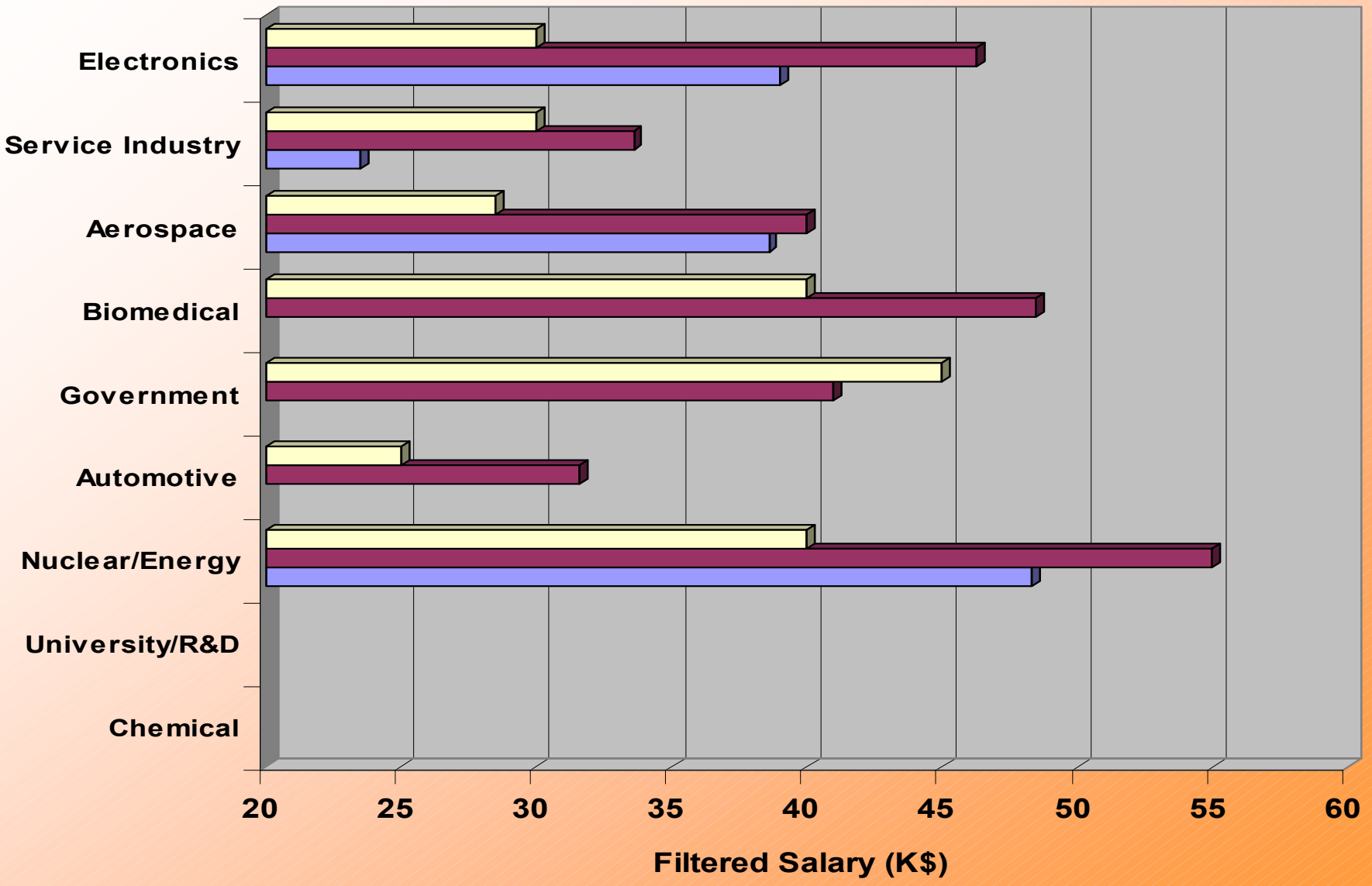
Senior Eng Salaries By Industry (USA)



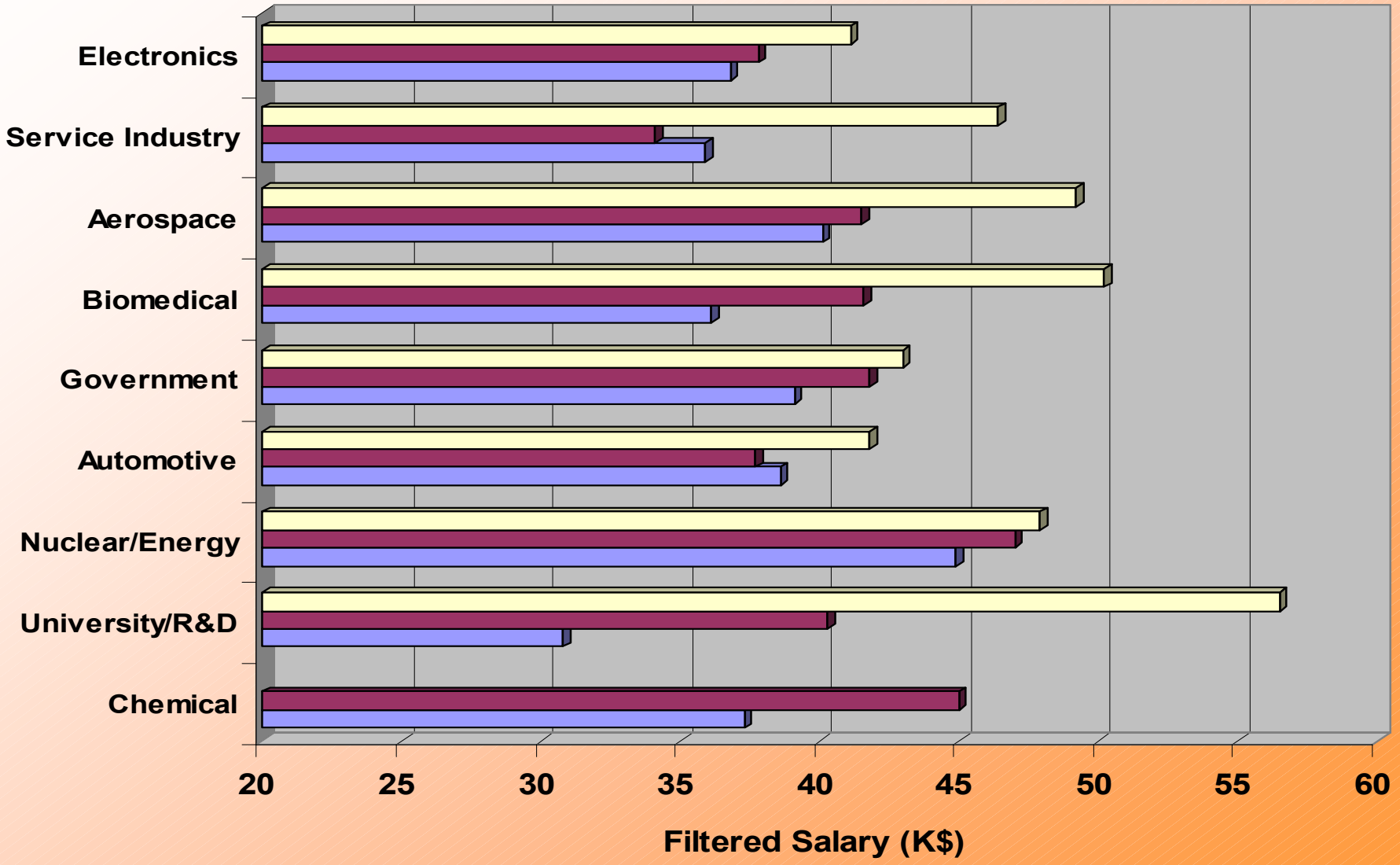
Engineer Salaries By Industry (USA)



