Aspen Technology 2021 Investor Day
February 12, 2021
# Agenda

**Welcome**

**Company Overview & Strategy**

Antonio Pietri, President and Chief Executive Officer

**BREAK**

**Industrial AI Strategy & Solutions**

David Arbeitel, Senior Vice President, Product Management

**Creating Customer Value**

John Hague, Executive Vice President, Operations

**BREAK**

**Financial Highlights**

Karl Johnsen, Chief Financial Officer

**Summary**

Antonio Pietri, President and Chief Executive Officer

**Q&A**
Safe Harbor Statement

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Any such commitment must be explicitly set forth in a written contract between the customer and Aspen Technology, executed by an authorized officer of each company.
Company Overview and Strategy
Antonio Pietri, President and Chief Executive Officer
February 12, 2021
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AspenTech at-a-Glance

WORLD LEADER IN ASSET OPTIMIZATION FOR CAPITAL-INTENSIVE INDUSTRIES

2400 CUSTOMERS WORLDWIDE

$59B ANNUAL VALUE CREATED
SAFETY – SUSTAINABILITY
PROFITABILITY – INNOVATION

40 YEARS OF INNOVATION
1710 EMPLOYEES
A RECORD OF FIRSTS
- Flowsheet Simulator
- Desktop Planning Tool for Refineries
- Model Predictive Controller
- Adaptive Control Technology
- Concurrent Conceptual Engineering Workflows
- Unified Environment for Planning, Scheduling and Operations
- Hybrid Models
- AIoT Hub

ESTABLISHED GLOBAL PARTNERSHIPS
ADVISORY PARTNERS
VALUE-ADDED RESELLERS
IMPLEMENTATION SERVICE PROVIDERS

Industrial AI
Insights | Guidance | Automation
Industry Dynamics

- Multi-trillion-dollar global industries
- High capital costs
- High volume production
- Complex manufacturing processes
- High leveraging of technology and engineering
- Diverse processes, continuous and discrete

- Safety-first mindset
- Sustainable operations
- Reliable operations
- Operational excellence

On a Digitalization Journey to the Smart Enterprise...
Our Mission

Accelerate the digital transformation of the industries we serve by optimizing their assets to run safer, greener, longer and faster.
“Without Aspen DMC, there is no way we would have been able to adjust ... so quickly during the coronavirus crisis.”

“Aspen GDOT will improve agility in our response to market conditions, such as what we are experiencing right now... by minimizing product quality giveaway and maximizing production of the most valuable products.”
Our Customers by Industry

- **41% ENERGY**
- **28% CHEMICALS**
- **25% EPC**
- **28% Downstream**
- **6% OTHER**
- **2% Midstream**

Percentages based on Annual Spend for FY2020 through Q4

- **20/20** Largest E&C Oil & Gas Companies
- **19/20** Largest Petroleum Companies
- **20/20** Largest Chemical Companies
- **16/20** Largest Pharma Companies

E&C Ranking from ENR and Refining and Petrochemicals Petroleum Rankings from Forbes, Chemicals from C&EN, and Pharma from PharmaExec
Commitment to Our Employees

High-Performance Culture

- World-class talent
- Continuous investment in leadership and professional development
- Management and technical career paths

Driven by Strong Values and Leadership Principles

- High Engagement
- Culture of Disciplined Agility

Every Employee Deserves a Great Manager and Leader

- Leadership 2.0 Development
- PGX Feedback Cycle for Accountability

Recognized by Rosetta Stone with a G.E.M Award for our first-year program

Integrity
Collaboration
Innovation
Customer First
Diversity-Equality-Inclusion
Execution
Entrepreneurial Thought & Action
Competitive Spirit
Commitment to Our Communities

AspenTech Gives Back

- 40+ charities worldwide benefited from the corporate charitable giving program in 2020
- COVID-19 Relief Fund donations
- Holiday party budgets donated to local food banks

Supporting our Customers’ Sustainability Targets is at the Core of our Mission

- Aspen Mtell® Wins Singapore Business Review Award for Predictive Maintenance—for preventing costly downtime and reducing the risk of unplanned emissions
- AspenTech and FPCO win Green Supply Chain Award from SDC Executive publication

Focus on Environmental Causes

- Donating capital, technology and expertise as a member of the Alliance to End Plastic Waste

Accelerate the digital transformation of the industries we serve by optimizing their assets to run safer, greener, longer and faster
Joins Alliance to End Plastic Waste

“We welcome Aspen Technology as a member of the Alliance and its commitment to support and advance our mission. The collaboration among more than 50 member companies, strategic allies and supporters at the Alliance will bring us closer to our vision of ending plastic waste in the environment. Ultimately, we are unlocking scalable and sustainable solutions towards a circular economy.”

— Jacob Duer, President and CEO of the Alliance to End Plastic Waste
Market Dynamics
The World Has Changed!
An Even More VUCA Environment

Volatility

Uncertainty

Complexity

Ambiguity
Industries and Associated Dynamics

### Industry Trend:
- **OPEC production adjustments** in early 2020, coupled with significantly **decreased energy demand** due to COVID-19, created a reduced CAPEX environment and impacted refining margins.

### Industry Response:
- Operational agility and flexibility
- Efficiencies and productivity increases
- **Energy transition**, decarbonization
- Crude-to-chemicals

### Industry Trend:
- **Industry imbalance**—some sectors seeing decreased demand, while others such as plastics and cleaning products experiencing growth / shifts; **disciplined capital allocation** will be key in period of recovery.

### Industry Response:
- Operational agility and flexibility
- Efficiencies and productivity increases
- Supply chain management insights
- **Circular economy**, new products

### Industry Trend:
- **Short-term capital spending cuts** and **project delays** due to price volatility and uncertainty around recovery timing; **lower-cost E&Cs demonstrating advantage** in upcoming recovery period.

### Industry Response:
- Mergers and acquisitions
- **Operations & Maintenance Strategy**
- Leverage technology to increase productivity in design, **Aspen Multi-Case™**
Dated Brent-WTI price spread to widen relative to tight fourth quarter 2020

Dated Brent and WTI-Cushing crude oil price outlook to 2022

Benchmark crude price outlook ($/bbl)

<table>
<thead>
<tr>
<th></th>
<th>Q1 2019</th>
<th>Q2 2019</th>
<th>Q3 2019</th>
<th>Q4 2019</th>
<th>Q1 2020</th>
<th>Q2 2020</th>
<th>Q3 2020</th>
<th>Q4 2020</th>
<th>Q1 2021</th>
<th>Q2 2021</th>
<th>Q3 2021</th>
<th>Q4 2021</th>
<th>Q1 2022</th>
<th>Q2 2022</th>
<th>Q3 2022</th>
<th>Q4 2022</th>
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<tr>
<td>Dated Brent</td>
<td>$63.1</td>
<td>$68.7</td>
<td>$61.8</td>
<td>$63.1</td>
<td>$50.0</td>
<td>$42.8</td>
<td>$43.9</td>
<td>$55.3</td>
<td>$55.4</td>
<td>$56.3</td>
<td>$60.5</td>
<td>$59.6</td>
<td>$59.9</td>
<td>$59.8</td>
<td>$61.0</td>
<td></td>
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<tr>
<td>WTI</td>
<td>$54.8</td>
<td>$59.9</td>
<td>$56.4</td>
<td>$56.9</td>
<td>$45.6</td>
<td>$28.0</td>
<td>$40.9</td>
<td>$42.6</td>
<td>$52.6</td>
<td>$52.6</td>
<td>$53.5</td>
<td>$57.5</td>
<td>$56.3</td>
<td>$56.6</td>
<td>$56.5</td>
<td>$57.6</td>
</tr>
</tbody>
</table>

Source: IHS Markit, Argus Media Limited (historical)

Note: For our monthly Dated Brent and WTI price outlook, please see the accompanying IHS Markit Global Crude Oil Markets Short-Term Outlook: Fundamentals file.
Pandemic Causes Downturn in Capacity in Richer Countries
Increasing opportunity for China, India and Middle East to add capacity

2009 – 11

2.2 MILLION BARRELS A DAY
refining capacity CLOSED
(according to IHS Markit)

2020 – 21

2.2+ MILLION BARRELS A DAY
worth of fuel-making capability ADDED
China, India & Middle East
(International Energy Agency)

1.7+ MILLION BARRELS A DAY
worth of refining capacity has or is poised to DISAPPEAR
countries such as US & Japan
(International Energy Agency)

World refinery capacity, by region

By David Winning and Rebecca Elliott
Reported by The Wall Street Journal, December 7, 2020
Indian Government Estimates Growth in India Energy Sector

- **33-35%** Reduction in emissions intensity of its GDP by 2030*
- **4x** Increase the share of Natural Gas in energy needs this decade
- **Oil refining capacity in the next 5 years**

Narendra Modi says India set to double oil refining capacity in five years, earlier than expected. Reported by Reuters, November 21, 2020

*IEA India 2020 Energy Report
... seeing a number of companies announcing global refinery rationalizations or shutdowns – in Europe, the US and at some scale in Asia ...

... more than 50% of the world’s new refining capacity that will come on stream in the next 8-10 years will be in Asia, and 70-80% of that will be focused mainly on plastics ...

... expectation that petrochemicals will represent over half of the growth in global oil demand over the next decade.

