

# Mining a Mirage:

A study conducted by IISD, CCSI and EWB

Geneva, October 2016

IGF- AGM

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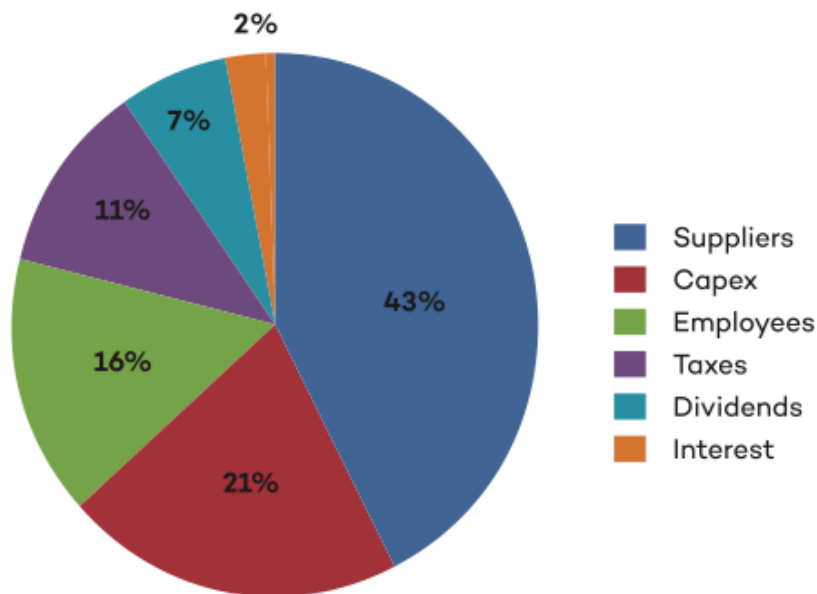
Head: Extractive Industries



**Columbia Center  
on Sustainable Investment**

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# Shared value paradigm



**Figure 1. Anglo American Expenditures 2014**

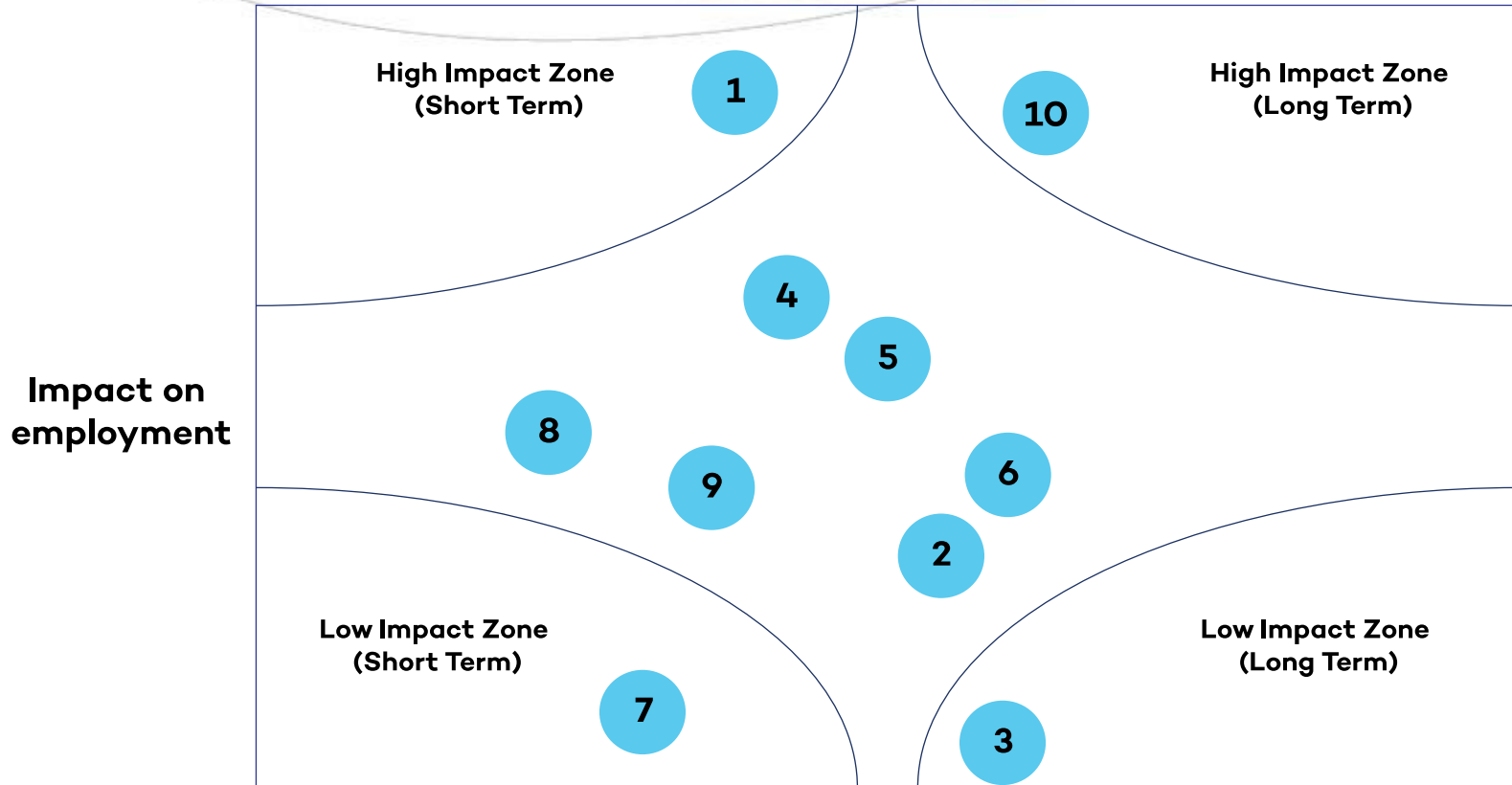
Source: Anglo American plc (2014)

