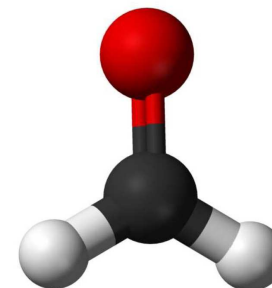


**HEXION™**

Specialty Chemicals

## Global Formaldehyde Update

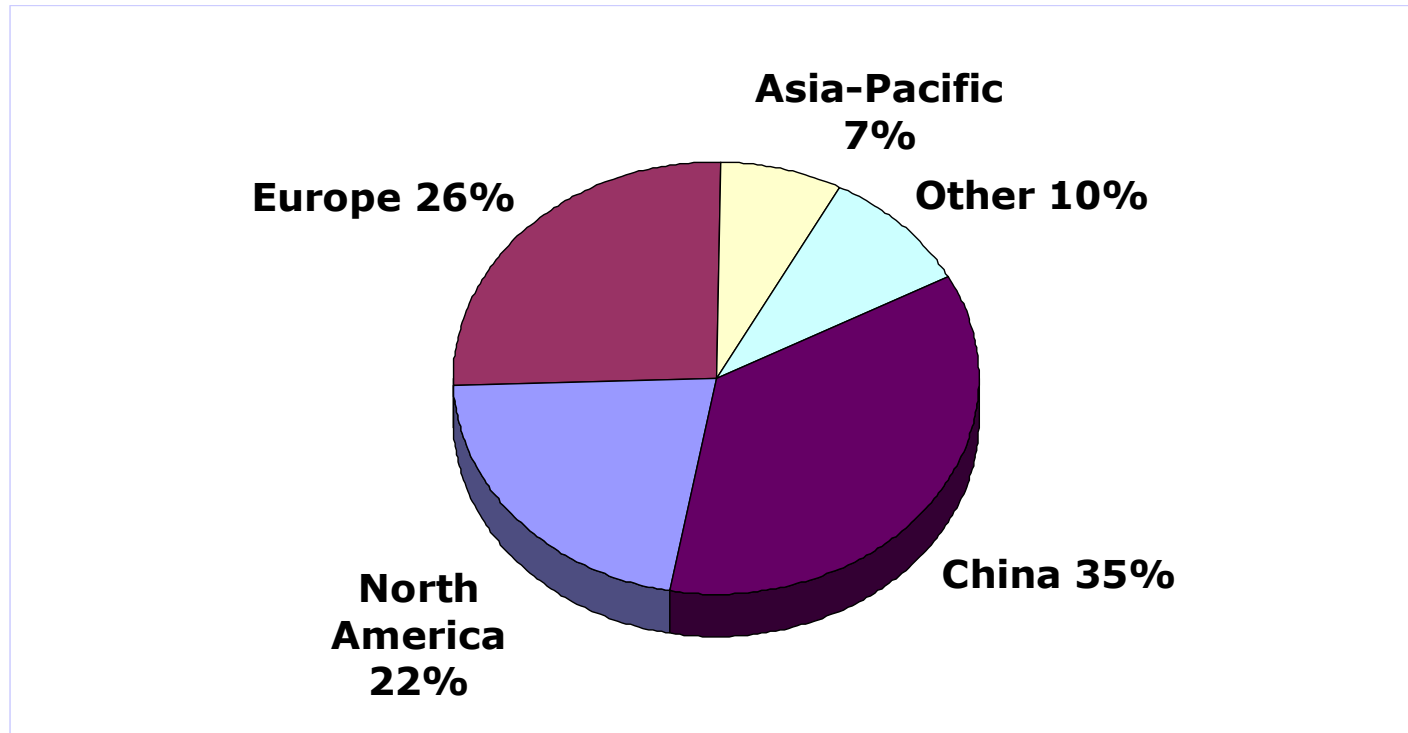


Scott Earnshaw  
Technical Manager - Australasia

# Economic Benefit

## Global Formaldehyde Production

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- ▶ Europe: 7.3 million Mt/annum
- ▶ North America: 6.1 million Mt/annum
- ▶ Asia Pacific: 2.1 million Mt/annum
- ▶ China: 10.0 million Mt/annum
- ▶ Other: 2.7 million Mt/annum