Amin Nasser – Saudi Aramco President and CEO

Reported by Trade Arabia
December 4, 2020
Industries and Associated Dynamics

**PHARMACEUTICALS**

**Industry Trend:**
- Supply chains greatly impacted and will be difficult to manage; Risk management key as asset reorganization may be necessary, impacting time to market

**Industry Response:**
- Accelerated Digitalization Strategy to advance data-led approaches
- Pharma 4.0
- Transformation of production

**METALS & MINING**

**Industry Trend:**
- Price volatility and economic uncertainty to limit capital spending; need to maximize production efficiency without making capital commitments

**Industry Response:**
- Applying technologies that reduce water, energy and capital
- Use predictive intelligence for safe & self-learning operations
Pharmaceutical Market Dynamics

- Increasing Demand on Accessibility and Affordability of Therapeutics
- Increasing Complexity & Targeted Nature of Newer Therapeutics
- Transformation of Production
  - Collaboration across Lifecycle and Integration across Value Chain
- Pharma 4.0
  - Proposed by ISPE to address these needs
- COVID-19 has accelerated push to digitize, transform infrastructure
Strategy
Asset Optimization Powers the Smart Enterprise

**OPERATE**
Running to the limits of performance

**MAINTAIN**
Driving uptime through actionable insights

**DESIGN**
Pushing the boundaries of what’s possible

A comprehensive, holistic approach achieves the highest possible financial return over the entire asset lifecycle – safer, greener, longer and faster
Asset Optimization — Extending the Lifecycle

**Engineering**
- R&D/Conceptual Engineering
- Basic Engineering
- Equipment Engineering
- Debottlenecking & Upgrades Planning

**Manufacturing & Supply Chain**
- Long-term Forecasting & Planning
- Production Planning & Scheduling
- Manufacturing Operations Management
- Dynamic Optimization & Advanced Control

**Asset Performance Management**
- Predictive & Prescriptive Analytics
- Reliability Management
- Maintenance Strategy

PUSHING ASSET DESIGN
OPTIMIZING ASSET OPERATIONS
DRIVING ASSET UPTIME
Asset Optimization — Extending the Lifecycle

Pushing the Boundaries of What’s Possible
Running to the Limits of Performance
Driving Uptime Through Actionable Insights
AspenTech Provides a Complete End-to-End Solution

**Forecast and Plan**
Balance supply & demand

**Inform the plan**
VALUE CHAIN OPTIMIZATION

**What can the Plant produce?**

**Performance Engineering**

- **Plant Digital Twin**
  Optimize OPEX by mirroring asset

- **Design & Debottleneck**
  Optimize CAPEX and time to market

**Production Optimization**

- **Plan & Schedule**
  Optimize feed, processing and products

- **Control & Optimize**
  Maximize quality and performance

- **Monitor & Execute**
  Collect, monitor and automate execution

**Asset Performance Management**

- **Assess Reliability**
  Minimize risk

- **Prescriptive Maintenance**
  Avoid unplanned downtime

**Industrial AI Infrastructure**
Connectivity: Edge to Cloud, IIoT, Data Analytics, Insights & Collaboration

**Produce to demand**
VALUE CHAIN OPTIMIZATION

**Distribute**
Optimize product distribution

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Asset Optimization—Extending the Lifecycle

$59 B
2400 Customers

$1.4 T
All Manufacturing Industries
Digitalization Investments Provide Significant Returns

**Technology**
Cost of technology has dropped, making adoption of digital technologies more cost effective

**Data Immersion**
New sensors allow for more advanced and faster transmitting

**Generational Shift**
By 2025 "digital natives" will account for 75% of the global workforce
Digital managers will influence how their team and business work

---

$14.2T$ Benefit IoT to the Global Economy

**Typical ROI Improvement**
- Production Throughput: 5 – 25%
- Asset Utilization: 3 – 5%
- Asset Downtime: 1 – 5%
- Maintenance Productivity: 10 – 15%
- Total Maintenance Cost: 15 – 30%
- Energy/Run Costs: 5 – 15%
- Material Costs: 5 – 25%
- Equipment Availability: 5 – 10%
- Inventory: 15 – 20%
- Repair / Fix Cycles: 20 – 30%
- Asset Lifecycle / Age: 15 – 20%

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Source: Major Middle Eastern Refiner, presented at ARC 2019
Accelerating Growth
Our Journey: Over 40 Years of Innovation

Point Products

Process Products

MIT ASPEN Project


Engineering & MSC Suite Integrated Solution

Process Optimization

APM Suite Embedded AI

Asset Optimization

APM
Alot Hub
Industrial AI
Pharmaceutical Industry
Self-Optimizing Plant

Hyprotech Acquisition
Aspen HYSYS® for Energy Process Modeling

Feature Acquisitions
Relief Valve Sizing, Solids Modeling, Pipeline & Dock Scheduling, Sulfur Modeling, Depressurization Systems

aspenONE® V8
Usability & Integrated Workflows

apsenONE® V9, V10, V11
Push the Limits of Asset Performance

Asset Performance Acquisitions
Ensure Asset Reliability, Predictive & Prescriptive Maintenance Insights from Multi-Variate Analysis

GDOT & Operator Training
Maximize Operational Excellence through Coordinated Control & Train Operations

Digitalization & Embedded AI
Digitalization through Actionable Insights & Automated Execution

Industrial AI
Operational Excellence with Self-Optimizing Plant
Potential TAM\(^1\) (AS) — Grew by 15% from FY2019 to FY2020

1. Estimated by AspenTech from internal white space methodology on existing customer base.
Secular Trends Supporting AspenTech’s Growth

Digitalization
- Improved Safety
- Increased Reliability
- Efficiency and Productivity

Sustainability
- Energy Transition
- Circular Economy
- Resource Efficiency

End Market Dynamics
- Refining capacity shift to growing regions
- Oil-to-Chemicals (O2C)
- EPC’s Operations and Maintenance strategy

The Dual Challenge
Meeting the growing demand for energy and chemicals from a growing population with increasing standards of living, while also addressing the risks of climate change and plastic waste in the environment.
Planning and Executing for Growth

- Penetrate existing customer base
- Drive increased usage and adoption into the existing customer base
- Leverage existing capabilities for energy transition and circular economy
- Grow APM and AIoT into existing and new customer base
- Increase Total Addressable Market through organic and inorganic innovation
- Expand to adjacent industries and market segments
Industrial AI
AIoT Hub
New Technology Reality: Enabler, Disruptor or Both?

200x More Data

Industry 4.0 Technologies

Connected Devices
Real-World Production ML System

Typical ML System Software, Tools and Infrastructure

- Data Collection
- Data Verification
- Machine Resource Management
- Analysis Tools
- Configuration
- Monitoring
- Serving Infrastructure

- Physics, chemistry, and math knowledge (1st principles)
- Process/equipment knowledge
- Process/operations knowledge
- Operating constraints knowledge

AspenTech is the Industrial AI Company – A Unique Position

Data Insights
Data Management
AI/ML, Advanced Analytics

Domain Expertise
Engineering Fundamentals
Industry Experience

Industrial AI
Insights | Guidance | Automation
Hybrid Models — Industrial AI in Action

Opportunities
- Interpolate and extrapolate more accurately
- Easier to analyze and interpret
- Require less training data
- Inferential for unmeasured variables
- Models run more quickly

Challenges
- Need lots of “good” data
- May not extrapolate well or may violate physical constraints
- Difficult to interpret

Lower Total Cost of Ownership and Improve Time to Value
The AIoT Hub

- Cloud-ready Infrastructure to deliver Industrial AI
- Data mobility for data historian and other enterprise data sources
- Scale deployment of Industrial AI applications
- Infrastructure to deliver the Self-Optimizing Plant vision
Industrial AI Infrastructure Bridges IT and OT: AIoT Hub

Enterprise Visualization & Workflow
- Aspen Enterprise Insights
- Enterprise Visualization and Collaborative Workflow

Industrial AI Apps
- Aspen AI Model Builder™
- Aspen Event Analytics™
- Aspen Industrial AI Models and Agents
- Customer and Partner Purpose-BUILT Apps

Enterprise Speed & Scale
- Aspen Cloud*
- Model Productization: Training, versioning, embedding, deploying, updating and sustainment...at scale
- Data Management: Cleaning, conditioning, enrichment, processing and storage of...billions of data points
- Data Ingestion: Large-scale ingestion and aggregation...across diverse data sources

Aspen Industrial AI Workbench
- Aspen Data Science Studio
- Aspen IoT Analytics Suite
- Machine Learning Libraries

Connectivity & Edge Computing
- Aspen Connect
- Connectivity Framework and Intelligent Edge

Enterprise Data Sources
- Aspen Data
- Aspen Apps
- Historians
- HEXAGON
- IIoT
- ERPs
- EAMs
- www

*Cloud platform to host and manage Industrial AI Applications (Not licensable)
The Paradigm of Industrial AI: A Competitive Advantage

Platform & AI

Software @ Scale

Domain Expertise

Traditional software vendors shifting to digital technology

Digital infrastructure providers

Industrial AI
## aspenONE V12 Highlights

<table>
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<tr>
<th><strong>Aspen Hybrid Models™</strong></th>
<th><strong>Aspen Maestro™</strong></th>
<th><strong>Aspen Deep-Learning IQ™</strong></th>
<th><strong>Aspen Multi-Case™</strong></th>
<th><strong>Aspen MES Collaborative™</strong></th>
<th><strong>Aspen Event Analytics™</strong></th>
</tr>
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<tbody>
<tr>
<td>Combine AI, 1st Principles &amp; Domain Expertise</td>
<td>Automate the development of better models faster</td>
<td>Build more accurate models and predictions more easily</td>
<td>Easily run dozens of simulation cases concurrently</td>
<td>Aggregate data with Enterprise-level Historian</td>
<td>Investigate unexpected production events</td>
</tr>
<tr>
<td>Model complex processes</td>
<td>Tune models with less expertise</td>
<td>Cover a wider range of operations—linear &amp; nonlinear</td>
<td>More complete analysis</td>
<td>Eliminate stranded data—Connect small sites</td>
<td>Take safer and faster corrective action and decision making</td>
</tr>
<tr>
<td>Comprehensive &amp; more accurate models without significant expertise</td>
<td>New capability for both Aspen Mtell &amp; DMC3</td>
<td>Advanced AI Capability</td>
<td>Use results to navigate complexity in operations</td>
<td>High-availability minimizes data loss — 24x7x365</td>
<td>SaaS-based Solution</td>
</tr>
</tbody>
</table>

*and much more...*
Asset Performance Management Suite
APM Strategy

- Dedicated team aligned on growth
- Speed to market and market penetration
- Marketing
  - Education, dissemination, validation
- Leading technical capabilities
- Customer success — value
- Ambitious vision — APM 4.0
- Partner ecosystem for scale
APM Customer Success

- Growing catalog of value captured from Aspen Mtell® throughout installed base
- Comprehensive coverage of assets — impacting production, safety and sustainability
- Increasing number of successful pilots completed
- Aspen ProMV™, Aspen Event Analytics™ and Aspen Maestro™ for Aspen Mtell all recently introduced to market — provide holistic view of the plant health
- 100+ customers across over 30 countries
APM Pilots Trend — Completed Pilots
Lack of overhauls at U.S. refiners could stall industry recovery

By Laura Sanicola, Erwin Seba

NEW YORK/HOUSTON (Reuters) - In fuel demand in the second half of workers are expected to resume con

But Marathon forecast first-quarter spending of $150 million on planned maintenance, less than half its year-ago period budget. Phillips 66 estimated $200 million to $230 million in turnaround costs this quarter, versus $329 million a year ago.

