



Where **Analog** and **Value** Meet

TSEM Investor and Analyst Online Conference

March 31, 2020

www.towersemi.com





Where **Analog** and **Value** Meet

Welcome and Introduction

Ms. Noit Levy

SVP, Investor Relations and Corporate Communications



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Safe Harbor

This presentation contains forward-looking statements within the meaning of the “safe harbor” provisions of the Private Securities Litigation Reform Act of 1995. These statements are based on management’s current expectations and beliefs and are subject to a number of risks, uncertainties and assumptions that could cause actual results to differ materially from those described in the forward-looking statements. All statements other than statements of historical fact are statements that could be deemed forward-looking statements. For example, statements regarding expected (i) customer demand, (ii) utilization and cross utilization of our Fabs, (iii) demand from our end markets, (iv) market and technology trends, and (v) results regarding revenues, cash flow, margins and net profits are all forward-looking statements. Actual results may differ materially from those projected or implied by such forward-looking statements due to various risks and uncertainties applicable to Tower Semiconductor’s business as described in the reports filed by Tower Semiconductor Ltd. (“Tower”) with the Securities and Exchange Commission (the “SEC”) and the Israel Securities Authority (“ISA”), including the risks identified under the heading "Risk Factors" in Tower’s most recent filings on Forms 20-F and 6-K. No assurances can be given that any of the events anticipated by the forward-looking statements will transpire or occur, or if any of them do, what impact they will have on the results of operations or financial condition of Tower Semiconductor. In addition, some of the financial information in this presentation, is non-GAAP financial measures, including, but not limited to, EBITDA, Cash, debt and Net Cash. These non-GAAP financial measures have the same definition as appear in our previously filed quarterly financial results related announcements and/ or other public filings.

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Where **Analog** and **Value** Meet

Opening

**A Resilient Growth Company in a Challenging Environment
“Where Analog and Value Meet”**

Mr. Russell Ellwanger

CEO



Key Messaging

Business & Market

On track with Q1 guidance.

Q2 outlook as per the beginning of the year expectation of quarter-over-quarter growth.

Business unit activities continue focus on key analog industry growth drivers.

Operations

All factories operating with no measurable impact from COVID-19.

Global/ regional diversity minimizes potential future disruptions.

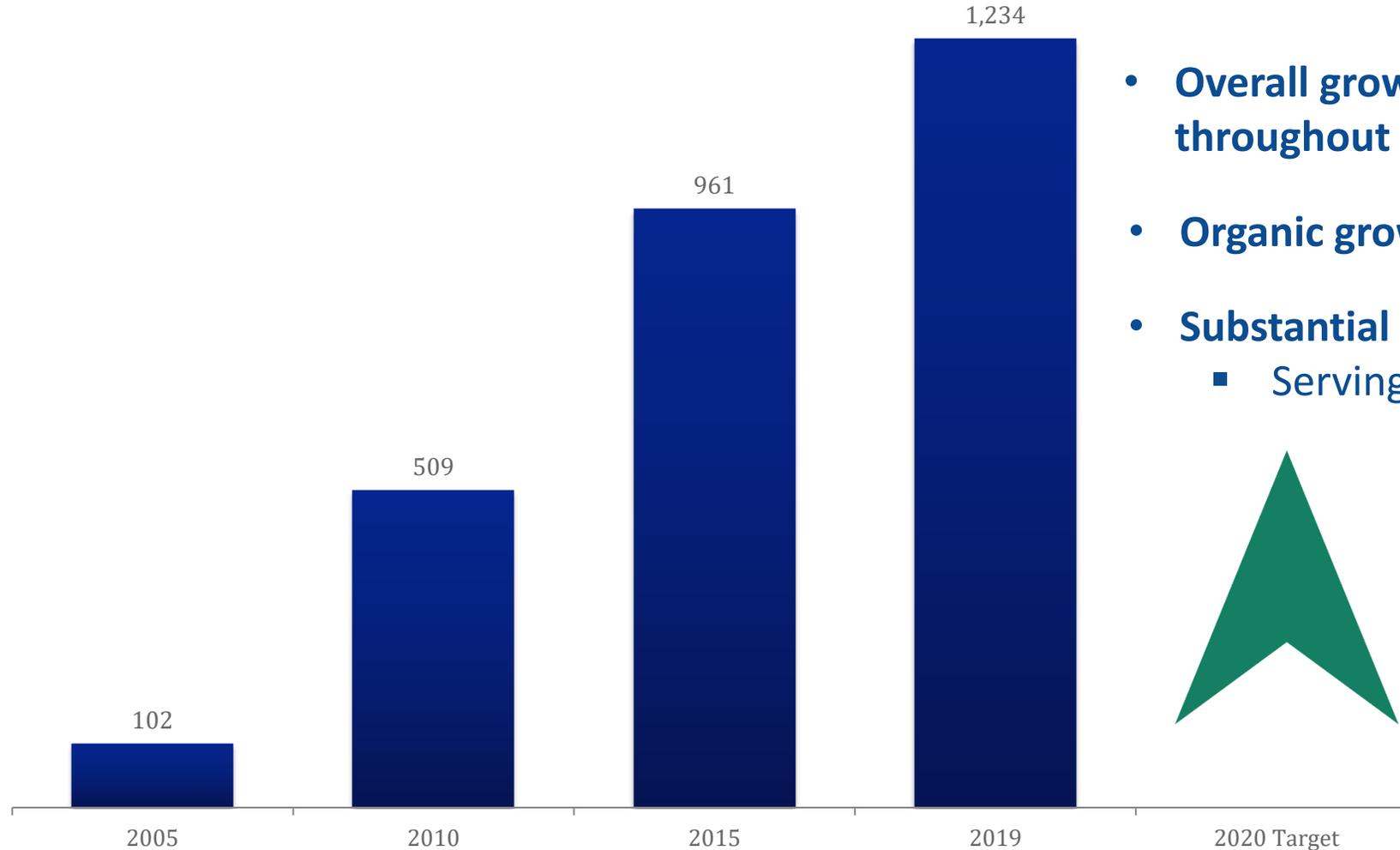
Financial

Strong financial and coverage ratios.

Comfortable Net Cash position with Cash at ~3X of debt.

Annual Revenues \$M – 5-year tracking – 2020 Target

As presented in NY on January 14, 2020



- Overall growth with growth throughout the year
- Organic growth of low double digit
- Substantial 300mm capacity capability
 - Serving all our business units

Semi Market Trends

Wireless Everything
Seamless Connectivity



31% of corporate revenues

Green Everything
Energy Efficiency



38% of corporate revenues

Smart Everything
Interactive Smart Systems



15% of corporate revenues

2022 vs. 2019 Projected Growth of Tower's Served Market

44% FEM and Optical
50% with SiPho

22% PMIC and Discrete

32% traditional CIS and analog sensors
Hundreds % with VR/AR and display

Wireless Everything - Seamless Connectivity

• Infrastructure

- >60% market share in optical transceivers (SiGe)
- Data center: expected to grow at 13% CAGR
- 5G: upgrade in progress moving from 10 to 25Gb/s
- Silicon Photonics - new, leading platform with >30 active customers.

• Wireless front-ends

- 5G: accelerating RF content growth (13% CAGR expected for RF SOI in the next few years)
- Increasing market share as demonstrating by 2019 over 2018 growth of >40%
- Best of industry 200mm and 300mm figure of merit with real time increases in capacity that is already “spoken for”.



Green Everything – Energy Efficiency

- **Power IC**

- Best in the world 300mm 65nm BCD figure of merits with strong tier-1 wins.
- 200mm increased SAM through expanded voltage range with industry leading figures of merit.

- **Power Discretes**

- We serve 5 of the 6 worldwide leading discrete makers.
- Behind firewall, continued development on new platforms.



Smart Everything - Interactive Smart Systems

- **Image Sensors**

- Strong share in traditional markets exhibiting growth (x-ray, high-end photography, machine vision), with best in the world figures of merit and continued road-map development.
- Long-term partnerships with absolute leaders for new, hence by definition, high growth markets (under screen fingerprint and advanced time of flight for facial imaging).

- **Non-imaging Sensors and Display**

- Differentiated gas, temperature, magnetic and non-magnetic axial motion sensors, VR/ AR novel display, as well as edge AI devices.