**Total:** 28.2 million Mt/annum

Source: Global Insight Inc.- FormaCare

# Economic Benefit Scale

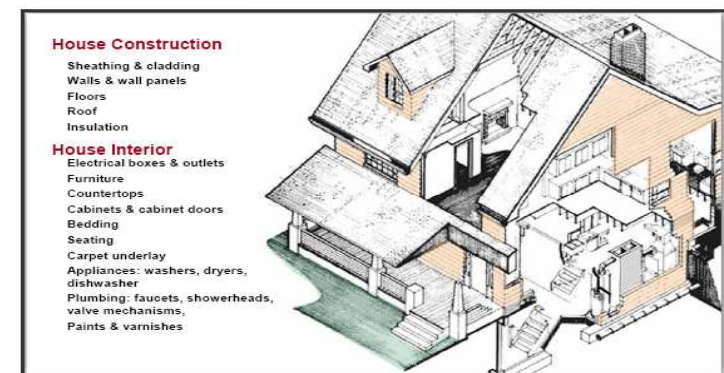
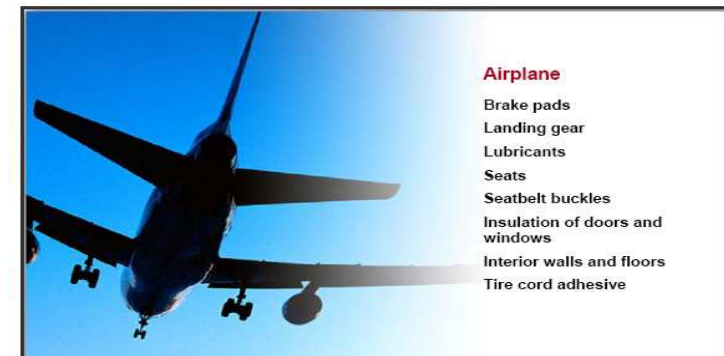
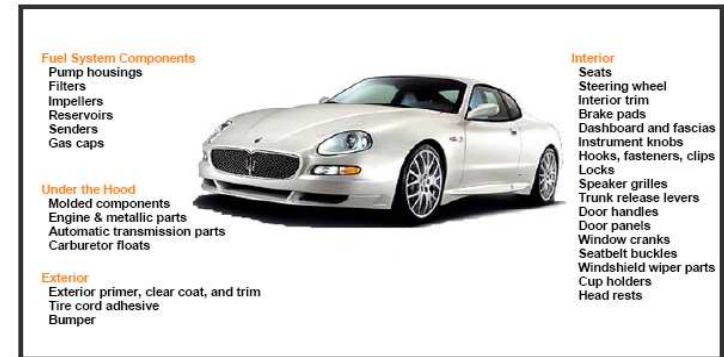
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## European Community

- €29 billion/annum calculated economic benefit
- €300 billion worth of sales resulting from industry activities
- 1.7 million employees directly involved in the industry and 4 million indirectly

