

# ***Challenges and Issues in the Aluminum Industry***

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# CHALLENGES & ISSUES

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- Scope Of Sloan Foundation Activity
  - Recycling
  - Supply Side Management
  - Work Force Development

# SUSTAINABILITY

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- Sustainability is key issue for future
  - “Sustainability is about addressing the legacies of the past, managing the realities of the present, and planning for the generations of the future” Dick Evans, Executive VP, Alcan, at 2004 Arabel Conf.
- Life cycle assessment (LCA) will provide data and metrics on a global basis (AA, IAI, etc.) Ref. AA AT2 Auto Report
- Recycling is key for sustainability

# RECYCLING

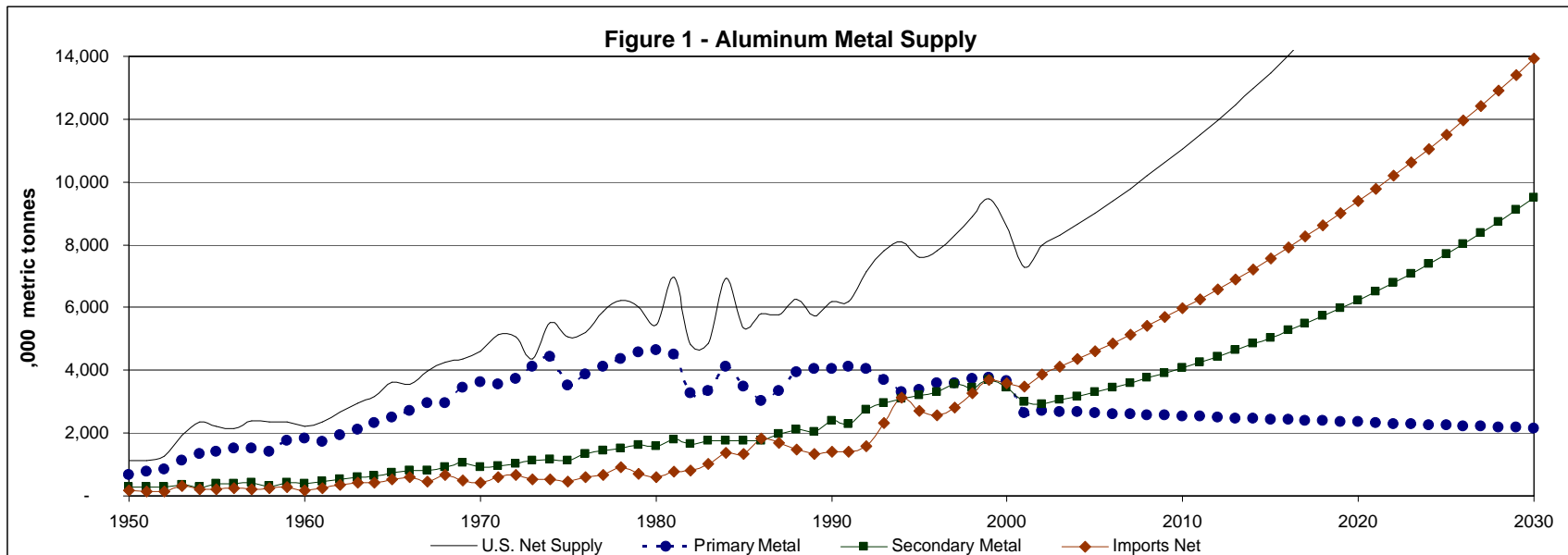
- Recycling provides >1/3 of metal supply
- Recycling saves ~94% of energy and emissions as compared to making aluminum from ore

**Table 1: U.S. Metal Supply**

Year	Metric Tons, K	Primary Product.	Imports	Secondary Recovery
1980	6,833,000	68.1%	8.9%	23.0%
1990	7,863	51.5%	18.1%	30.4%
1999	11,154	33.9%	33.0%	33.1%
2000	10,699	34.2%	33.5%	32.2%
2002	9,500	28.5%	40.8%	30.7%