Semi Market Trends

Wireless Everything
Seamless Connectivity



Green Everything
Energy Efficiency



Smart Everything
Interactive Smart Systems



From Viola “MARKET OPPORTUNITIES IN SEMI: A VC PERSPECTIVE” report (February 2020)

- This era has opened three main market opportunities for semi companies:
 - Next-Gen Datacenters
 - Smart Machinery
 - Edge Computing

Rebranding

The logo features a blue horizontal bar above the word "Tower". The letters "T", "o", "w", and "e" are blue, while "e", "r", and "e" are green. Below "Tower" is the word "Semiconductor" in a black, sans-serif font.

Tower
Semiconductor

Where **Analog** and **Value** Meet

Our Vision

Provide the highest value analog semiconductor solutions as validated by our customers, employees, shareholders and partners.

Our Mission

Being a trusted long-term partner with a positive and sustainable impact on the world through innovative analog technologies and manufacturing solutions.

Value Vectors

We pursue excellence in all we do from ideation through product shipment. Hence, we deliver the best experience to our customers and employees

Being a trusted long-term partner for customers, employees and shareholders

Partnership

Leadership

Leading the analog ecosystem with technology and manufacturing solutions in exciting and growing markets

Excellence

Embedded in everything that we do

Making a positive and sustainable impact on the world

Impact

Innovation

An environment of innovation - moving great ideas into value

Rebranding

The logo features a blue horizontal bar above the word "Tower". The word "Tower" is written in a bold, sans-serif font with a color gradient from blue on the left to green on the right. Below "Tower" is the word "Semiconductor" in a black, sans-serif font.

Tower
Semiconductor

Where **Analog** and **Value** Meet

One Strong Global Company



Where **Analog** and **Value** Meet

Operational Continuity and Manufacturing Capabilities

Mr. Rafi Mor

Chief Operations Officer



High Quality and Flexibility of Worldwide Manufacturing Capabilities

Migdal Haemek, Israel



6", 150mm
Sensors, Power
1 μ m to 0.35 μ m

Migdal Haemek, Israel



8", 200mm
Sensors, Power, RF SOI
0.18 μ m to 0.13 μ m

Newport Beach, USA



8", 200mm
SiGe, MEMS, RF SOI
0.5 μ m to 0.13 μ m

San Antonio, USA



8", 200mm
RF SOI, Power
0.18 μ m

Tonami, Japan



8", 200mm
Power
0.18 μ m

Arai, Japan



8", 200mm
Sensors, RF SOI
0.13 μ m to 0.11 μ m

Uozu, Japan



12", 300mm
Power, Sensors, RF SOI
65nm to 45nm

All seven fabs have and continue to operate with good performance.

Measures to ensure business continuity and safer environment for employees:

- We have taken, and in many cases gone well beyond, measures and actions aligned to the relevant governmental instructions and requirements.
- Implemented a Work from Home policy for all jobs that can be done remotely.
- For onsite, implemented multiple protocols, including:
 - Social distancing
 - Minimizing frequency and attendance of in-person/ face-to-face meetings
 - Frequent cleaning of all public areas, including intense comprehensive clean of all heavy traffic areas before and after shift changes
 - Hygiene education
 - Implementing temperature measurement upon entering the facility
 - Video conferencing with customers and business partners rather than face-to-face meetings
 - All employee travel has been canceled.

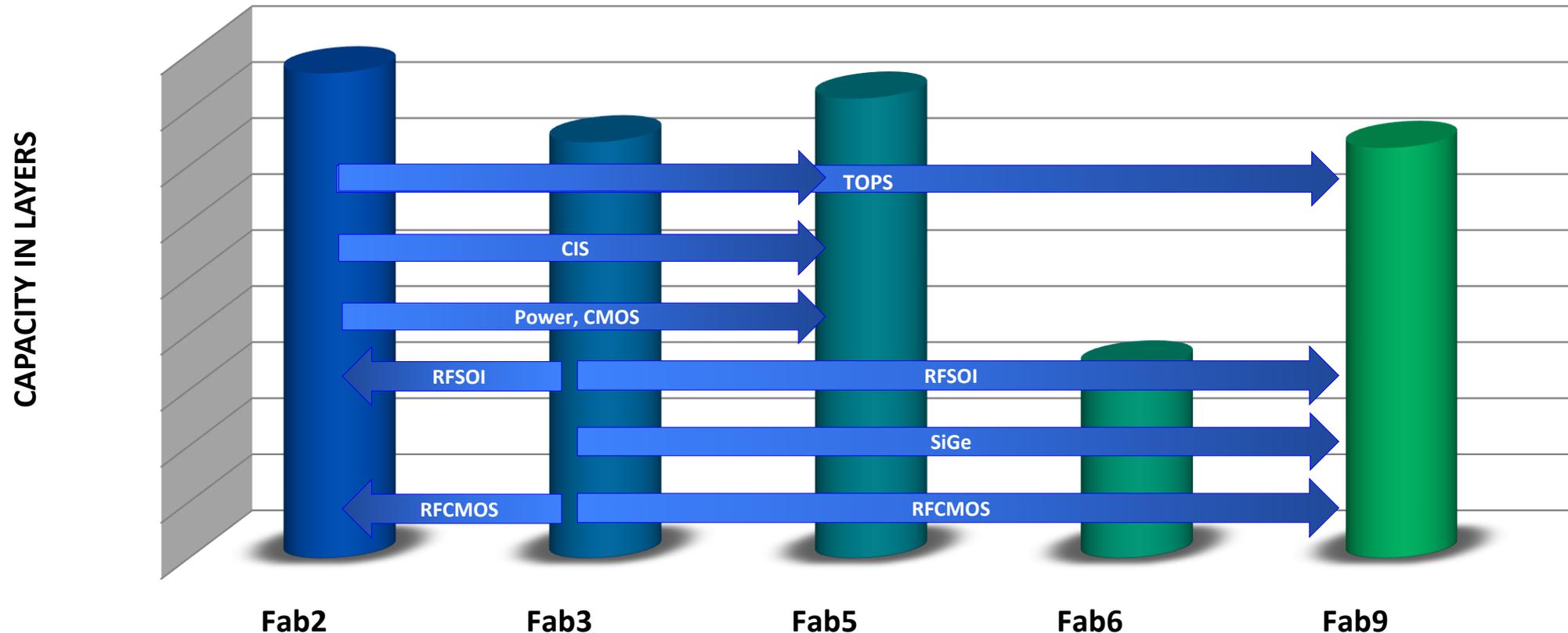
Additional measures to ensure business continuity:

- Supply Chain:
 - Increased inventory of indirect materials and silicon.
 - All major supply chain materials are without interruption. There were small item issues that we have mitigated well.
 - Air and sea freight lines remain open. Some delays have required close follow up. Have increased amount of air cargo freight, in place of the lost passenger freight capacity.
 - Some delays regarding vendor on site services, due to travel restriction, are being mitigated with local vendor employees and Tower teams.
- We continually assess the impact of the Coronavirus situation taking the appropriate actions.
- **The key: being proactive-smart.**

Tower Operations - differentiation factors: Global capacity assurance

Enabling 200mm multi-fab wafer production

- Cross qualified platforms enabling maximized utilization and customer assurance
- Cross qualification answer customers BCP needs





Where **Analog** and **Value** Meet

Leading the Analog Ecosystem:

