

Chemical Management Services: A New Strategy for Pollution Prevention

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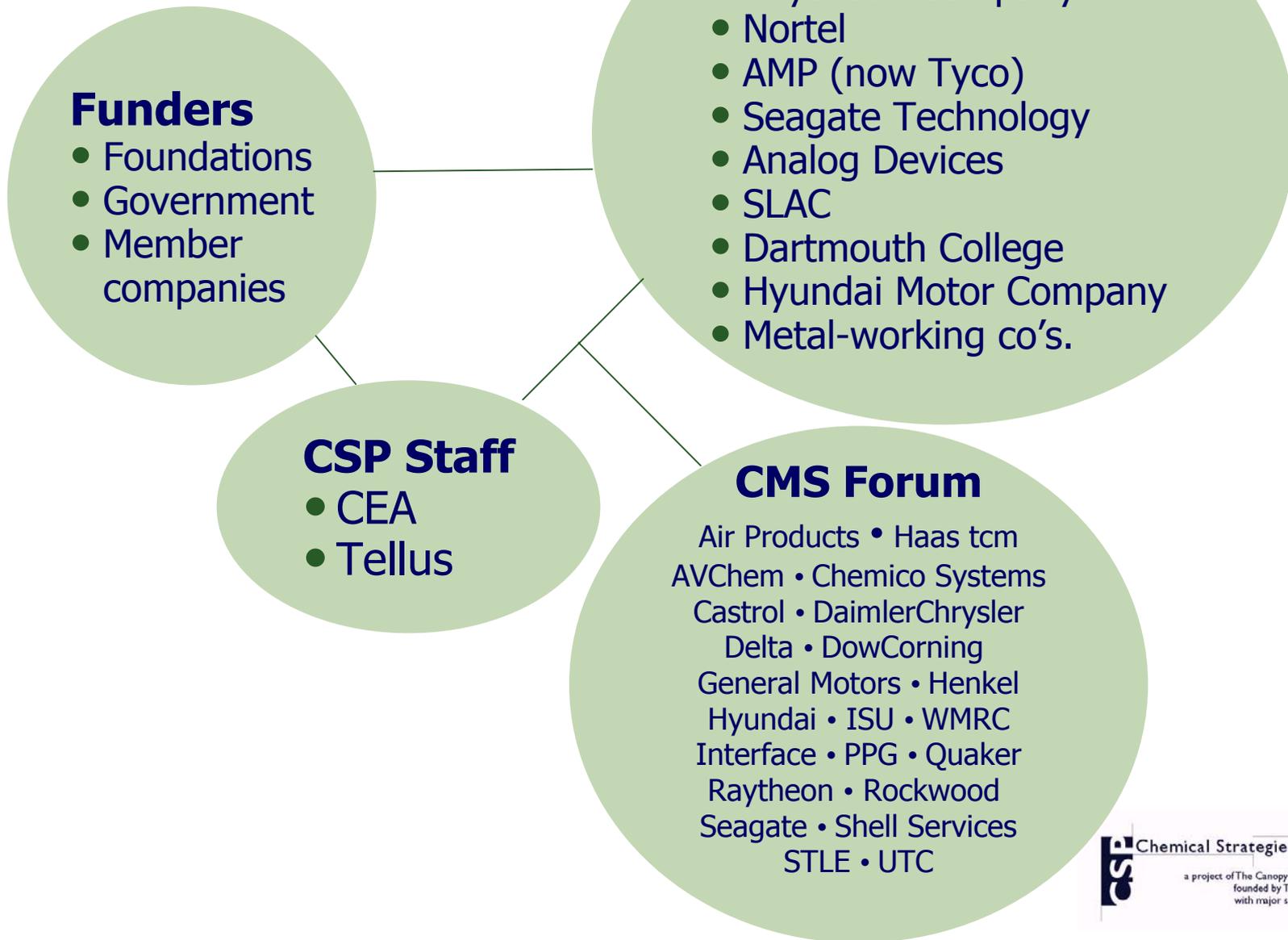
What is the Chemical Strategies Partnership?

- The Chemical Strategies Partnership (CSP) is a non-profit project funded by foundations, government, and private companies
- CSP is helping to promote the economic and environmental benefits of chemical management services (CMS)

CSP Mission

To reduce chemical use, waste, and cost through transformation of the chemical supply chain

CSP Structure



Servicizing: beyond product-in-a-box

- The emergence of a class of product-based services
- Manufacturers who traditionally delivered “products in a box” are increasingly viewing **products** as a vehicle or platform to **deliver service or function**.
- Cornerstone: change in compensation for the supplier from volume of **product** supplied to quality/quantity of **services** provided



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founded by The Pew Charitable Trusts
with major support from The Heinz Endowments

Servicizing examples: business to business

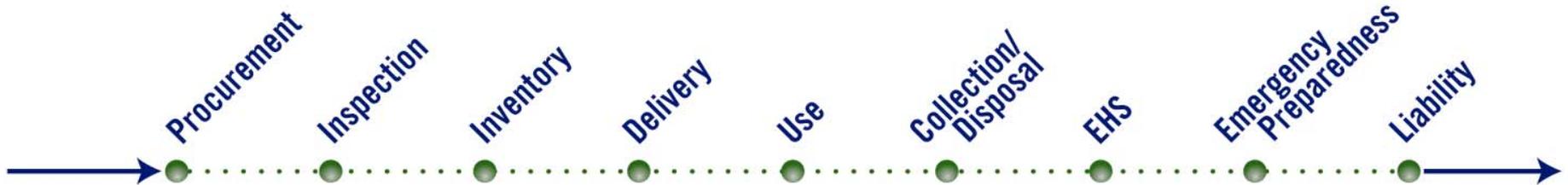
Company	Product	Service
IBM	Information Technology Services	Management of companies' applications and information technology (IT) systems.
Xerox	Document services	Integrated document storage and reproduction with business systems to achieve just in time, customized document production
Coro (Herman Miller)	Post-occupancy services	Move, churn and inventory management for staff and office relocation (large commercial firms)