## North America

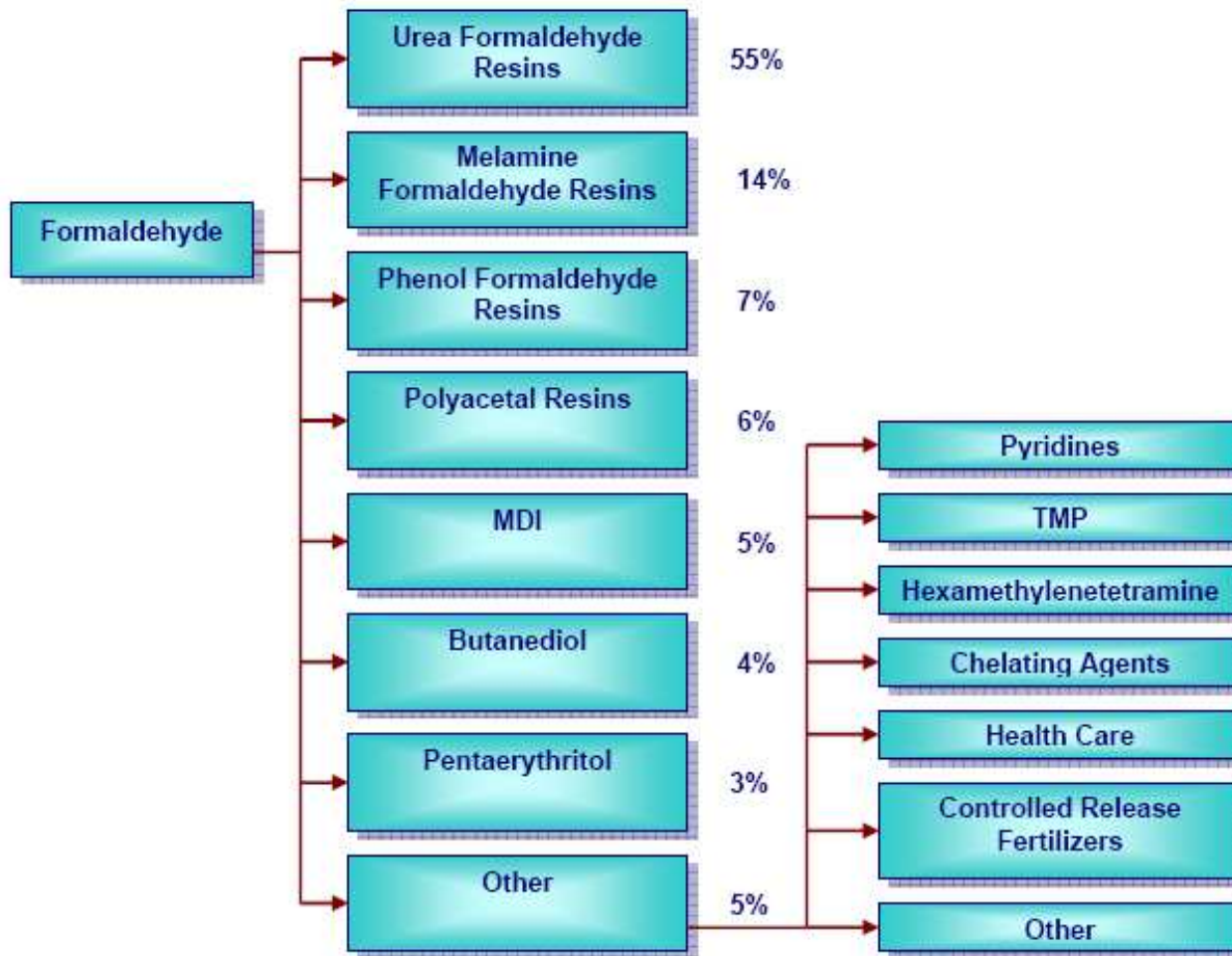
- USD500 billion worth of sales resulted from industry activities
- 0.7 million employees directly involved in the industry. 4 million indirect jobs.



Source: Global Insight Inc.- FormaCare 2007

# Economic Benefit Product Tree for Formaldehyde

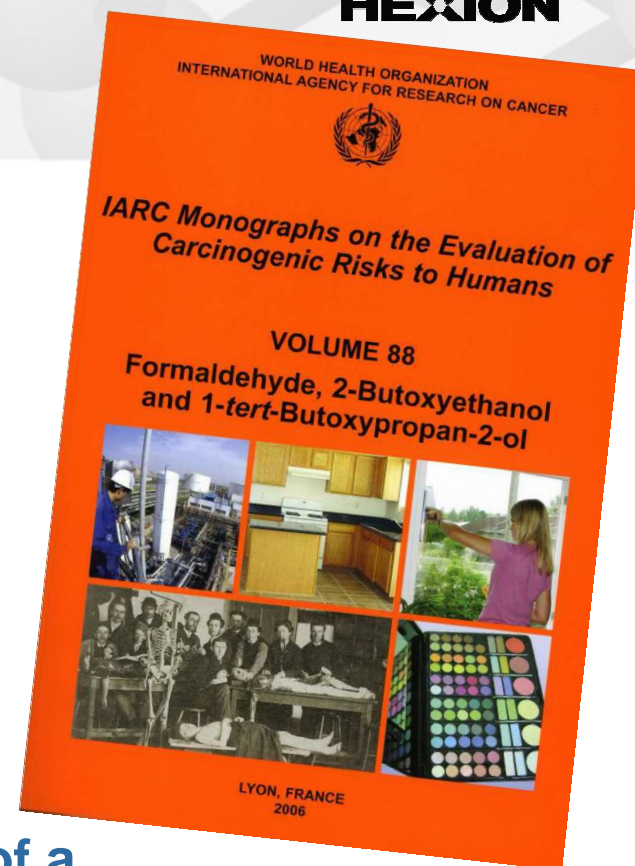
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# Europe Chemical Assessment