Mega Trends and Technology Solutions

Unique Position and Value-add Offerings

Growth Drivers and Current Market Outlook





Where **Analog** and **Value** Meet

Analog IC Business Unit

Dr. Marco Racanelli

SVP, GM AIC BU



2020 Focus and Future Growth Drivers: Analog IC

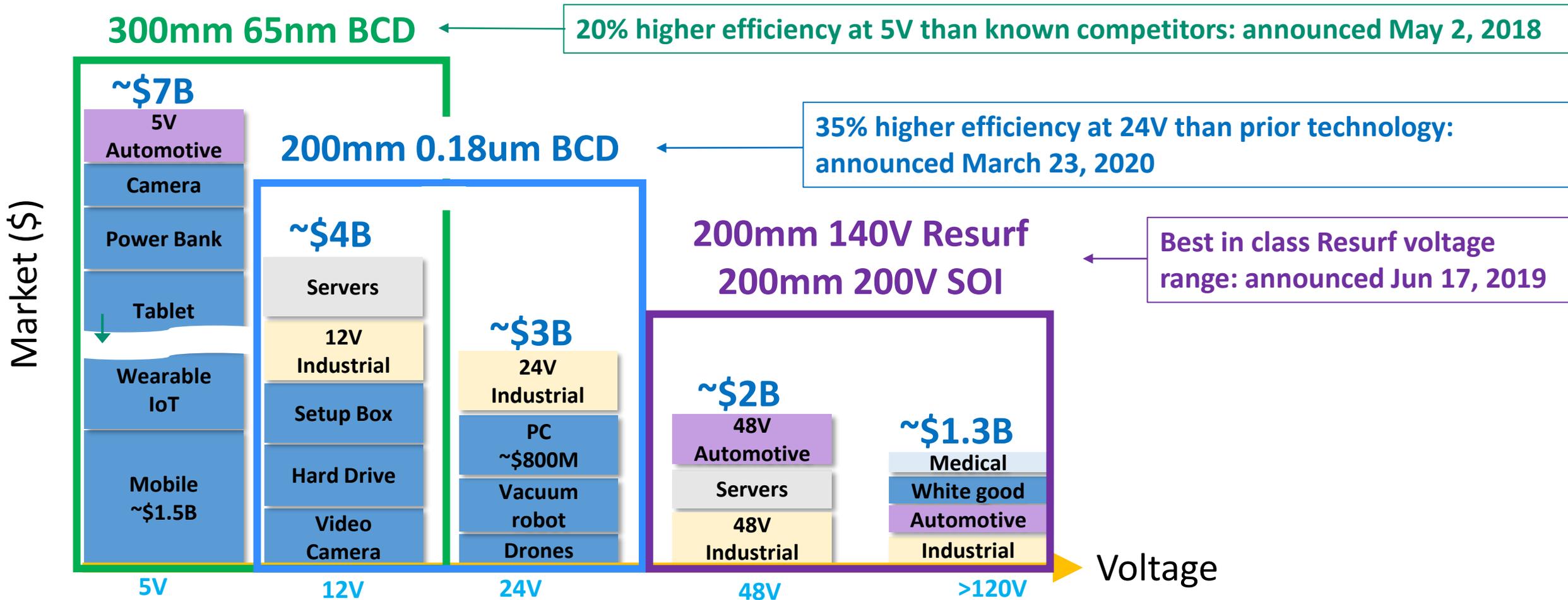
- **Expand 300mm business with added capacity**
 - RF SOI: strong traction on existing platforms; winning new designs on next-gen platform
 - 65nm BCD: strong orders beginning with large pipeline of new Tier 1 opportunities
- **Capitalize on 5G opportunity**
 - Infrastructure: the upgrade of 5G base-stations occurring
 - Mobile: strong content growth with 5G is expected to result in 13% CAGR (Yole) for RFSOI
- **Continue growth in Optical data-com business**
 - SiGe: multiple design wins for 400G SiGe products; 100G data center has begun recovery
 - SiPho: established leading edge foundry technology with initial production, poised for strong growth in the next several years
- **Gain share in the large 200mm Power market**
 - Developed next gen 200mm BCD platform, enabling strong area reduction targeting market share
 - Expanded platforms into high-voltage power applications, strong design wins with our differentiated 140V and 200V offerings.

300mm Opportunity in Analog IC

The ability to print smaller dimensions on 300mm wafers has enabled Tower to expand its Analog IC markets to include:

- **Smaller geometry RF SOI** with enhanced LNA and digital integration
 - 65nm RF SOI: 4x smaller digital and improved LNA performance for 4G and 5G
 - Now ramped to high volume
- **65nm SiGe** for next generation optical and mmWave products
 - Enabling SiGe with high performance CMOS and dramatically higher digital density
- **Low-Voltage Power Management** 65nm BCD (serving an \$11B analog market)
 - Best in class performance
 - Platform provides up to 50% cost reduction vs. 0.18um at low voltage

Power Management Opportunity



Poised to gain share with new technology and best power efficiency across entire voltage range in this large and diverse market.

