



Creating the Equation for Growth

Aerospace Offset Market Opportunity in India

Lucintel Brief

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Lucintel

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Table of contents

- *Executive Summary*
- *Offset Policy Overview*
- *Offset Market Opportunity in India*
- *Emerging Trends in Indian Offset Market*
- *Conclusions*
- *About Lucintel*



Executive Summary

- **Aerospace and Defense offset opportunity in India is a growing market with strong fundamentals:**
 - Aerospace and defense offset market opportunity crossed ~US \$500 Million annual value in 2010
 - Market saw a growth of 78% (CAGR) during 2005-2010 and is forecast to grow at 11% CAGR during next 5 years
- **Growing involvement of international players in Indian aerospace and the defense sector is creating opportunity for domestic companies**
 - OEM's and Prime contractors looking for capable and credible options to fulfill offset obligations
 - International players receive leverage with established relations and experience
 - International players benefit by participating in offset market by partnering with domestic companies for low cost manufacturing for both offset and other opportunities
- **Government initiative to build indigenous capability is expected to drive the market**
 - Indian Defense budget, estimated at ~US \$32 Billion in 2010, is expected to exceed US \$44 Billion in next 5 years
 - Total Offset opportunity is expected to surpass ~US\$12 B over the next 10 years driven by procurement plans



Table of contents

- *Executive Summary*
- *Offset Policy Overview*
- *Offset Market Opportunity in India*
- *Emerging Trends in Indian Offset Market*
- *Conclusions*
- *About Lucintel*



Overview – Offset Policy

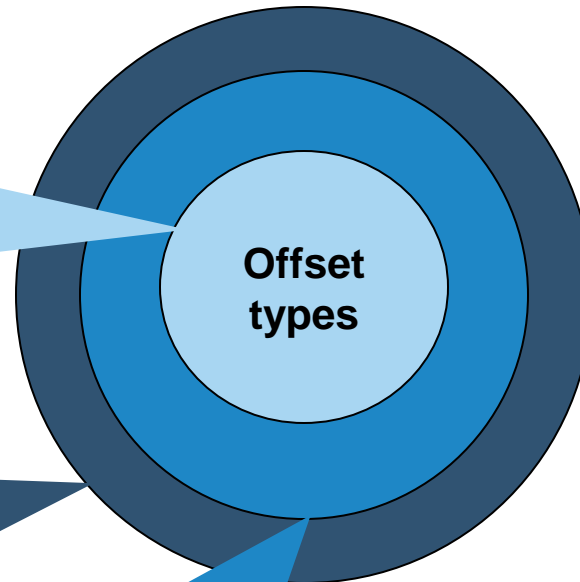
- The Offset Policy of a country defines the mechanism for rerouting procurement funds paid to international contractors back into the spending country

Direct Offset:

Player agrees to coproduce specific components of its products or to obtain related services in buying nation's territory

Indirect Offset:

Player agrees to assist importing country in development of its export or in investment requirements unrelated to principal contract



Semi-direct Offset:

Offsets relative to equipment and/or services that are very similar to items covered by main purchase contract

Probable Defense product offset

- Small arms, mortars, cannons, guns, howitzers, anti tank weapons etc
- Bombs, torpedoes, rockets, missiles etc
- Aircraft and parts, unmanned airborne vehicles, aero engines and parts, aircraft equipment, etc.
- Electronics and communication equipment
- Specialized equipment for military training or for simulation software
- Forgings, castings and other unfinished products, misc equipment, etc. for military

Global examples: Offset Policy in World

| Country | Offset Sector | Minimum Contract Value for offset policy (US \$ Million) | Offset amount as % of contract size | Direct vs. Indirect |
|--------------|-----------------------|--|-------------------------------------|---------------------|
| India | Civilian and military | \$70 | 30% | Both |
| Australia | Civilian and military | \$3 M foreign content/any tender of \$5 M | Maximized where cost effective | Both |
| Belgium | Civilian and military | Not Specified | 100% | Both |
| Canada | Civilian and military | \$2 preferred \$100 required | Not specified | Both |
| Denmark | Civilian and military | \$3,800 | 100% | Both |
| Finland | Civilian and military | \$13 | 100% + marketing consulting | Both |
| Greece | Military | \$1 | 80-120% | Direct |
| Israel | Civilian and military | \$0.1 | 35% | No distinction |
| Korea, South | Military | \$10 | 30% | No distinction |
| Kuwait | Civilian and military | \$4 | 30% | No distinction |



Aerospace and Defense Offset Policy in India

2005: Defense Procurement Policy (DPP-2005), to benefit Indian Defense Industry

Policy introduced 30% offset in contracts valued above Rs 3 billion under “buy” and “buy and make” categories to develop Indian defense Industry

2nd amendment 2008:

- List of products exempted from policy (Annexure-VI of the DPP)
- Removal of license to private industry to participate in offset programmed unless stated by DIPP
- Offset credit banking
- Banking of surplus offset credit
- Exemption of acquisitions under fast track from offset obligations

Offset policy in India

DPP-2005

DPP-2006

DPP-2007

DPP-2008

DPP-2009

DPP-2010

1st amendment 2006:

- Offset made mandatory as prescribed in DPP 2005
- Flexibility of forming joint ventures (JVs) with Indian firms
- Establishment of Defense Offset Facilitation Agency (DOFA)



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Snapshot 2006: Major deals announced under aerospace and defense subjected to offset policy in India