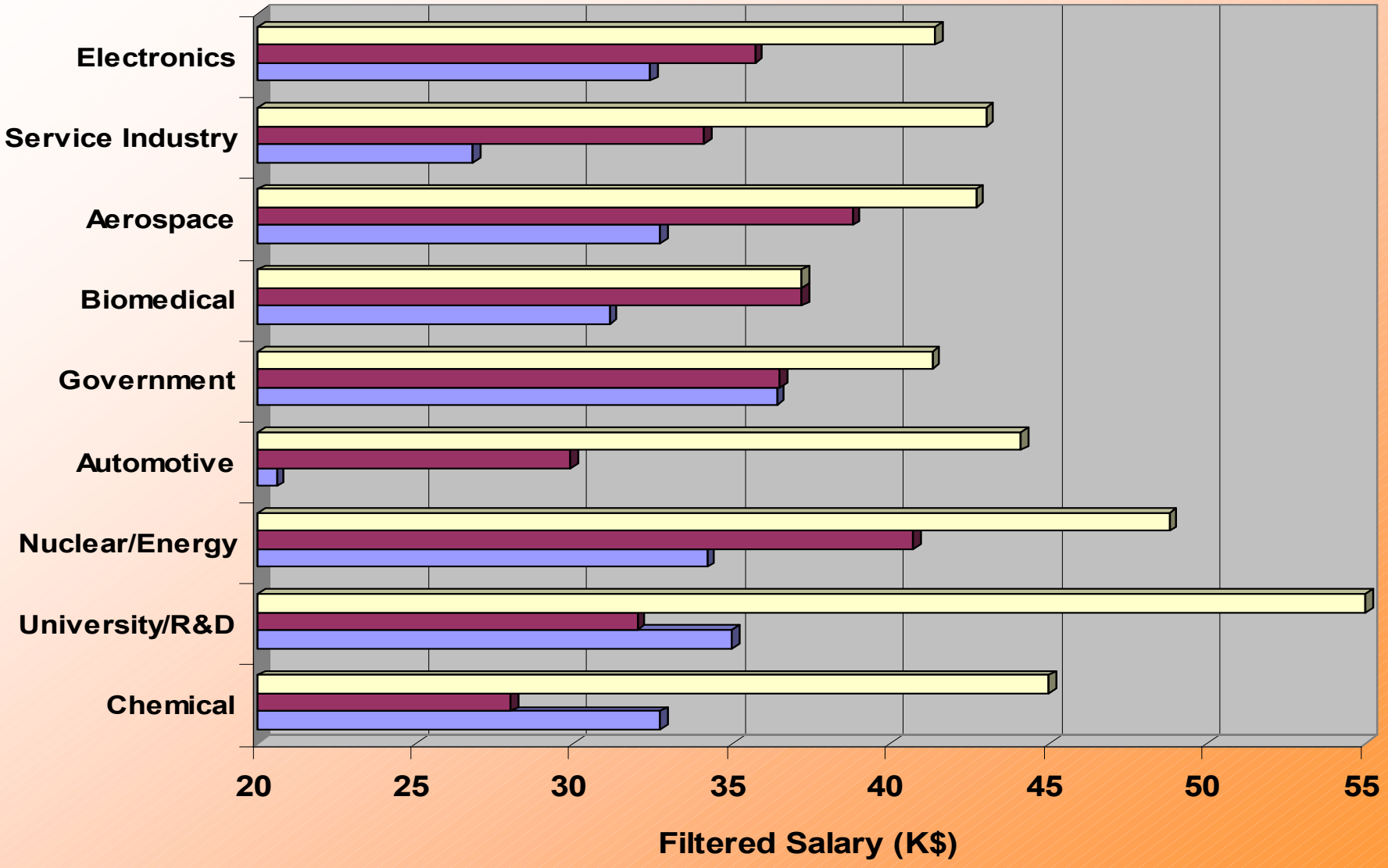
Assoc Eng Salaries By Industry (USA)



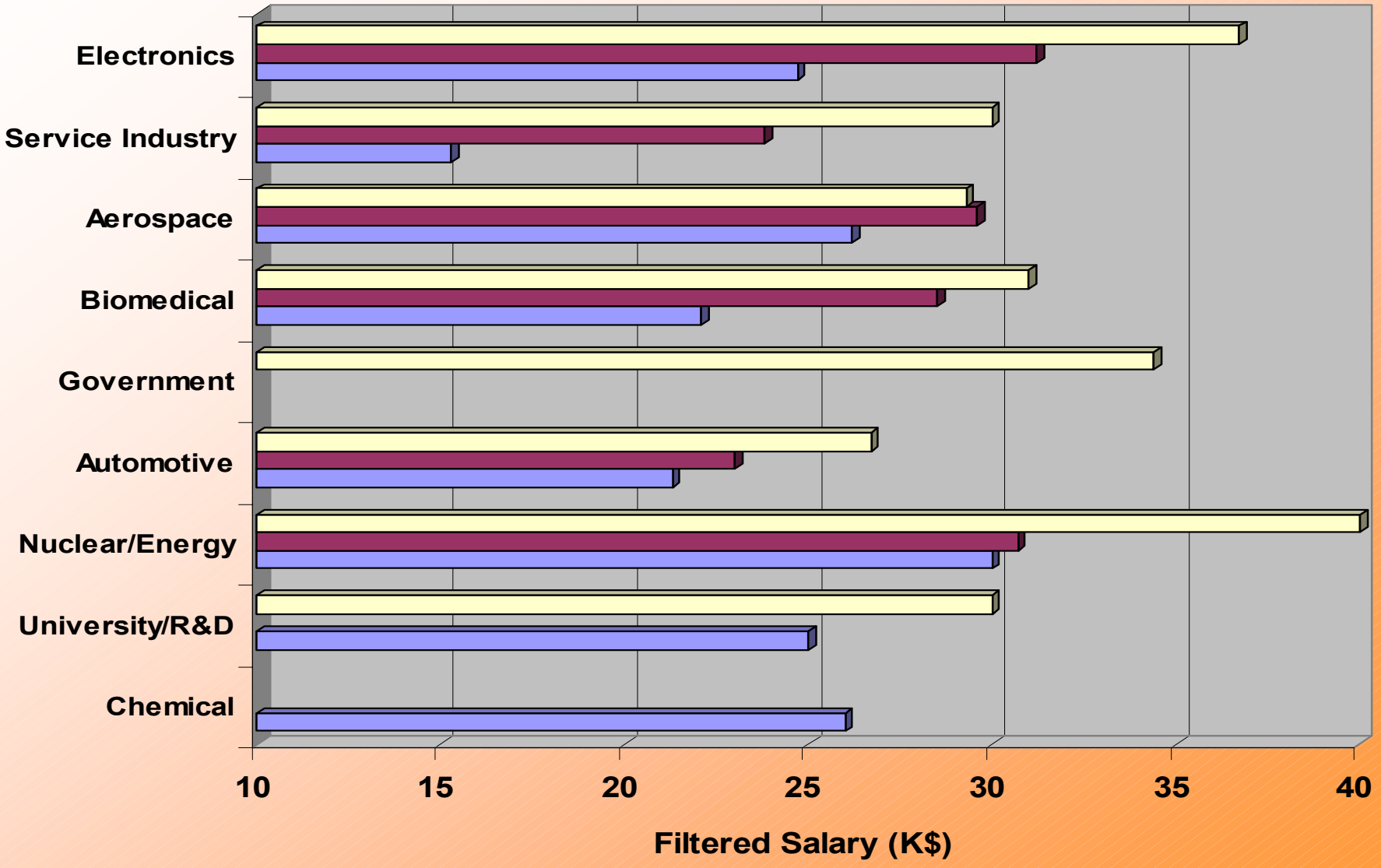
Sr. Tech Salaries By Industry (USA)