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- IARC (International Agency for Research on Cancer) Volume 100 Monograph Working Group Meeting, Lyon, France, 20 – 27 October 2009
  - ▶ IARC Evaluation of carcinogenic risks to humans
  - ▶ **“In a divided opinion, IARC concludes there is sufficient evidence in humans of a causal association of formaldehyde with leukemia”**
  - ▶ Unpublished Chinese study had a significant influence on Working Group
    - ▶ Average formaldehyde exposure of 1.3ppm



- REACH (Registration Evaluation Authorisation and Restriction of Chemicals) – European Parliament management of chemicals initiative
  - ▶ French Government preparing discussion dossier supporting the harmonisation of the classification of formaldehyde as 1a or 2a carcinogen under REACH. Due by end of 2009.
    - ▶ Currently formaldehyde is classified as a Category 3 “Possible Carcinogen”
  - ▶ If this occurs formaldehyde is likely to be classified as a SVCH (Substance of very high concern)

# Europe Wood Panels

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- EPF (European Panel Federation) have proposed a voluntary wood panel emission standard of half-E1 (E0.5) termed EPF-S
  - ▶ EPF to meet with CARB (California Air Resources Board) to discuss adoption of EPF-S as an equivalent to CARB Phase II with the aim to bypass CARB certification requirements
- IKEA - E0.5
  - ▶ E0.5 demanded
  - ▶ Plan to change from an extractable formaldehyde method (Perforator) to a passive emission method (Desiccator, chamber, etc.). Method yet to be confirmed.
  - ▶ Forcing defacto standards and EU country consistency
  - ▶ F4\* emission requirement – “a matter of time”



- REACH

- ▶ Composite wood panels may be classified in the future as “articles” under REACH requiring registration

- ▶ One interpretation to be debated . . .

Under REACH “registration is only required if an article intentionally emits a substance under conditions of its intended use.”

- ▶ Wood panels do not intentionally emit any more than natural wood.

# Europe cont. Work Place Exposure

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- 3<sup>rd</sup> EU Directive for (20 substances) ILEOV's (Occupational Exposure Limits) Meeting – 31<sup>st</sup> March 2009.
  - ▶ EU directive aimed at aligning European chemical substance occupational exposure limits
  - ▶ Formaldehyde not included in 20 substances, pending EPF and FormaCare sponsored human study due for completion in 2011.

- National Toxicological Program (NTP) Expert Panel concludes formaldehyde should be reclassified as a ‘Known Carcinogen’ - 12<sup>th</sup> Report on Carcinogens (RoC): November 2009
  - ▶ Based on worker exposure studies
  - ▶ Found evidence of links to nasopharyngeal cancer, sinonasal cancer and myloid leukemia
  
- ▶ US EPA (Environmental Protection Agency) authorised in January 2009 for the National Academy of Sciences (NAS) to conduct a thorough review of formaldehyde
  - ▶ Not started

# North America

## Work Place Exposure

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- No change
  - ▶ TWA: 0.75ppm (8 hour work period)

# North America Wood Panels

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## CARB (California Air Resources Board) Airborne Toxic Control Measure for Formaldehyde Regulation 11 months on . . .

- ▶ Minimal Pain and strong support in California in achieving Phase 1
- ▶ Vast majority of US MDF and particleboard plants meeting CARB Phase I requirements
- ▶ No CARB enforcement actions imposed
- ▶ No CARB furniture disassembly and testing protocol developed
- ▶ CARB completing testing laboratory interlab..
- ▶ No CARB regulation changes expected



# North America

## Wood Panels Cont.

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### CARB Airborne Toxic Control Measure for Formaldehyde Regulation 11 months on . . .

