



Environmental, Safety and Health Chapter ITRS 2008

ESH ITWG

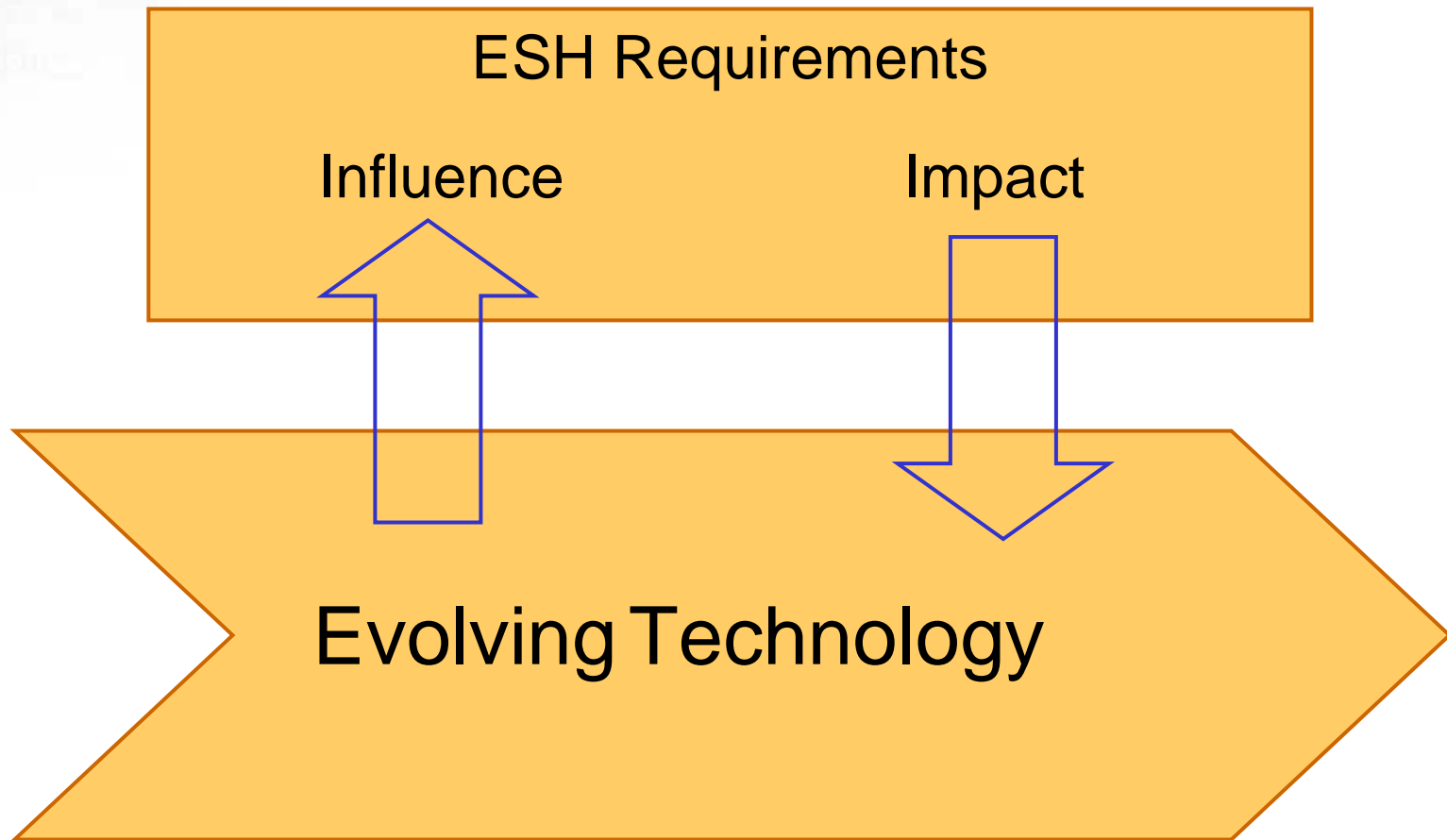
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Impact to Technology from ESH Policy



Prioritization of ESH Requirements

Table ESH3a Chemicals and Materials Management Technology Requirements—Near-term Years