Potential US\$18 Billion offset opportunity from 2006

| Sector | Items | Deal Amount (\$ Million) | Offset amount @30% (\$ Million) |
|--------------|------------------------------------|--------------------------|---------------------------------|
| Defense | 126 Fighters | 15,000 | 4,500 |
| | 197 Helicopters | 700 | 200 |
| | Maritime, Freighters, AWACS etc. | 20,000 | 6,000 |
| Civil | 68 Boeing for Air India | 7,700 | 2,000 |
| | 43 Airbus for Indian | 2,800 | 700 |
| | ~300 aircraft for other airlines * | 18,000 | 5,000 |
| Total | | 63,600 | 18,400 |

* Not mandatory for non-government deals, but negotiations on country basis possible Source: CLSA Asia-Pacific Markets

** Deals are based on CLSA 2006 Data



Creating the Equation for Growth



Relative market attractiveness for offset opportunity in various countries

| Parameter | India | Australia | Canada | Denmark | Finland | Greece |
|------------------------------------|------------|------------|------------|------------|------------|------------|
| Manufacturing facility - Composite | Low | Low-Medium | Low-Medium | Low | Low | Low |
| Manufacturing facility - Metal | Low-Medium | Low-Medium | Low-Medium | Low | Low | Low |
| Technology and IT services | High | Low-Medium | Low-Medium | Low-Medium | Low-Medium | Low-Medium |
| Avionics | Low-Medium | Low-Medium | Low-Medium | Low-Medium | Low | Low |
| Assembly facility | Low | Low-Medium | Low-Medium | Low | Low | Low |
| Maintenance facility | Low-Medium | Low-Medium | High | Low-Medium | Low-Medium | Low-Medium |
| Others | Low-Medium | Low-Medium | Low-Medium | Low-Medium | Low-Medium | Low-Medium |

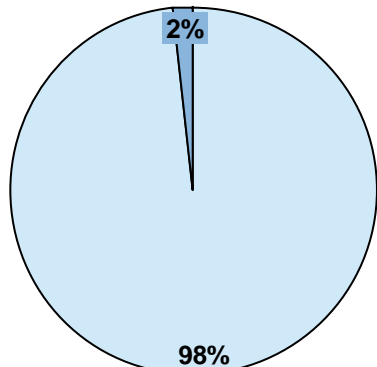
 High
  Medium
  Low-Medium
  Low
  No



Offset opportunity in India is expected to be more in defense sector as compare to commercial sector, driven by increasing defense budget and deals in fighter and helicopter segments

