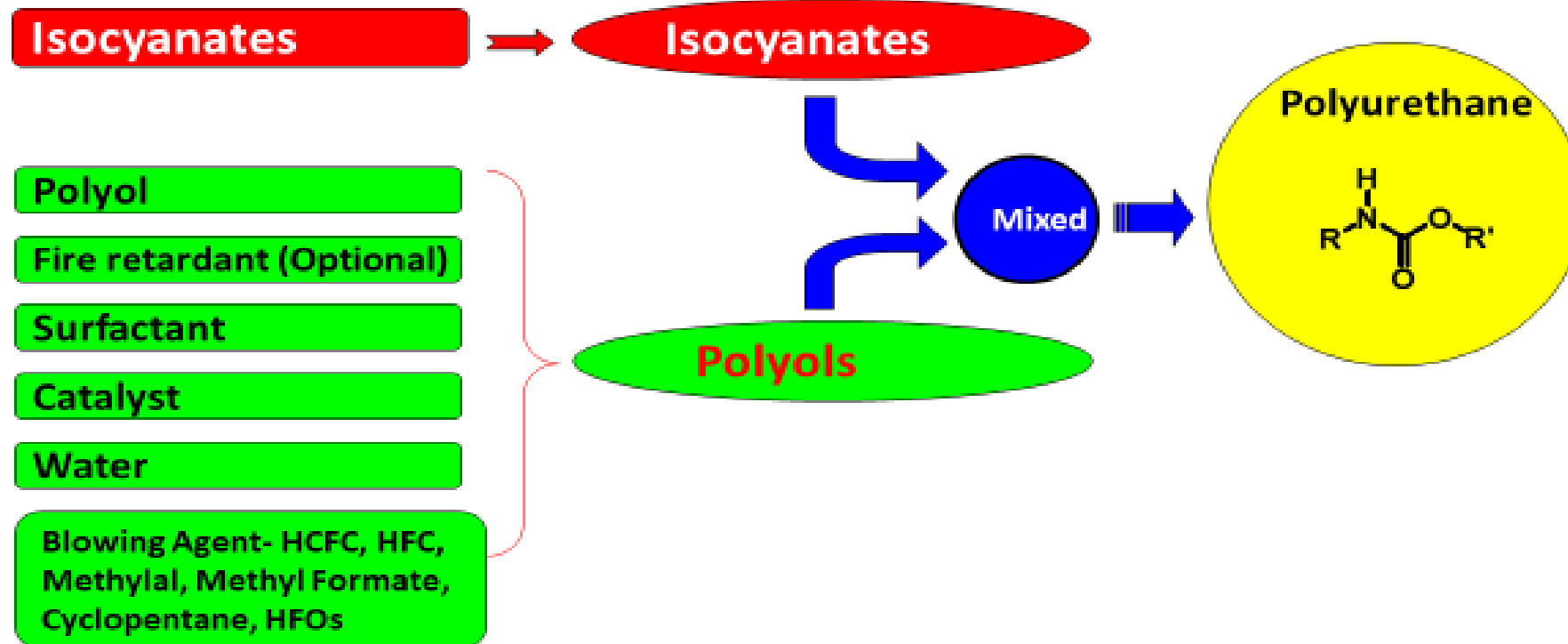


ecomate®

Cost Effective – Blowing Agent
For
Polyurethane Foam Applications

Partnership For A Better Environment

* POLYURETHANE BASIC CHEMISTRY



2

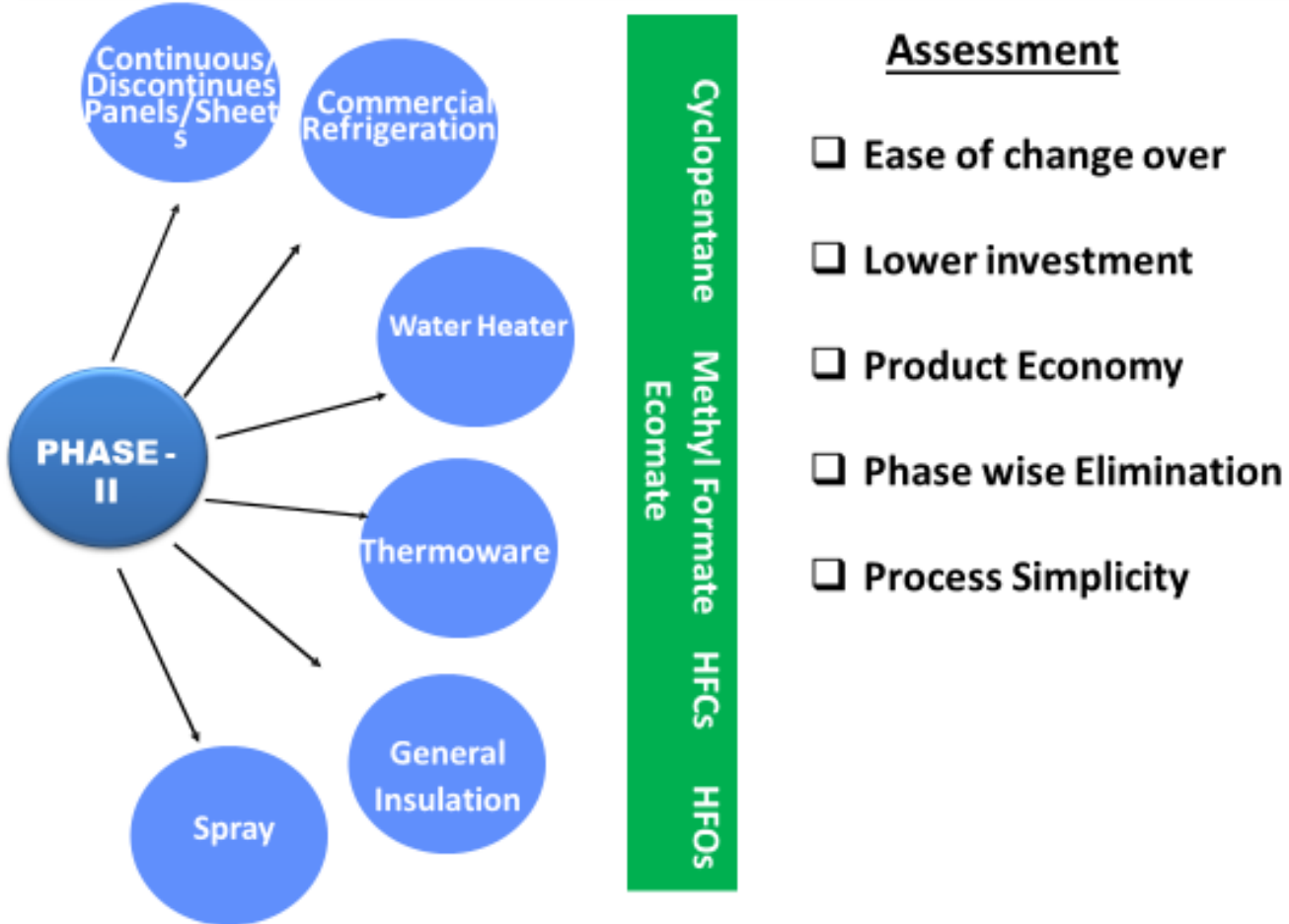
BLOWING AGENT CONSUMING PU SECTORS

- **Domestic Refrigeration / Appliances**
- **Commercial Refrigeration**
- **Continuous Panel & Discontinuous Panel**
- **General Insulation**
- **Spray Foam / In-Situ applications**
- **Thermo ware/ ice boxes**
- **Integral Skin Foam (ISF)**