Chemical Management Services (CMS) is a market-based approach to reducing chemical use and costs

- A strategic, long-term relationship in which a customer contracts with a service provider to supply and manage the customer's chemicals and related services
- The provider's compensation is tied primarily to quantity and quality of services delivered, not chemical volume
- Goes beyond invoicing and delivering product; CMS optimizes processes and continuously reduces chemical lifecycle costs, risk, and environmental impact
- These chemical services are often performed more effectively and at a lower cost than companies can do by themselves

At each stage of the chemical lifecycle, a company incurs quantifiable costs associated with chemical management

The Chemical Lifecycle

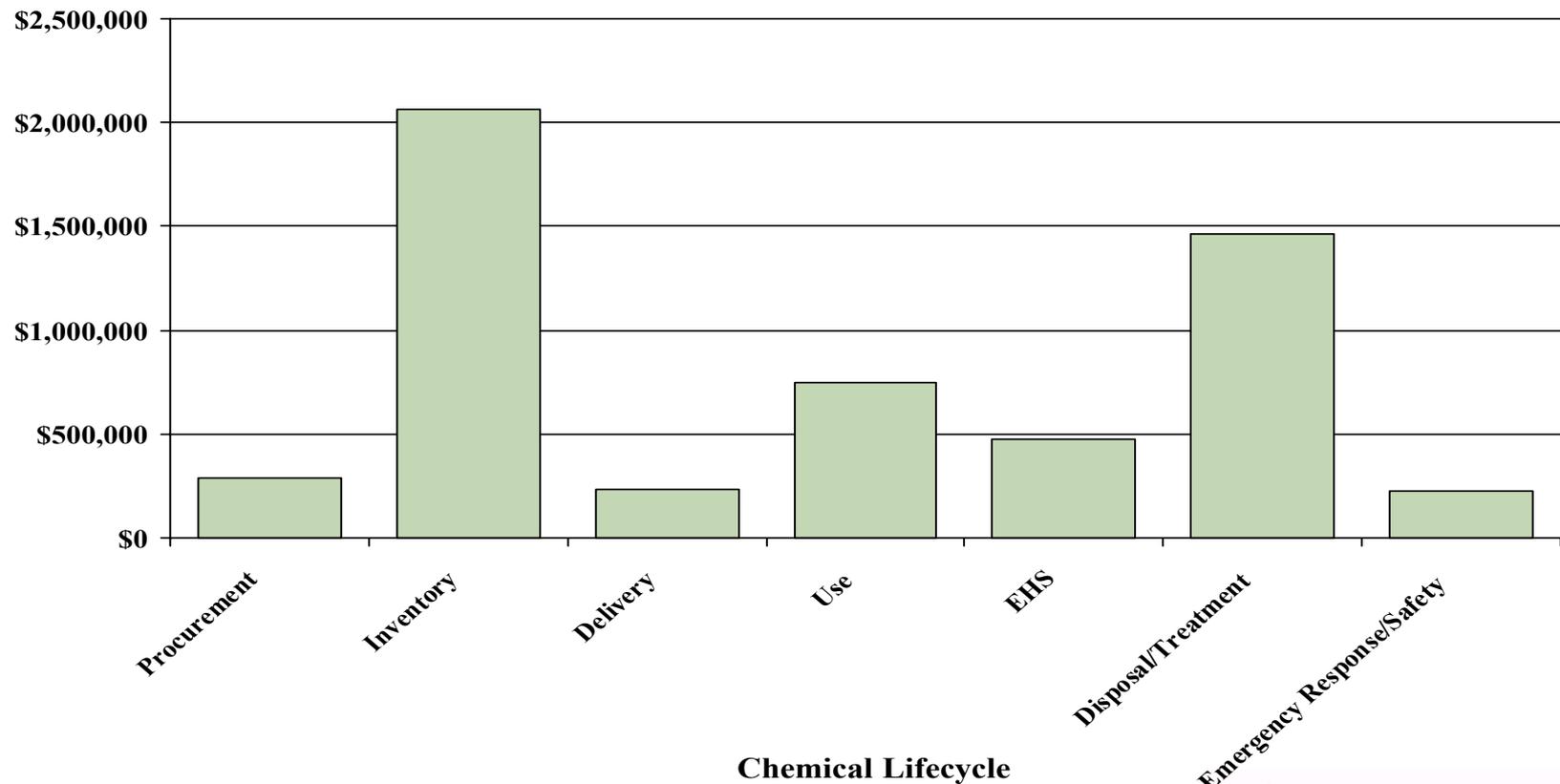


In the semiconductor industry, chemical management can cost up to \$1 for every \$1 of chemical purchased.

