

Manufacturing Productivity

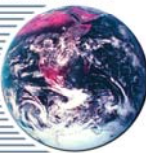
Feel overwhelmed at times?

Let's avoid drowning!

Where do you Start?

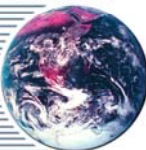
- Look at your costs
- Look at your energy, gas, water & material usage
- Look at your scrap losses
- Look at your cycle time and down time
- Look at major loss events

Select the greatest Loss, Scrap, cost areas first



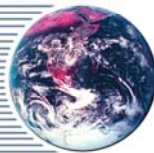
Initial Reaction

- It costs too much
 - It's not proven
 - Can't afford the down time
 - ROI too far out
- **THEY are ALL WRONG!!!!**



Here is what was found!

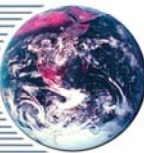
			APPLICATIONS											
			Process Tools, Clean Area						Pump Chases, Facilities					
			CMP	Diffusion	CVD	Venting/ Exhaust	Mains/ Laterals Supply	Com- pressed Air	Process Chilled Water	Burn Boxes	DI Water Filter	Gas Cylinders	Boilers	Pumps
COST	Materials	Process Gases, Consumables				\$\$\$		\$		\$	\$\$\$			
		Energy, Water, Utilities			\$	\$		\$		\$				
		Scrap	\$\$\$	\$\$\$	\$\$\$			\$\$\$		\$\$\$				
	Labor	Planned Maintenance			\$\$\$			\$\$\$		\$\$\$	\$\$\$	\$\$\$	\$\$\$	\$\$\$
		Trouble-shooting	\$	\$	\$	\$	\$	\$		\$	\$	\$	\$	\$
		Rework, Recovery					\$							
	Equipment	Parts												
		Breakdown Replacement							\$		\$			
	Down Time	Loss of Production	\$	\$	\$		\$	\$	\$\$\$	\$\$\$	\$\$\$	\$	\$	\$



Here is what we found

- The yield loss model

Potential Gauge Impact Assessment	Model Fab 4" wafer 12.5" sq. (avg)	Model Fab 6" wafer 28" sq. (avg)	Model Fab 8" wafer 50" sq. (avg)	Model Fab 12" wafer 112.5" sq. (avg)	Target Fab 8" wafer 50" sq. (avg)
Gauge Upgrade Fee	\$1,250	\$1,250	\$1,250	\$1,250	\$1,250
Gauge Upgrade Maintenance	\$188	\$188	\$188	\$188	\$188
WGR Units Installed	1,455	1,455	1,455	1,455	176
Equipment	1,415	1,415	1,415	1,415	130
Facilities	0	0	0	0	30
Process	0	0	0	0	5
Wafer Handling	40	40	40	40	10
Other	0	0	0	0	1
Gauge Cost	\$1,818,750	\$1,818,750	\$1,818,750	\$1,818,750	\$220,000
Maintenance Cost	\$272,813	\$272,813	\$272,813	\$272,813	\$33,000
Gauge Cost	\$2,091,563	\$2,091,563	\$2,091,563	\$2,091,563	\$253,000
Yield Improvement Attributable to WGR	2.31%	1.79%	1.28%	0.77%	0.19%
WGR Yield Improvement (Monthly)	\$198,896	\$348,157	\$442,247	\$596,995	\$65,334
Annual Revenue Improvement	\$2,386,749	\$4,177,887	\$5,306,963	\$7,163,938	\$784,013
Break-even Month	11	6	5	4	4



Measure & Monitor non-Invasively



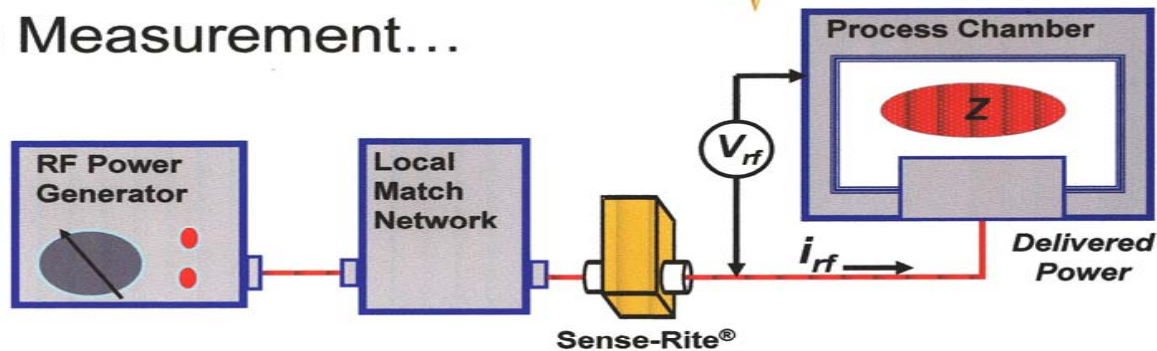
Wireless

Non-Intrusive Reader Mounts On Top of Existing Gauge in Minutes...

Alarming, Trending, Historization for Process/Asset Monitoring.

Another approach: RF End Point Detection

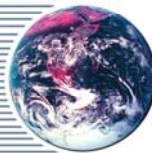
It's All Possible Because of  FORTH-RITE®
the Measurement...



- The Sense-Rite® measurement technology is uniquely designed to provide “point of use” values for:
 - Voltage
 - Current
 - Phase
 - Delivered Power
 - Impedance (created by the plasma chemistry)
- Analogous to an MFC on the energy source to the process.

...Staying the Course

Forth-Rite Technologies, LLC
Confidential



The results

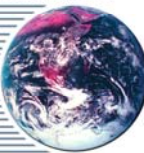
Summary



→ RF Endpoint provides clear benefits –

- Cost
 - 20% decrease in NF_3 consumption
- Particle Reduction
 - 25% reduction in STI process particles
- Productivity
 - Faster Etch rates increase in batch size
- Environment
 - 50% reduction in MMTCE associated Gases

**The key to success for Novellus is developing technology partnerships
for our older equipment**

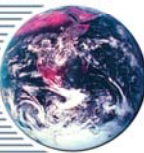


See, you don't have to drown!

- Must measure & monitor to:
 - Improve yield
 - Reduce energy, gas and material use
 - Reduce costs
 - Improve productivity
- Must implement RF monitoring
 - Reduce gas use
 - Shorten cycle time
 - Reduce costs

All Proven & in use today with fast ROI's!

Taylor Deinger
Partners Inc.



Affiliate of VLSI Research

THE END

- Thank you
- Our next speaker is:
 - Harry Sim, CEO, Cypress Systems