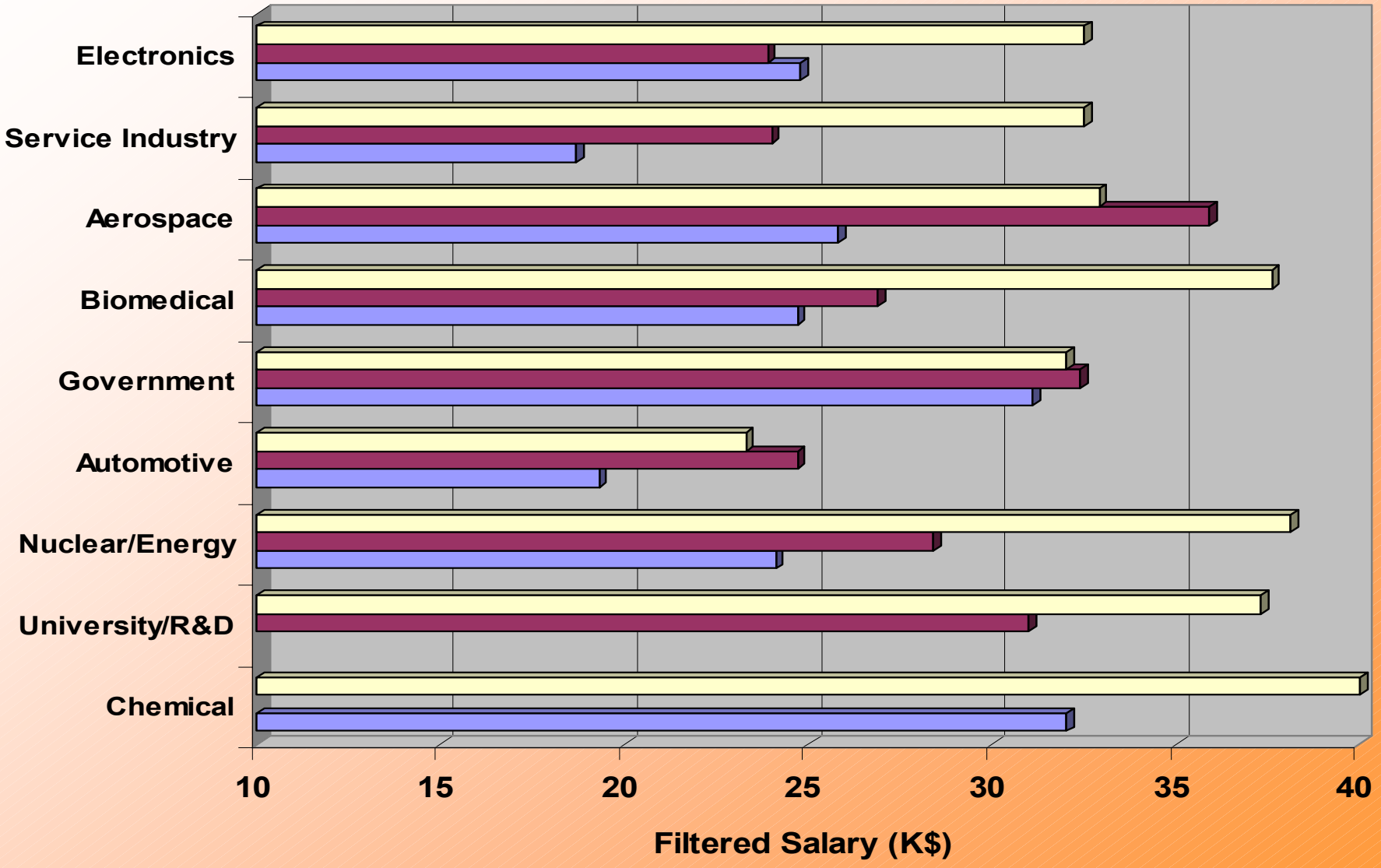
Technician Salaries By Industry (USA)



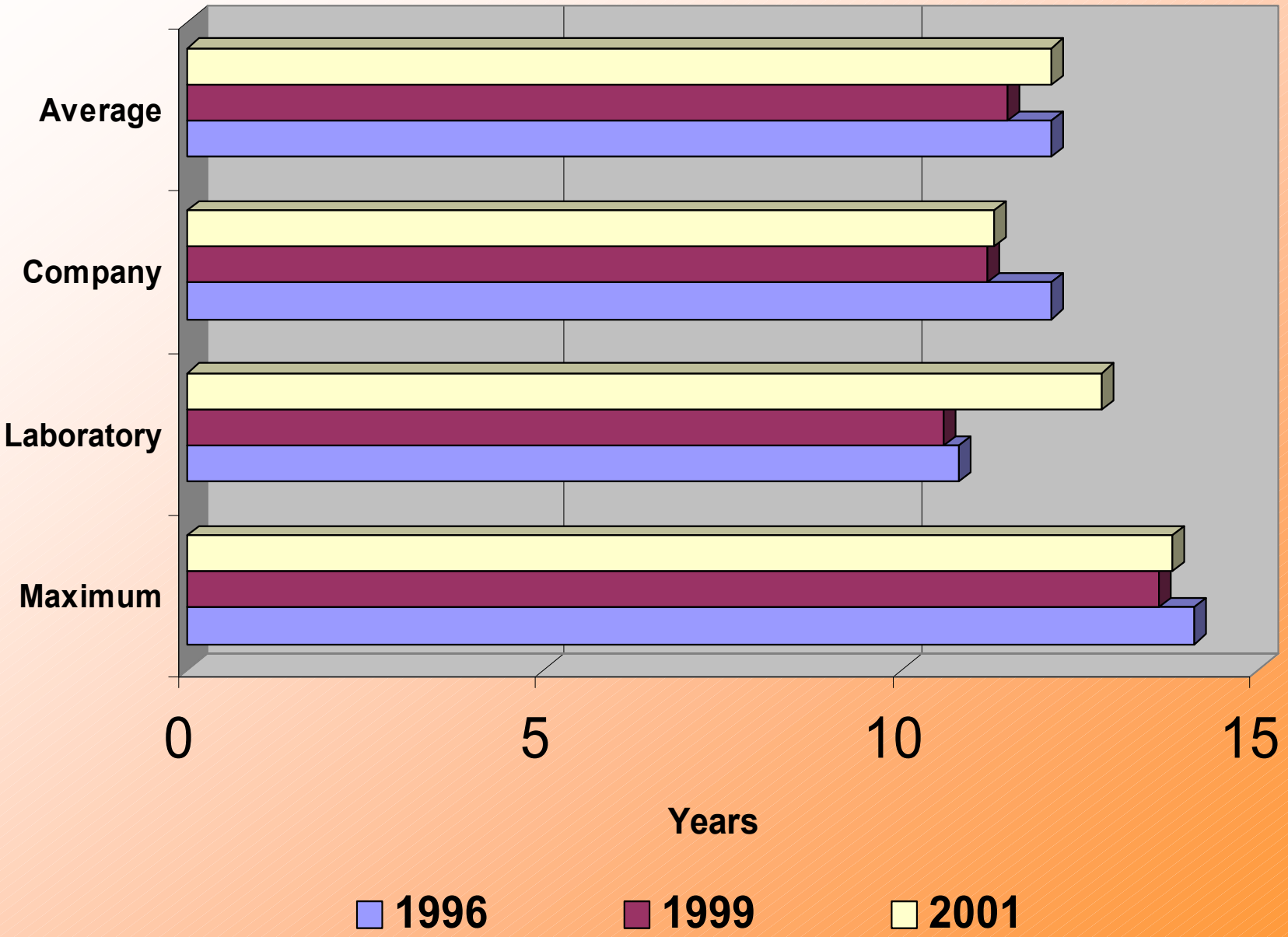
Assoc Tech Salaries By Industry (USA)



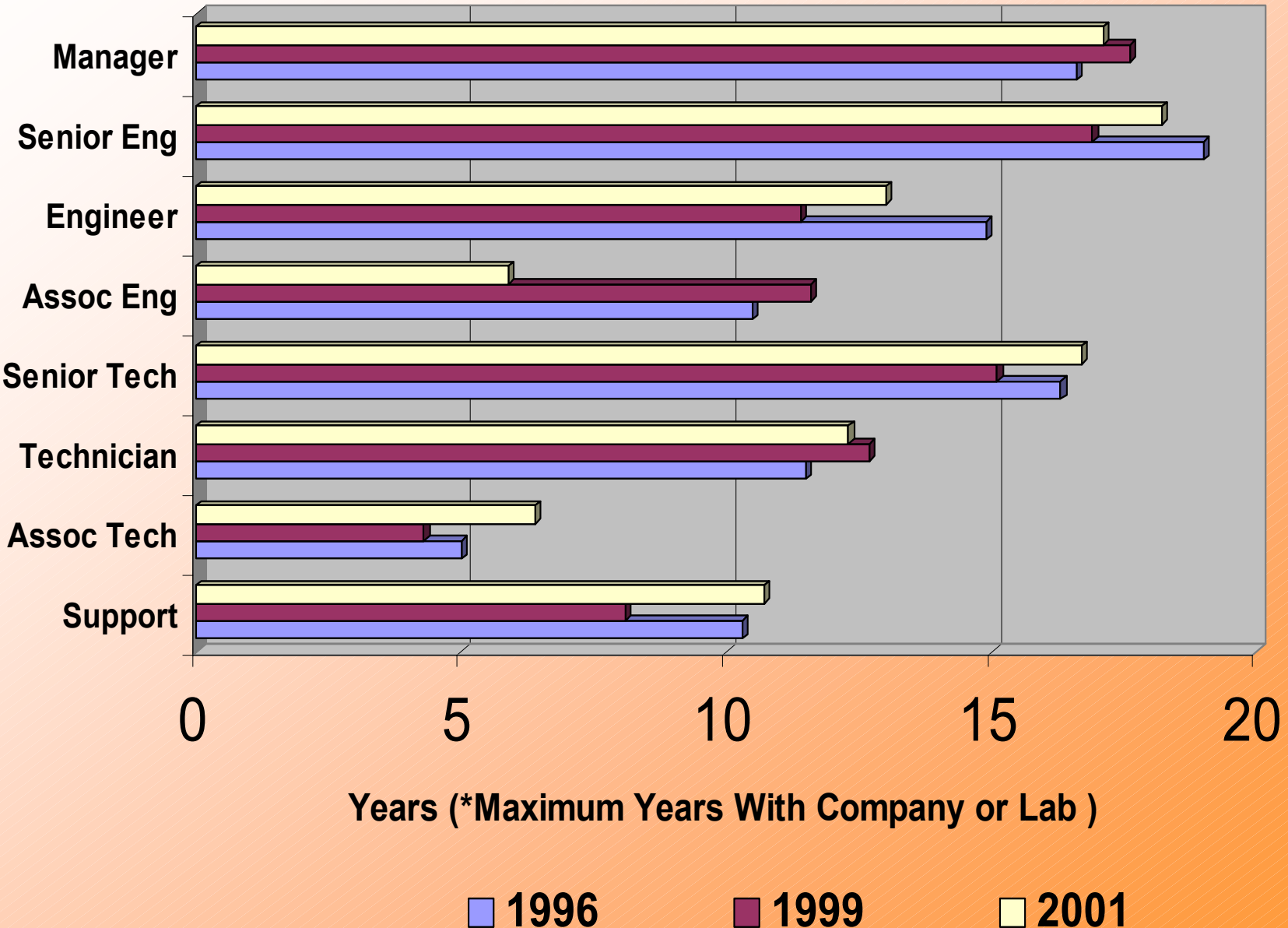
Support Salaries By Industry (USA)