Indian defense budget in 2010

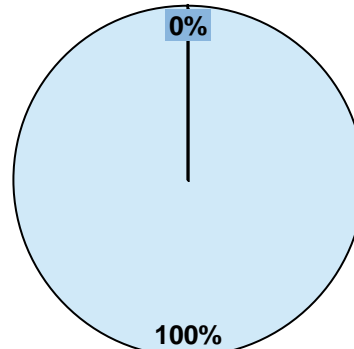
US \$32 Billion
Offset



Non-Offset

Indian offset market in 2010

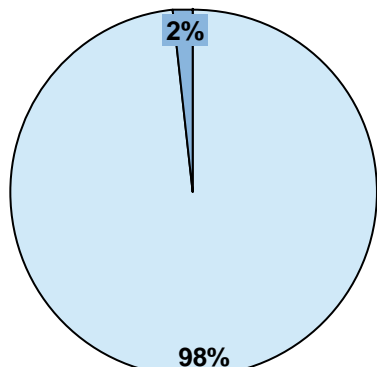
US \$500 Million
Defense Aerospace



Commercial Aerospace

Indian defense budget in 2016

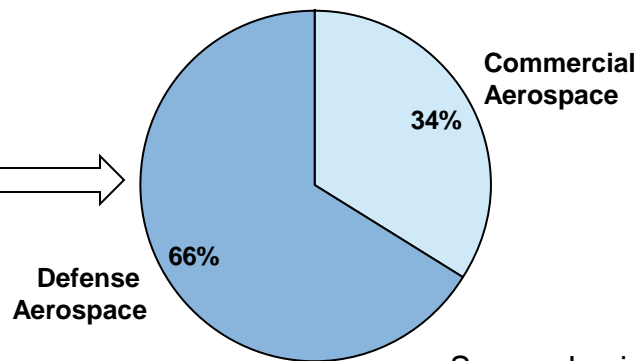
US \$44 B
Offset



Non-Offset

Indian offset market in 2016

US \$700 Million



Defense Aerospace

Commercial Aerospace

Source: Lucintel

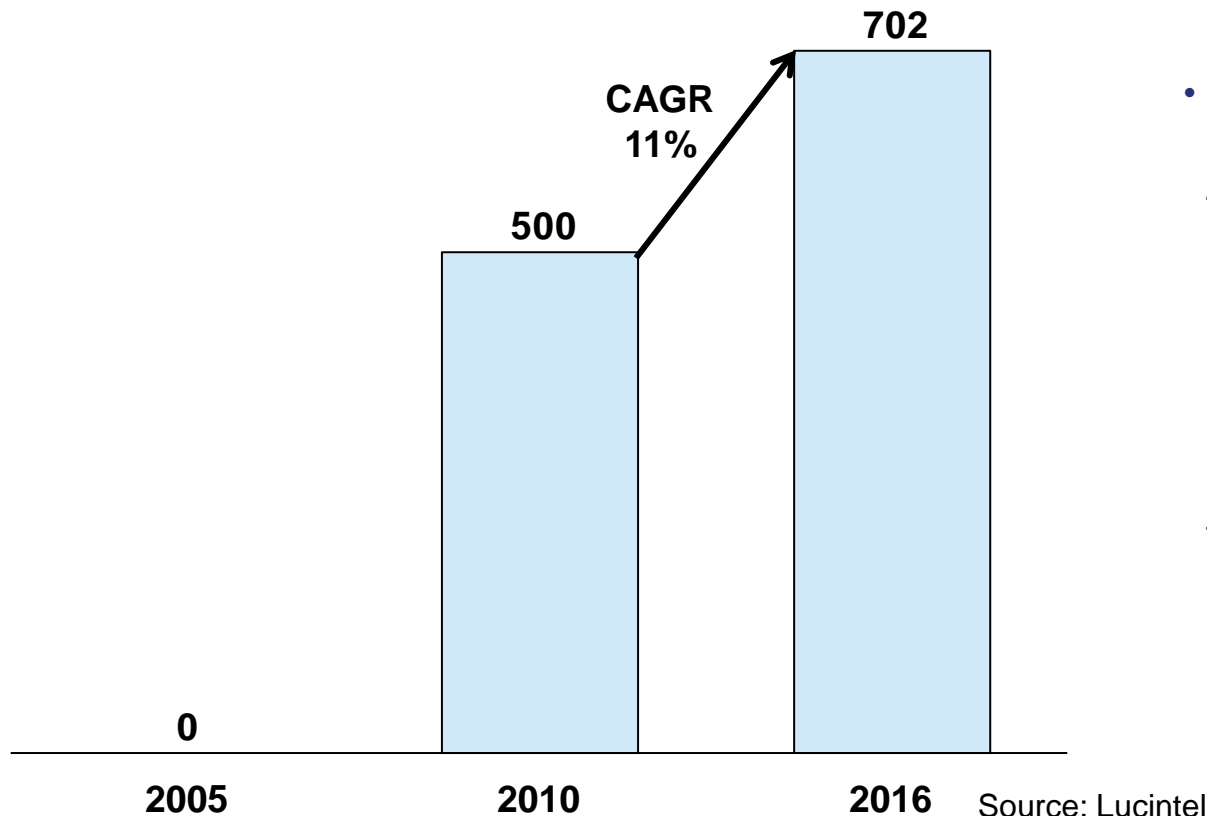
Key Insights

- Increasing Indian defense budget creates more opportunity for foreign investors
 - It is expected that the defense budget will grow with ~6% CAGR from 2010-2016 and reach to US \$44 billion in 2016
- Offset opportunity in India is expected to increase and will reach to ~US \$700 million in 2016
 - Offset opportunity is expected to be ~70% of offset market
 - Major driver for defense deal is MRCA



Aerospace and Defense Offset Market In India– Trend and Forecast

Offset value (\$ Million)

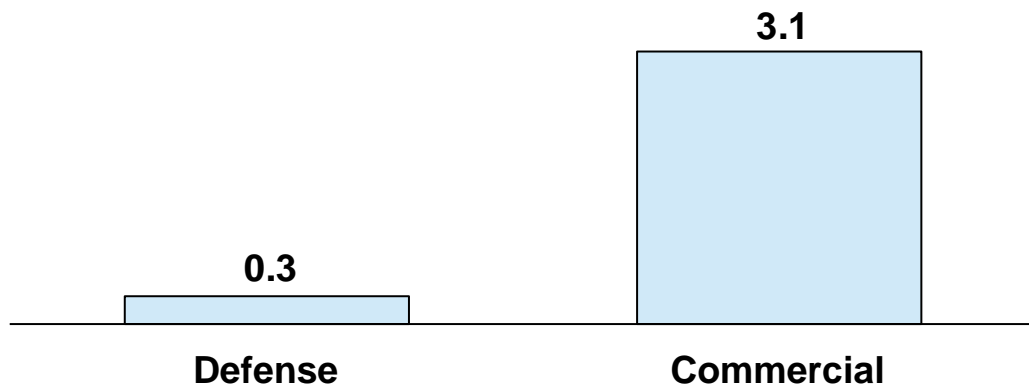


Key Insight

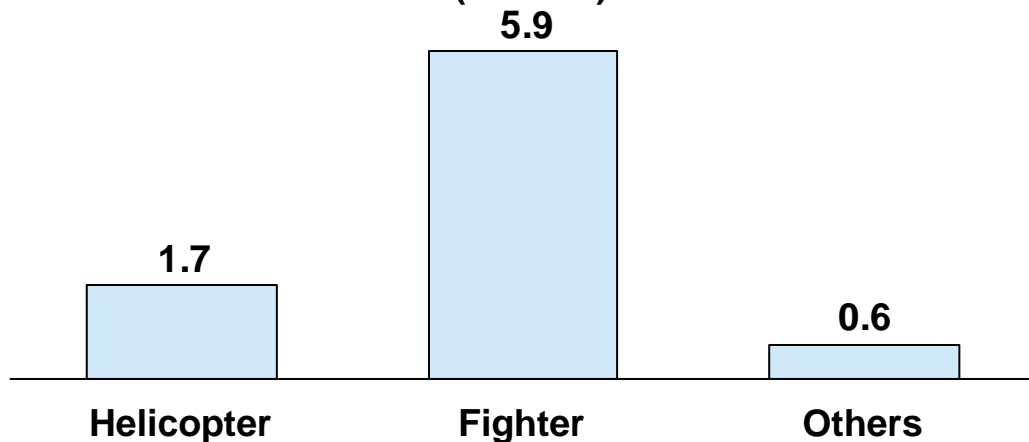
- Total Offset Market for Aerospace and defense is expected to be US \$702 Million in 2016
- Top deals in offset policy (multi-year)
 - Contract between Boeing and Air India for 68 Boeing planes, value of US \$7.7 Billion –
 - B737-800: 18 planes
 - B787-800: 27 planes
 - B777(-300, -200): 23 planes
 - Contract between Airbus and Air India for 43 Airbus planes, value of US \$2.2 Billion –
 - A319: 20 planes
 - A320: 4 planes
 - A321: 19 planes