Chemical use accounts for only a fraction of "true costs"

CASE STUDY

Based on chemical purchases of \$6.2 million

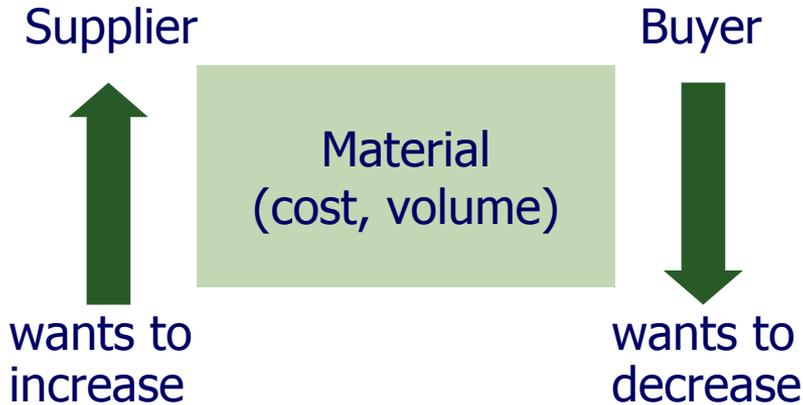


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Under the CMS model, formerly conflicting incentives are now aligned

Traditional relationship:
Conflicting incentives



CMS model:
Aligned incentives



Changing the supply chain model results in potential costs savings and environmental gains

A different way of doing business

FROM.....

Traditional

- Focus on material cost
- Volume-based cost
- Volume-based discounts
- User-driven chemical management
- Arms-length negotiation
- Opposed financial incentives
- Fragmented approach



TO

CMS

- Focus on lifecycle cost
- Unit pricing
- Gain Sharing
- Supplier-driven chemical management
- Partnership
- Aligned financial incentives
- Systems approach

CMS is a growing trend in the US

CMS market penetration across sectors

- Automotive \approx 50-80%
- Metalworking \approx 20%
- Electronics \approx 35%
- Aerospace \approx 10%

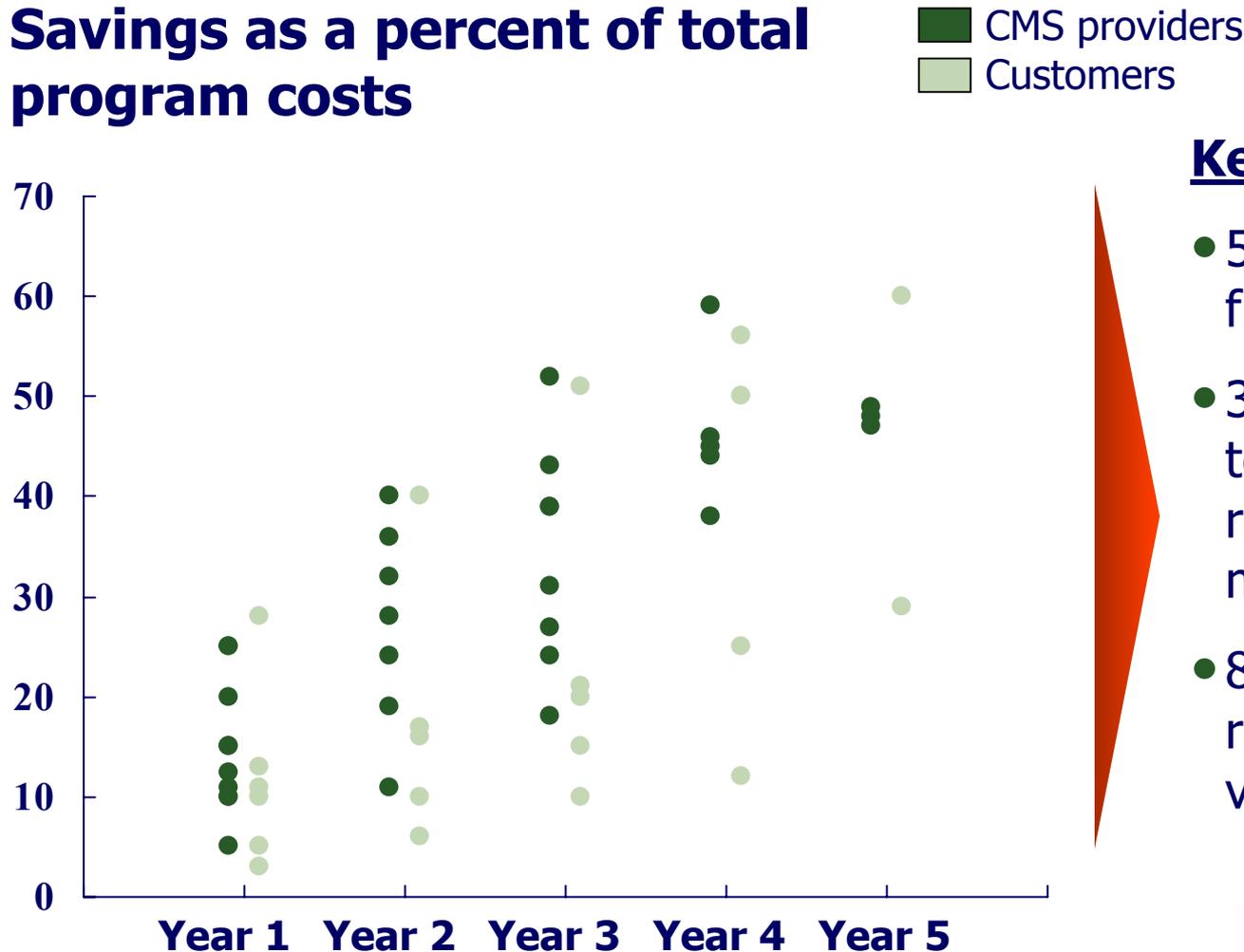
Various business models for CMS Providers