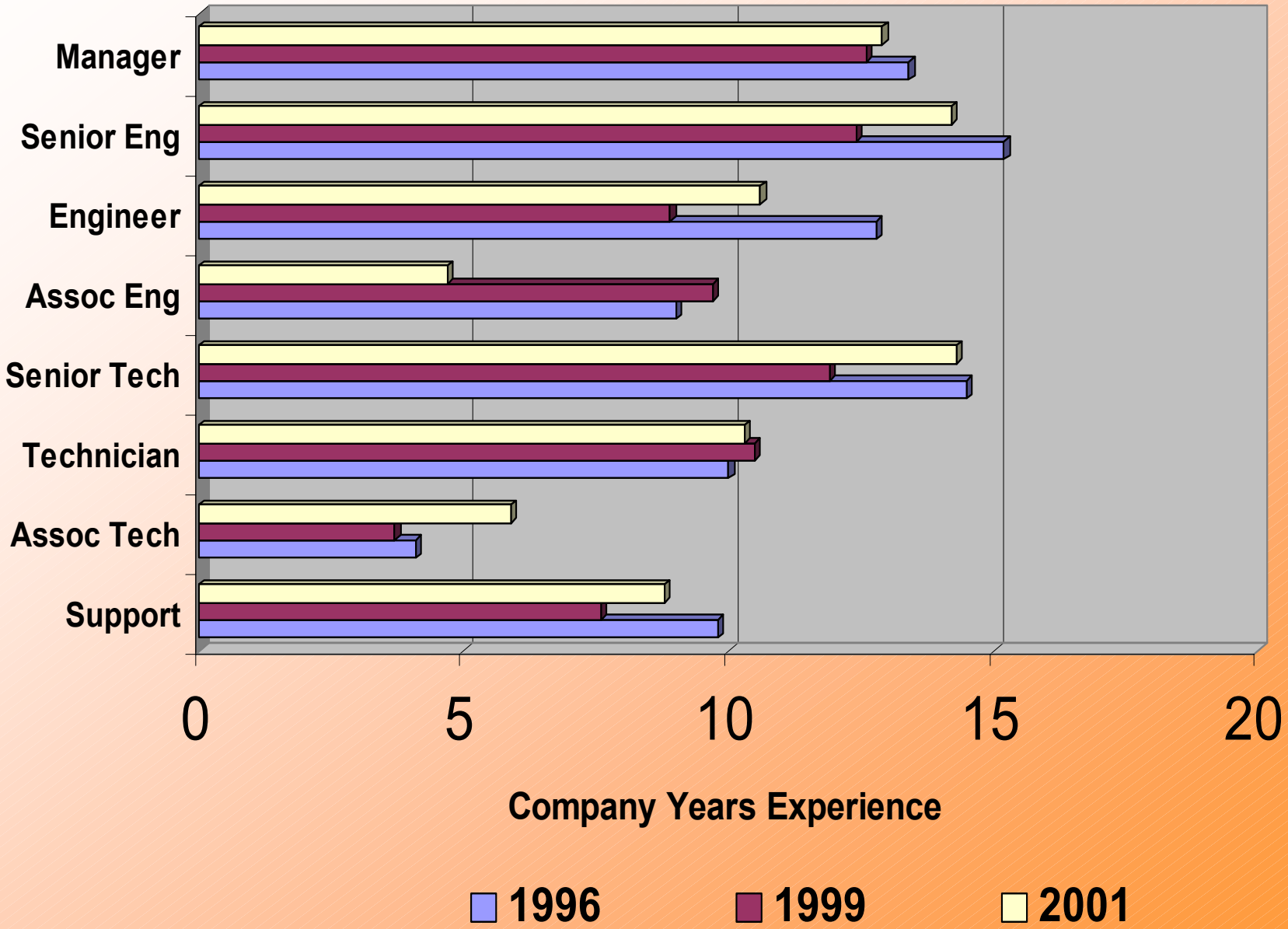
Experience (USA)



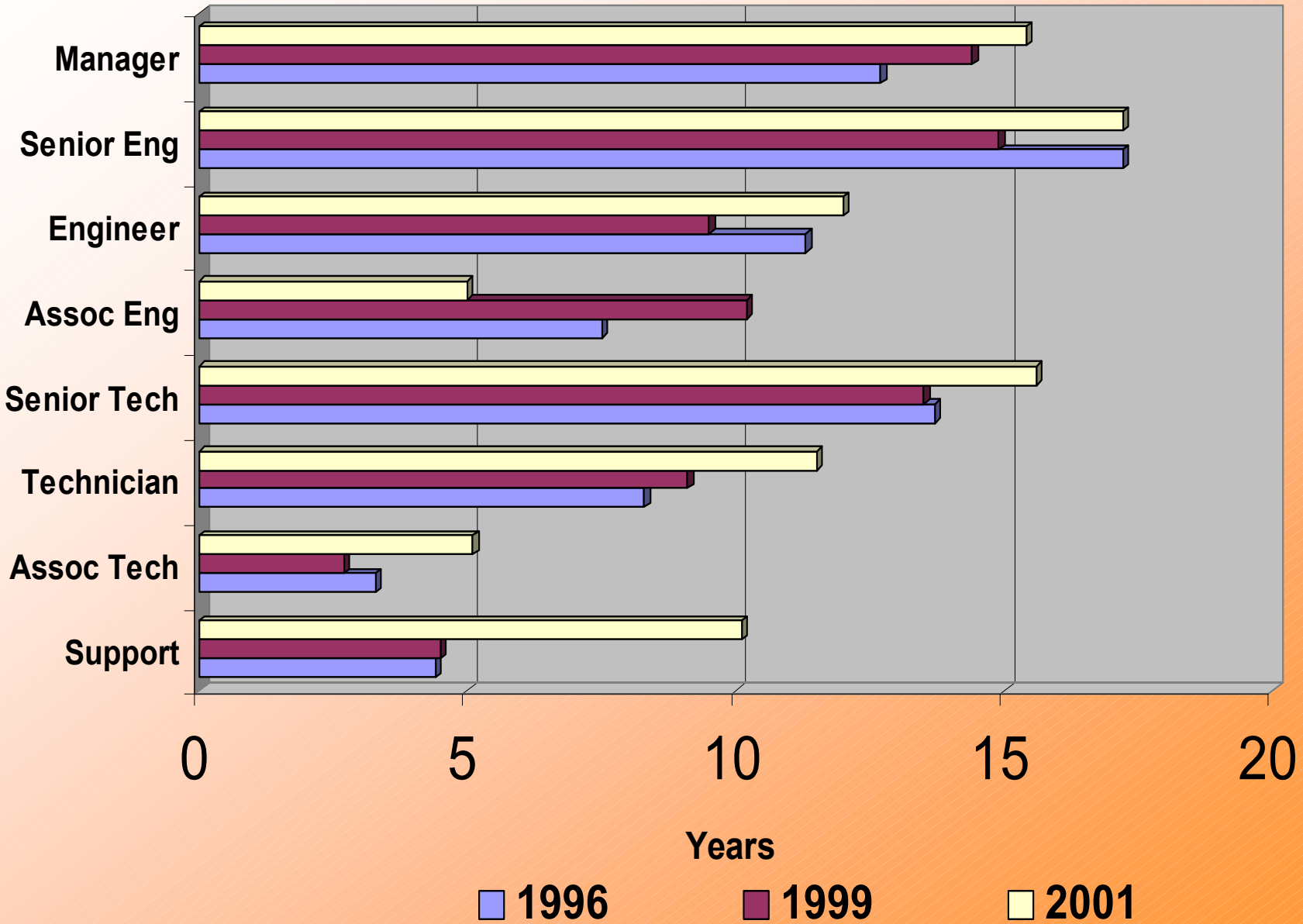
Max Experience* By Job Classification (USA)