- ▶ CARB Phase I Wood Panels in strong demand by other US states and Canada
- ▶ MDF and Particleboard Plants trialling CARB Phase II but no mills commercially producing yet.

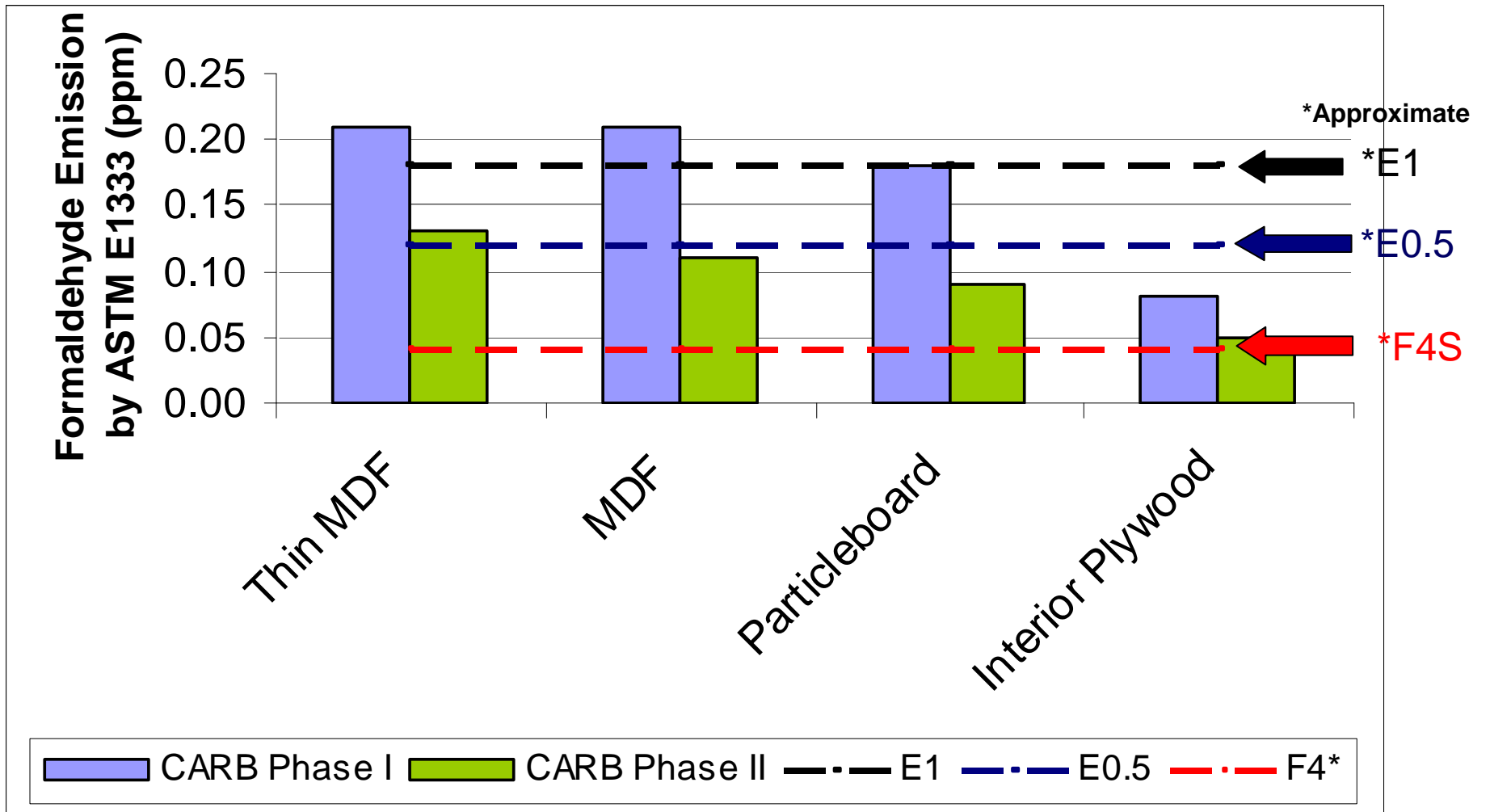
### CARB Phase II compliant Mills (US)