Driving Factors for Aerospace Manufacturing in India: Indian Offset Market

Indian Aerospace and Defense offset value (\$ B)
(Deal Finalized till 2010; 4 Deals)



Future India Aerospace and Defense offset value (\$ B)
(7 Deals)

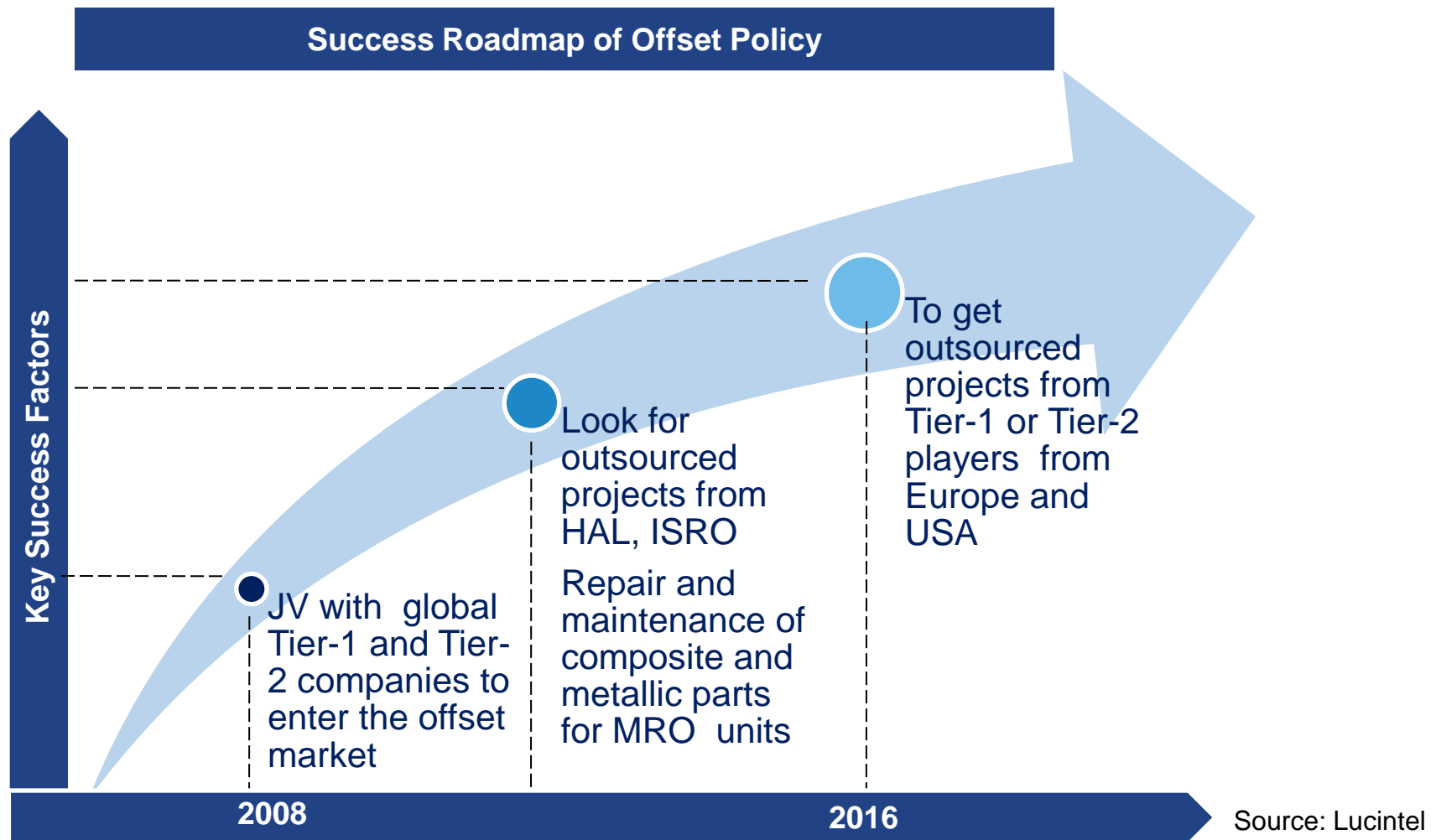


Key Insight

- Until 2010, 10 offset contracts have been finalized
- There are 41 offset contracts worth more than US \$11 B in pipeline and at various stage of negotiation
- Total offset market for aerospace and defense is expected to be US\$11 B over the next 10 years (2011-2020)
- Government initiative to build indigenous capability is expected to drive the market
- More defense deals are expected in next 5 years
 - Obsolesce in current systems & sub-systems
 - Quest to evolve into a global power