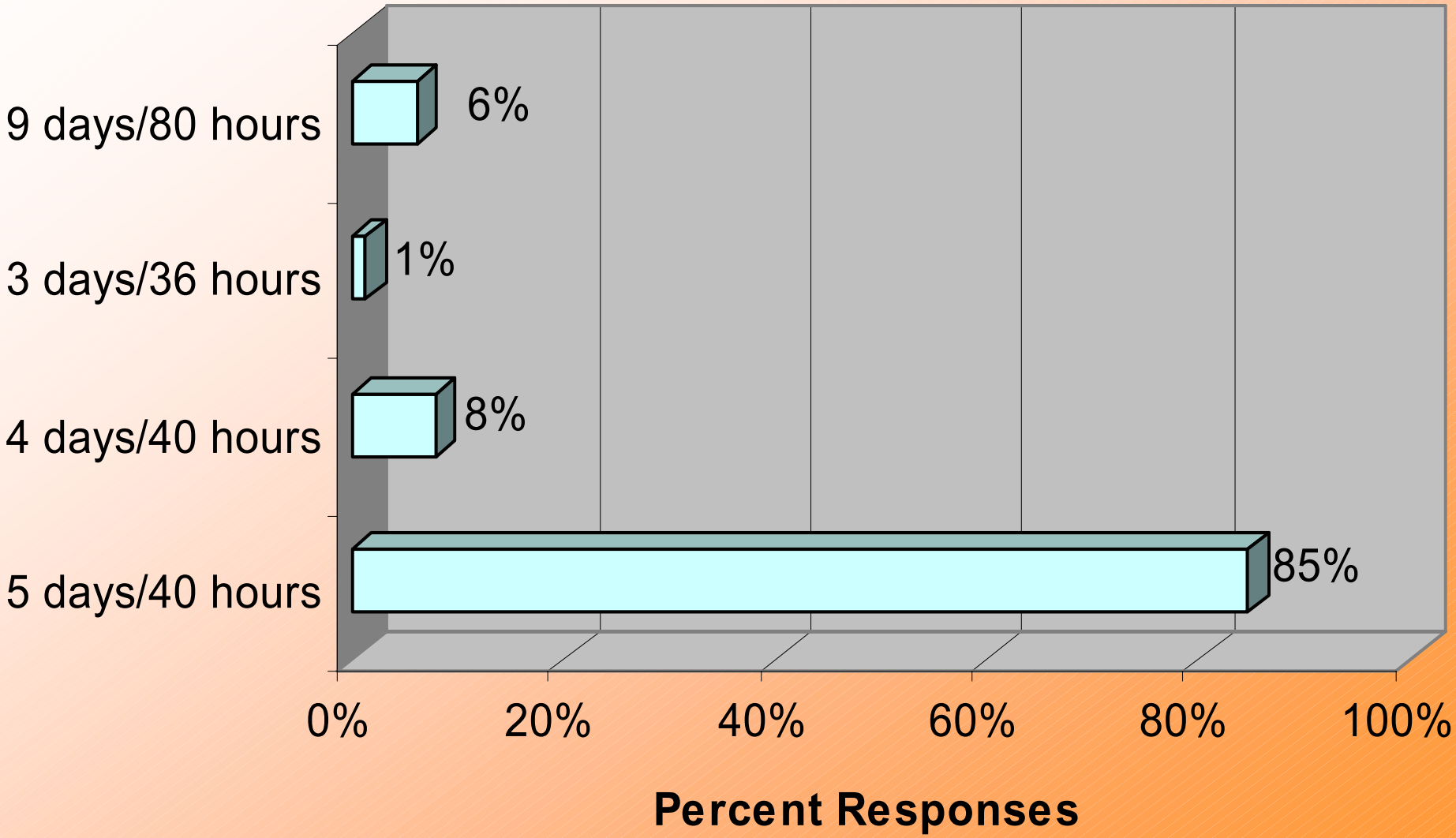
Company Experience By Job Classification (USA)



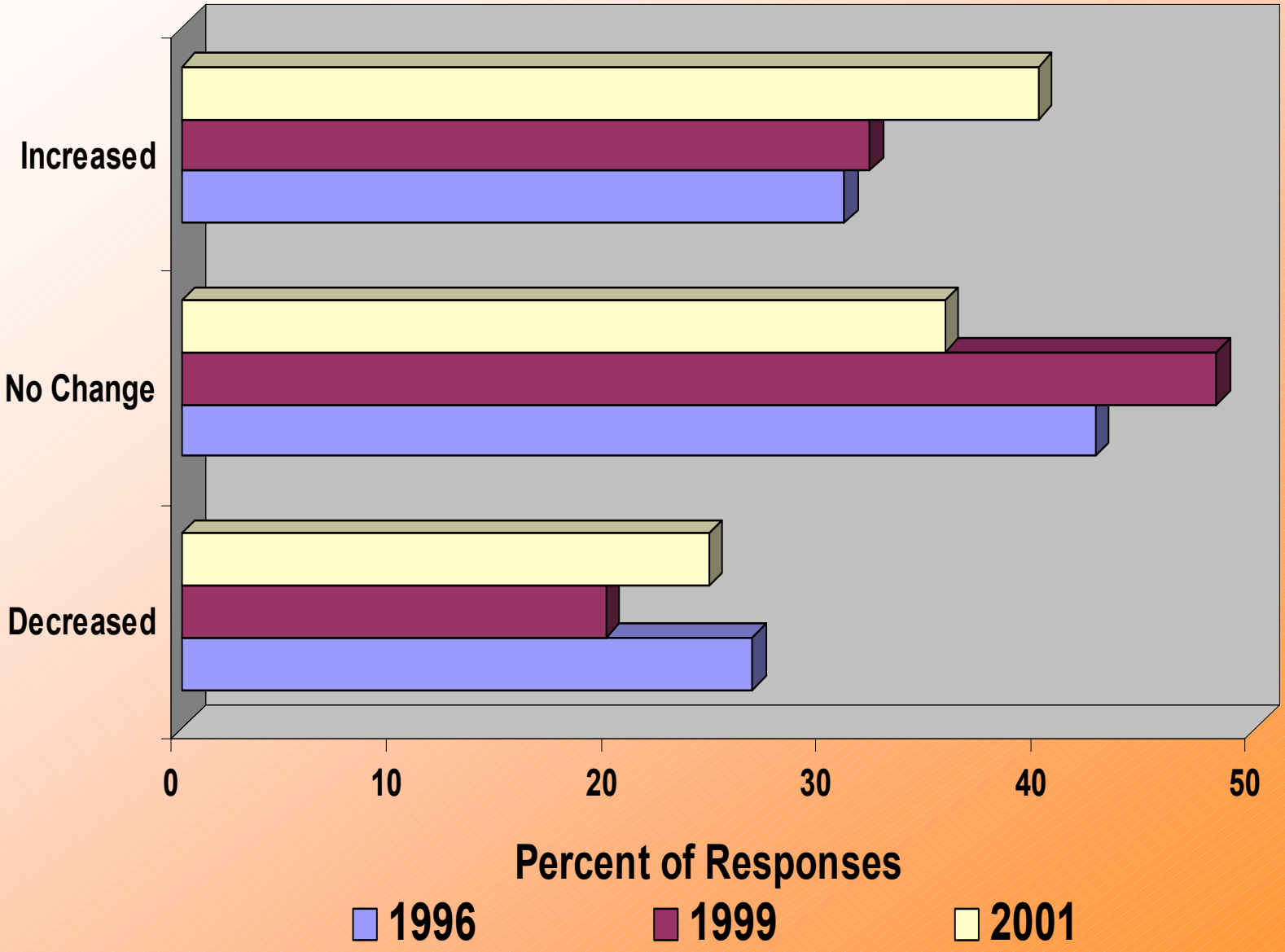
Lab Experience By Job Classification (USA)