Lower costs could reflect reduced stress from lower output on equipment, or stretching out work and limiting overtime, said Matthew Blair, a refining analyst at Tudor, Pickering, Holt & Co.

Production will fall when maintenance begins, said Bob Yawger, director of futures for financial firm Mizuho Americas. He forecast fuel output falling another 6.5 percentage points from January’s 82.5% peak utilization.

“No matter how you cut it, turnaround season is simply a matter of time,” Yawger said on Jan. 27. “How far the refinery run rate slides is the only question.”
Aspen Mtell Detects Gearbox Failure on Primary Crusher Conveyor

ASSET/AGENT OVERVIEW

Metals and Mining Industry
Crusher Conveyor
Anomaly Agent

detects a deviation from
normal operating patterns
(across time and many
sensors) warning far earlier
than single tag DCS threshold alarm.

VALUE

Taking early, less-intrusive action prevented a major breakdown on the order of $500,000 in terms of maintenance costs and production losses.

ALERT/PRESCRIPTION

Anomaly Agent detected an abnormal condition and revealed sensor ranking for one of the three motor currents as most significant. The Agent requested an inspection.

ACTION

The inspection found a drive synchronization issue that was caused by a lubrication imbalance in the motor/ gearbox system.

Oil imbalance was corrected avoiding a gearbox and/or coupling failure. A new Failure Agent will warn much earlier of a recurring problem.
Aspen Mtell allowed the customer to avoid 2 days of downtime per year, per furnace. This equated to €1.7M in losses. The advanced warning also provided additional energy savings and extended the lifetime of the furnace.

Aspen Mtell Anomaly and Failure Agents detected multi-variate signals showing process degradation of the cracker furnace. Agents requested inspection.

Inspection confirmed furnace fouling.

Maintenance intervention was strategically scheduled to minimize production impacts while reducing downtime due to required repairs.

Aspen Mtell to be used to predict the need for furnace maintenance in real-time.
Sustainability
Ambitious Emissions Targets for Oil, Gas and Chemical Companies

Announcements of oil company GHG emissions reduction and net-zero commitments

<table>
<thead>
<tr>
<th>Company</th>
<th>Target</th>
<th>Target date</th>
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<tbody>
<tr>
<td>Repsol</td>
<td>Net zero by 2050 (scope 1, 2, 3); 50% cut in carbon intensity (scope 3)</td>
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<tr>
<td>Shell</td>
<td>Net zero by 2050 (scope 1, 2, 3); reduce carbon intensity 65% (scope 3)</td>
<td></td>
</tr>
<tr>
<td>Shell</td>
<td>Net zero by 2050 (scope 1, 2); reduce carbon intensity 65% (scope 3)</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>Net zero by 2050 (scope 1, 2); net zero in Europe (scope 1, 2, 3); 60% reduction in carbon intensity globally (scope 3)</td>
<td></td>
</tr>
<tr>
<td>Petrobras</td>
<td>Reduction in absolute emissions in upstream of 25% by 2030 (scope 1, 2)</td>
<td></td>
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<tr>
<td>ExxonMobil</td>
<td>Reduction intensity of upstream emissions 15–20% by 2025 (scope 1, 2)</td>
<td></td>
</tr>
<tr>
<td>Occidental</td>
<td>Net zero by 2040 (scope 1, 2)</td>
<td></td>
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<tr>
<td>OMV</td>
<td>Reduce carbon intensity of operations at least 30% by 2025; net zero by 2050</td>
<td></td>
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<tr>
<td>BP</td>
<td>Announced series of emissions reduction targets for 2030</td>
<td></td>
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<tr>
<td>Conoco</td>
<td>Reduce operational GHG emissions intensity 35–45% by 2030; net zero for operations by 2050</td>
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<tr>
<td>Petronas</td>
<td>Aspire to Net zero by 2050</td>
<td></td>
</tr>
<tr>
<td>Pioneer</td>
<td>Reduce GHG emissions intensity 25% by 2030</td>
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Source: Chemical and Engineering News, World Chemical Outlook 2021, January 11, 2021
Circular Economy – a Sustainability Priority

CIRCULAR LIFECYCLE FLOW

- Collect
- Consume
- Design & Manufacture
- Process

$1.5 BILLION COMMITTED TO KEEPING PLASTIC WASTE OUT OF THE ENVIRONMENT.
Sustainability in Capital-Intensive Industries

Reduce Emissions & Waste

Resource Efficiencies
Reduce usage of resources such as energy, water or feedstock

Energy Transition & Decarbonization
Renewable/alternative energy sources, biofuels

Circular Economy
Waste reduction, recycling, renewable feedstocks, innovation
Energy Efficiency Drops to Slowest Rate in a Decade: IEA

**Energy Efficiency Stalling**

Energy efficiency is expected to deliver more than 40% of the reduction in energy-related greenhouse gas emissions over the next 20 years.

**Climate Change Impact**

“Well below the level needed to achieve global climate and sustainability goals.”

“Energy efficiency should be at the top of to-do lists for governments pursuing a sustainable recovery—it is a jobs machine, it gets economic activity going, it saves consumers money, it modernizes vital infrastructure and it reduces emissions.”

Source: IEA Energy Efficiency Report, 2020
**Technology is Critical to Progress Sustainability through Efficiencies**

**Question:**

How valuable are these **Digital Technologies** for improving sustainability?

<table>
<thead>
<tr>
<th>Technology</th>
<th>Extremely Important</th>
<th>Very Important</th>
<th>Slightly Important</th>
<th>Moderately Important</th>
<th>Not Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Chain Optimization</td>
<td>44%</td>
<td>38%</td>
<td>14%</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Advanced Process Control</td>
<td>44%</td>
<td>35%</td>
<td>17%</td>
<td>2%</td>
<td></td>
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<tr>
<td>Energy and Utility Optimization</td>
<td>42%</td>
<td>39%</td>
<td>15%</td>
<td>3%</td>
<td></td>
</tr>
<tr>
<td>Predictive and Prescriptive Maintenance</td>
<td>39%</td>
<td>37%</td>
<td>19%</td>
<td>4%</td>
<td></td>
</tr>
<tr>
<td>Digital Twin</td>
<td>42%</td>
<td>25%</td>
<td>20%</td>
<td>10%</td>
<td></td>
</tr>
</tbody>
</table>

Source: *The Sustainability Future for Energy and Chemicals, ARC Strategies Research with Aspen Technology* 2020
Sustainability in Capital-Intensive Industries

Resource Efficiencies
Reduce usage of resources such as energy, water or feedstock

Energy Transition & Decarbonization
Renewable/alternative energy sources, biofuels

Reduce Emissions & Waste

Circular Economy
Waste reduction, recycling, renewable feedstocks, innovation
SESAME Life Cycle Assessment

Example — Transportation System

Fig. An example of a transportation system studied by SESAME (system-level LCA).¹

Solutions for the Hydrogen Supply Chain

- **Hydrogen Production**
  - Green Hydrogen — Aspen Plus® with ACM and Aspen HYSYS® simulate electrolysis processes
  - Blue Hydrogen — Aspen Plus with ACM and Aspen HYSYS simulate thermal processes with carbon capture

- **Hydrogen Distribution**
  - Aspen Plus and Aspen HYSYS simulate conversion processes
  - Aspen Supply Planner™ optimizes production and distribution

- **Hydrogen Storage**
  - Aspen Plus and Aspen HYSYS simulate physical-based storage such as cryogenic processes

- **Hydrogen Usage**
  - Aspen Plus with ACM simulate various fuel cell processes

There is significant potential for emissions reductions from clean hydrogen. [IEA report](https://ihsmarkit.com/research-analysis/the-role-of-hydrogen-in-a-deeply-decarbonized-future.html) (June 2019)

[Image: IHS Markit hydrogen supply chain diagram]

Sustainability in Capital-Intensive Industries

Resource Efficiencies
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Circular Economy
Waste reduction, recycling, renewable feedstocks, innovation
Chemical Recycling
Core Processes Can be Modeled With Aspen Plus®

Pyrolysis
This process breaks down the macrostructure of the polymer to form smaller molecules at moderate to high temperature. Products can be decomposed into three fractions: gas, liquid and solid residue.

Advantages
▪ Suitable for highly heterogeneous mixtures of plastics
▪ Simple technology

Challenges
▪ Complexity of reactions
▪ Requires high volumes to be cost effective
▪ Low tolerance for PVC
▪ Stable waste supply

Window cleaner and detergent bottles, shampoo bottles, food packaging, wire jacketing, medical equipment, siding, windows, piping, etc.

Squeezeable bottles: bread, dry cleaning and shopping bags, tote bags, carpet, etc.

Syrup bottles, ketchup bottles, straws, medicine bottles, etc.