5G Opportunity for RF

Wireless Front-Ends

SiGe and RF SOI

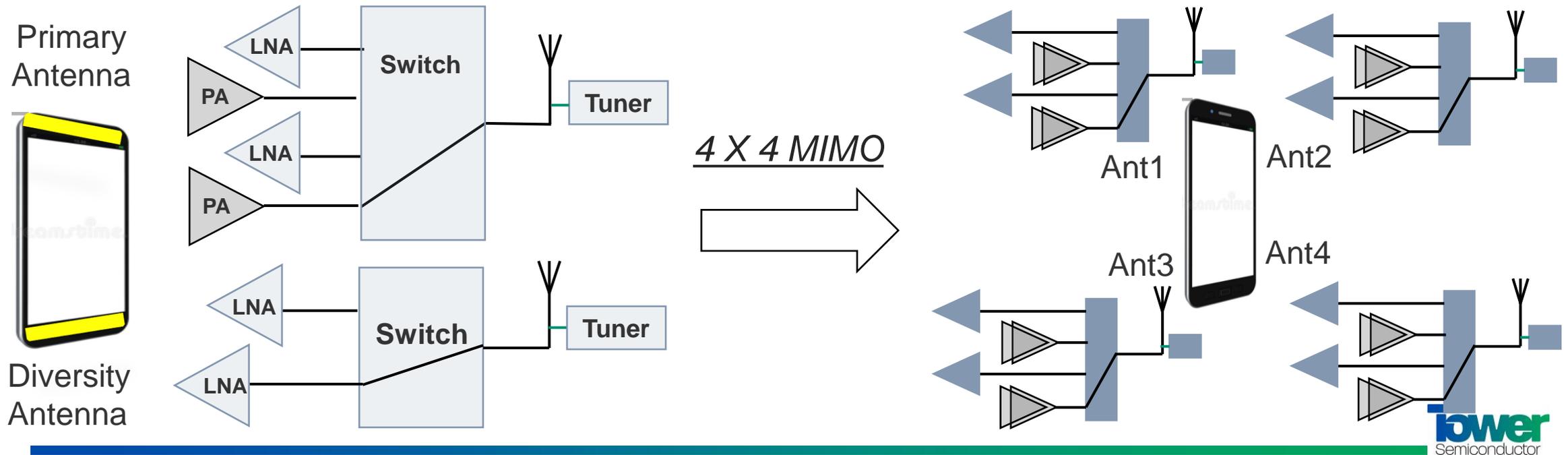


Optical Fiber Communications

HP SiGe and Si Photonics

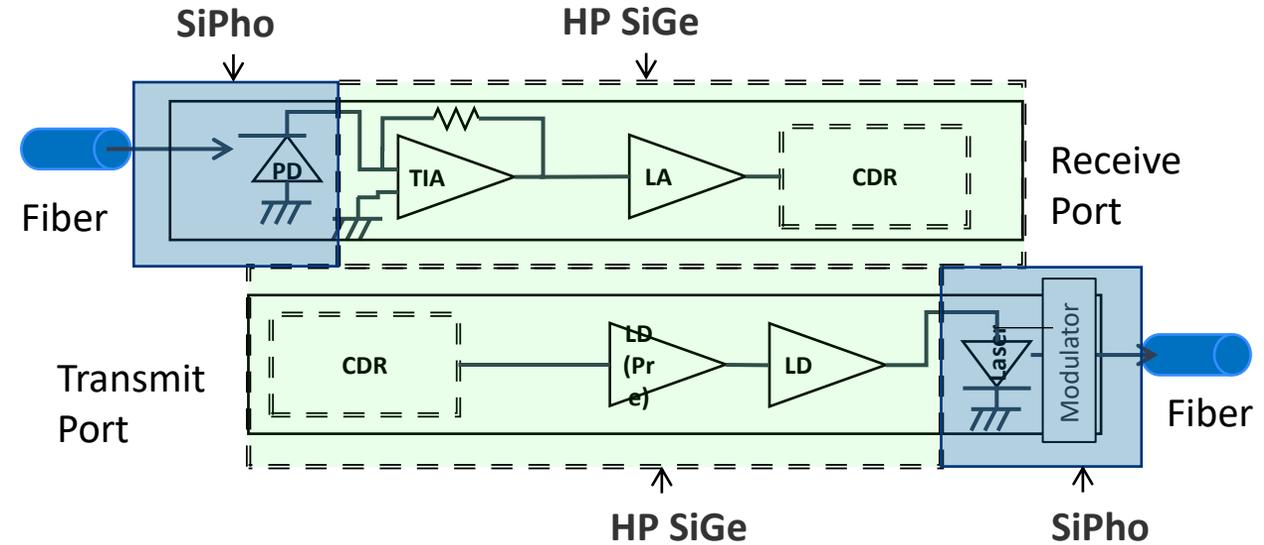
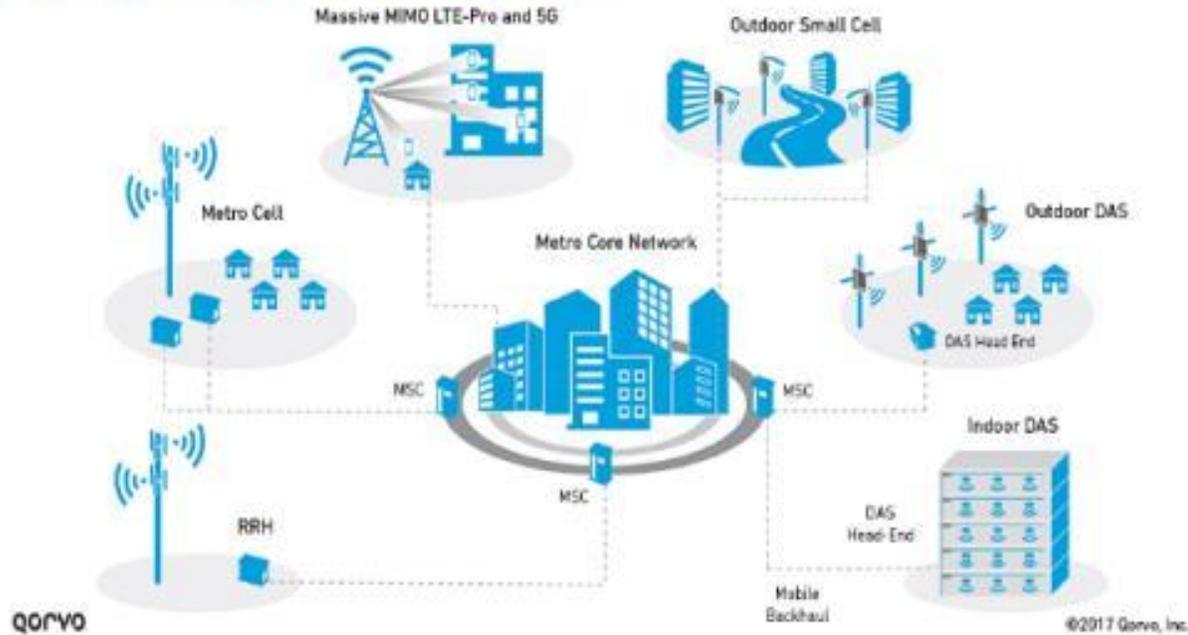
5G Handset Opportunity

- Industry expectation: 5G in ~25% of handsets by 2023 vs. <1% in 2019
- 5G offers higher data rates by use of more antennas and frequencies increasing RF content
 - More switches to select frequencies Built in **Tower RF SOI**
 - More antenna tuners per phone Built in **Tower RF SOI or RF MEMS**
 - More low-noise amplifiers (one per antenna) Built in **Tower RF SOI or SiGe**



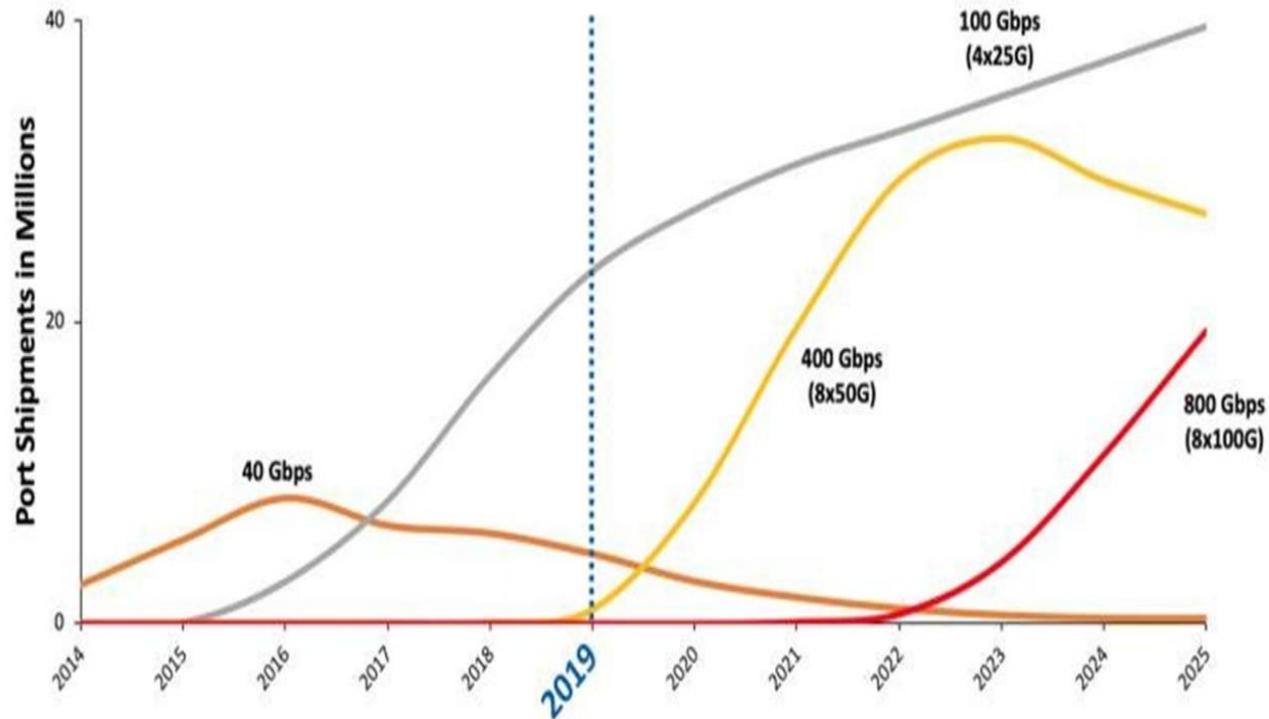
5G Infrastructure Opportunity

Wireless Infrastructure: A Heterogeneous Network

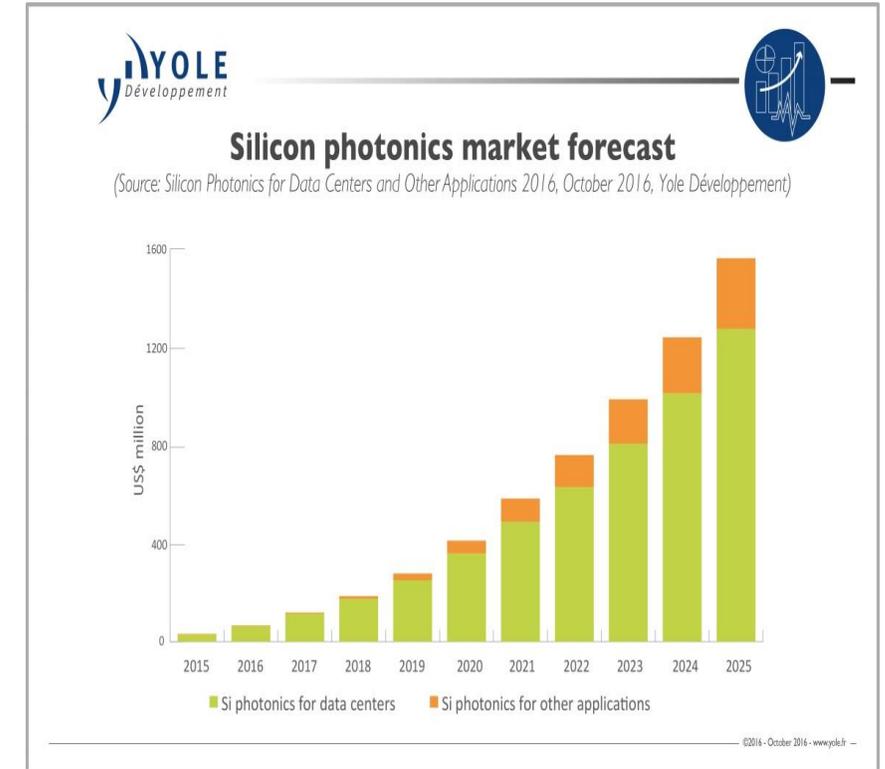


- Optical fiber will dominate transport from base-stations and small-cells into the network
- 5G increases the number of connections and also the speed (from 10Gb/s to 25Gb/s optical connections)
- Technology of choice is SiGe (Tower holds >60% market share in this market)
- Silicon Photonics (SiPho) is expected to play a critical role in the coming years.