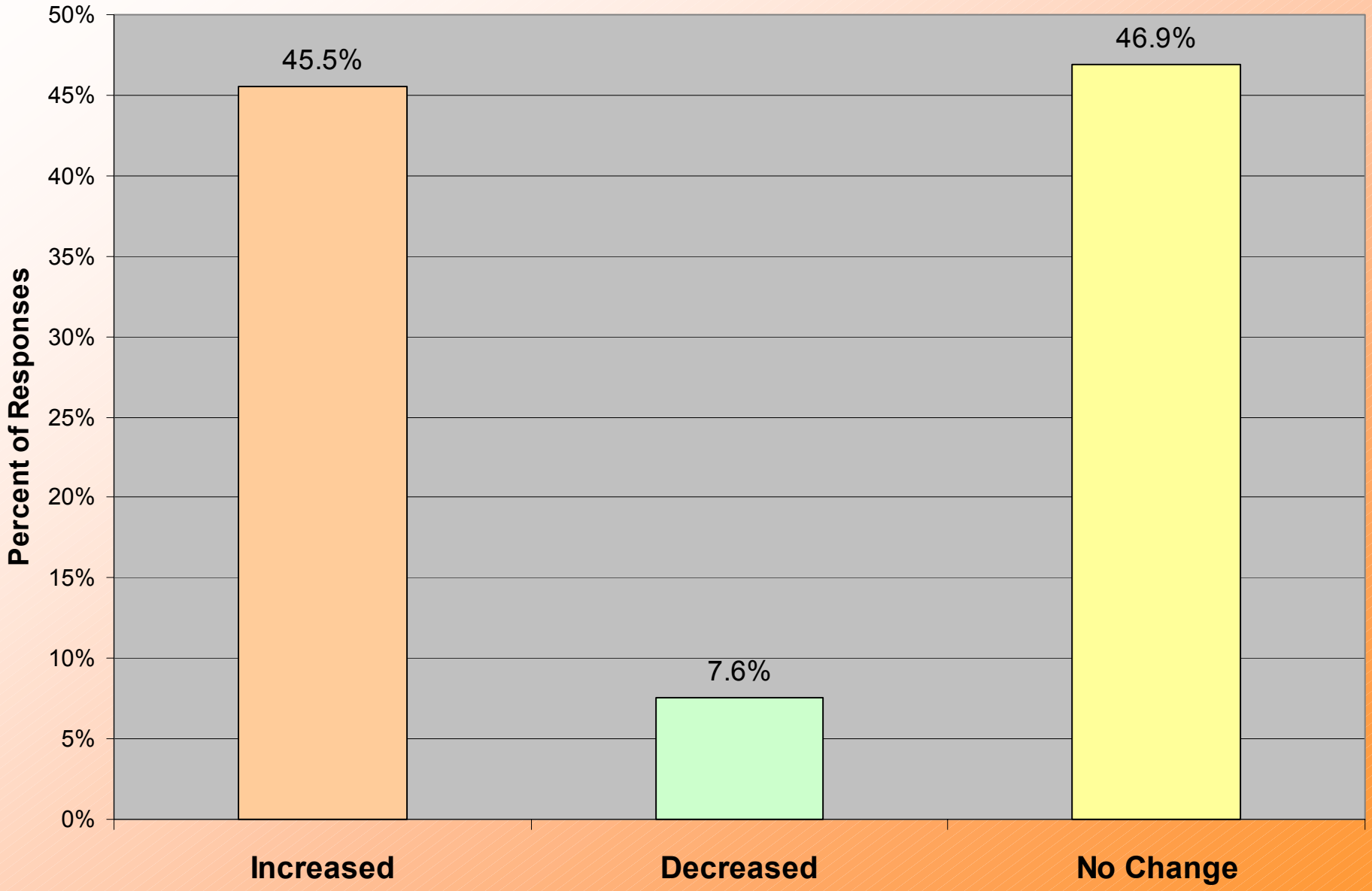
Standard Work Week Schedule



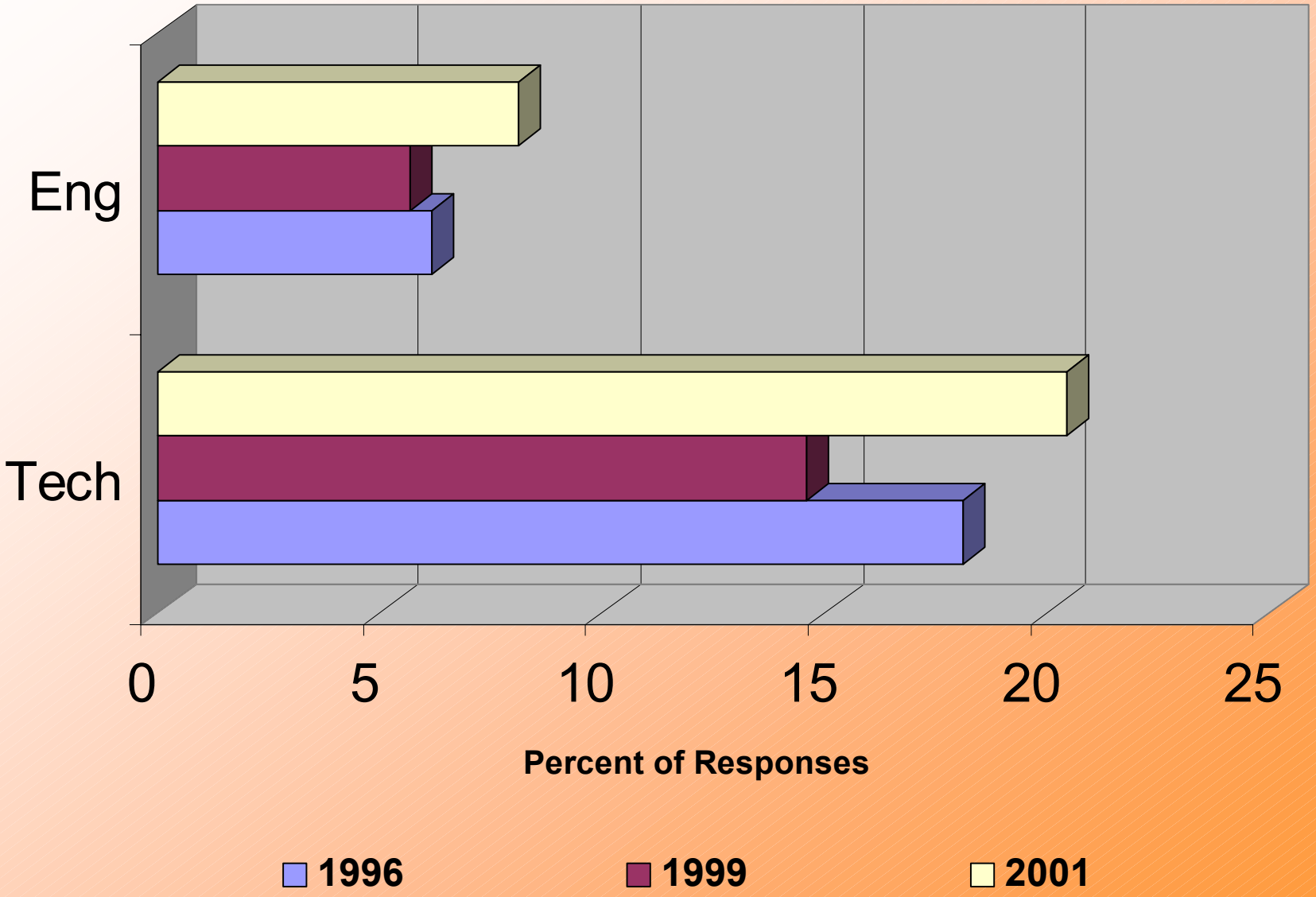
Head Count Change from Last Year



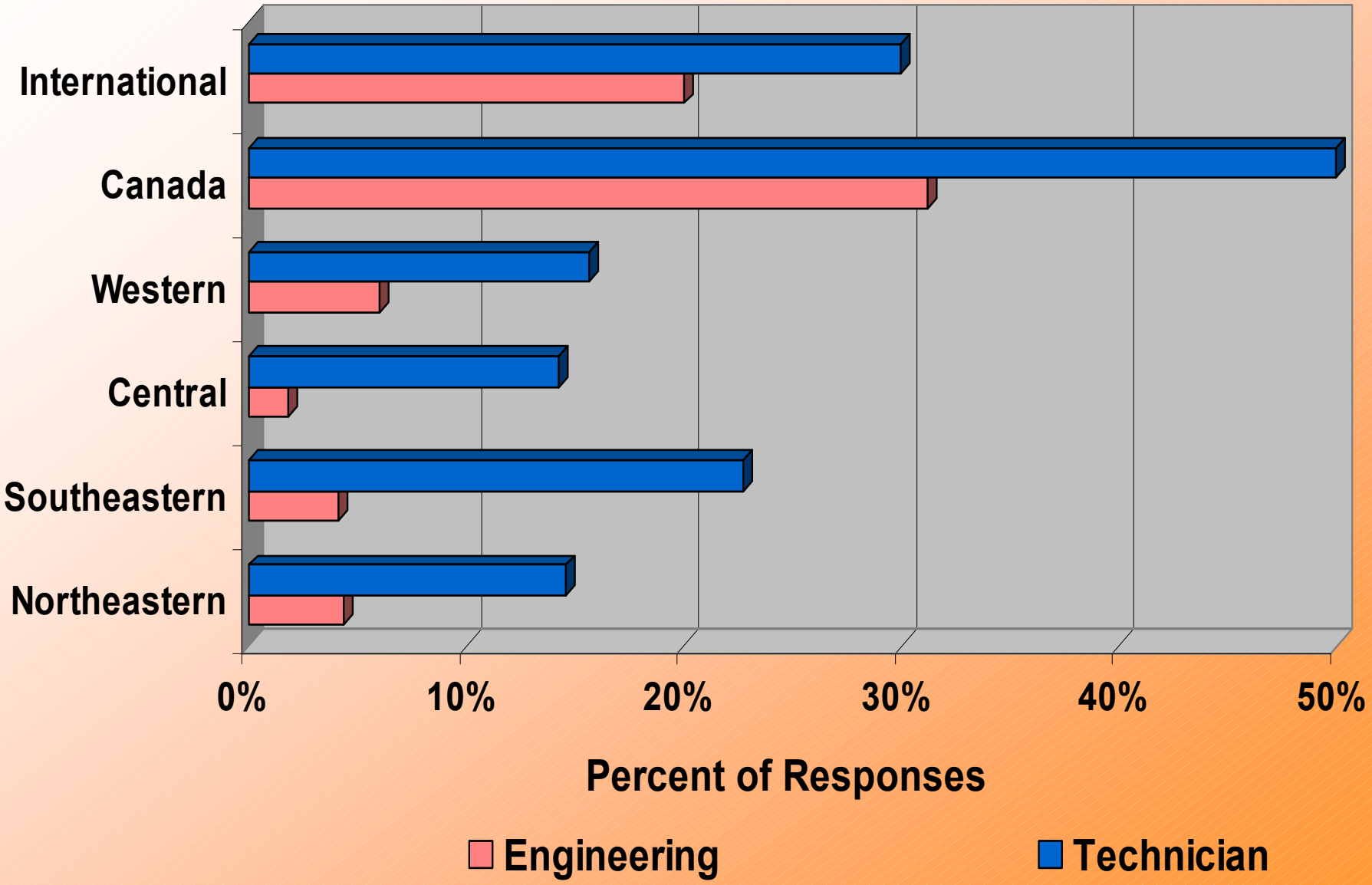
Expected Change in Headcount Within 24 Mos.