Mechanical and chemical recycling of solid plastic waste
Waste Management, Volume 69, November 2017, Pages 24-58
Award-Winning Technologies for Sustainability

- Winner of 2020 **Green Supply Chain Award** from SDC Executive publication for a project with FP Corporation that reduced CO₂ emissions by 135,000MT and waste by 375,000MT

- Bharat Petroleum wins **ASSOCHAM Innovators Excellence Awards 2020** for real-time emission and efficiency monitoring and data acquisition using Aspen HYSYS®

- Aspen Mtell® Wins **Singapore Business Review Award** for Predictive Maintenance—for preventing costly downtime and reducing the risk of unplanned emissions
AspenTech Established Track Record in Enabling Sustainability

- **Dow**: Reduce 9% energy use & CO₂
- **Cabletech**: Reduce 10-50% fugitive emissions
- **Blue & Green Hydrogen**: CO₂ to chemicals
- **New solvents for CO₂ capture**: Wind Turbine Reliability & Uptime
- **Monitor gas field CO₂ emissions and reduce water use 5%**: Refinery-wide emissions monitoring
- **Palm Oil to Polymers**: 30% CO₂ reduction across the total site
- **Second Generation Biofuels**: Save 15% energy use in world-scale ethylene plant
- **LOTTE**: Reduce CO₂ and plastic waste in value chain
- **Alcoa**: Reduce 10% energy use in Aluminum refining
- **Wind Turbine Reliability & Uptime**: Accelerated innovation in carbon capture
- **Blue & Green Hydrogen**: Reduce 10% energy use in Aluminum refining

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Lonza Implements Aspen Plant Scheduler™ to “Tame the Scheduling Beast”

Batch cycle time has been reduced from 7 to less than 5 days. While production output has increased by approximately 20%. No additional scheduling headcount has been required.


20% Increase in production throughput

CHALLENGE

- Balance profitable operations and flexibility with changing customer demands
- Increase facility production and throughput
- Maintain scheduling staff at current levels
- Enhance Lonza’s ability to respond to production upsets

SOLUTION

- Scheduling Model Includes:
  - 200 assets
  - 3,000 activities
  - Adherence to Current Good Manufacturing Practices (cGMP)
  - Intricate timing of production activities
  - Shared production equipment
  - Uncertainty associated with growing mammalian cells

Ref:

Product(s):
Aspen Plant Scheduler
AspenTech Products are Widely Used in the Pharmaceutical Industry
Camo Analytics Strengthened Our Offering to Pharma Industry

- 16 of the 20 largest pharma companies are now AspenTech customers
  - Strong pharma compliance domain knowledge
- Unique Product and Process Monitoring and Optimization
  - Differentiated analysis of spectroscopy and chemometrics
  - Good Manufacturing Practice (GMP) Ready Compliance
    (EU Annex 11 & 21CFR part 11)

Examples of Camo Analytics Applications

- Batch monitoring
- Blend monitoring
- Continuous manufacturing
- Drying optimization
- Fermentation monitoring
- Quality monitoring
Our Vision of the Future
Market Forces Demanding New Levels of Operational Excellence

**Volatility**
- Supply & Demand
- Energy Transition
- Macro Economics

**Sustainability**
- Climate and Environment
- Social Responsibility
- Governmental Policy

**Workforce**
- Skills Shortage
- Remote Workers
- Changing Expectations

**Technology**
- Industry 4.0 Technologies
- Connectivity
- Volume of Data

---

1. Targeted reduction in carbon intensity by 2050, or sooner (Source: BP Reimagining Energy Feb 2020);
2. ROI through digitalization investments, high returns in production throughput, maintenance, asset lifecycle. (Source: major Middle Eastern refiner, presented at ARC 2019)
Self-Optimization — Key Step in the Journey to the Smart Enterprise

1. **Manual Process Improvement**
2. **Optimize Individual Disciplines**
3. **Isolated Improvement**
4. **Real-Time Insights Optimize Across Disciplines**
5. **AI + Domain Intelligence Drives Continuous Improvement**

**The Smart Enterprise**

**New Opportunities**

**New Business Model**

**Digitalization Journey**
The Self-Optimizing Plant

- Safer Operation
- Reduced Emissions
- Higher Margins
- Improved Reliability

Maximize and Sustain Value
The Self-Optimizing Plant

Self-learning, self-adapting and self-sustaining set of technologies and processes that work together to predict future state and prescribe or automate actions.
Total Addressable Market (TAM)
Methodology

- **SITES**

- **PRODUCTS**
  - Focus on top 500 accounts
  - Calculate white space by site and product for each account
  - Estimate Annual Spend Potential for each account
  - Totals extrapolated to all accounts
What Drives TAM Expansion?

- Industry Growth
- Price Increases
  - 2-3% price escalation on average on term contracts
- Product Innovations (through v11)
- Expansion into New Market Segments
Potential TAM\(^1\) (AS) — Grew by 15% from FY2019 to FY2020

1. Estimated by AspenTech from internal white space methodology on existing customer base
Expanding TAM Through Innovation and New Verticals (AS)

2018:
▪ ProMV – $157 million
▪ AORA Data Services (MSC) – $28 million
▪ Aspen Watch Centralized Monitoring (MSC) – $3 million
▪ Planning Model Update (ENG) – $34 million
▪ Fouling Monitoring of Preheat Exchangers (ENG) – $37 million

2019:
Innovation:
▪ GDOT Refining – $87 million
▪ OTS – $19 million

2020:
Innovation:
▪ Aspen Enterprise Insights – $235 million
▪ IQ Watch – $70 million
▪ Plant Digital Twin Online Applications – $56 million
▪ GDOT for Olefins – $40 million
Expanding TAM¹ Through Innovation FY20 (AS)

ENG & MSC

$0.42B

$2.11B
(Available TAM)

$3.64B

AspenTech
Current AS
$0.53B

Competitors
AS*
$0.58B

White Space
from
Innovations

APM

$2.14B
(Available TAM)

$5.78B

AspenTech
Current AS
$0.02B

Competitors
AS*
$0.01B

¹ Estimated by AspenTech from internal white space methodology on existing customer base
FY25 Target Outcome
### Target Operating Model

Stated as percentage of Annual Spend

<table>
<thead>
<tr>
<th>Category</th>
<th>GAAP</th>
<th>Non-GAAP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ending Annual Spend</td>
<td>100%</td>
<td></td>
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<tr>
<td>Cost of Revenue</td>
<td>10–13%</td>
<td></td>
</tr>
<tr>
<td>Sales &amp; Marketing</td>
<td>20–22%</td>
<td></td>
</tr>
<tr>
<td>Research &amp; Development</td>
<td>14–16%</td>
<td></td>
</tr>
<tr>
<td>General &amp; Administrative</td>
<td>8–9%</td>
<td></td>
</tr>
<tr>
<td>GAAP Operating Expenses</td>
<td>43–46%</td>
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<tr>
<td>GAAP Operating Margin</td>
<td>42–45%</td>
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</tr>
<tr>
<td>Non-GAAP Operating Margin</td>
<td>47–50%</td>
<td></td>
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</tbody>
</table>

*Totals may not equal 100% due to rounding

### Target Annual Spend

($M)

- **FY21 Guidance**: $629-$641
- **FY25 Model**: ~$1 Billion
- **CAGR**: ~12%

*GAAP Operating Margin*
In Summary
AspenTech Investment Highlights

Value Creation for Customers

Mission-Critical Products and Solutions

World-Class Customer Base

Market Leadership Position

Multi-Billion Dollar Opportunity

Long-Term Contracts and Recurring Revenue Model

Best-in-Class Profitability and FCF

Uniquely Positioned to Deliver on Industrial AI

Well Understood Growth Opportunities
Our Mission

Accelerate the digital transformation of the industries we serve by optimizing their assets to run safer, greener, longer and faster
$250+ Billion
Estimated Value in 2400 Customers
Thank You.
Aspen Technology Disclaimer

Aspen Technology may provide information regarding possible future product developments including new products, product features, product interfaces, integration, design, architecture, etc. that may be represented as “product roadmaps or product visions”.

Any such information is for discussion purposes only and does not constitute a commitment by Aspen Technology to do or deliver anything in these product roadmaps or otherwise.

Any such commitment must be explicitly set forth in a written contract between the customer and Aspen Technology, executed by an authorized officer of each company.
Industrial AI
Asset Optimization Strategy for Next Level Value Creation

Self-Optimizing Plant Vision Powered by Industrial AI

Technical Services
Significantly automate troubleshooting and debottlenecking through on-line digital twins that continuously mirror assets and processes

Operations Services
Significantly automate and “close the loop” on many aspects of operations to maximize profitability and sustainability potential

Maintenance Services
Achieve foresight into asset and process reliability and optimize maintenance scheduling in order to maximize profitability and sustainability potential

Integrated Value Chain Management
Gain deep visibility and control of plants and sites that tightly aligns with the supply chain to unlock new business opportunities

Industrial AI
Insights | Guidance | Automation

What can the Plant Produce?

What’s the Condition of the Plant?