- Pure service providers
- Chemical manufacturers with a service division
- Chemical distributors, waste mgmt. companies, environmental engineering firms providing CMS

Source: *CMS Industry Report 2000*, Chemical Strategies Partnership

Overall cost savings reported by CMS customers are significant

Savings as a percent of total program costs



Key results

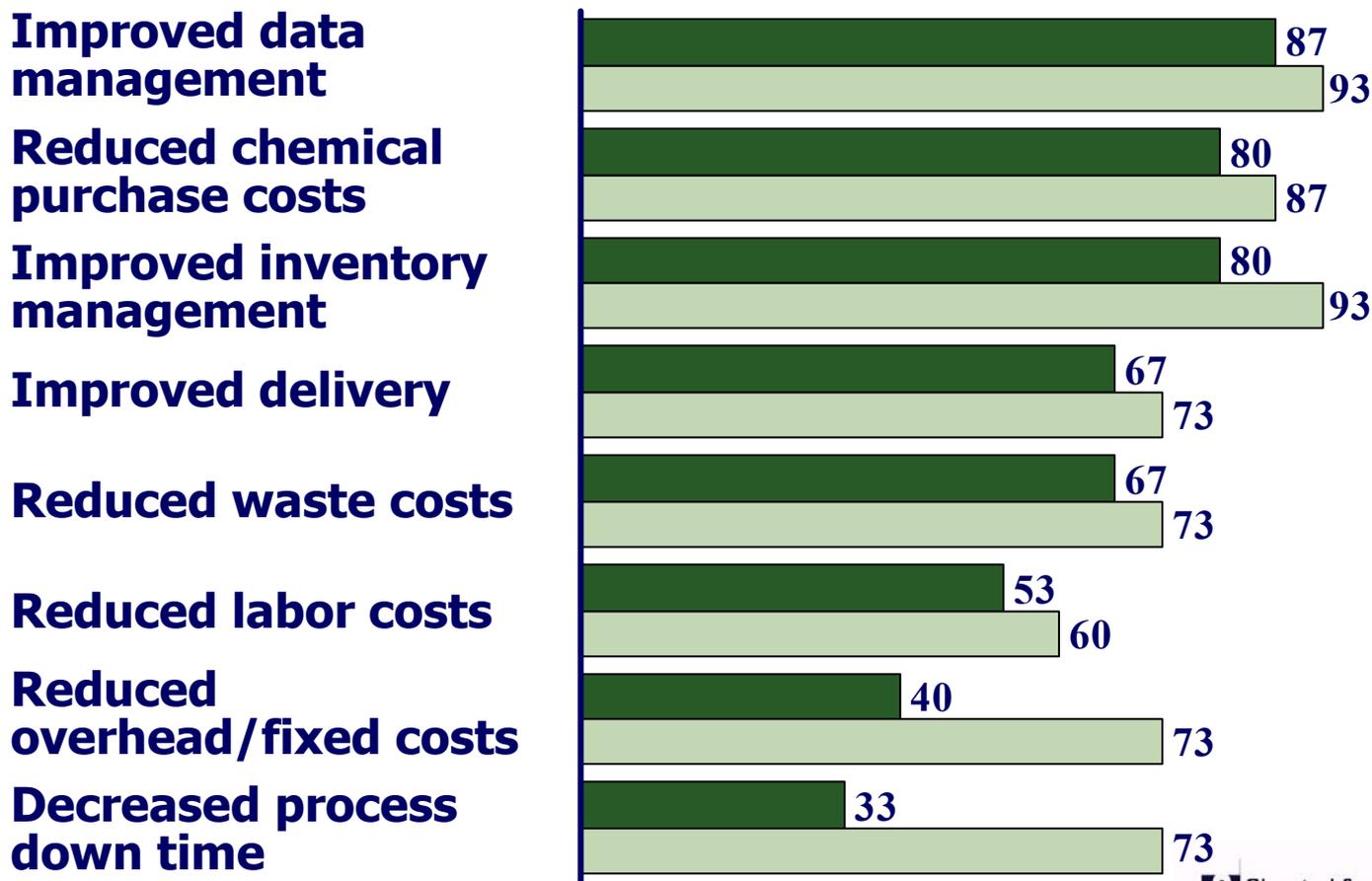
- 5-25% savings in first year
- 30-80% of long-term savings from reducing management costs
- 80% of customers report chemical volume reduced