SiGe and SiPho Opportunity for Data-com and Tele-com



Source: 650 Group



- **SiGe** is used in most optical transceiver electronics (Tower has >60% market share)
- **SiPho** enables lower power and lower cost (Tower has >30 active customers)



Where **Analog** and **Value** Meet

Sensors Business Unit

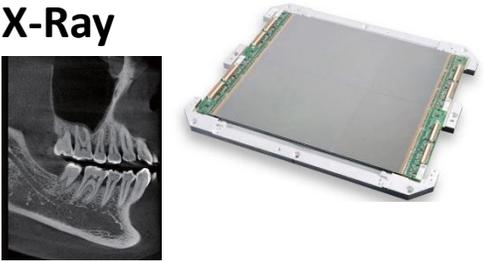
Dr. Avi Strum

SVP, GM Sensors BU

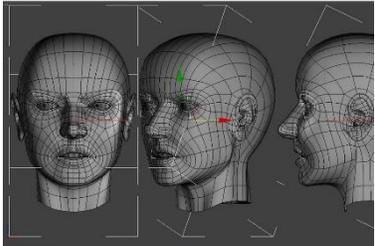


Growing Markets

- Tower Traditional Market

<p>Medical and Dental X-Ray</p> 	<ul style="list-style-type: none">• Growing market share• New 200mm and 300mm products introduction
<p>High end Photography</p> 	<ul style="list-style-type: none">• New Cinema products• Growing market share with a leading DSLR maker
<p>Industrial Machine Vision</p> 	<ul style="list-style-type: none">• Next gen products based on 300mm state of the are GS pixels

- New Emerging High Growth Markets

<p>Under Screen Fingerprint</p> 	<ul style="list-style-type: none">• Customers providing to leading Chinese cellphone makers• Under OLED• Under LCD
<p>Time of Flight</p> 	<ul style="list-style-type: none">• Two market leaders for face recognition ToF based solution
<p>VR Displays</p> 	<ul style="list-style-type: none">• Market leader for VR goggles

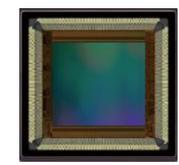
Global Shutter for the Industrial Market

65nm, 2.5um

300mm

Industry Smallest Pixel at 2.5um with >10K of 1/PLS

Gpixel GMAX0505



Super high resolution with stitching

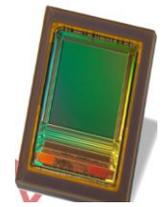
SE: 80dB (100dB for 3.6um), Noise: 1e

110nm, 2.8um

E2v Emerald, Gpixel GMAX0806

200mm

Intel



SE: 70dB Noise: 2e

On Semi, e2v, Anafocus, CMOSIS, Dalsa, Gpixel,..



Shutter Efficiency 60dB, Noise: 15e

180nm, 5um

2007

2014

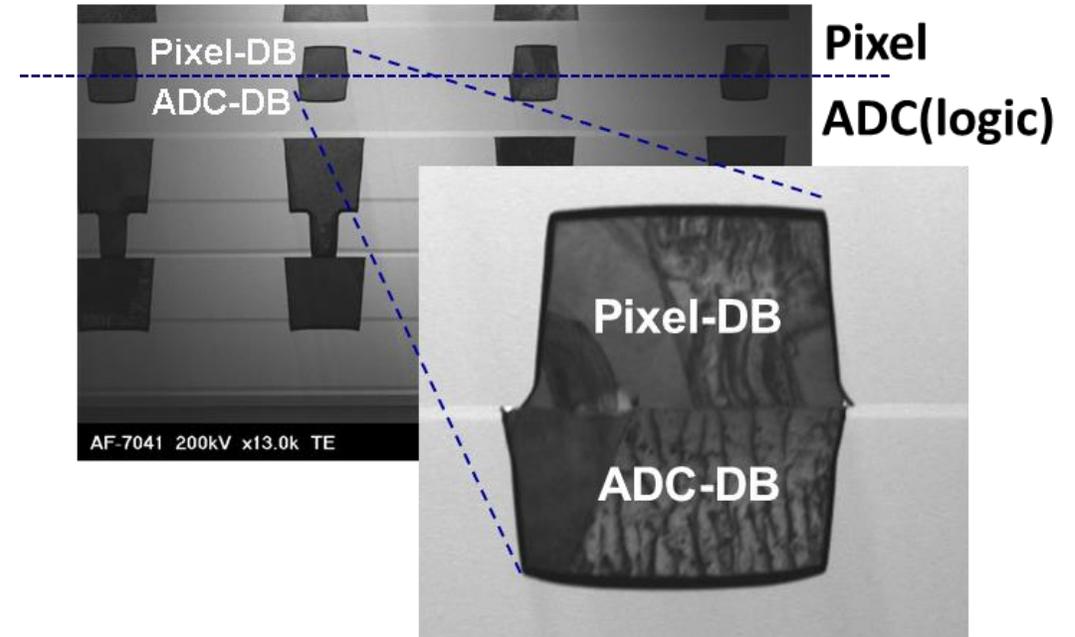
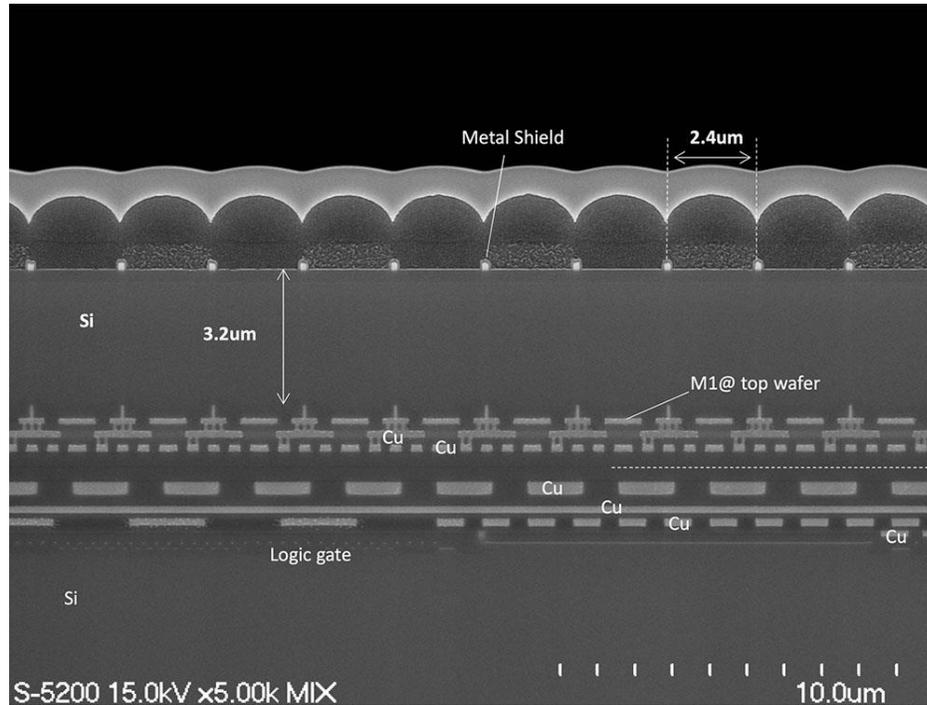
2016