Source: IDSA and Times of India articles

Success Roadmap- Offset policy implementation in India



Indian companies most likely to benefit from aerospace and defense offset policy

| Companies | Sector |
|-----------------------------|--|
| Hindustan Aeronautics (HAL) | Will provide airframe subassemblies and product support for Bell Helicopter. Involved in the manufacture of Jaguar aircraft. |
| Bharat Electronics Limited | State Owned - Electronics, Engineering |
| NELCO | Electronic products, Automation Systems |
| Infotech Enterprises | IT solutions in Geo-space, Engg. Design (Close association with Pratt & Whitney) |
| HCLT, TCS, Satyam, Wipro | IT, ITES |
| Bharat Forge | Auto Component, Forging |
| Astra Microwave | RF and Microwave components |
| Dynamatic Technologies | Hydraulics and Aerospace component mfg. |
| Mahindra and Mahindra | Autos |
| Larsen and Toubro (L&T) | Engineering Goods |
| Titan Industries | Precision equipment manufacturing for aerospace industry |

*Source: CLSA 2006



Offset Outsourcing Area in Indian Aerospace and Defense Industry

Outsourcing Maturity in Aerospace

| | |
|--|---|
| Future outsourcing areas | Engine control systems |
| | Air control management systems |
| | Navigation system |
| Emerging outsourcing opportunities | Embedded development |
| | Control system design |
| | Simulation |
| | High-level aeronautical system design |
| | Testing services |
| | Cockpit equipment support software |
| | Composite structuring |
| Currently being undertaken by Indian IT vendors | Detailed design for modeling |
| | Manufacturing |
| | Drafting and field failure analysis |
| Non-core commonly outsourced | Testing, validation and verification |
| | Technical documentation of designing work |