Source: *CMS Industry Report 2000*, Chemical Strategies Partnership

Improved data management is the benefit most widely cited by customers

Benefits cited, percent of respondents

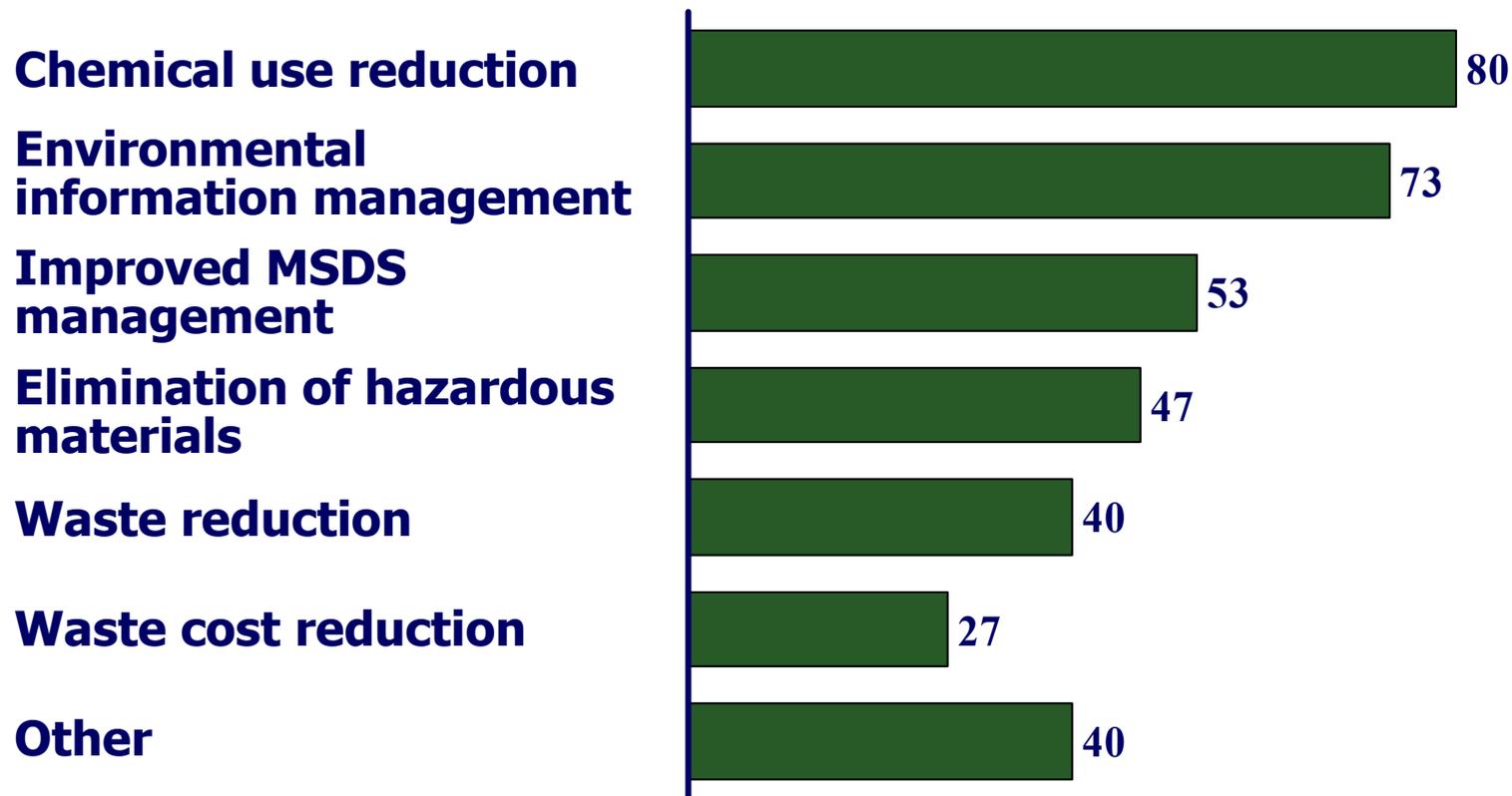
■ Customers
■ CMS providers



Source: *CMS Industry Report 2000*, Chemical Strategies Partnership

Environmental benefits are especially strong

Benefits cited, percent of customer respondents



Source: *CMS Industry Report 2000*, Chemical Strategies Partnership



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Case study: General Motors

Programs in over 90% of plants worldwide

- Average total chemical use reduction of 30%
- Total cost savings above 30%
- Environmental benefits: Reductions achieved over 6 years in one CMS contract
 - 54% decrease in purge solvent
 - 77% decrease in paint stripper
 - 80% decrease in solvent masking
 - 75% decrease in VOC emissions
 - 83% reduction in detackification chemicals

Case study: Raytheon Company

Streamlined Operations

Automated ordering, chemical gate-keeping, on-line MSDS and EHS data for reporting, chemical use and waste generation tracking, consolidated sourcing, procurement and inventory management

Improved Service and Quality

On-time delivery rose from a base of 82% to an average of 91% in the first 5 months. Scrap rate dropped considerably.

Reduced Costs

Payback of the program in the first 6 months. Expected savings over the 5 year contract is 30%

Reduced Waste

- Consolidated regional inventories and higher inventory turn rates have lead to lower scrap rates.

Key barriers & CSP responses or...

Why aren't more companies doing it?

Barrier

- Chemicals are a small percentage of overall operating costs
- Value of CMS not understood
- Lack of credible information
- Suppliers not coordinated to promote the CMS industry