- ▶ Plywood: 23 out of 33 Mills
- ▶ Particleboard: 6 out of 30 Mills
- ▶ MDF: 2 out of 17 Mills
- ▶ Foreign Mills: 613 Mills (CARB Phase 1 compliant)
- ▶ No other US States have adopted the CARB regulation
- ▶ Composite Panel Association have supported the Sierra Club and other environmental groups for Congress to adopt CARB Phase II as a National Standard



# North America Wood Panels – CARB Phase I & II

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Source: Hexion Specialty Chemical 2009

# North America

## Wood Panels Cont.

**HEXION**

- ▶ Plywood industry
  - ▶ Meeting low 0.08ppm Phase I requirement and 0.05ppm Phase II requirement (1<sup>st</sup> January 2010)
  - ▶ The plywood industry came from a low level

# Asia Pacific Work Place Exposure

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- New Zealand DoL (Department of Labour) propose:
  - ▶ TWA: 0.3ppm (1.0ppm ceiling currently)
  - ▶ STEL: 0.6ppm
  
  - ▶ DoL: In-line with global regulated limits(?)
  
  - ▶ DoL position paper issued proposing the Brief and Scala method for TWA calculation be used where shifts are longer than 8 hours:
    - ▶ Effectively a 12 hour shift would mean the TWA is adjusted to 0.15ppm
  
- Industry consultation meeting on 25<sup>th</sup> November 2009 in Wellington

- AWPA propose to adopt 0.7mg/L formaldehyde emission ceiling level for PB and MDF as per ISO Standard for Australian market by January 2011
- The Green Building Council introduced in June 2009 a revised Green Star (Office interior) credit system
  - ▶ 1 Credit for  $\leq 1.0$ mg/L (E1) Wood Panels
  - ▶ 2 Credits for  $\leq 0.3$ mg/L [mean] (F4\*) Wood panels

# Alternative and Green Binder Technologies

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- Hexion is actively devoting attention to alternative binder technologies
  - ▶ Require:
    - ▶ Sustainable
    - ▶ Safe
    - ▶ High volume
    - ▶ Long term cost effective raw material supply
  - ▶ Established research programme with TTS Inc. (Tekle Technical Services Inc.) Canada, to develop bio-based adhesives in August 2009
  - ▶ Hybrid resin systems incorporating raw material substitution



# FCANZ

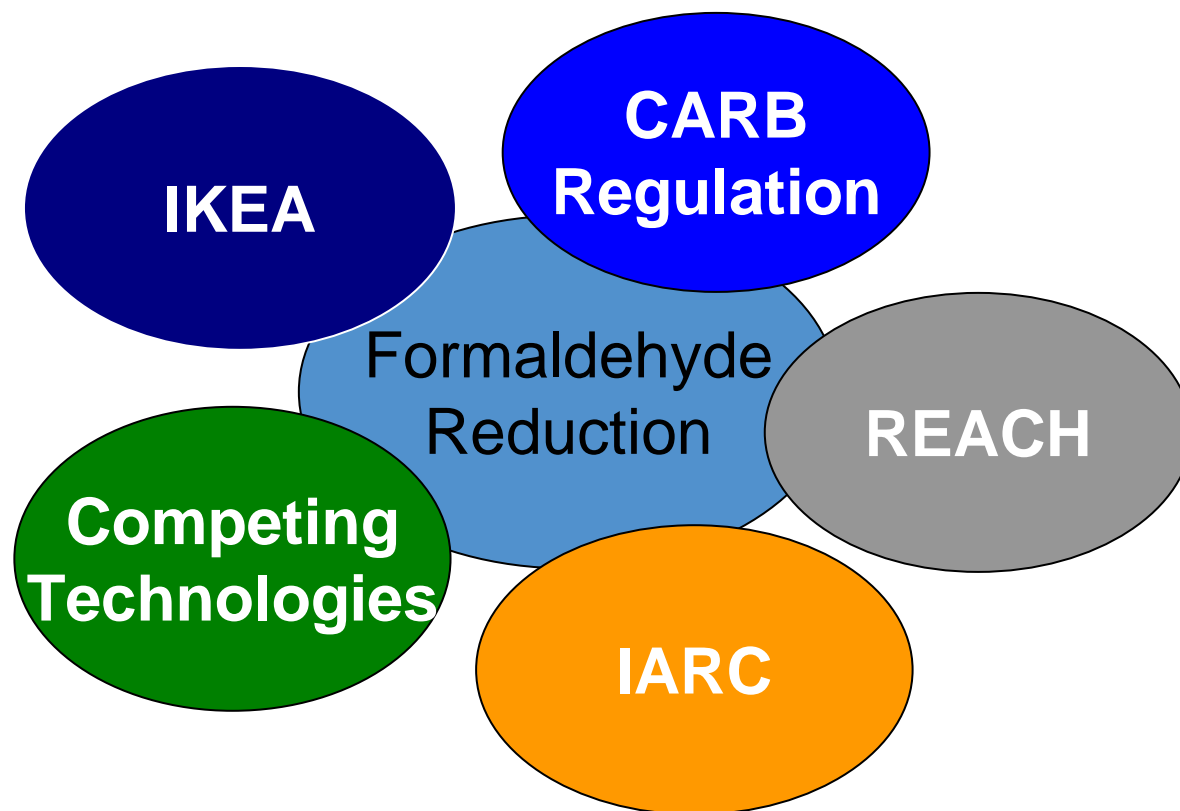
Formaldehyde Council of Australia and New Zealand