2018

2020

BSI and Wafer Stacking for high end photography and ToF

- Wafer stacking of 65nm Image Sensor Wafer to a 65nm CMOS Mixed-Signal Wafer

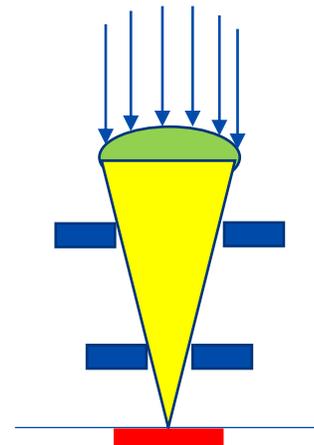
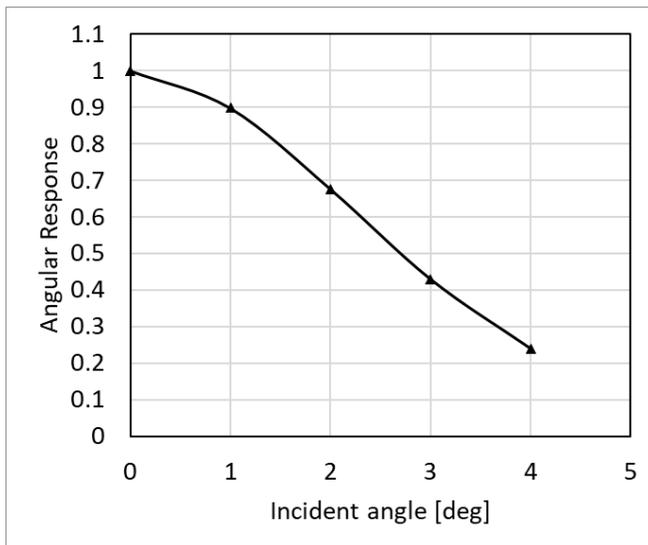
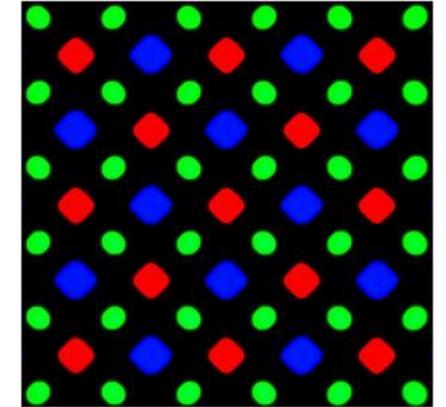


- Smallest in the world contact pitch < 2 micron
- Best in class dark current: < 7e at 60°C
- Full frame of ~20MP at 500fps

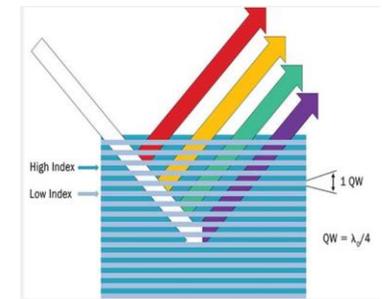
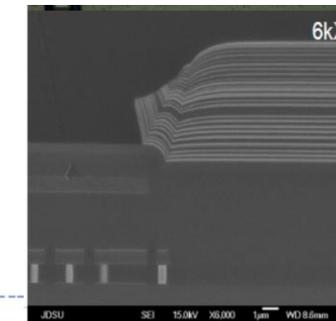
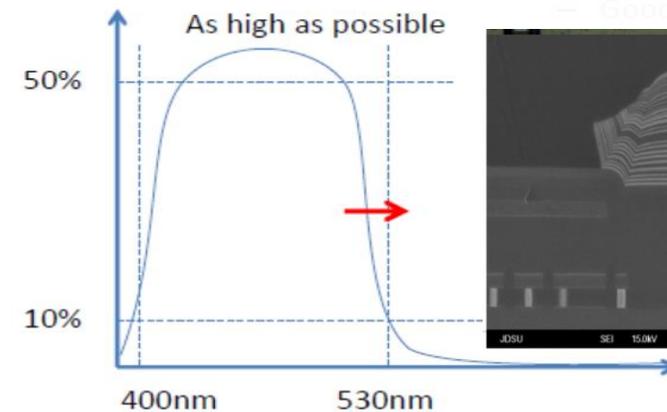
Fingerprint Optical Sensor

Under OLED Optical Fingerprint 1:1 sensors for the next generation flagship smartphones

- Unique pixel technology
- Special optical filter solutions for best performance
- Very large market as sensor size is big (>50 mm²)
- Technology has been matched to our well establish 0.18um CIS (no need for unique CapEx)

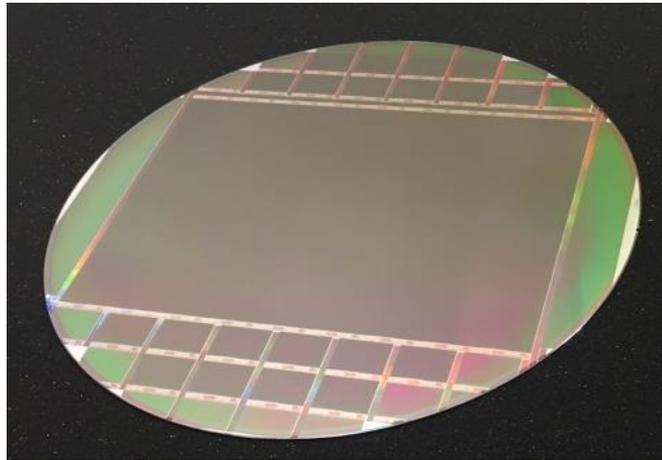


Expected pixel QE



Stitching on 300mm wafers for X-Ray and high-end photography sensors

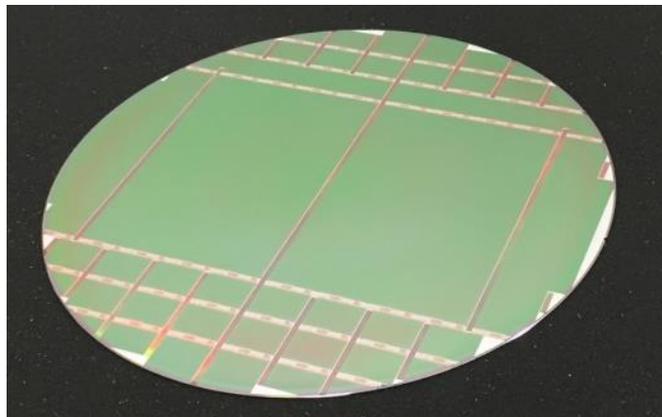
1die per wafer product



Radiography



2dies per wafer product



Fluoroscopy (hand)