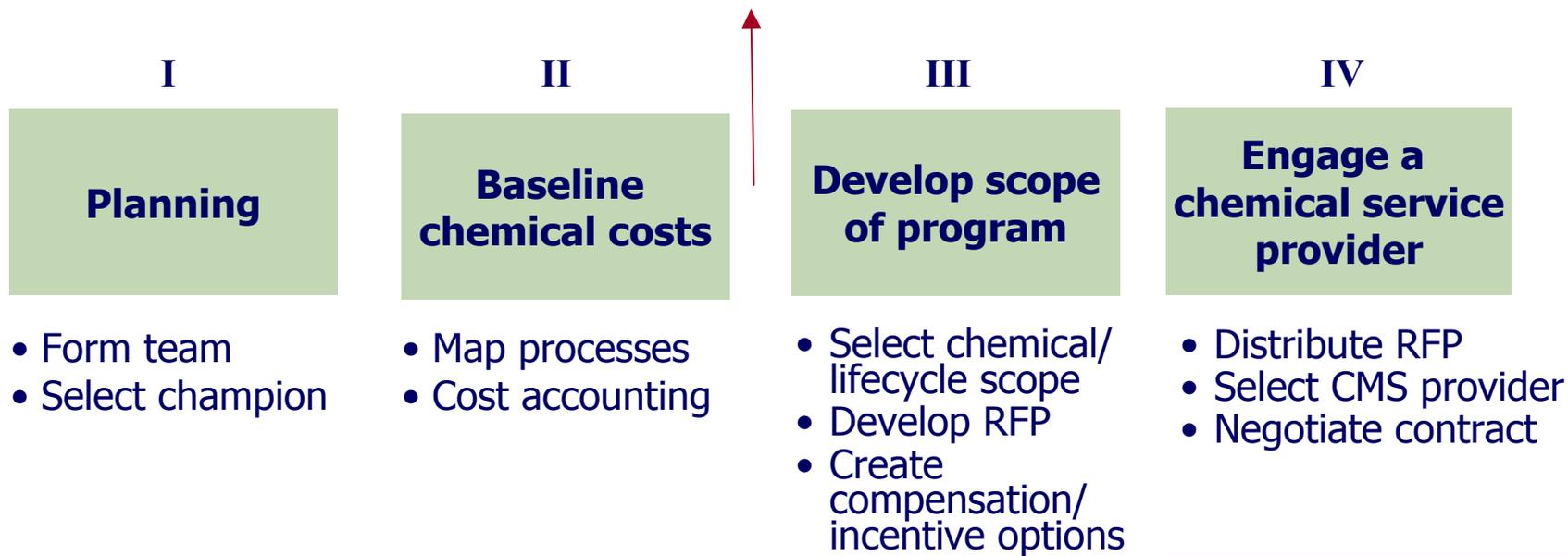
CSP response

- Make true costs transparent
 - Baselining chemical costs in pilot programs
 - Chemical cost analysis tool
- Conduct pilot programs
 - Work with companies, publish pilot results
 - Publish case studies of successful CMS programs
- Conduct workshops/distribute information
 - Intensive workshops with supplier/customer panels
 - Tools for *Optimizing Chemical Management*
 - CMS Industry Report 2000
 - Publish articles/presentations
- Support and grow supplier base
 - CMS Forum
 - Trainings

CSP approach...

CSP's Approach: conduct pilot programs to assist manufacturing companies in assessing their total chemical lifecycle costs and developing a CMS program

Decision Point: Is CMS right for my company?



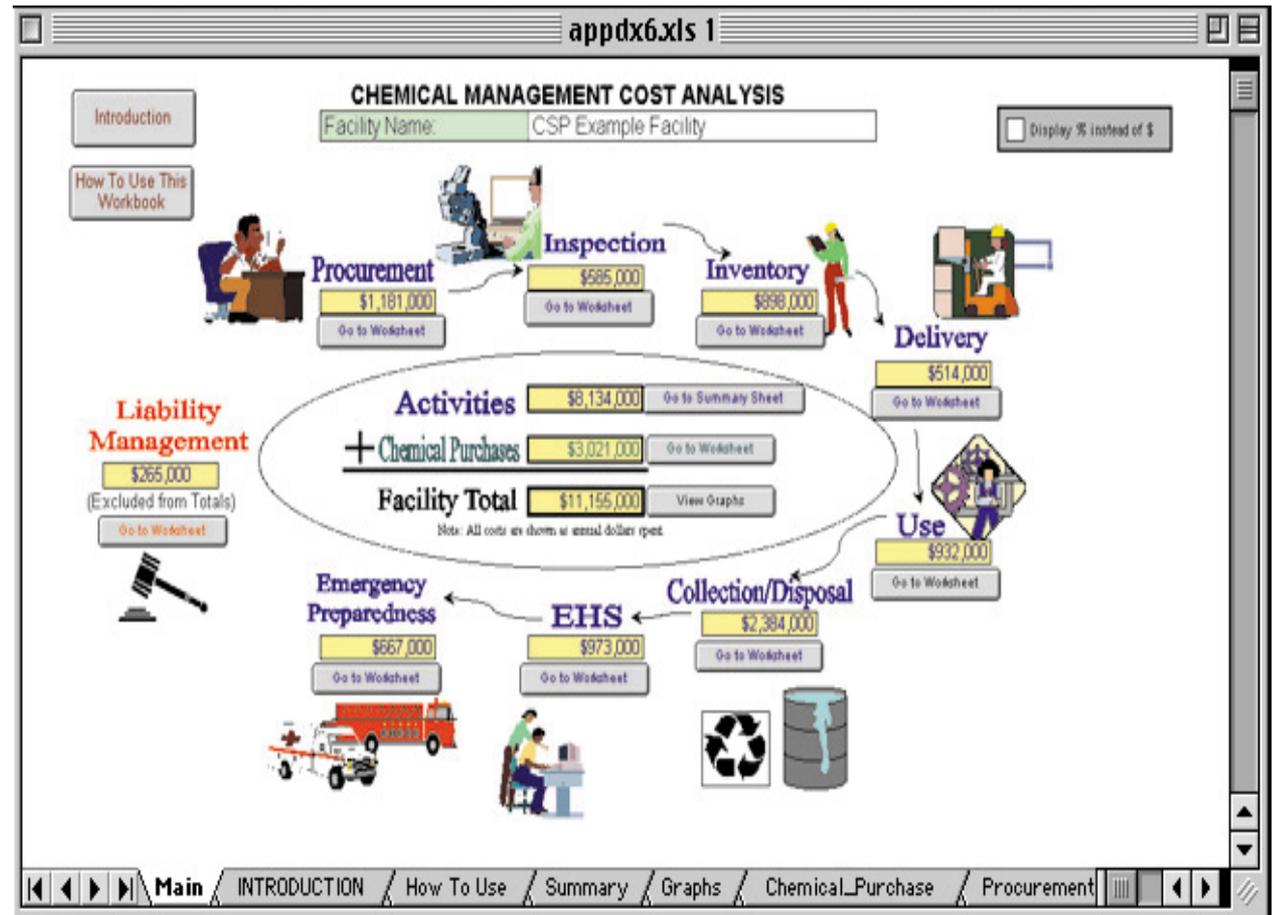
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CSP tools...