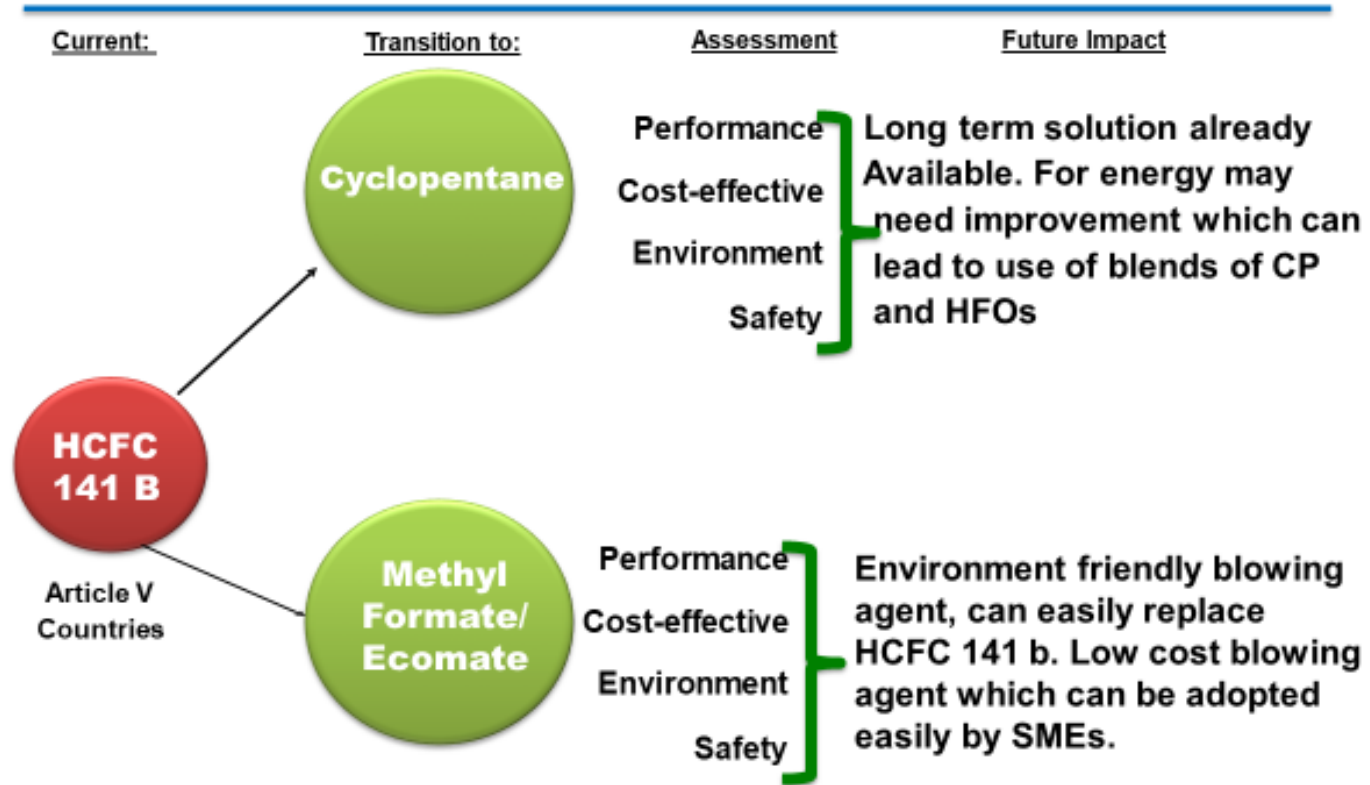
Alternative Blowing Agents Foam Properties

Properties	HCFC-141b	Cyclopentane	Methyl Formate (Ecomate)	HFC – 245fa	Solstice	FEA 1100
Density(Kg/m ³)	33-36	36-40	38-40	33-35	30-35	32-35
Compressive Strength (Kg/Cm ²)	1.5-1.8	1.6 -1.9	1.6-1.8	1.8-2.1	1.5-1.6	1.5-1.6
K-Value (W/m ^{°k})	0.020 – 0.021	0.0205 – 0.023	0.0205 – 0.023	0.0190-0.0210	0.0192-0.0195	0.0185-0.0190
Dimensional Stability (%)	<1	<1.25	< 1.5	<1	<1	< 1
Closed Cell Content (%)	> 90	> 90	> 90	>92	>92	> 92

Phase - II Elimination: : 1st Jan 2015 to 31st Dec 2019



Transitioning from HCFC 141b



WHAT IS *ECOMATE*[®] ?

ecomate[®] is a liquid blowing agent or foam expansion agent

ecomate[®] is an alternative to 141b for rigid and flexible applications

ecomate[®] has properties similar to 141b

ecomate[®] is cost competitive

ECOMATE[®] REGULATORY

- ✓ US EPA SNAP Approved
- ✓ RoHS and Wee Compliant
- ✓ GRAS Approved
- ✓ Non-Toxic
- ✓ VOC-Exempt
- ✓ Montreal & Kyoto Protocol Compliant
- ✓ UL, FM & USCG Classified Systems

ECOMATE® CONCLUSIONS

ecomate® is environmentally safe

- Meets Montreal Protocol Regulations
- Meets Kyoto Protocol Regulations
- LCA [Life Cycle Analysis] compliant

ecomate® is cost competitive

ecomate® is a safe option

ecomate® is available in your market

TRY IT ... AND YOU WILL APPRECIATE IT

ecomate – a proven solution

- In the world market for more than a decade. Proven in wide range of applications since 2002, including refrigeration, marine, automotive, construction , sandwich panels, spray foam and many more
- Most thermal efficient Blowing agent
- Can replace HCFCs, HFCs, HCs & HFOs Environmentally Benign and Economically advantageous
- Regulator complaint-US EPA, SNAP, MONTREAL AND KYOTO Protocol
- properties similar to 141-b with half the molecular weight, hence less quantities
- for same density. Hence cost effective
- Ease of change over with minimal capital expenses. Means very ideal for change over for SMEs. Can be processed through standard and/existing equipments
- ECOMATE is stored and shipped in metal containers.
- Excellent miscibility with all major Polyols and compatible with most PU raw materials
- No need to emulsify blowing agent
- Blended POLYOL does not possess any fire risk
- Available worldwide

13

Questions?



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Innovation

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THANK YOU FOR YOUR TIME



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