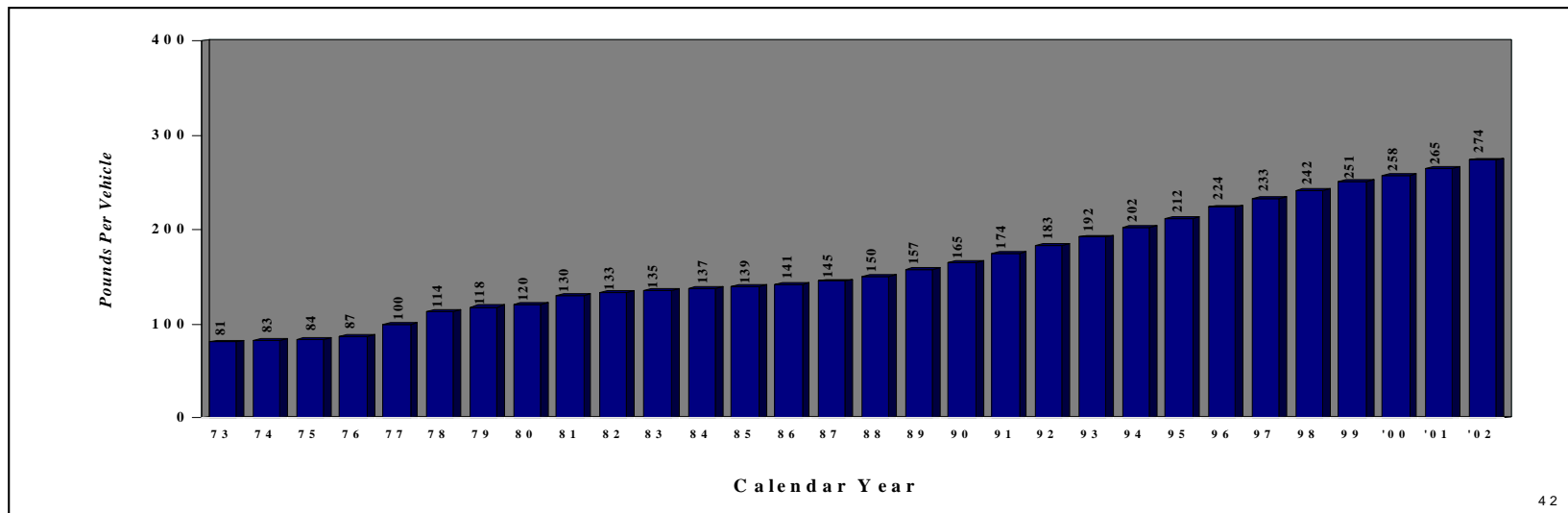
# Recycling (cont.)

- Sources of recycled metal are modeled in TMS 2004 paper “Modeling the Impact of Secondary Recovery on US Aluminum Supply---” Choate and Green



# Recycling / Metal Supply

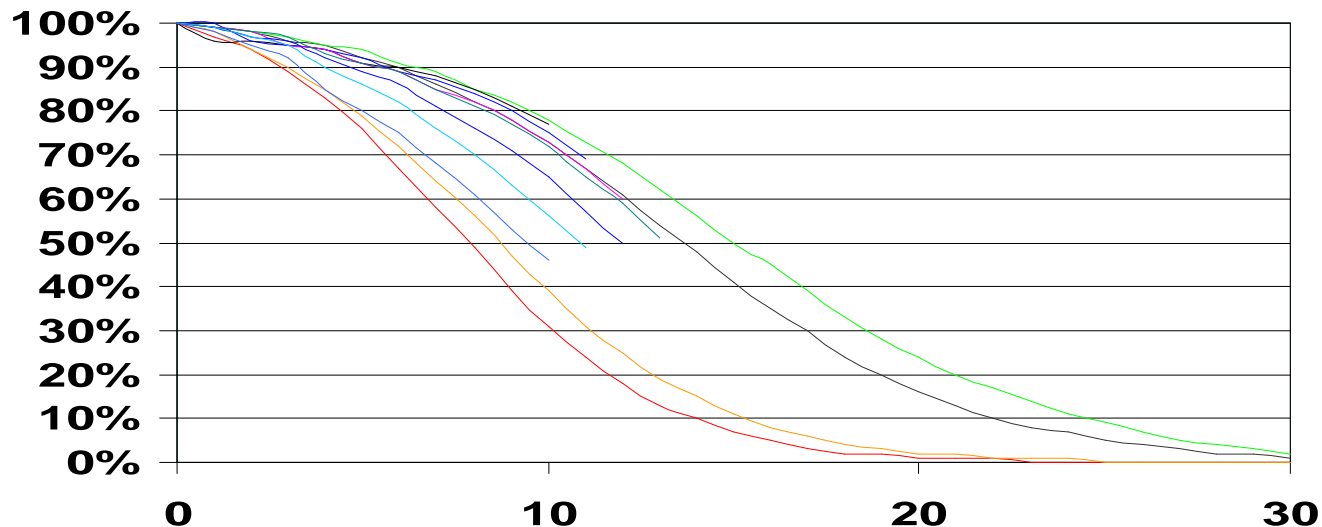
- Recycling will grow as auto aluminum returns from the “urban mine”
- Aluminum can be recycled many times (~1% loss per cycle)