Where **Analog** and **Value** Meet

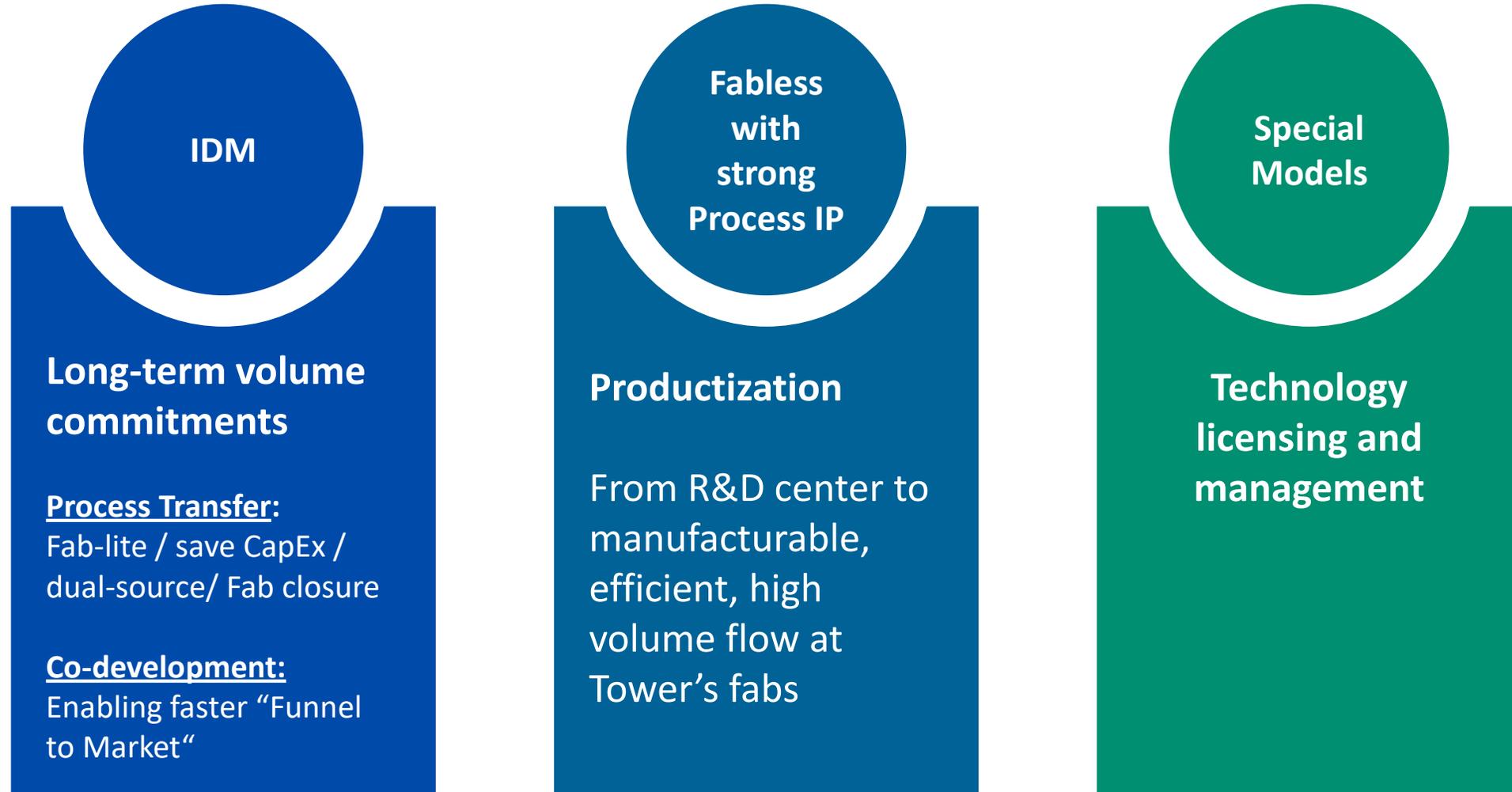
TOPS Business Unit

Mr. Dani Ashkenazi

SVP, GM TOPS BU



Creating Value with TOPS



MOSFETS & TVS

Tower Semi progress in MOSFETS & TVS

- Long-term volume commitments
- **Our customers hold 60% of the MOSFET market**
- Leading TVS company is Tower Semi customer
- Continue to co-develop and sandbox advance MOSFETS & TVS technologies with customers

MOSFETS Market

- Total market at \$7.58B in 2018
- Forecast at \$9.40B in 2024

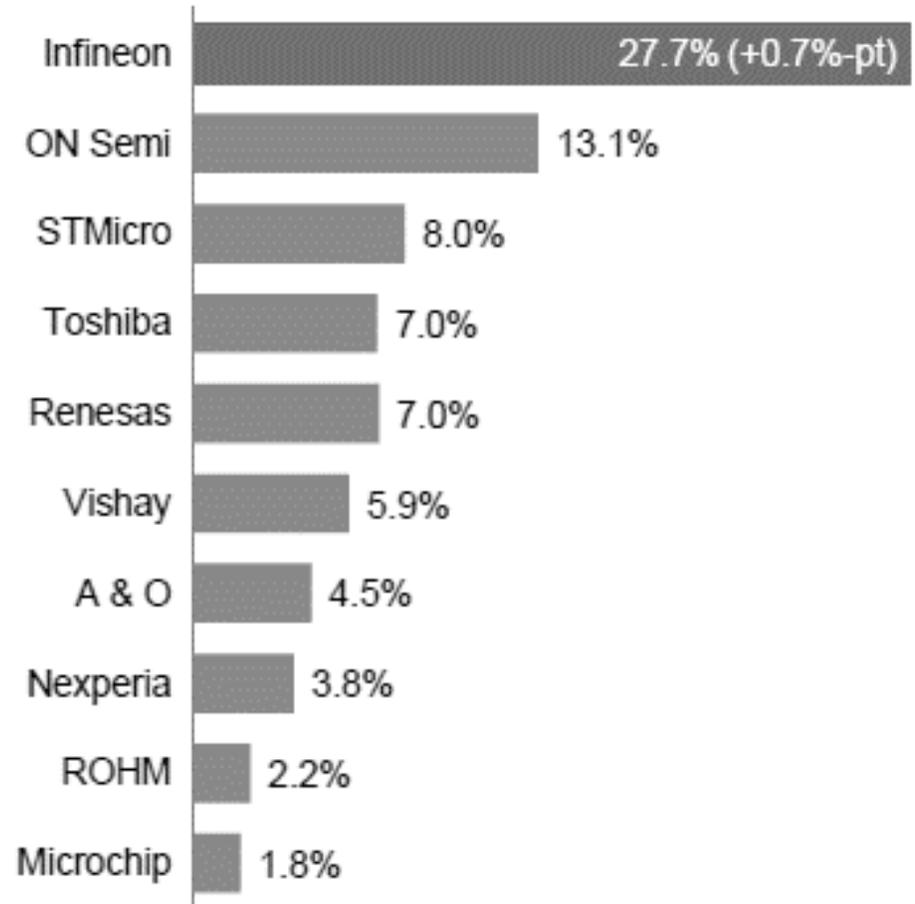
(Source: Yole Report 2019)

TVS Market (Source: 360 Research Report 2019)

- Estimated at \$590M in 2019
- Forecast at \$700M in 2023

Discrete Power MOSFET market

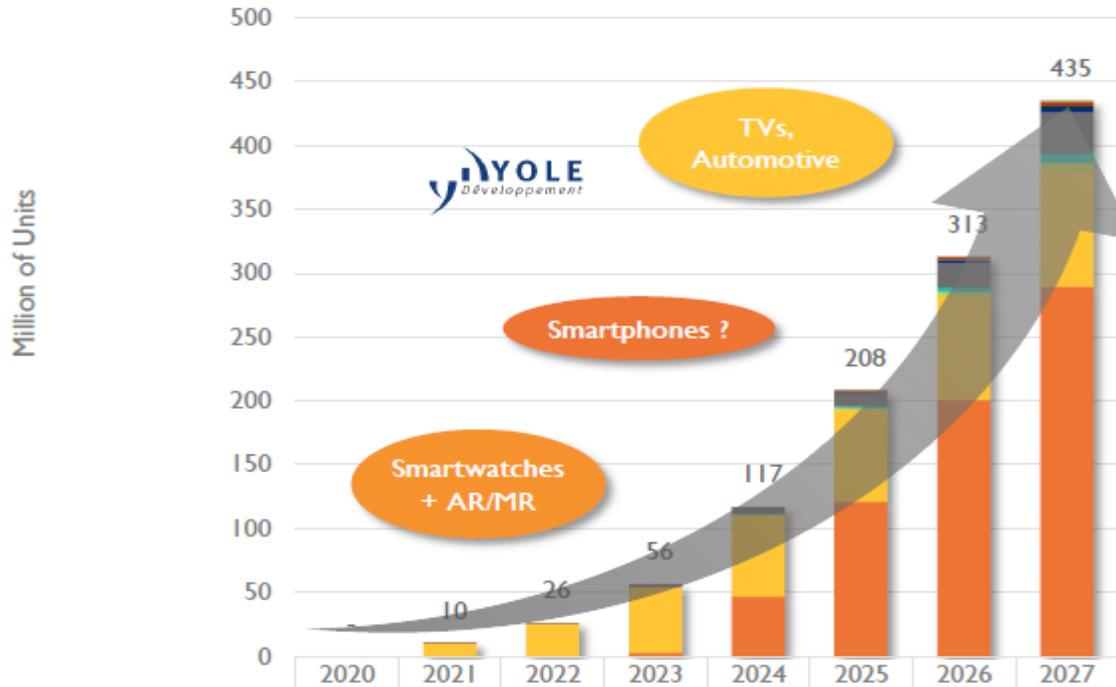
total market in 2018: \$7.58bn



Source: Infineon annual report – 2019

Micro LED Display

MicroLED Panel Volume Forecasts - Aggressive Scenario



	2020	2021	2022	2023	2024	2025	2026	2027
Monitors	-	-	-	-	0,0	0,1	0,3	0,6
TVs ("luxury" + consumer)	-	0,002	0,011	0,068	0,34	1,1	2,0	3,6
Laptops	-	-	-	-	0,2	0,9	2,7	4,6
AR/MR & HUD	-	0,1	0,4	1,9	4,9	10,5	18,9	32,7
Automotive	-	-	-	-	0,2	1,2	3,5	7,3
Tablets	-	-	-	-	0,3	1,3	3,8	6,3
Smartwatches	-	10,1	25,6	51,3	64,2	72,6	80,5	90,5
Smartphones	-	-	-	2,9	46,7	120,8	201,0	289,5
Total	-	10	26	56	117	208	313	435

