MARKET DRIVERS

- Environment
- Oil Prices
- Pressure on costs
BUSINESS JET DELIVERIES

Growth driven by:
- Corporate profits
- New aircraft introduction
- Fractional ownership
- Jet cards

US corporate profits ($B)*
Average # aircraft (units)

230 360 360 240 260 530 650 990 1,110 1,330 1,520
71-75 76-80 81-85 86-90 91-95 96-00 01-05 06-10 11-15 16-20 21-25
24 new aircraft introduced
25 new aircraft introduced

Fractionals taking off 1996
Globalization
Longer mission
Security factor

VLJ's excluded
*Source: Global Insight
## REGIONAL JET & COMMERCIAL MARKET

### New platforms emerging

<table>
<thead>
<tr>
<th>Company</th>
<th>Models</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mitsubishi</td>
<td>MRJ70, MRJ90</td>
</tr>
<tr>
<td>Embraer</td>
<td>EMB170 / 175, EMB190 / 195, ARJ21-700, ARJ21-900</td>
</tr>
<tr>
<td>Sukhoi</td>
<td>SuperJet 100-75, SuperJet 100-95</td>
</tr>
<tr>
<td>Bombardier</td>
<td>CRJ 700 / 705, CRJ 900 / 1000, CS110, CS130</td>
</tr>
<tr>
<td>Boeing</td>
<td>737 NG</td>
</tr>
<tr>
<td>Airbus</td>
<td>A320 NG</td>
</tr>
</tbody>
</table>
### SIGNIFICANT BUSINESS OPPORTUNITIES

**Engine forecast (2012-2032)**

<table>
<thead>
<tr>
<th></th>
<th>Market size</th>
<th>Potential P&amp;W market share</th>
<th>Captured to date</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Heavy business jet</strong></td>
<td>16,000</td>
<td>7,000</td>
<td>2,600 ✔️</td>
</tr>
<tr>
<td><strong>Regional jet</strong></td>
<td>7,000</td>
<td>4,000</td>
<td>1,500 ✔️</td>
</tr>
<tr>
<td><strong>Small single-aisle</strong></td>
<td>16,500</td>
<td>8,000</td>
<td>3,300 ✔️</td>
</tr>
<tr>
<td><strong>Large single-aisle</strong></td>
<td>24,400</td>
<td>10,000</td>
<td>N/A</td>
</tr>
</tbody>
</table>

*Over 28,000 engines*
Emission: Directly linked to fuel burn
(1 pound of fuel burn is 3 lb of CO2.)

Increasing Airline Operating Cost

*Step Change In Powerplant Design Is Required*
NEXT GENERATION PRODUCT FAMILY
Advanced Product Offerings For Multiple Market Segments

Business Jets  Regional Jets  100 Pax Jet  737 Replacement A320 Next Gen

10K – 30K

Powering Change  Pratt & Whitney Proprietary
## NEXT GENERATION PRODUCT FAMILY

### Targeted Market Segments

<table>
<thead>
<tr>
<th>Segment</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Single Aisle</td>
<td>100 – 225 Passengers</td>
</tr>
<tr>
<td>Regional Jets</td>
<td>70 – 95 Passengers</td>
</tr>
<tr>
<td>Corporate Jets</td>
<td>Medium (20,000 to 40,000 lbs Gross Weight)</td>
</tr>
<tr>
<td></td>
<td>Heavy (40,000 to 100,000 lbs Gross Weight)</td>
</tr>
</tbody>
</table>
MARKET NICHE

ATF (Un-Geared) ~ 73” Fan

GTF (Geared) ~ 65” Fan

Low Spool optimized for application: A/C design and use (Corporate or Regional)

~ 65” Fan

~ 46” - 50” Fan

~ 39” Fan

~ 42” Fan

~ 56” Fan

Thrust Class (lbs)

9K 10K 11K 12K 13K 14K 15K 16K 17K 18K 19K 20K 21K 22K
# GTF™ – BEST VALUE PROPOSITION

For Mainline Jets

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Base</th>
<th>Advanced Direct Drive TurboFan (ATF)</th>
<th>Geared TurboFan (GTF)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel Burn</td>
<td>Current</td>
<td>-6%</td>
<td>-12%</td>
</tr>
<tr>
<td>Noise</td>
<td>Chapter IV</td>
<td>-15dB</td>
<td>-20dB</td>
</tr>
<tr>
<td>Maintenance Cost</td>
<td>Current</td>
<td>-25%</td>
<td>-40%</td>
</tr>
<tr>
<td>Emissions (NOx)</td>
<td>CAEP6</td>
<td>60%</td>
<td>60%</td>
</tr>
<tr>
<td>Weight</td>
<td>---</td>
<td>Base</td>
<td>-10%</td>
</tr>
</tbody>
</table>
GTF SIGNIFICANT NOISE REDUCTION

Local Noise Concerns A Major Growth Limit

Schiphol Airport

737-800 noise footprint (35 mi²)

Geared turbofan™ noise footprint (8 mi²) (77% reduction)
NOISE RESTRICTIONS CONTINUE TO GROW
Local noise constraints dominate