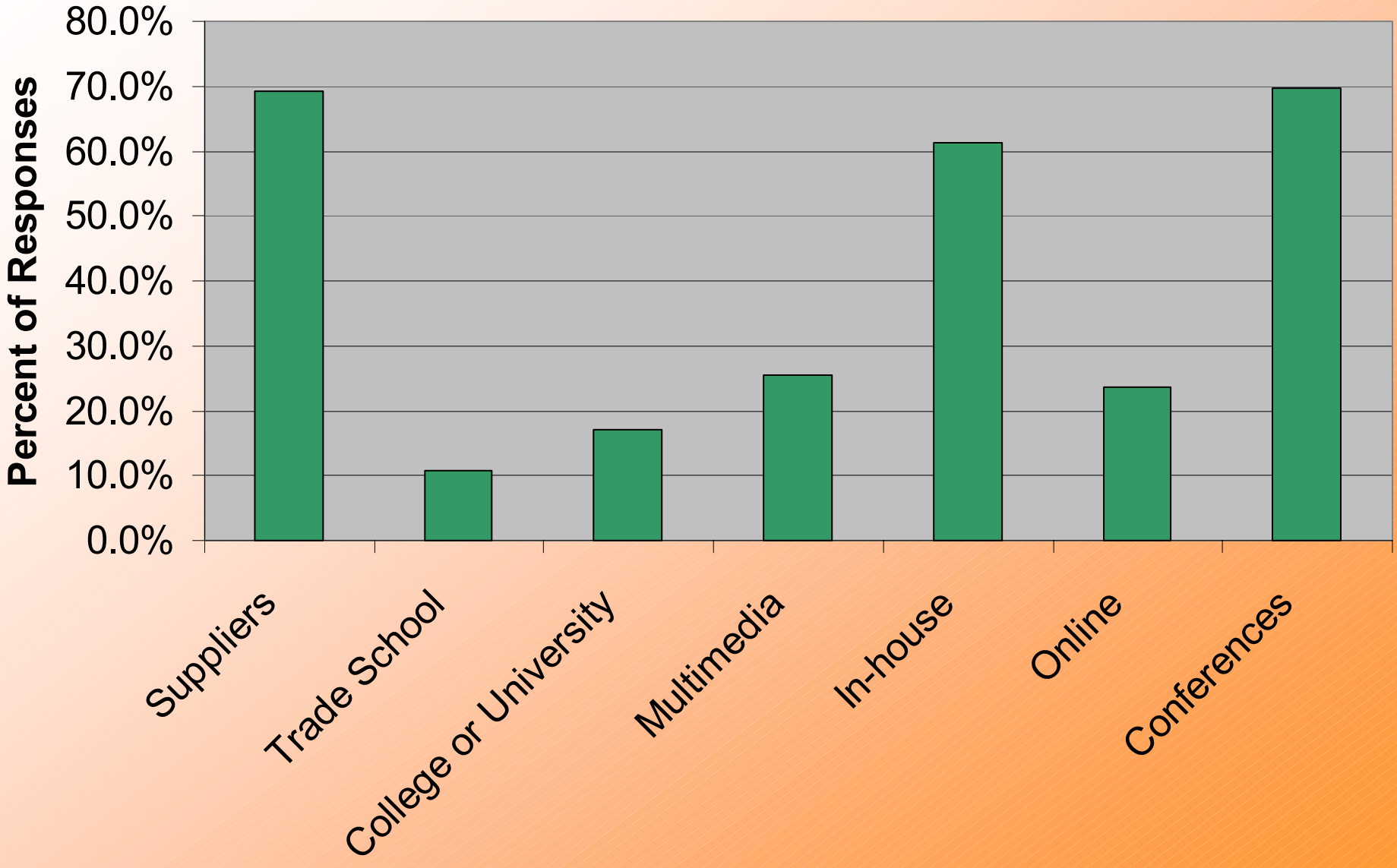
Union Membership



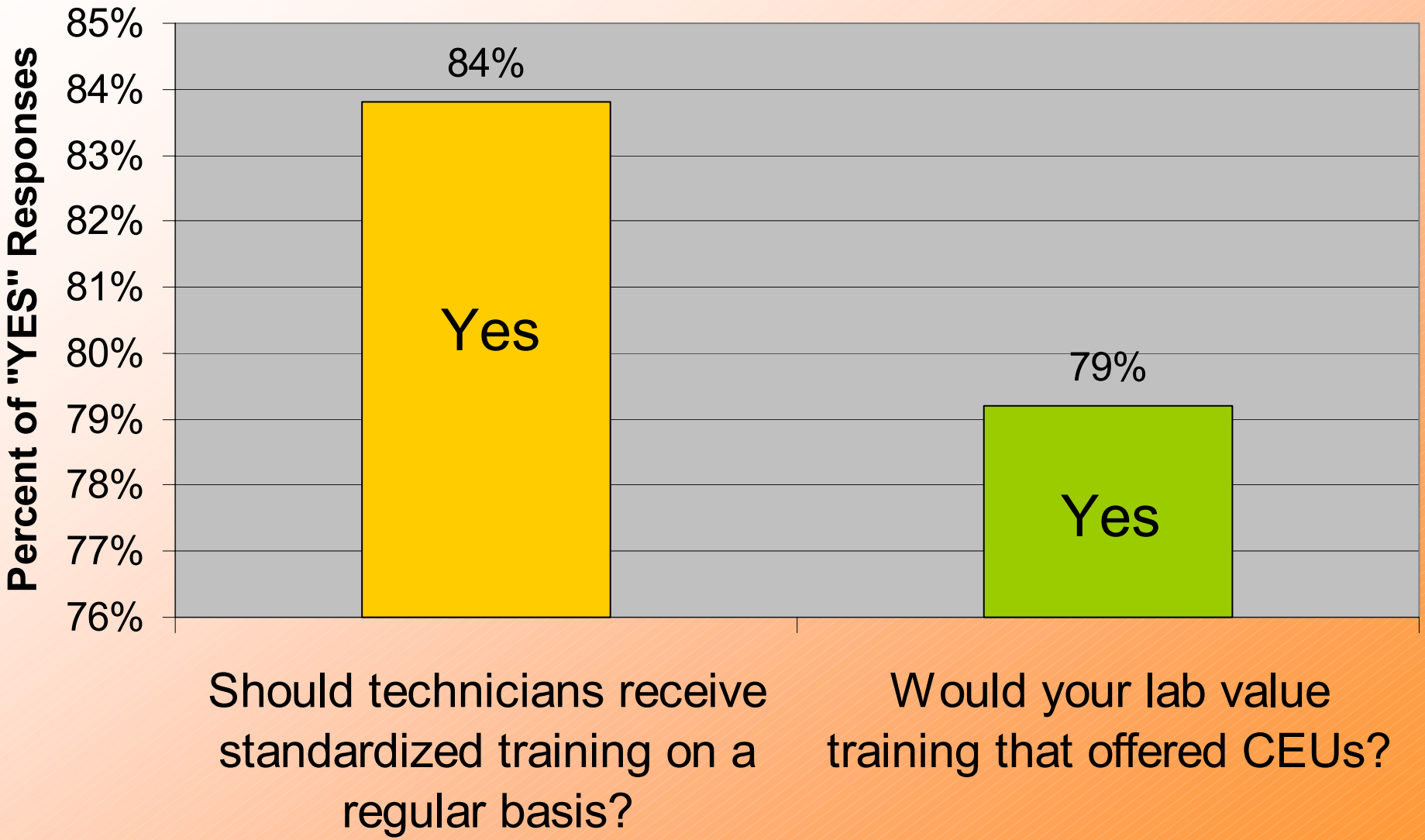
Union Representation by Division

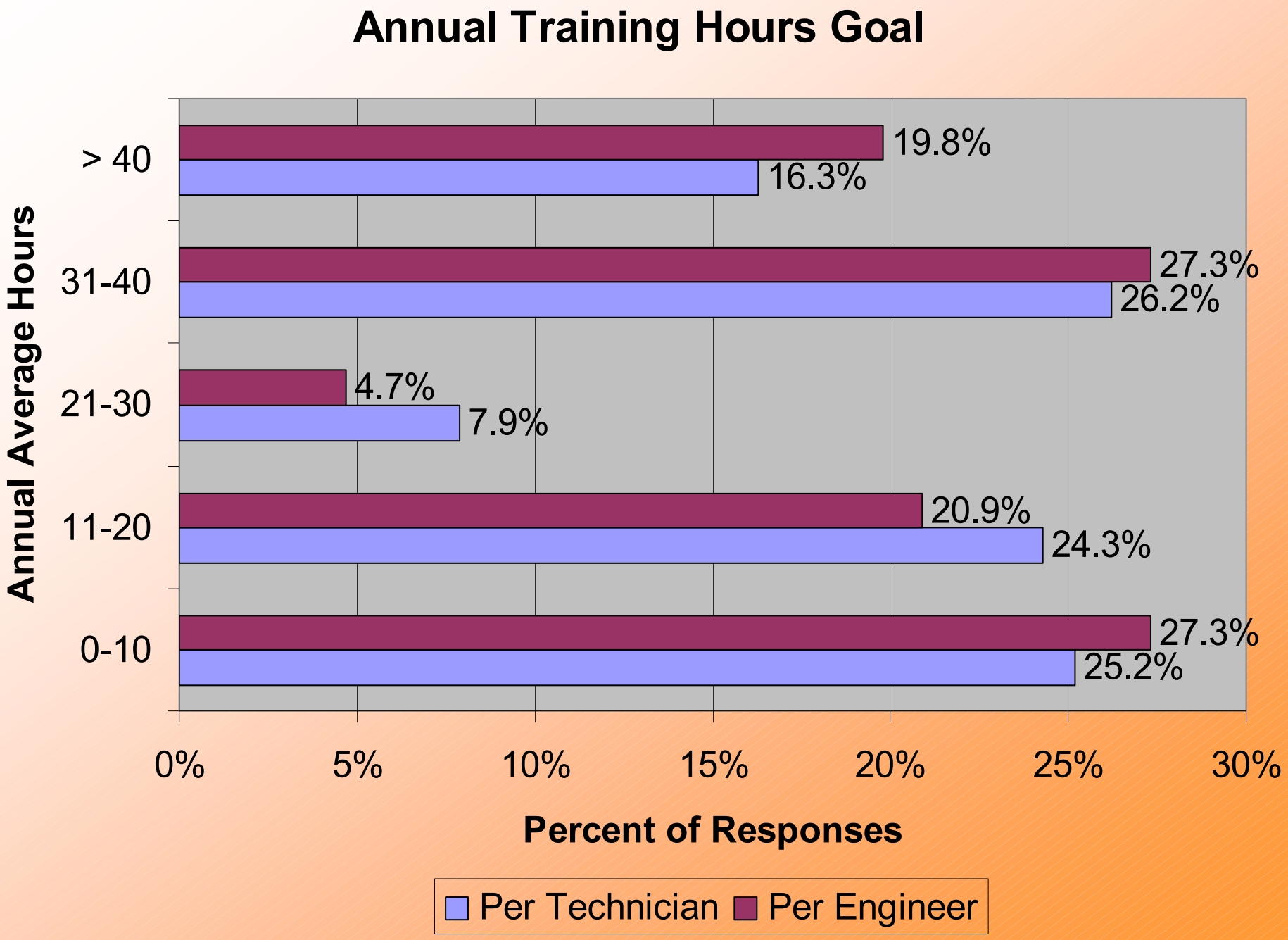


Metrology Training Source



Training Perspective




Annual Training Hours Goal
Annual Average Hours
> 40
31-40
21-30
11-20
0-10
19.8%
16.3%
27.3%
26.2%
4.7%
7.9%
20.9%
24.3%
27.3%
25.2%
0%
5%
10%
15%
20%
25%
30%
Percent of Responses
Per Technician
Per Engineer

Typical Laboratory Profile

Typical Laboratory Profile

Based on the results of the 2001 NCSL International Benchmarking Survey, the typical participant laboratory has the following profile:

- Is within the service industry
- Classified as a calibration laboratory
- Located in the central part of the USA
- Part of Region 11
- Part of a site with 11 - 50 employees
- Performs 1001 to 5000 calibrations per year

Typical Laboratory Profile (cont.)

- Maintains cycle time < 5 working days
- Does not factor repairs into it's cycle time
- Does not factor vendor/supplier outsourced work into it's cycle time
- Maintains less than 100 active items
- Target and actual in-tolerance rate is > 95%
- Delinquency rate is < 1%
- Provides pick-up and delivery service
- Provides/uses an Equipment Mgmt. Center

Typical Laboratory Profile (cont.)

- Has the following workload distribution:
  - **EM - DC/Low Hz workload is 26-50% of inventory**
    - **1-10% of EM - DC/Low Hz workload is offloaded**