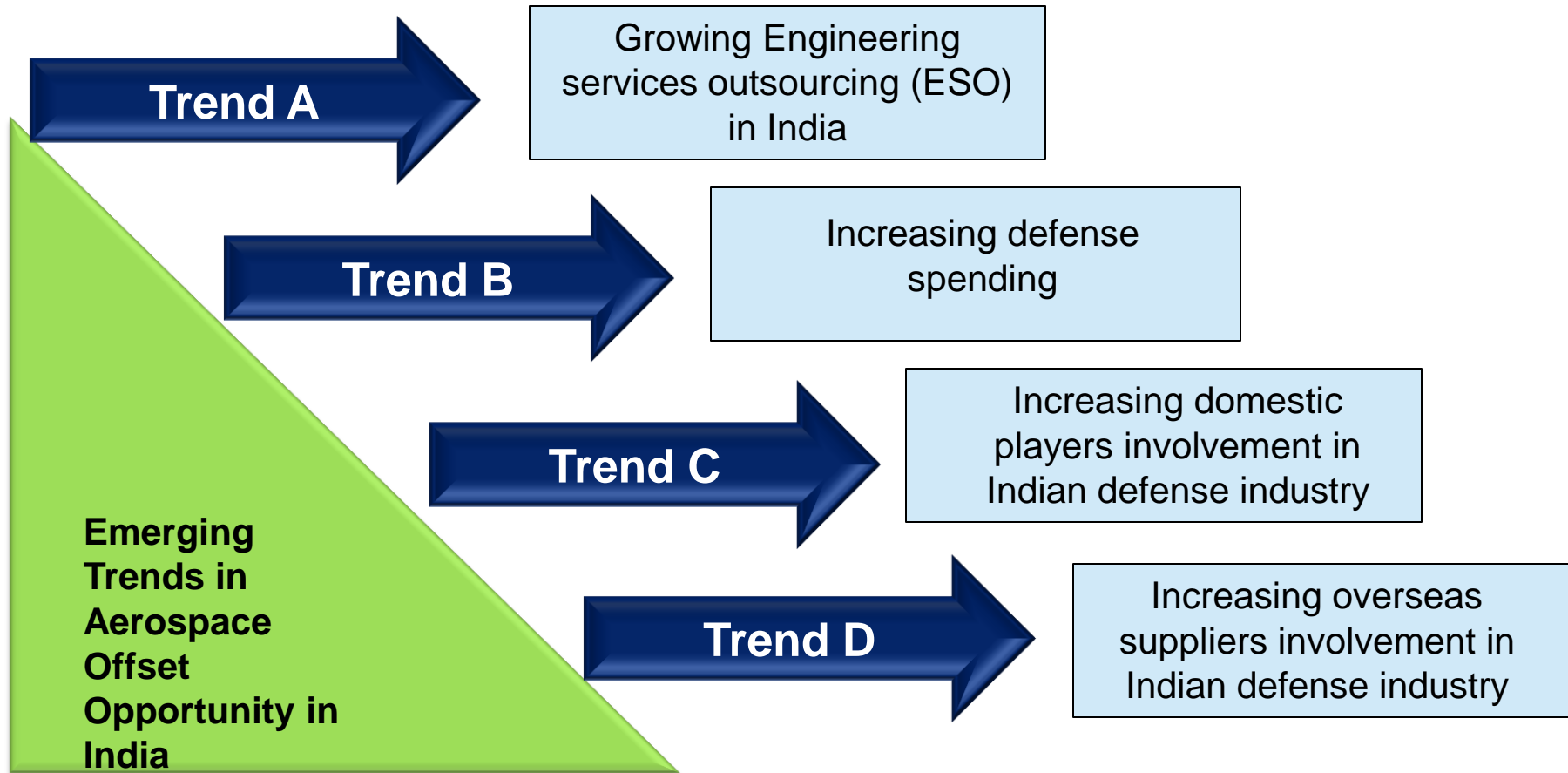


Table of contents

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- *Emerging Trends in Indian Offset Market*
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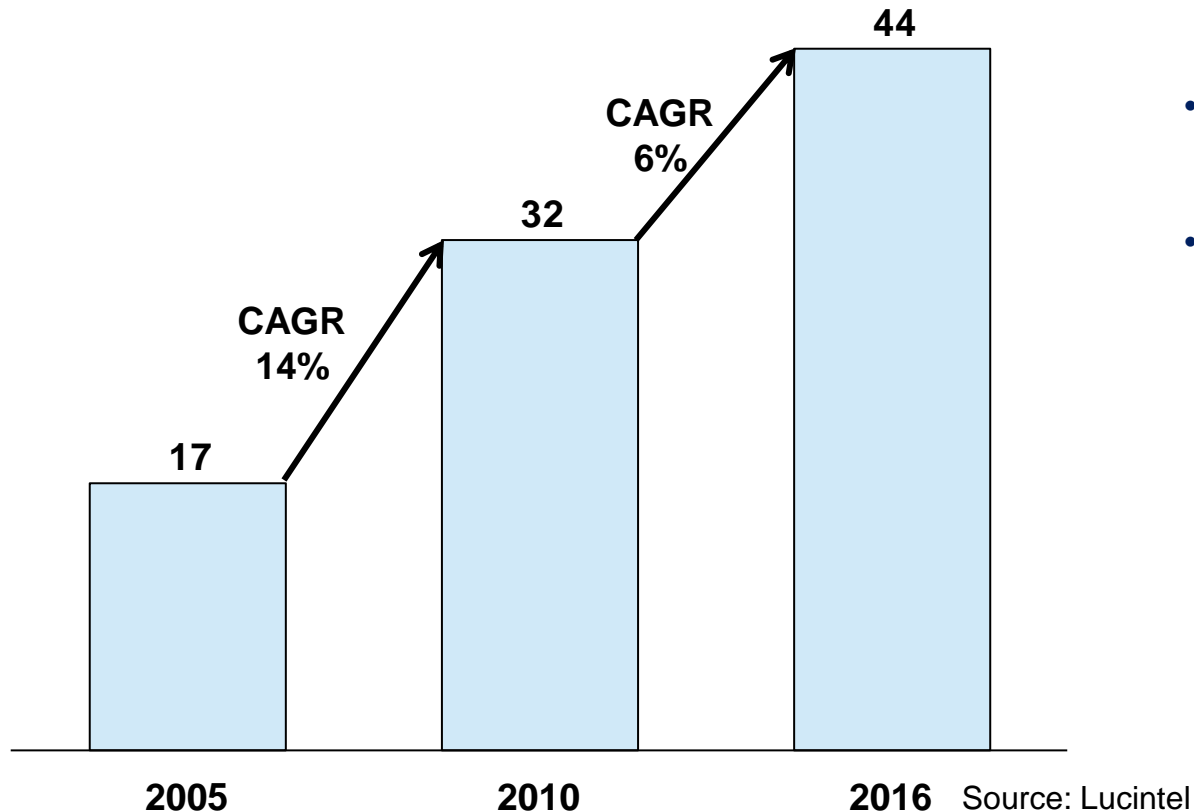


Emerging Trends in Aerospace Offset Opportunity in India



Increasing defense spending; defense expenditure was \$32 B in 2010, expected to \$44 B by 2016

India Defense Spending (\$ Billion)



Key Insight

- Indian government currently ranked among top 15 countries on the basis of defense expenditure
- It is expected that Indian defense expenditure will reach US \$44 Billion in 2016 with CAGR of 8%
- Growing defense spending increases the opportunity for FDIs (Foreign Direct Investment) in Indian defense sector –
 - Increasing capital investment on new weapons/platforms
 - Increasing demand for updating equipments create largest equipment procurement cycles
- 94% of all planned offsets are in aerospace sector and the rest are in manufacture of naval systems