# Recycling / Metal Supply

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- Auto aluminum usage will continue to increase based upon fuel efficiency, lightweighting and safety,
- Vehicles are lasting longer, now 15-18 years



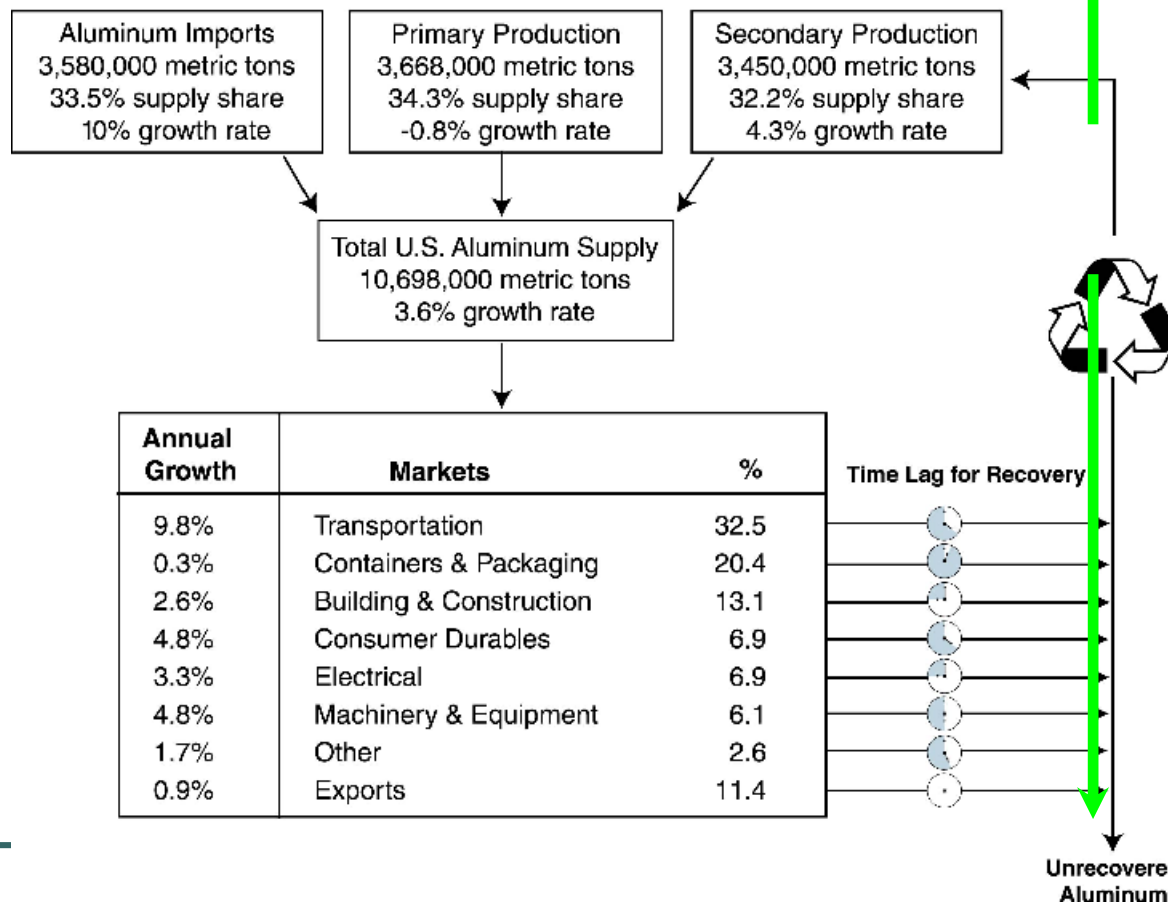
## Metal Supply

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- Two largest areas are cans and autos
- Can recovery reached ~67% in early 1990's – now at ~50%; cultural, societal and technical issues
- Auto metal recovery >90%; aided by regulations, shredders and lack of individual choice.
- Recovery of Al from autos will exceed all other scrap sources beyond 2005