CSP has developed a detailed methodology:

- Facility selection
- Chemical cost analysis
- Contract structure



The Silicon Valley CMS Pilot Program

- Silicon Valley Pilot Program: promote CMS in Silicon Valley to improve environmental protection, economic prosperity, and community well-being
- 4 companies evaluated CMS:
 - Seagate Technology
 - Analog Devices
 - Stanford Linear Accelerator Center (SLAC)
 - Nu-Metal Finishing
- Companies received:
 - training in an innovative environmental business strategy
 - assistance in developing a comprehensive CMS program
- Sponsored by the U.S. EPA, the Steven & Michele Kirsch Foundation, and the Switzer Foundation

The SV Pilot Program was administered by CSP, the Silicon Valley Manufacturing Group, and the Santa Clara County P2 Program

Seagate Technology

- Seagate senior management gave their full support early in the process.
- Issued RFP in May 2001; selected partner in September 2001
- Launched program at their Minnesota facilities
- Rolling out a global CMS program (US, Asia, Europe)
- Contract includes chemical use & waste reduction performance metrics

Seagate - Benefits in first twelve months

- Aligned incentives and guaranteed savings – supplier generates no profit from volume sales
- Reduced onsite chemical inventory/handling (JIT)
 - Reduced 10,000 sq. ft. of inventory by 50%
 - Reduced \$800,000 in carrying costs of chemicals
 - Eliminated chemical scrap – approx. 7% of inventory
- Improved chemical processes/shared best practices
 - Photo-resist process: substituted more benign product and extended bath life 3-5 times, resulting in savings of \$50,000/month
- Eliminated distributor markup on chemicals
- OSHA Incident rate, 0 Spills/Releases, 0 Scrap/Obsolete Chemical Waste



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Seagate - Productivity Progress

Before CMS

- 21 Chemical Related Seagate Employees
- 149 Direct Tier 1 Suppliers
- 868 Chemical POs
- 7 Direct Supplier Contracts and Risk
- No Electronic Chemical Catalogs
- Manual Chemical Approval/MSDS Process



After CMS

- 16 Chemical Related CMS Employees
- Single Integrated Supplier
- Ariba E-procurement
- Contracts Novated Under CMS Supplier/Less Risk
- Single Consolidated Web-Based Electronic Catalog
- Web-based Approval CRA/MSDS Process

- Analog purchasing & EHS staff are leading initiative with a focus on improved supplier relations & environmental performance, and overall cost reductions
- Issued RFP in October 2001 for contract at Sunnyvale and Santa Clara facilities (will evaluate potential rollout corporate wide)
- High interest in RFP with 9 CMS providers (suppliers) bidding
- Expected partner selection in March 2002
- Contract to include incentives, gainshare, & environmental metrics

Analog Devices Inc.

Drivers for Initiating a CMS Program

- Reduce costs
- Increase yields
- Improve information management and reporting
- Reduce or eliminate inventory
- Improve environmental performance- ISO 14001
- Reduce liability

Challenges for Initiating a CMS Program

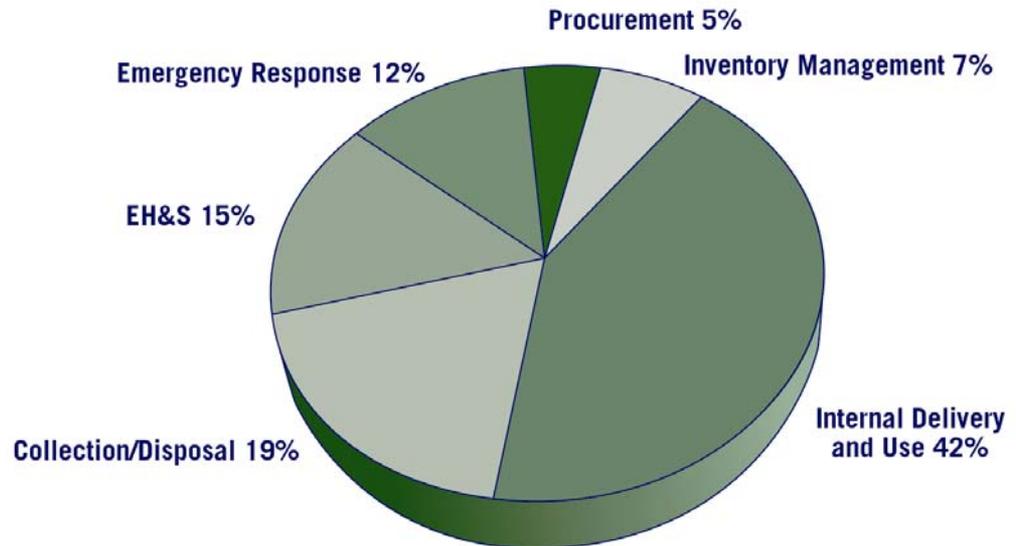
- Defining ADI's regulatory responsibilities vs. those of the CMS provider
- Establishing baseline measurements--how are cost savings and chemical reductions reconciled with ongoing production cycles?
- Liability and insurance arrangements
- Contractual agreements and
- Personnel issues
- Key stakeholder support in transition and implementation

ADI's CMS goals go beyond just invoicing and delivering product. They emphasize the optimization of processes, the continuous reduction of chemical lifecycle costs, and the reduction of risks and impacts to employees and the environment.