VALUE CHAIN OPTIMIZATION

SELF-OPTIMIZING PLANT

AUTONOMOUS PERFORMANCE ENGINEERING

AUTONOMOUS PRODUCTION OPTIMIZATION

AUTONOMOUS RELIABILITY & MAINTENANCE

VALUE CHAIN OPTIMIZATION
Industrial AI Strategy Growth Drivers

Profitability

Current Solutions and Markets
- FY20 $5.78B TAM Potential
- FY20 15% YoY TAM Expansion
- FY20 Annual Spend $593M

New Industrial AI Solutions
- Performance Engineering
- Production Optimization
- Asset Performance Mgmt.
- Value Chain Optimization
- Industrial AI Infrastructure – AIoT Hub

Uplift Industrial AI Usage
- Hybrid Model Pervasive Usage in Current and New Solutions
- Embedded AI Applications incl. ML/DL/RL/NN/CG/More...
- OT/IT Convergence Brings IT and Data Scientists

Expand into Other Markets
- Pharmaceuticals
- Food & Beverage
- Metals and Mining
- Power
- Pulp & Paper
- Pharmaceuticals
- Food & Beverage
- Metals and Mining
- Power
- Pulp & Paper

Customer Value Creation

Sustainability

Token License Model

Usage Growth

Industrial AI
Insights | Guidance | Automation

$59B → $250B+
Asset Optimization — Digital Reference Architecture

*aspenONE® Industrial AI Solutions and Infrastructure*

**VALUE CHAIN OPTIMIZATION**
- Produce to demand
- Forecast and Plan
  - Balance supply & demand

**PERFORMANCE ENGINEERING**
- Plant Digital Twin
  - Optimize OPEX by mirroring asset
- Design & Debottleneck
  - Optimize CAPEX and time to market

**PRODUCTION OPTIMIZATION**
- Plan & Schedule
  - Optimize feed, processing and products
- Control & Optimize
  - Maximize quality and performance
- Monitor & Execute
  - Collect, monitor and automate execution

**ASSET PERFORMANCE MANAGEMENT**
- Assess Reliability
  - Minimize risk
- Prescriptive Maintenance
  - Avoid unplanned downtime

**Industrial AI Infrastructure**
- Connectivity: Edge to Cloud, IIoT, Data Analytics, Insights & Collaboration

**Distribute**
- Optimize product distribution

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aspenONE® V12 Innovation Highlights

Industrial AI Infrastructure and Solutions Introduced Fall 2020

**AloT Hub**
- Aspen MES Collaborative™
- Aspen Cloud Connect™
- Industrial AI Workbench
- Aspen Enterprise Insights™

**Performance Engineering**
- Hybrid Modeling
- Multi-Case Analysis
- Cost Estimation Insights
- Digital Twin Workflow

**Production/Value Chain Optimization**
- Aspen Unified™
- Aspen GDOT™
- Hybrid Models
- Polymer Scheduling

**Asset Performance Management**
- Aspen Mtell®
- Aspen ProMV™
- Aspen Event Analytics™
- APM Insights
AspenTech Unique Capabilities
Enable the Self-Optimizing Plant of the Future

Industrial AI combines Data Science & AI with Software and Domain Knowledge to deliver the Self-Optimizing Plant of the future for the Capital-Intensive Industries
Industrial AI Infrastructure

*AloT Hub and Asset Optimization Solutions*

**Enterprise Visualization & Workflow**

- **Aspen Enterprise Insights**
- **Enterprise Visualization and Collaborative Workflow**

**Industrial AI Apps**

- **Aspen AI Model Builder™**
- **Aspen Event Analytics™**
- **Aspen Industrial AI Models and Agents**
- **Customer and Partner Purpose-Built Apps**

**Enterprise Speed & Scale**

- **Aspen Cloud***
- **Model Productization**
  - Training, versioning, embedding, deploying, updating and sustainment...at scale
- **Data Management**
  - Cleaning, conditioning, enrichment, processing and storage of...billions of data points
- **Data Ingestion**
  - Large-scale ingestion and aggregation...across diverse data sources

**Connectivity & Edge Computing**

- **Aspen Connect**
- **Connectivity Framework and Intelligent Edge**

**Enterprise Data Sources**

- **Aspen Data**
  - Aspen Apps
  - Historians
  - Hexagon
  - I2O
  - SAP
  - IBM
  - www

*Cloud platform to host and manage Industrial AI Applications (Not licensable)*
Benefits

- Ability to aggregate and manage data from all sites represents tangible gains in roll-ups and comparisons
- Comprehensive real-time information on productivity and efficiency across the enterprise
- Leverages the resourcing capabilities of cloud technology
Empower Data Scientists to Build Data-Rich Industrial AI Applications

Benefits

- Cloud-ready AI/ML collaborative solution
- Enrich and process data streams across IIoT and enterprise data sources
- Organize and store enriched data, ready for analytics and machine learning
- Advanced data modeling, robust data pipelines, auto-scaling and best-in-class security

Production-Grade AI environment
Develop, train, test, productize and deploy rapidly

Hosted Notebooks
Develop and run code in browser and reduce algo development cycles

Bring Your Own Model
High flexibility to use almost any script or algorithm code

Versioning & Collaboration
Enhancing data science team productivity and collaboration

Scalability
One-click Deployment
Visualization
Benefits

- Improve enterprise performance management by integrating people, data and workflows into a highly automated digital business process.

- Gain actionable insights through aggregation of data from different data sets across the enterprise into analytics and visualizations to guide better decisions.

- Transform work processes into automated solutions ensuring work is assigned and processed effectively.

Insights and Workflow Automation in Low Code/No-Code Environment

Enterprise Collaboration for Industrial AI Applications
Aspen Enterprise Insights™
Hybrid Models
Aspen Hybrid Models™ Power Industrial AI Applications

Pure Data-Driven AI Models Have Major Challenges for Capital-Intensive Industries

**Challenges**
- Modeling complex behavior
- Computationally expensive
- Difficult to maintain

**Benefits**
- Model difficult processes and constraints
- Create more accurate models faster
- Sustain more easily over time

**Democratize AI**

---

**ML Model**

Pure Data-Driven

- Plant
- Operations data
- ML builds empirical model
- AI driven empirical model
- Manual deployment

**Aspen Hybrid Model**

Data + 1st Principles Model

- Plant
- Operations & simulation data
- ML builds empirical model, guided by domain knowledge
- Add 1st principles & constraints
- AI driven Hybrid Model
- Seamless deployment

---

Notes:
1. Polymer Reactor POC for Predicting Polymer Molecular Weight
2. MWN = Molecular Weight Number
Record Innovation Club Participation and Customer Response

Aspen Hybrid Models™

100+ companies
300+ users

“Very exciting confluence of traditional first principles & AI based technologies.”

“Easy to build and fast solution, great for real time model deployment.”

“I liked the easy ability to import data and define constraints.”

“Aspen Hybrid Models are a major advance in the field of chemical engineering. Hybrid Models are a major step forward in bringing together AspenTech’s process models and machine learning; and are a game changer in process engineering and plant improvement.”

“Aspen Hybrid Models provide very efficient non-linear planning model generation, taking information from Aspen HYSYS rigorous refining reactor models and offering a great deal of promise as a new approach for updating planning models”

Dr. Karuna Potdar
Vice President Technology
Centre of Excellence
Reliance Industries Limited

Francesco Mura
Digital PM Pool Head
Saras
Wide Range of Industrial AI Use Cases for Asset Optimization

Aspen Hybrid Models™ Have Double Digit Approved and Pending Patents to Date

Operations Optimization
- Simple, Robust and Fit for Purpose Models
- Engineering Model
- Online Digital Twin
- Planning Model

Product/Operations KPIs
- Color
- Hydrate
- Porosity
- Particle Size
- Viscosity
- pH
- Color
- Viscoisty
- Porosity
- Particle Size

New Equipment Models
- Accurate models based on historical operational data
- Specialized Equipment
- Aromatics Upgrading
- Lube Oil Processing

Asset-Wide Modeling & Optimization
- Light-weight, Robust & Reliable Models for Multi-unit Simulations
- Integrated upstream & midstream
- Integrated oil to chemicals
- Refinery/site-wide models
- Site-wide emissions tracking
Asset Optimization Solutions
Asset Optimization – Digital Reference Architecture

Performance Engineering

**Forecast and Plan**
Balance supply & demand

**Value Chain Optimization**

**Plan & Schedule**
Optimize feed, processing and products

**Control & Optimize**
Maximize quality and performance

**Monitor & Execute**
Collect, monitor and automate execution

**Assess Reliability**
Minimize risk

**Prescriptive Maintenance**
Avoid unplanned downtime

**Design & Debottleneck**
Optimize CAPEX and time to market

**Plant Digital Twin**
Optimize OPEX by mirroring asset

**Performance Engineering**

**ASSET PERFORMANCE MANAGEMENT**

**WHAT CAN THE PLANT PRODUCE?**

**WHAT’S THE CONDITION OF THE PLANT?**

**INFORM THE PLAN**

**VALUE CHAIN OPTIMIZATION**

**Indirect Al Infrastructure**
Connectivity: Edge to cloud, IIoT, Data Analytics, Insights & Collaboration

**Distribute**
Optimize product distribution

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Benefits

- Transform 1st Principles models into Hybrid Models in combination with plant data
- Makes it easier to deploy and sustain process models into operations
- Accelerates alignment between Performance Engineering and Production Optimization
- Expands the boundary of Performance Engineering to all types of equipment and plants
Benefits

▪ Run a multitude of use cases in the same amount of time leveraging high performance computing (HPC)

▪ Employ advanced visualization to analyze multiple cases, validate design criteria, and find governing case

▪ Share Multi-Case project files containing entire set of simulations between EPCs and Owner/Operators
Benefits

- Complete workflow to configure and deploy on-line models using plant data in Aspen Plus and Aspen HYSYS
- Combine Sequential and EO models in the same on-line projects
- Deploy the same high-fidelity hybrid models for off-line and on-line use cases in Aspen Plus and Aspen HYSYS
- Easy model validation to keep simulation models up to date
Asset Optimization — Digital Reference Architecture

Production Optimization

Forecast and Plan
Balance supply & demand

Inform the plan
VALUE CHAIN OPTIMIZATION

What can the Plant produce?