Increasing domestic players involvement in Indian defense industry

Increasing domestic players involvement in Indian defense industry –

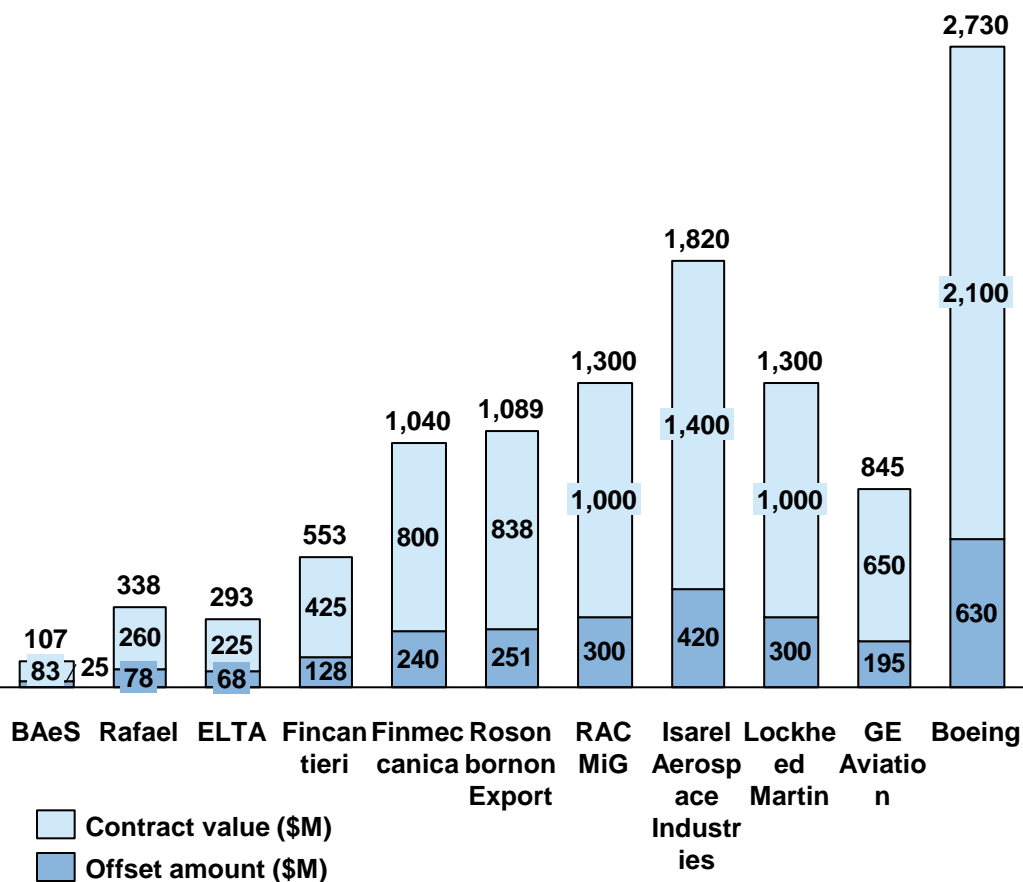
- Introduction of “Buy and Make (Indian)” category in DPP 2009
- 40 Ordnance Factories (OFBs) and eight Defense Public Sector Undertakings (DPSUs) are working in India as defense weapons and systems manufacturer in India
- These DPSUs and OFBs outsourced tie-ups with Indian private players and overseas players to improve Indian defense industry infrastructure
- Following are few agreements made by various foreign players and Indian private players –

| Objective | Indian Private Player | Foreign Player | Insight |
|--|--|---|--|
| Ballistic Missile Defense (BDM) Systems | Defense Research and Development Organization (DRDO) | Israel and France | Expected date to launch: 2015 Based on radar technology for tracking and fire control |
| Indian Aircraft Carrier Project 71 INS Vikrant | Shipyards Ltd | Fincanteri and NDB, Russia Cochin | Projected started in 2001-02 |
| Light Combat Helicopter (LCH) | Hindustan Aeronautics Limited (HAL) | Turbomeca, France | Derivative of Dhruv ALH with tandem seating |
| BrahMos Missile | Defense Research and Development Organization (DRDO) | NPO Mashinostroyeniya, Russia | BrahMos Missile is a supersonic cruise missile and can be launched from submarines |
| Strategic partnership | Bharat Electronics Limited | Lockheed Martin, Boeing, EADS, Northrop Grumman, Rafael Advanced Defense Systems and Israel Aerospace Industries | |



Growing Overseas Suppliers involvement in Indian Defense Industry

Defense procurement contracts from 2008-2010 (\$ million)



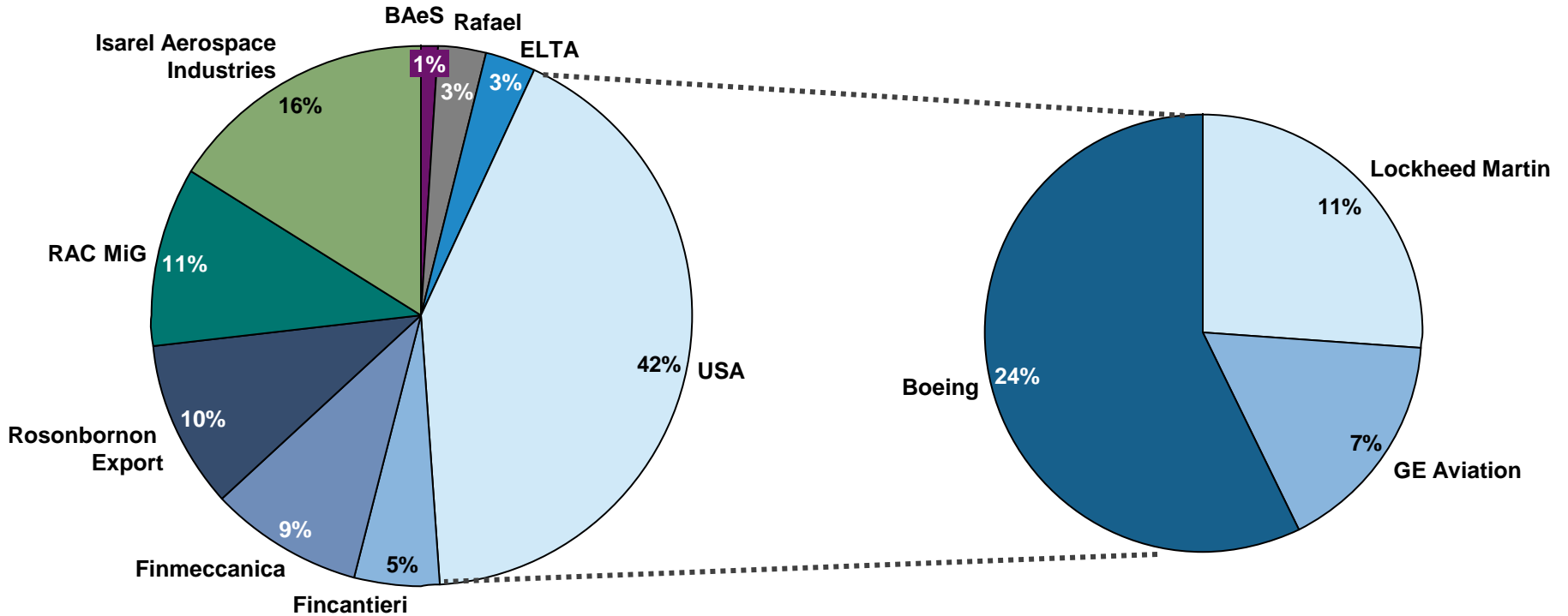
| Procurement program | Company | Contract value (\$M) |
|---|---------------------------|----------------------|
| 127 Multi Mission Role Combat Aircrafts (MMRC) | Boeing, Lockheed Martin | 10,000 |
| 15 Heavy lift Helicopter | Boeing/ Sikorsky | 700 |
| 10 C-17 Globemaster-III Giant Strategic Lift Aircraft | Boeing | 3,000 |
| 22 Apache Attack Helicopter | Boeing | 550 |
| 16 Multi Role Helicopter | Lockheed Martin/ Sikorsky | 300 |
| Javelin Anti Tank missile | Raytheon/ Lockheed Martin | 900 |
| 510 CBU- 105 Sensor Fuzed Weapons | Textron Systems | 375 |
| F125IN Engine for Jaguar Fighter Aircraft | Honeywell | 670 |
| Quick Reaction Surface to Air Missile Weapon | Raytheon | 1,400 |