The Environment, Safety, and Health new chemical screening tool ([Chemical Restrictions Table](#)) is linked online

Year of Production	2007	2008	2009	2010	2011	2012	2013	2014	2015
Interconnect									
Low-κ materials—spin-on and CVD Enabling	Establish chemical utilization* and process byproducts baseline	Maintain or improve chemical utilization* by 10%		Maintain or improve chemical utilization* by 10%			Maintain or improve chemicals utilization* by 10%		
Copper deposition processes (conventional and alternative) Enabling	75% copper reclaimed/recycled	85% copper		<p>Critical - Essential item for the implementation and success of the technology</p> <p>Enabling - Important item for the implementation and success of the technology</p> <p>Improving - Useful item for the implementation and success of the technology</p>					
Advanced metallization including barrier and nucleation deposition Improving	Establish chemical utilization* and process byproducts baseline	Maintain or improve chemical utilization* and process byproducts		<p>Critical - Essential item for the implementation and success of the technology</p> <p>Enabling - Important item for the implementation and success of the technology</p> <p>Improving - Useful item for the implementation and success of the technology</p>					
Planarization methods Enabling	Characterize emissions and consumables; establish baseline.	> 15% Reduction in consumables from baseline					2% reduction in consumables per year		
Plasma etch Critical	Alternatives with improved ESH impacts. Maintain or improve chemical utilization*; characterize process byproducts.	Alternatives with improved ESH impacts. Maintain or improve chemical utilization* by 10%; minimize process byproducts.		Alternatives with improved ESH impacts. Low ESH impact chemistries. Maintain or improve chemical utilization* by 10%; minimize process byproducts.			Alternatives with improved ESH impacts. Low ESH impact chemistries. Maintain or improve chemical utilization* by 10%; minimize process byproducts.		



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Proposed Changes to Table_{H₂O}

Site water consumption reduction is the primary target – ensures sustainable growth of the semiconductor industry

Year of Production		Near-term Years									Long-term Years					
		2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
WAS	Total fab tools (kWh/cm ²) [2]	0.40-0.35		0.35-0.30			0.30-0.25			0.25						
Is																
WAS	Total fab energy usage (kWh/cm ²)	1.5-1.3		1.3-1.1			1.1-1.0			1.0-0.75						
Is		0.8-0.7		0.7-0.6			0.6-0.5			0.5						
WAS	Total fab support systems energy usage (kWh/cm ²) [2]	0.8-0.6		0.6-0.5			0.5-0.4			0.4-0.25						
Is		0.40-0.35		0.35-0.30			0.30-0.25			0.25						
Is	Net feed water use (liters/cm²) [2]	15	15-12	12-10			10-8			8-6						
Is	Fab UPW use (liters/cm²) [2]	8	8-7	7-6			6-4			4-3						
Is	Total fab* energy consumption (kwh per cm2) [4]	4.9		4.6			4.35			4.2		4.4				
WAS	Total fab* water consumption (liters/cm ²) [1]	14		12.5			11			10		9				
Is		7.8		6.5			5.4			4.4		4.4				
WAS	Total UPW consumption (liters/cm ²) [1]	8		7			6			5		5.5				
Is																
WAS	UPW recycled/reclaimed** (% of use)	70		75			80			85		90				
Is		70		75			80			85		90				

Facility power consumption reduced

Delete redundant information

Considers Recycling/reclaim rate

Needs review in 2009

Work needed



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2009 Challenges

Reorganize requirements to topical focus from functional area focus

[Table ESH3a Chemicals and Materials Management Technology Requirements](#)

Hazard, POPs, New chemicals, Nano

[Table ESH4a Process and Equipment Management Technology Requirements](#)

PFC, Energy, Material utilization

[Table ESH5a Facilities Energy and Water Optimization Technology Requirements](#)

Energy, Waste, Emission impact

[Table ESH6 Sustainability and Product Stewardship Technology Requirements](#)

Green Fab

Adjust scope on Factory requirements (wafer size vs. functionality)

[450mm, new 300mm and Existing factories with new technology](#)

Additional 2009 Challenges

[Supplementary Material \(Scope Documents\)](#)

[ERM/ESH Material Table](#)



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