PERFORMANCE ENGINEERING

Plant Digital Twin
Optimize OPEX by mirroring asset

Design & Debottleneck
Optimize CAPEX and time to market

Plan & Schedule
Optimize feed, processing and products

Control & Optimize
Maximize quality and performance

Monitor & Execute
Collect, monitor and automate execution

ASSET PERFORMANCE MANAGEMENT

What’s the condition of the Plant

Assess Reliability
Minimize risk

Prescriptive Maintenance
Avoid unplanned downtime

Industrial AI Infrastructure
Connectivity: Edge to Cloud, IIoT, Data Analytics, Insights & Collaboration

Produced to demand
VALUE CHAIN OPTIMIZATION

Distribute
Optimize product distribution

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Next-Generation Production Optimization

Aspen Unified™

Industrial AI Plant Automation that Maximizes Margins and Minimizes Emissions

Benefits

- Cloud ready Production Optimization that combines models and master data within a unified solution
- Unified flowsheets for planning, scheduling, dynamic optimization, and advanced process control
- Maximize margins while minimizing emissions using Industrial AI
- Leverages real-time data historians and constraints in GDOT/APC, and factors in current conditions in plants

Crude Selection
- Price catalog for sensitivity
- Improve parametric analysis

Production Planning & Optimization
- Flowsheet model building
- Planning work area
- Model lifecycle management

Crude Scheduling
- Automatic reconciliation
- Crude schedule optimizer
- Caust for scheduling

Value Chain Optimization
- Integrated with industrial delivery models
- Optimize shipping and storage
- Migrate easily from INX-PM3
Dynamic Optimization within the Aspen Unified™ Environment
Aspen GDOT™

Intuitive Flowsheets for GDOT Model Building, Deployment and Maintenance

Benefits
- Reduce the gap between planning and operations by maintaining consistency with planning and APC models
- Run large scope of optimization in real-time at the same frequencies as APC
- Unified GDOT Builder flowsheet environment simplifies model building and configuration
- Continuously update models to reflect actual process conditions

Closed Loop Dynamic Optimization of Multiple Units

Planning/Scheduling

Dynamic Optimization

Crude Unit
VAC Unit
Hydro Treater
Hydro Cracker
Blending

Example of GDOT scope for Diesel Envelope Optimization
Automatically Adapt and Optimize to Ever-Changing Plant Conditions
Aspen DMC3™, Aspen Maestro™, and Aspen Deep Learning IQ™

Industrial AI for APC Model Building, Deployment and Adaptive Control

Benefits

- AI ML/DL mines historical process data using linear/non-linear variables in seed models with Aspen Deep Learning IQ and Inferentials
- Aspen Maestro infuses model-building expertise in simple self-guided workflows
- Adjust controller tuning and optimization while accounting for severe process non-linearities
- Remote deployment and performance monitoring with secure data access
Benefits

▪ Enable operators and plant engineers to rapidly diagnose unusual process behaviors and determine best response

▪ Automatically builds an event agent based on the diagnosis

▪ Monitor processes on-line to detect and rapidly resolve repeat events

▪ Manages a history of all event occurrences and resolutions

▪ SaaS application accessible anytime and anywhere
Avoid Unplanned Downtime and Prevent Environmental Incidents

Aspen Mtell® with Maestro

**Proactively Isolate Events that Lead to Unplanned Downtime and Asset Damage**

**Benefits**

- Enable reliability engineers to rapidly build autonomous agents that protect assets throughout the plant
- Industrial AI based ML predictive and prescriptive maintenance
- Monitor assets context of usage to provide the earliest possible warning of asset damage and/or failure
- Maestro assists with selecting and preparing data for agent building and feature engineering
Collaboration for Rapidly Assessing Alerts and Initiating Mitigation Workflows

Benefits

▪ Enable cross-functional teams to proactively assess real-time asset and process predictive alerts
▪ Collaborate for optimal resolution and initiate automated workflow responses
▪ Report on asset performance, alert histories, and value of mitigation responses
Key Takeaways

- Aspen Industrial AI Delivers the Next Level of Value Creation Across Capital-Intensive Industries
- Aspen Hybrid Models™ are a Major Advance in Chemical Engineering and Artificial Intelligence that “Changes What is Possible” for Digitalization
- Aspen Industrial AI V12 Solutions are the 1st Wave of the Self-Optimizing Plant Vision with Much More in the Future
Thank You.
Customer Value Creation

John Hague, Executive Vice President, Operations

February 12, 2021
Asset Performance Management (APM)
Asset Performance Management
Customer Value
Enterprise Rollout of Mtell across a major integrated downstream petroleum company

AI prescriptive maintenance analytics are successfully protecting pipeline integrity and refining assets. This enables the company to take preemptive actions to maximize asset availability and safety.

**Avoided safety & environmental issues. $3.26M Savings to date!**

**Challenge**
- Deployment of prescriptive maintenance across the enterprise
- Goal is to reduce unplanned downtime and emissions, while improving safety

**Solution**
- Prescriptive maintenance AI agents deployed on extended midstream pipeline – 12 Refineries, 6 Pipeline Regions, 361 Major Assets Protected
- Deployment best practice across APM included customer enablement & customer success
- On-time and under budget

**Product:** Aspen Mtell
33 Catches!
1 Avoided 7 Days of Downtime

Significant save – Failure Agent on a lube oil pump – avoided seven days of downtime, due to the avoidance of a primary crusher bearing failure!

Challenge
- On-going breakdowns prevent meeting operational and financial goals
- No lead-time to easily mitigate risk or recover quickly from unplanned downtime
- Safety risks due to unplanned shut-downs and start-ups

Solution
- Aspen Mtell deployed at selected sites across four asset classes: Primary Crushers, Primary Scrubbers, Circulating Media Pumps and Common Stream Conveyors
- Customer moving to deploy across the enterprise with additional sites in South Africa, Botswana, Canada, Chile and Australia!

Product(s): Aspen Mtell
Sustainability: Decrease off-spec material resulting in reduced waste and operator interventions

Mtell provides advanced warning of column flooding, increasing on-spec product and eliminating more than 50 flooding events per year!

3 Days of Increased Asset Availability

Challenge
- Generation of off-spec materials that need to be reprocessed due to asset instability
- Temporary unit shutdowns
- Collected lots of information on preferred data platform, unable to fully capitalize on investment

Solution
- Aspen Mtell enables prescriptive maintenance
- Identification of root cause resulting in asset instability
- Continuous learning of event patterns with Aspen Maestro for Mtell
- Applied Aspen domain expertise to data platform for reliability insights

Products:
Aspen Mtell, Aspen Maestro for Aspen Mtell
30 Catches in 30 Days

External Outreach
- 5-Week Email Campaign

Social Media

Results
- Thousands of Visitors
- Longer Time on the site
- Increase Customer Engagement

Turning Unplanned Downtime Into Planned Downtime

30 Catches in 30 Days Interactive Infographic
Sustainability
Refining Margin Leakage Reduction for European Customer

With a capacity of 300 KBPD the Ref gap = $50M to $70M
**Plan**

**Actual**

- **10-15% Energy Reduction**
  - Minimize process units energy consumption
  - Avoid unplanned downtime
  - Optimize energy supply/demand
  - Sustainably_dashboard, Monitor HX fouling factors, Improve energy usage

**CO₂ Emissions Reduction at European Customer**

- **LP – Advanced Opt**
  - CO₂ Emissions Reduction

- **Digital Twin**
  - >50,000 t/y

- **Scheduling & Blending (APS/MBO)**
  - >50,000 t/y

- **Dynamic Optimization (GDOT)**
  - >100,000 t/y

- **Advanced Process Control (DMC3)**

- **Machine Learning (Aspen Mtell)**

**CO₂ emissions for a 300 KBPD European Refinery are typically in the range of 3.8 – 4.2 M t/y and energy bill is in the range of 250-300 M$/y**
Sustainability in Capital-Intensive Industries

<table>
<thead>
<tr>
<th>Net Zero Carbon</th>
<th>9% Plastic waste recycled</th>
</tr>
</thead>
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<td></td>
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</tbody>
</table>

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Technology is Critical to Progress in Sustainability

**Question:** How valuable are these **Digital Technologies** for improving sustainability?

<table>
<thead>
<tr>
<th>Technology</th>
<th>Extremely Important</th>
<th>Very Important</th>
<th>Slightly Important</th>
<th>Moderately Important</th>
<th>Not Important</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply Chain Optimization</td>
<td>38%</td>
<td>14%</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Advanced Process Control</td>
<td>35%</td>
<td>17%</td>
<td>2%</td>
<td>2%</td>
<td>2%</td>
</tr>
<tr>
<td>Energy and Utility Optimization</td>
<td>39%</td>
<td>15%</td>
<td>3%</td>
<td>3%</td>
<td>3%</td>
</tr>
<tr>
<td>Predictive and Prescriptive</td>
<td>37%</td>
<td>19%</td>
<td>4%</td>
<td>4%</td>
<td>4%</td>
</tr>
<tr>
<td>Maintenance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Digital Twin</td>
<td>25%</td>
<td>20%</td>
<td>10%</td>
<td>10%</td>
<td>10%</td>
</tr>
</tbody>
</table>

Source: *The Sustainability Future for Energy and Chemicals*, ARC Strategies Research with Aspen Technology 2020
AspenTech Established Track Record in Enabling Sustainability

- Save 15% energy use in world scale ethylene plant
- Reduce CO₂ and plastic waste in value chain
- Monitor gas field CO₂ emissions and reduce water use 5%
- Accelerated innovation in carbon capture
- Reduce 10% energy use in Aluminum refining
- Palm Oil to Polymers
- CO₂ to chemicals
- Blue & Green Hydrogen
- New solvents for CO₂ capture
- Wind Turbine Reliability & Uptime
- Refinery-wide emissions monitoring
- 30% CO₂ reduction across the total site
- Second Generation Biofuels
- Reduce 10-50% fugitive emissions
- Reduce 9% energy use & CO₂
- Save 9% energy use & CO₂
- CO₂ to chemicals
- New solvents for CO₂ capture
Sustainability in Capital-Intensive Industries

Resource Efficiencies
Reduce usage of resources such as energy, water or feedstock

Energy Transition & Decarbonization
Renewable and alternative energy sources, biofuels

Circular Economy
Waste reduction, recycling, renewable feedstocks, innovation

Reduce Emissions & Waste
Sustainability in Capital-Intensive Industries

Resource Efficiencies
Reduce usage of resources such as energy, water or feedstock

Challenge
Energy inefficiency is creating excess carbon load (up to 20%); Growing global water shortage

Opportunity
Improve energy and utility effectiveness and efficiency in current operations

Value
Save 10-15% energy use & cost, reduce 20% carbon load

Energy Transition & Decarbonization
Renewable/alternative energy sources, biofuels

Circular Economy
Waste reduction, recycling, renewable feedstocks, innovation

Reduce Emissions & Waste
Potential to Deliver 10-30% Energy Savings & Carbon Reduction Today

Typical Energy Savings*

Current energy use: 100%

Design: 5 – 20%
Planning & Scheduling: 3 – 5%
Digital twin & Optimization: 2 – 10%
Advanced Process Control: 2 – 10%
Future energy use: 70 – 90%

Total energy savings: 10 – 30%**

* Typical savings based on 26 energy efficiency case studies
** Total savings depends on overlap & synergies

AspenTech Solutions for Energy Efficiency

Dow Chemical Co has achieved $700 million in cumulative benefits over 9 years, increasing energy efficiency improvement of 9% across 15 sites globally. Dow uses online process models and APC to increase asset capability for alternative feedstocks.