*Source: KPMG



Growing Overseas Suppliers involvement in Indian Defense Industry

Distribution of Offset Contracts Awarded by India (March 2008 –October 2010)
 (Total offset value: \$2.65 billion)



- US companies accounted for ~42% of total offset contracts awarded by Indian government
 - Boeing accounted for ~24% of total deal followed by Lockheed Martin with 11% for the period

*Source: KPMG



Growing Engineering services outsourcing (ESO) in India

Growing Engineering Services Outsourcing (ESO) in India drives Indian ITES sector

- Indian aerospace and defense ITES sector was estimated \$30 billion in 2010
 - Aerospace and defense ESO opportunity accounted for \$700 million in 2010
 - Aerospace and defense ESO market is expected to reach \$50 billion in 2020
- Objective of ESO are product design, development and testing with CAD/CAM design, fluid dynamics, 2D & 3D modeling, remote monitoring, system architecture development, and associated technologies
- Approx 10 companies such as Boeing, Airbus, Raytheon, Pratt and Whitney, Northrop Grumman and Magellan Aerospace are setting their captive centers in India
 - It is expected that EOS in India will help foreign players to reduce design costs ~30%-40% and shortening design cycles
 - Following are few major deals in Indian ITES sectors under EOS

| Company | Boeing | Airbus | Pratt & Whitney |
|---------------------------------|--------|--------|-----------------|
| HCL Technologies | ✓ | ✓ | |
| Infosys | ✓ | ✓ | ✓ |
| Tata Consultancy Services (TCS) | ✓ | | |
| Larsen and Toubro (L&T) | ✓ | ✓ | ✓ |

✓ Represents contracts among companies

*Source: CLSA 2006



Table of contents

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Findings/Conclusions

- Total Offset opportunity is expected to surpass US\$12 B over the next 10 years driven by:
 - Increasing Indian defense budget, expected to reach US\$44 billion in 2016
 - Making Indian defense market lucrative for foreign players and bringing FDI
 - Increasing procurement plans for new weapons/programs and increasing demand for updating equipments
- Defense sector will see more offset opportunity than commercial aerospace
 - Defense market will account for more than ~60% of total Indian offset market in 2016
- Majority of offset opportunity in India will be in MRO sector, Technology and IT sector, ESO, Part manufacturing, control systems, Navigation system, Simulation and training...
- Currently, there is a technology gap in Indian aerospace industry as compared to developed nations and the Indian aerospace industry lacks strong supply chain
 - Technology partnership by domestic players with multi-nationals will minimize this gap
- In next 10 years, there will be significant joint venture opportunity in Indian aerospace industry. Companies entering early in this opportunity will benefit from future growth potential.
- There will be an increase in multi-national companies in the Indian aerospace industry over the next 10 years –
 - Companies such as Boeing, Lockheed Martin, Sikorsky, Raytheon, Textron Systems have their long term investment strategies for India



Table of contents

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About Lucintel

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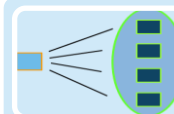
Consulting



Growth and Strategic Consulting



Benchmarking



Opportunity Screening



Partner Search and Evaluation



Due Diligence and M&A



Market Entry Strategy

Lucintel has an extensive toolkit to address key strategic questions for increasing your company's profitability and market presence



Key Questions

- Is market space / opportunity of current product offerings sufficiently robust?
- Markets are focus for many: how can my company profitably differentiate?
- Based on our core skills, where should we focus?
- Should we build or buy? Is build even an option?
- What game changer actions exist and/or is a more incremental approach best?
- What is the order sequence of market entry segments / products?



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