# U.S. Aluminum Markets

## Aluminum Market and Growth



## Scrap recovery and Sorting

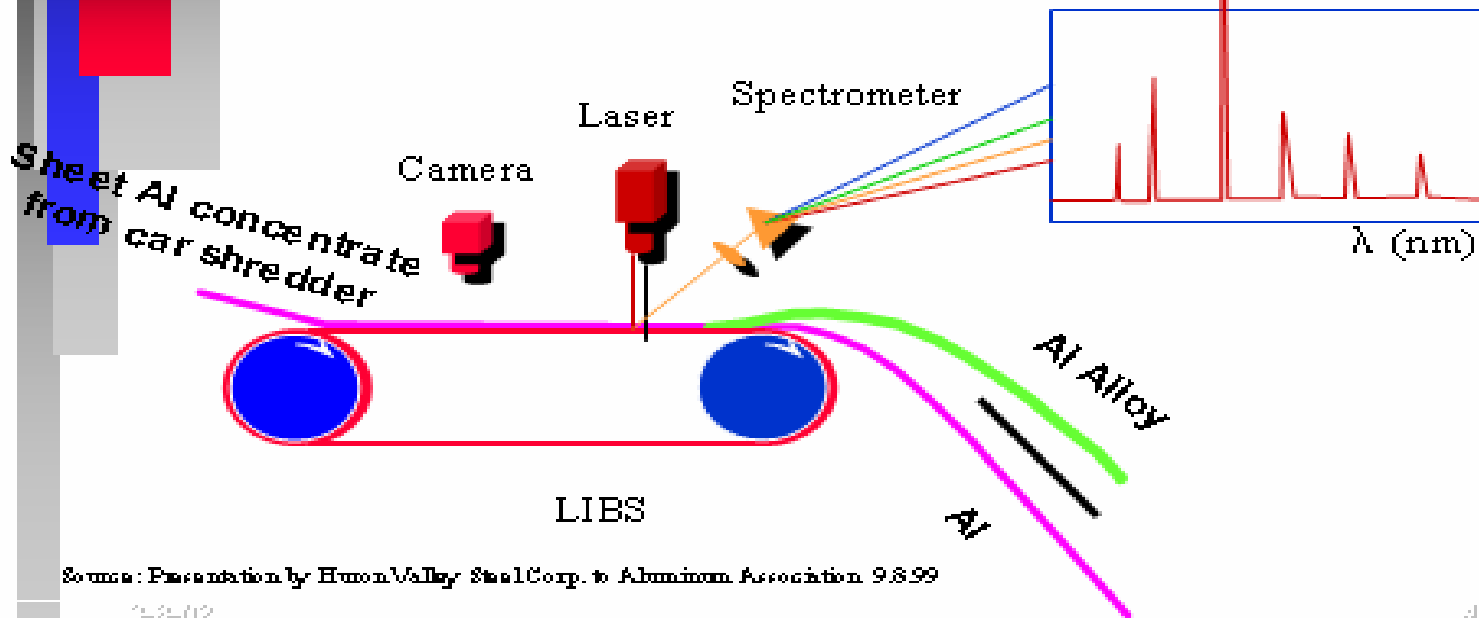
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- Recent developments aid recovery
- Existing technology—shredding (4in), fluff separation, magnetic separation, heavy media separation, eddy current separation
- New technology –color sorting (cast from wrought with some alloy sorting), LIBS (enables alloy by alloy sorting)

# Alloy Sorting

## Alloy Sorting by Laser Induced Breakdown Spectroscopy

Technology spin off from Alcan work in early 90's  
Now subject of Auto Aluminum Alliance program with Hiron Valley



Source: Presentation by Hiron Valley Steel Corp. to Aluminum Association 9/8/99

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## Issues

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- Scrap availability – how long will China and India monopolize exports?
- Can sustainability become a marketing asset for aluminum?
- Reasons behind decline of can recycling?
- Differences between auto and can recycling—how to encourage recycling?
- Can new programs assist with manpower needs? Collaborative efforts a partial solution?

## Primary Metal Supply

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- Rate of decline of existing smelters?
- New technology successes, and timing?  
Carbothermic reduction, vertical HH concepts
- Both these technologies have smaller production footprint, co-location with fabrication plant would enable molten metal shipments

## Manpower

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- Aluminum is mature industry in need of next generation manpower
- Need to convey excitement of recent developments, high tech aspects (LIBS), even though industry is mature
- Sloan Foundation, Secat /UK and DOE university projects will help train next generation

## Sustainability “successes”

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- Some examples

Martin Marietta Refractories -- brine field experience

Aluminum smelters – suppression of anode effect and PFC reductions

New architecture – energy savings in London’s “gerkin” building

## Summary on Recycling

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- Major domestic source of metal supply
- Aids sustainability—energy and emissions
- Should continue to grow rapidly, assuming a viable scrap supply
- Shredding and sorting technologies are available
- Metal flows can be modeled; auto scrap exceeds other forms after 2005