**Challenge**
- Drive to be lowest-cost producer and lowest-emissions producer
- Achieve optimization of ethylene production, year by year, with a global excellence program
- Achieve flexibility for alternative feedstocks
- On-time flawless production

**Solution**
- DMC commissioned first to help adjust multiple variables and still meet product demands
- Digital twin optimization models added later to address product profitability shifts and energy costs
- Extended to 15 sites

**Reduced emissions by 80%**

**Products:**
- Aspen Plus
- Aspen Online
- Aspen DMC
Challenge

- Provide actionable sustainability dashboard across Abu Dhabi’s largest gas field (Shah Gas Field)
- Demonstrate value of digital twin, for broader adoption across all assets

Solution

- Actionable operator insights from intuitive visualization
- Online engineering model, calibrated every minute
- Identifies lift gas compressor operating issues for operator action

Decreased water use by 10%

Products:
Aspen HYSYS, Energy Analyzer, Aspen Utilities, AORA, IP.21
Sustainability in Capital Intensive Industries

Resource Efficiencies
Reduce usage of resources such as energy, water or feedstock

Energy Transition & Decarbonization
Renewable/alternative energy sources, biofuels

Challenge
Reduce carbon footprint and emissions over process life-cycle to achieve long-term carbon neutrality

Opportunity
Renewable energy sources, green/blue hydrogen and biofuels; CO$_2$ capture, utilization and storage

Value
At least 20-50% less footprint, >90% less carbon taxes through CCUS

Circular Economy
Waste reduction, recycling, renewable feedstocks, innovation
Energy Transition: Achieving Goals through Tactical & Strategic Actions

Example of carbon emissions from energy use*

>50% Carbon reduction
BP estimates* from using renewables in their energy mix

3x Carbon price in Europe compared to 2018
CO₂ European Emission Allowance reduction of 2.2% per year

* 2020 BP Energy Outlook Summary
Challenge

- Commodity business of bio-ethanol production affected by volatility in feedstock prices
- Capacity and energy identified as major goals in current plant improvement
- Plan plant expansions

Solution

- Simulation of dry-grind bio-ethanol separation process
- Identification of bottlenecks
- Resulted in molecular sieve regeneration improvement

Reduced regeneration steam in a processing column load to allow overall capacity increase. Further improvements identified with 36% reduction in reboiler duty.

Increase capacity by 13%

Product: Aspen Plus
Insights on scale-up & costs

Pan Pacific Technologies was able to model and do economic evaluation of algal biofuels process. The model provided basis for analyzing and evaluating biofuels innovations. This was accepted by National Alliance for Advanced Biofuels and Bioproducts.

**Challenge**
- Poorly documented thermodynamic and kinematic data for bioprocesses
- Pan Pacific Technologies needed to model algal biofuels process to communicate its value to a wide audience

**Solution**
- Aspen Plus to model bioprocess
- APEA, ACCE and Aspen Dynamics for further analysis
- Easy access to aspenONE
  
  Engineering made modeling complex process & economics possible

*Products: Aspen Plus, APEA, ACCE, Aspen Plus Dynamics*
Sustainability in Capital Intensive Industries

Resource Efficiencies
Reduce usage of resources such as energy, water or feedstock

Energy Transition & Decarbonization
Renewable/alternative energy sources, biofuels

Circular Economy
Reduce Emissions & Waste

Challenge
Reduce waste and extend product life to lower environmental impact

Opportunity
Design out waste, pollution and optimize recovery of energy and material after use

Value
Up to 85% reduction in CO₂ emissions using chemical recycling versus conventional feedstock*

* Chemical Recycling, CEFIC October 2020
Circular Economy Impacts the Entire Value Chain

LINEAR LIFECYCLE FLOW

- Extract Raw Materials
- Design & Manufacture
- Consume
- Dispose

Redesign processes and products to reduce waste and emissions
Circular Economy Impacts the Entire Value Chain

Redesign processes and products to *eliminate* waste and emissions
Reduce CO$_2$ emissions by 135,000 MT

Challenge
- Provide stable and responsive food distribution in environmentally-friendly, efficient way
- Minimize CO$_2$ Emissions
- Sell recycled products as an economically sustainable activity

Solution
- Aspen Supply Chain Planner provides a “high degree of precision” to production and distribution planning to FPCO’s network
- Distribution network utilizes returning trucks to collect used containers

Product: aspenONE Supply Chain Management Solutions
Reducing the use of downstream treatment chemicals not only reduces environmental risks but creates business efficiencies as well!

**Challenge**
- Achieving desired melt flow of final products often required downstream treatment before shipping
- Treatment with peroxide required 80% of the time

**Solution**
- Aspen ProMV™ was used to monitor predicted final melt point to enable process correction before off spec product resulted
- Two months of analysis resulted in successful campaigns
- Total estimated >60% reduction in chemical use across all campaigns

**Reduced peroxide use by 60%!**

*Product: Aspen ProMV*
Sustainability in Capital-Intensive Industries

**Net Zero Carbon**

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**10-30% More Energy Efficiency**

possible with digital technologies in industrial processes

(IEA Energy Efficiency Oct 2019)

**>50% Carbon reduction**

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**x2 Plastic waste production in 15 years**

Alliance to End Plastic Waste, September 2020

**BP estimates from using renewables in their energy mix (2020 BP Energy Outlook Summary)**

**Alliance to End Plastic Waste, September 2020**

**Carbon reduction**

>50%

**Plastic waste recycled**

9%

**More Energy Efficiency**

10-30%

**Total, Shell, Dow, BP, Repsol, Equinor, OMV, Petronas, Lukoil, OMV**

**LANXESS**

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**By**

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### Sustainability Levers Mapped to Technology Solutions

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- **Major impact**
- **Supporting role**
### Sustainability Levers Mapped to Technology Solutions

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**Legend:**
- **Major impact**
- **Supporting role**
Energy Transition to Hydrogen Economy
Path to Net Zero Carbon

**Challenges**

- Improve time to market
- Optimize process & cost efficiencies
- Operate innovative processes effectively

**Benefits**

- Accelerate techno-economic analysis
- Design and operate with process and energy efficiency
- Maximize uptime and safety and minimize risk
Key Takeaways

**Resource Efficiencies**
Reduce usage of resources such as energy, water or feedstock

**Challenge**
Evolve businesses to dramatically reduce emissions and waste while still meeting profit and growth goals

**Opportunity**
Improve product mix, supply chain, and manufacturing to win in sustainable economy

**Value**
Increase company value and market share through positive sustainability positioning

- **Energy Transition & Decarbonization**
  Renewable/alternative energy sources, biofuels

- **Circular Economy**
  Waste reduction, recycling, renewable feedstocks, innovation
Thank You.
Financial Highlights
Karl E. Johnsen, Chief Financial Officer
February 12, 2021
Safe Harbor Statement

This presentation may contain forward-looking statements for purposes of the safe harbor provisions of the Private Securities Litigation Reform Act of 1995. Actual results may vary significantly from Aspen Technology's expectations based on a number of risks and uncertainties, including, without limitation, the risk factors described in Aspen Technology's most recent Annual Report on Form 10-K and any subsequent quarterly reports on Form 10-Q, each as filed with the U.S. Securities and Exchange Commission. Aspen Technology cannot guarantee any future results, levels of activity, performance, or achievements. Further, Aspen Technology expressly disclaims any current intention to update any forward-looking statements after the date hereof.
How to Measure our Performance — Key Metrics

Topic 606 — Impacted the way we recognized revenue, but not the value we create for customers and investors. We have not changed the way we contract with customers.

Business Metrics

▪ Annual Spend — is an estimate of the annualized value of our portfolio of term license arrangements. Annual spend is calculated by summing the most recent annual invoice value of each of our active term license contracts. Comparing annual spend for different dates can provide insight into the growth and retention rates of our business.

▪ Bookings — is the total value of customer term license contracts signed and delivered in the current period, plus term license contracts signed in a previous period for which the initial licenses are deemed delivered in the current period. License revenue is heavily impacted by the timing of Bookings, and more specifically renewal Bookings. A decrease or increase in Bookings between fiscal periods resulting from a change in the amount of term license contracts up for renewal is not an indicator of the health or growth of our business.

▪ Total Contract Value — is defined as the aggregate value of all payments received or to be received under all active term license agreements, including maintenance and escalation. Comparing Total Contract Value for different dates provides insight into the total revenue that will be recognized under our active contracts.