<table>
<thead>
<tr>
<th></th>
<th>Percent of Regional Traffic Affected by . . . . .</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Noise Fees</td>
</tr>
<tr>
<td><strong>Europe</strong></td>
<td>71%</td>
</tr>
<tr>
<td><strong>North America</strong></td>
<td>0%</td>
</tr>
<tr>
<td><strong>Asia Pacific</strong></td>
<td>38%</td>
</tr>
</tbody>
</table>

As of 2007

~175 Airports added Noise Abatement Procedures between ‘95 and ‘05

* Based on P&W analysis of noise restrictions at airports listed in Boeing’s airport database and further review of airport websites
NOISE – OPERATIONAL CONSIDERATIONS

Factors to Maximize Utilization / Minimize Fuel Costs

Reduced Airport Fees

Avoid Abatement Tracks

- Restricted Jet Operations
- Unrestricted Operations

1 minute = 1.2% fuel burn

Use Preferred Runways

Detroit Metropolitan Wayne County (DTW)

1 minute = 0.4% fuel burn

Address Capacity (NGATS) Gap

Expand utilization potential

Powering Change

Pratt & Whitney Proprietary
NGPF SUPPLY CHAIN STRATEGY

85% Commonality

“P&WC” Product
- PW810 Turbofan
- Cessna - Columbus

“PWEH” Product
- PW Geared Turbofan (GTF)
- MHI - MRJ
NGPF SUPPLY CHAIN STRATEGY

- **Supplier Pre-selection**
  - NGPF GTF & PW810 Bidders Conference
  - One Company commercial requirement

- **65% fewer suppliers – Tier 1 Strategy**
  - “Right” competitive suppliers with winning proposition

- **Concurrent engineering with complete supplier involvement** (Producibility, Modularity of engine)

- **Optimized material flow**
  - Production preparation process (3P) events planned

- **2 day engine Assembly & Test**
ONE COMPANY SOURCING

Supplier benefits

Exclusive access to Corporate & Regional markets

Unparalleled Revenue growth opportunity
Volume increase (2X for new programs by 2020)

One Company commercial requirements

Limited amount of selected players
PROGRAM SCHEDULES

|------|------|------|------|------|------|------|------|

**PW810**
- ▲ Detail Design
- ▲ Engine Certification
- ▼ Entry Into Service
- Program Launched

**MRJ**
- ▲ Detailed Design
- ▲ Engine Certification
- ▼ Entry Into Service
- Program Launched

**C-Series**
- ▲ Detailed Design
- ▲ Engine Certification
- ▼ Entry Into Service
- Program Announced

Multiple Applications – Multiple Market Opportunities
P&WChosen to Power the New Cessna Citation Columbus Feb 2008

PW810
CESSNA COLUMBUS
Powered by PW810 engines

- Engine power (lbf): 8,800
- Speed: 488Mn
- Range (nm): 4,000
- Cabin length (ft): 36.3
- Cabin height (ft): 6.1
- Cabin width (ft): 6.8
- Passengers: 8
- Entry in service: 2014
GEARED TURBOFAN™ SELECTION

Exclusive Power for the Mitsubishi Regional Jet (MRJ)
MITSUBISHI MRJ
Powered by GTF™ engines

<table>
<thead>
<tr>
<th></th>
<th>MRJ-70</th>
<th>MRJ-90</th>
</tr>
</thead>
<tbody>
<tr>
<td>Engine power (lbf)</td>
<td>14,500</td>
<td>17,300</td>
</tr>
<tr>
<td>Speed</td>
<td>0.82Mn</td>
<td>0.82Mn</td>
</tr>
<tr>
<td>Range (nm)</td>
<td>1,960</td>
<td>1,800</td>
</tr>
<tr>
<td>Cabin length (ft)</td>
<td>TBD</td>
<td>TBD</td>
</tr>
<tr>
<td>Cabin height (ft)</td>
<td>6.6</td>
<td>6.6</td>
</tr>
<tr>
<td>Cabin width (ft)</td>
<td>9.5</td>
<td>9.5</td>
</tr>
<tr>
<td>Passengers</td>
<td>70-80</td>
<td>86-96</td>
</tr>
<tr>
<td>Entry in service</td>
<td>2014</td>
<td>2013</td>
</tr>
</tbody>
</table>
GEARED TURBOFAN™ SELECTION

Exclusive Power for the Bombardier CSeries Airplane

Lufthansa Airlines Summer 2008
GTF™ ENGINE DEMO PROGRAM

Successful Demonstration of GTF Benefits

~200 Hours of Testing thru May 1st

747SP Flying Test Bed

A340-600 Flying Test Bed

Ground test
November 2007

747SP
1st flight
July 2008

A340
1st flight
Sept 2008

2007

2008
WITH P&W’S GEARED TURBOFAN™ ENGINE
Airlines can have it all …

- Significantly better fuel burn
- **And** Significantly lower greenhouse emissions
- **And** Significantly lower noise
- **And** Significantly better economics

... by 2013!