- Funded Industry advocacy group (LLC)
- Foundation Members
  - ▶ Dynea Australia and New Zealand
  - ▶ Woodchem Australia
  - ▶ Hexion Australia and New Zealand
- Establishing strong links with CEFIC FormaCare and the Formaldehyde Council Inc.



# Current Key Drivers

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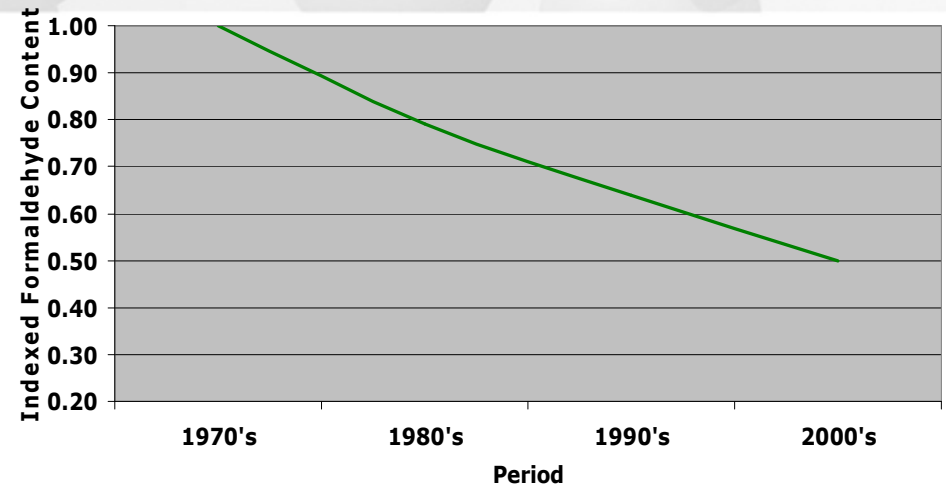


# Summary

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## Resin Formaldehyde Content

- Hexion continues to develop low formaldehyde emitting adhesive systems to manufacture composite wood panels
  - ▶ Formaldehyde emissions approach that of natural wood
- Hexion has increased it's activity to support industry in the use of low formaldehyde emitting based binder systems
- Hexion is developing and commercialising a range of viable alternative binder systems



- Nexant Chem Systems PERP Report – Formaldehyde and Derivatives. July 2006
- Global Insight Reports – Socio-Economic Benefits of Formaldehyde to the European Union (EU25) and Norway. June 2007
- Formaldehyde Council Inc.
- California Air Resources Board  
<http://www.arb.ca.gov/toxics/compwood/compwood.htm>
- FormaCare <http://www.formaldehyde-europe.org/>
- IARC <http://www.iarc.fr/>

# Questions?