Non-GAAP Metric

▪ Annual Free Cash Flow — is calculated as net cash provided by operating activities adjusted for the net impact of (a) purchases of property, equipment and leasehold improvements, (b) capitalized computer software development costs, (c) non-capitalized acquired technology, (d) excess tax benefits from stock-based compensation and (e) other nonrecurring items, such as acquisition and litigation related payments. Annual free cash flow is the best metric to assess the overall value our business creates in a period.
Financial Strengths

- Sustained Growth
- Best in Class Profitability
- Sustained Free Cash Flow
- Disciplined Capital Allocation
## Financial Strengths

### Sustained Growth
- Multi year sustained organic growth in Annual Spend
- $5.78 billion FY20 TAM with ~15% year over year growth rate
- Significant investment in research and development
- Average 5-year contracts with low attrition
- 2–3% annual contract escalation
- > $59 billion of annual customer value creation (100:1 value to cost ratio)
- Mission-critical products and solutions

### Best in Class Profitability
- Investing organically and inorganically while maintaining best in class profitability based on Annual Spend
  - 87% – 90% Gross Margin
  - 47% – 50% Non-GAAP Operating Margin
- Operating results obtained from disciplined investment process and leverageable sales model

### Sustained Free Cash Flow
- 41% to 44% Free Cash Flow as a percentage of Annual Spend
- Average 5-year contracts including annual payments in advance with 2–3% annual contract escalation
- Allows for multi-year investment strategy
- World-class customer base
- Low bad debt expense and DSO

### Disciplined Capital Allocation
- Competitive advantage provided by sustained, predictable Free Cash Flow
- Focus on short-term and long-term shareholder value
- Organic and inorganic investments with excess capital returned to shareholders via buybacks
Financial Strengths

- Sustained Growth
- Best in Class Profitability
- Sustained Free Cash Flow
- Disciplined Capital Allocation
How Annual Spend Grows

- **Beginning Annual Spend**
- **Annual Contract Escalation**: 2% – 3% of Beginning Annual Spend
- **Amendments & Renewals**
- **Predominately SMB Vertical**
- **Attrition Rate**: 3% – 6% of Beginning Annual Spend
- **New Spend**
- **New Logos**
- **Ending Annual Spend**
Annual Spend

- Provides insight into the growth and retention rate of our customers
- Leading indicator of cash inflow
- Provides financial stability and predictability
  - Average 5-year contracts
  - 2–3% annual escalation
  - High renewal rates
- We will provide annual guidance with quarterly directional guidance
- Bookings include both renewals and growth bookings
- Bookings are heavily influenced by the timing of renewals
- The timing of renewals is not linear between quarters or fiscal years
- We will provide annual guidance, including value of renewals, as well as renewals for the next quarter
Renewal Bookings for FY2021—FY2024

- Renewal Bookings information provided from FY21–FY24 was based on our outlook as of June 30, 2020
- The actual timing of the Renewal Bookings can be impacted by early renewals
Total Contract Value

- **Total Contract Value**—is defined as the aggregate value of all payments received or to be received under all active term license agreements, including maintenance and escalation.

- Comparing Total Contract Value for different dates provides insight into the total revenue that will be recognized under our active contracts.

- We will be providing Total Contract Value on an annual basis.

As of June 30, 2019: $2.57 billion

As of June 30, 2020: $2.76 billion

7.4% YoY Growth
Financial Strengths

- Sustained Growth
- Best in Class Profitability
- Sustained Free Cash Flow
- Disciplined Capital Allocation
Expenses
GAAP & Non-GAAP Total Costs

1. Non-GAAP costs are GAAP costs adjusted for the impact of stock-based compensation expense, non-capitalized acquired technology, amortization of intangibles, and other nonrecurring items, such as the impact of litigation judgments and acquisition related fees.
# Target Operating Model

*Stated as percentage of Annual Spend*

<table>
<thead>
<tr>
<th></th>
<th>Target Values</th>
<th>FY2020 Actual*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ending Annual Spend</td>
<td>100%</td>
<td>100%</td>
</tr>
<tr>
<td>Cost of Revenue</td>
<td>10–13%</td>
<td>10%</td>
</tr>
<tr>
<td>Sales &amp; Marketing</td>
<td>20–22%</td>
<td>19%</td>
</tr>
<tr>
<td>Research &amp; Development</td>
<td>14–16%</td>
<td>16%</td>
</tr>
<tr>
<td>General &amp; Administrative</td>
<td>8–9%</td>
<td>12%</td>
</tr>
<tr>
<td>GAAP Operating Expenses</td>
<td>43–46%</td>
<td>47%</td>
</tr>
<tr>
<td>GAAP Operating Margin</td>
<td>42–45%</td>
<td>42%</td>
</tr>
<tr>
<td>Non-GAAP Operating Margin</td>
<td>47–50%</td>
<td>49%</td>
</tr>
</tbody>
</table>

*Totals may not equal 100% due to rounding*
Financial Strengths

- Sustained Growth
- Best in Class Profitability
- Sustained Free Cash Flow
- Disciplined Capital Allocation
Free Cash Flow

Free cash flow is net cash provided by operating activities adjusted for the net impact of (a) purchases of property, equipment and leasehold improvements, (b) capitalized computer software development costs, (c) non-capitalized acquired technology, (d) excess tax benefits from stock-based compensation and (e) other nonrecurring items, such as acquisition and litigation related payments.

<table>
<thead>
<tr>
<th></th>
<th>FY17</th>
<th>FY18</th>
<th>FY19</th>
<th>FY20</th>
<th>FY21 Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>$M's</td>
<td>$187</td>
<td>$212</td>
<td>$237</td>
<td>$243</td>
<td>$60–$70</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>FY19</th>
<th>FY20</th>
<th>FY21 Guidance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cash Taxes</td>
<td>$53</td>
<td>$40</td>
<td>$60–$70</td>
</tr>
<tr>
<td>Free Cash Flow</td>
<td>$237</td>
<td>$243</td>
<td>$60–$70</td>
</tr>
<tr>
<td>Free Cash Flow % of Annual Spend</td>
<td>44%</td>
<td>41%</td>
<td>43%</td>
</tr>
</tbody>
</table>

Cash Taxes Per Share
- FY17: $0.85
- FY18: $0.69
- FY19: $0.75
- FY20: $0.58
- FY21 Guidance: $0.88–$1.02

Free Cash Flow Per Share
- FY17: $2.43
- FY18: $2.91
- FY19: $3.34
- FY20: $3.54
- FY21 Guidance: $3.87–$4.02

1. Free cash flow is net cash provided by operating activities adjusted for the net impact of (a) purchases of property, equipment and leasehold improvements, (b) capitalized computer software development costs, (c) non-capitalized acquired technology, (d) excess tax benefits from stock-based compensation and (e) other nonrecurring items, such as acquisition and litigation related payments.
Financial Strengths

- Sustained Growth
- Best in Class Profitability
- Sustained Free Cash Flow
- Disciplined Capital Allocation
Goal: Allocate AspenTech’s capital in the most efficient manner to create long-term shareholder value.

Allocation is based on:
- Disciplined value based process
- AspenTech’s short and long term strategy
- WACC driven return on investment of the different options
- Current and anticipated market conditions
- Quantitative and qualitative criteria

Capital allocation is evaluated on a continuous basis.

Target Capital Structure
- Approximately $100 million in cash
- Gross Leverage at 0.5 – 2x turns of annual Free Cash Flow with ability to leverage up to 3 – 4x temporarily

**Current WACC @ 8.0 – 9.0%**
Investment at cost of capital (zero NPV)
Historical Capital Allocation

FY16: $165
FY17: $187
FY18: $212
FY19: $237
FY20: $243

- Free Cash Flow
- Stock Repurchase
- Acquisition

Stock Repurchase

Acquisition

Cash & Equivalents

FY16: $321
FY17: $102
FY18: $96
FY19: $72
FY20: $288
Share Repurchase Impact on Outstanding and Diluted Shares

As of December 31, 2020
Cumulative Amount Purchased: $1,766M
Cumulative Shares Purchased: 36M
Average Cost per Share: $49
FY2021 Guidance

<table>
<thead>
<tr>
<th>($M's except per share)</th>
<th>FY2021 Guidance¹</th>
</tr>
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<tbody>
<tr>
<td>Annual Spend Growth</td>
<td>6% – 8%</td>
</tr>
<tr>
<td>Bookings</td>
<td>$805 – $850</td>
</tr>
<tr>
<td>Total Revenue</td>
<td>$731 – $760</td>
</tr>
<tr>
<td>Total GAAP Expenses</td>
<td>$356 – $361</td>
</tr>
<tr>
<td>Operating Income</td>
<td>$375 – $399</td>
</tr>
<tr>
<td>Net Income</td>
<td>$328 – $347</td>
</tr>
<tr>
<td>Net Income Per Share</td>
<td>$4.80 – $5.08</td>
</tr>
<tr>
<td>Total Non-GAAP Expenses</td>
<td>$313 – $318</td>
</tr>
<tr>
<td>Non-GAAP Operating Income</td>
<td>$418 – $442</td>
</tr>
<tr>
<td>Non-GAAP Net Income</td>
<td>$328 – $347</td>
</tr>
<tr>
<td>Non-GAAP Net Income Per Share</td>
<td>$5.29 – $5.58</td>
</tr>
<tr>
<td>Free Cash Flow</td>
<td>$265 – $275</td>
</tr>
</tbody>
</table>

¹ Guidance assumes 68.4M weighted average diluted shares outstanding

Key Assumptions:

- FY2021 Revenue does not include ‘one time’ revenue items
- Does not reflect potential acquisitions
- FY2021 share count does not assume stock repurchases after December 31, 2020
- Current plan is to repurchase approximately $200M of our stock in FY2021
Key Takeaways

- World-class customer base with significant upsell opportunities
- Mission critical products and solutions
- Multiple pathways to grow within our installed base with a leverageable sales model
- Best-in-class profitability with average 5-year contracts provide predictable Free Cash Flow
- Disciplined capital allocation focused on short-term and long-term shareholder value
- Focused return on organic and inorganic investments
Thank You
Summary
Antonio Pietri, President and Chief Executive Officer
Today’s Takeaways

- AspenTech is a very different company today from 5 years ago, and will again be a very different company 5 years from now

- Industrial AI is a game changer for capital intensive industries and their sustainability and profitability objectives

- Our capacity to invest is a strategic advantage
Today’s Takeaways

▪ Culture of ‘Disciplined Agility’

▪ Target of $1 Billion of Annual Spend with best-in-class profitability in FY25

▪ Opportunity to become the software platform for manufacturing operations in capital intensive industries
Thank You, and Goodbye.