Source: Yole Development – 2019

Tower Semi progress in Micro LED Display

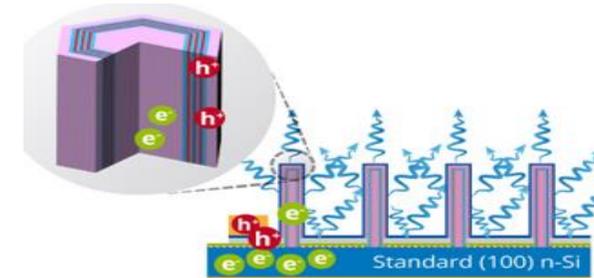
- Develop partnership with Aledia on next-generation 3D LEDs for display applications based on its gallium-nitride-nanowires-on-silicon platform

TowerJazz and Aledia Enter into Process Development Partnership Agreement for Cutting-Edge Nanowire-LED Technology

Utilizing TowerJazz process development services (TOPS) to bring Aledia's innovative IP into commercialized volume production
Providing breakthrough solutions for next generation display panels

Micro LED Display Market (Source: Yole Report 2019)

- Micro LED Display forecast at 117M at 2024 and 435M units in 2027
- Micro LED Display is suitable in AR/MR, Smartwatch, HUD, Smartphone, Automotive.





Where **Analog** and **Value** Meet

Financial Stability and Risk Management

Mr. Oren Shirazi

CFO



Financial Stability



Strong and stable financial position: Balance sheet, net cash and financial ratios

- Comfortable Net Cash position of \$435M with Cash at ~3X of bank & bond debt.
- Debt/EBITDA ratio 0.9X with minimal interest
- Current ratio of 4.3X, quick ratio of 3.5X
- Shareholders equity 70% of total balance sheet
- Cash and available credit line allow continued focus on growth activities.



Inventory Management and Business Continuity

- Have increased inventory levels with tight monitoring, in particular indirect materials and silicon.
- No interruptions to major supply chain materials.
- No impact to export and import.



Business performance – revenues

- Have not changed Q1 guidance which we provided pre-COVID19 outbreak.
- Customer forecast of Q2/Q1 growth.

Long-term Financial Stability | Strong Balance Sheet

In millions of \$	Dec' 31, 2019	Dec'31, 2018
CURRENT ASSETS		
Cash and cash equivalents	356	385
Short-term deposits	216	120
Marketable securities	176	136
Trade accounts receivable	126	153
Inventories	192	171
Other current assets	22	23
Total current assets	1,088	988
Long-term investments	40	36
Property and equipment, net	682	657
Intangible assets, net	10	13
Deferred tax asset and other assets, net	113	96
TOTAL ASSETS	1,933	1,790
CURRENT LIABILITIES		
Short-term debt	66	11
Trade accounts payable	119	104
Customers' prepayment and deferred revenue	10	21
Other current liabilities	58	68
Total Current Liabilities	253	204
Long-term debt	246	257
Employee related liabilities	13	14
Customer prepayment	28	28
Deferred tax liabilities	46	51
TOTAL LIABILITIES	586	554
Shareholders' equity	1,347	1,236
TOTAL LIABILITIES & EQUITY	1,933	1,790

- **Net Cash of \$435M driving strong financial, coverage and liquidity ratios.**

\$435M are calculated as cash, short term deposits and marketable securities in the amount of \$747M less short term and long-term debt of \$312M as presented herein

- **Cash from operations \$292M in 2019 with \$172M CapEx, resulting in \$120M FCF positive**

- **Strong financial ratios and balance sheet indicators**

Detailed ratios to come

- **Hedging Currencies' Risk**

Hedging policy mitigating currency fluctuation risk and its impact on FX cost, revenue, assets and liabilities:

- JPY/USD hedging on JPY cost, net of JPY revenue
- NIS/USD hedging on NIS cost and NIS bonds, net of NIS assets

Banks & Bonds Debt Breakdown Summary

	Type	Outstanding (\$M)	Key Terms
Bonds Debt Summary	IL Bonds Series G	122	Fixed 2.79% coupon non-convertible bonds; Final maturity Mar'2023 (through 7 semi annual payments from Mar'2020 to Mar'2023); linked to NIS but fully hedged a fixed USD amount through a \$/NIS swap transaction done in 2016
	Credit Line Wells Fargo Bank	0	USD Libor+1.5% available credit line for up to \$70M future possible draw-downs from Wells Fargo Bank (US)
Banks Debt Summary	TPSCo Banks' Loan	100	Fixed interest rate of 1.95%; lenders are JA Mitsui, SMBC & SMTB banks; JPY denominated, payable through 2025
	P&E (machines) leasing	54	1.85% & 1.95% interest capital leases from JA Mitsui; JPY denominated, payable through 2024

	2020	2021	2022	2023	2024	2025	Total Payments
IL Bonds G	35	35	35	17	-	-	122
TPSCo Loans		22	22	22	22	12	100
Capital Leases	15	16	14	8	1		54
Total	49	73	71	47	23	12	276

Balance Sheet, Coverage & Liquidity Ratios [December 31, 2019]

- **Debt service coverage ratio:**
 - Total Cash (including marketable securities & deposits) at 2.7X of gross banks & bonds debt
 - Net Cash of \$435M
 - Gross banks and bonds debt/ EBITDA ratio 0.9X
- **Current Ratio of 4.3X**
 - Defined as current assets divided by current liabilities: \$1.09B/\$253M
- **Quick Ratio of 3.5X**
 - Defined as current assets (excluding inventory) divided by current liabilities: \$896M/\$253M
- **Cash is 39% of total balance sheet**
 - Defined as cash, deposits and marketable securities divided by total balance sheet (or total assets) of \$1.9B

Balance Sheet, Coverage & Liquidity Ratios – Cont. [December 31, 2019]

- **Tangible assets coverage ratio of 5.9X**
 - Defined as total tangible assets net of short-term liabilities divided by gross banks & bonds debt: \$1.6B/\$276M
- **Interest coverage ratio of 49X**
 - Defined as EBITDA/ interest expense : \$299M/\$6M
- **Cash coverage ratio over interest expenses of 123X**
 - Defined as cash, deposit & marketable securities divided by interest expense: \$747M/\$6M
- **Interest expense to gross debt ratio of 2% (0.02X)**
 - Defined as interest expense divided by gross banks & bonds debt: \$6M/\$276M
- **Shareholders' equity is 70% of total balance sheet**
 - Defined as shareholders' equity divided by total assets: \$1.35B/\$1.93B



Where **Analog** and **Value** Meet

Q&A





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Summary and Closing Remarks

Mr. Amir Elstein, Chairman of the Board

Mr. Russell Ellwanger, CEO



Key Messaging

Business & Market

On track with Q1 guidance.

Q2 outlook as per the beginning of the year expectation of quarter-over-quarter growth.

Business unit activities continue focus on key analog industry growth drivers.

Operations

All factories operating with no measurable impact from COVID-19.

Global/ regional diversity minimizes potential future disruptions.

Financial

Strong financial and coverage ratios.

Comfortable Net Cash position with Cash at ~3X of debt.

A Resilient Growth Company in a Challenging Environment

- **Well experienced, matured and strong global company** – with solid and enviable balance sheet and net cash financial position, exceptional analog technology solutions and manufacturing capabilities, high level expertise and talents.

Excellence in leadership, partnership, impact & innovation

- **Long-term partnerships** – based upon unparalleled trust, mutual roadmap creation and shared success.
- **Leading the analog ecosystem in exciting growth markets, providing strong competitive advantage with full circle value creation.**



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Thank You

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