Analog – Chemical Cost Baseline

ADI's baseline analysis provides a snapshot of the primary cost drivers and overall level of effort for managing chemicals at each stage of the chemical lifecycle.

At 42%, internal delivery and use makes up the largest portion of overall chemical management costs for ADI.



*Based on chemical management costs at the Sunnyvale facility

**ADI's chemical management costs are typical for the industry

Analog – CMS Program Scope

The CMS provider will take over responsibility for the following activities:

- **Procurement** (mgmt. of tier II chemical suppliers, consolidated billing)
- **Inventory** (just-in-time (JIT) delivery, online inventory management, delivery management (i.e., bar coding), inspection, recertification)
- **Internal Point-of-use** (100% ontime delivery, container change-outs)
- **Administration of EH&S** (MSDS tracking, hazardous materials labeling, material and container tracking)
- **Reporting** (compliance, usage, hazardous materials)
- **Operation of Water and Treatment Systems**
- **Waste Disposal** (management of waste from point of use)

Scope of Chemicals:

- Process chemicals
- Compressed gases (direct line, bulk, canister)
- Support chemicals for facilities (WWT, DI water)
- Hazardous wastes generated from use of above chemicals
- Waste water generated from or receiving the above chemicals

Stanford Linear Accelerator Center (SLAC)

- SLAC adopted the CMS model approach as part of a larger effort to get a handle on chemical management in their facilities
- Expect to issue contract by end of 2003
- Intends to implement a program with a strong chemical information management systems component
- SLAC provides a unique opportunity to test the CMS model in a research and development (R&D) focused facility



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SLAC – Key Drivers

- Regulations driving the need for quality information
 - Clean Air Act Title V, DOE requirements, CA based regulations, MSDS management
- Facilitate ESH compliance reporting
- Transaction-based chemical container tracking
- Cost reduction: chemical management cost analysis preliminary results - 4.8:1
- Two primary goals for designing their CMS program
 - “To structure the workplace in such a way it enables, rather than hinders, people’s ability to get the job done”
 - “To see if efficiency can lead to cost savings”

Nu-Metal Finishing, Inc.

- Nu-Metal's CEO lead the effort to evaluate the potential of CMS to optimize operations & business systems, and reduce total costs
- Opportunity to test the CMS model in SME sector
 - develop hypotheses for adapting CMS model to SME
 - share lessons learned with broader community
- Key Management Costs
 - Inventory (floor space)
 - Procurement (including expedition premiums)
 - Waste management / EHS
- Preliminary chemical management costs to chemical purchase costs (including metals) ratio = 0.6 to 1.0

Nu-Metal - Opportunities

- Increase ordering efficiency / reduce premiums paid
- Consolidate suppliers / leverage chemical & metal spend
- Implement JIT / Off-site logistics
- Capitalize on opportunity cost of floor space
- Outsource key functions / obtain supplier expertise

Nu-Metal - Barriers to CMS Implementation

- Are there enough chemical purchase costs to engage a CMS provider?
- Is there enough cost saving/service value to justify an on-site chemical manager?
- Would enough benefits result from the above opportunities?
- Recommendation was to evaluate a leveraged purchasing program (essentially a strategic sourcing initiative) plus basic services using a CMS provider.
- Nu-Metal has held off on implementing a CMS program

Nu-Metal - Lessons Applicable to SME Sector

- Challenge in achieving necessary economies of scale
- Business case requires significant hard savings; for small facilities (<\$200k chemical spend), much of the CMS value is in extra services provided
- Upper management support is important
- Is Nu-Metal representative of the industry? - Nu-Metal seems to be ahead of the curve in best practice, efficient management
- Solutions:
 - Coalition approach?
 - Internal “CMS” program

Continuing efforts to promote CMS

- Continue to leverage past work to accelerate adoption in penetrated sectors - Auto, Aerospace, Airlines, Electronics, Metal Working
- Pilot projects to help break open new sectors (university/research, pulp and paper, steel, small and medium-sized enterprises)
- Develop tools (metrics, update manual, etc.)
- Disseminate information (outreach, 2-3 workshops/yr)
- Collect and distribute industry market data
- Rollout initiatives internationally
 - ✓ Korea – pilot with Hyundai Motor Company
 - ✓ Singapore, UK, EU initiatives beginning

Leverage benefits of CMS to environmental goals and policy

- CMS can advance EPR, DFE, and other EPA policy goals
ISO 14001/EMS
 - Data systems and systematic chemical procedures
 - Chemical clearance, regulatory reporting, MSDS, tracking to point of use
- Environmental Preferential Purchasing
- High Production Volume Challenge
- Green Chemistry
- Environmental Leadership Programs
- Promotes broader EU product to service trends

Reflections and futures

While CMS is timely in many ways for customers...

- Maintains focus on core competencies, continuous improvement, suppliers as strategic resources, the environment as a business issue

... it is a challenging business model

- For customers:
Not a priority; high perceived transaction costs; organizational inertia; poor data management and cost awareness
- For service providers:
Service division profits may be in conflict with product sales profits; must coordinate across multiple client business units to sell and implement the program