  - **Mechanical workload is 11-25% of inventory**
    - **1-10% of Mechanical workload is offloaded**
  - **Dimensional workload is 1-10% of inventory**
    - **1-10% of Dimensional workload is offloaded**
  - **Time & Freq. workload is 1-10% of inventory**
    - **1-10% of Time & Freq. workload is offloaded**
  - **Thermodynamic workload is 1-10% of inventory**
    - **1-10% of Thermodynamic workload is offloaded**
  - **Has no Ion./Rad., Microwave, or Opt./Rad. work**

Typical Laboratory Profile (cont.)

- Does not participate in a MAP
- Does not help define equipment needs for users
- Defines equipment needs for suppliers
- Has increased it's workload since 1999
- Has increased it's headcount since 1999
- Uses mostly manufacturer procedures
- Adheres to Z540-1
- Is ISO 9001 certified
- Uses a 40 hours standard work week
- Is a non-union shop

Typical Laboratory Profile (cont.)

– Has the following personnel mix and profiles:

Lab Classification	Qty	Salary	Years In Company	Years of Lab Exper.
Manager	2	$47K	13	16
Sr. Engineer	1	$65K	14	17
Engineer	1	$30K	11	12
Assoc. Engineer	0	N/A	N/A	N/A
Sr. Technician	2	$47K	14	16
Technician	3	$43K	10	12
Assoc. Technician	0	N/A	N/A	N/A
Support	2	$33K	8	10

Closing

Closing

- Clarification of survey questions has yielded solid results
- On-line survey solution is a great tool
- Participation still lower than desired
  - Target was 30%
  - Only 23% participated
- Next survey release: **Spring 2003**