*In the near and medium terms, what will happen to the local employment and procurement components of the shared-value paradigm—and, by extension, to the mining companies' social licence to operate—if technological change radically alters the amount of money mining firms are spending on hiring, procurement and other practices regarded as creating shared value?*

**Is automation putting the shared value paradigm and its growth at risk?**



# Potential impacts of automation on employment



**Time for the technology to be implemented at a mass scale**

1. Autonomous Haul Trucks and Loaders
2. Autonomous Long Distance Haul-Trains
3. Tele-remote Ship-Loaders
4. Semi-autonomous Crushers/Shovel Swings/Rock Breakers
5. Automated Drilling Systems

6. Automated Dragline/Long-wall Plough and Shearers/Earth Moving Systems
7. Geographic Information Systems and GPS
8. Autonomous Equipment Monitoring
9. Programmable Logic Controllers
10. Control Systems

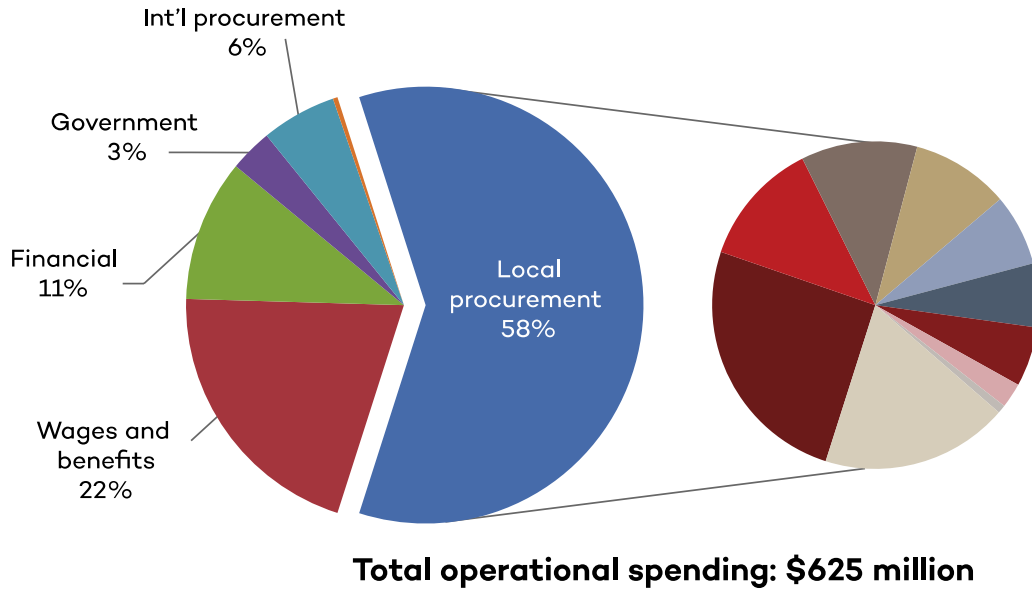


# Factors determining strength of impact and roll out of automation

- 🔥 Search for higher safety -> **Problem for both**
- 🔥 Reaching more frontier minerals -> **Problem for both**
- 🔥 Cost of labor -> **Problem in developed countries**
- 🔥 Labor skills -> **Problem in developing countries**
- 🔥 Union & government resistance -> **Problem for both**
  
- 🔥 Existence of policy instruments to mitigate unemployment -> **Problem for developing countries**

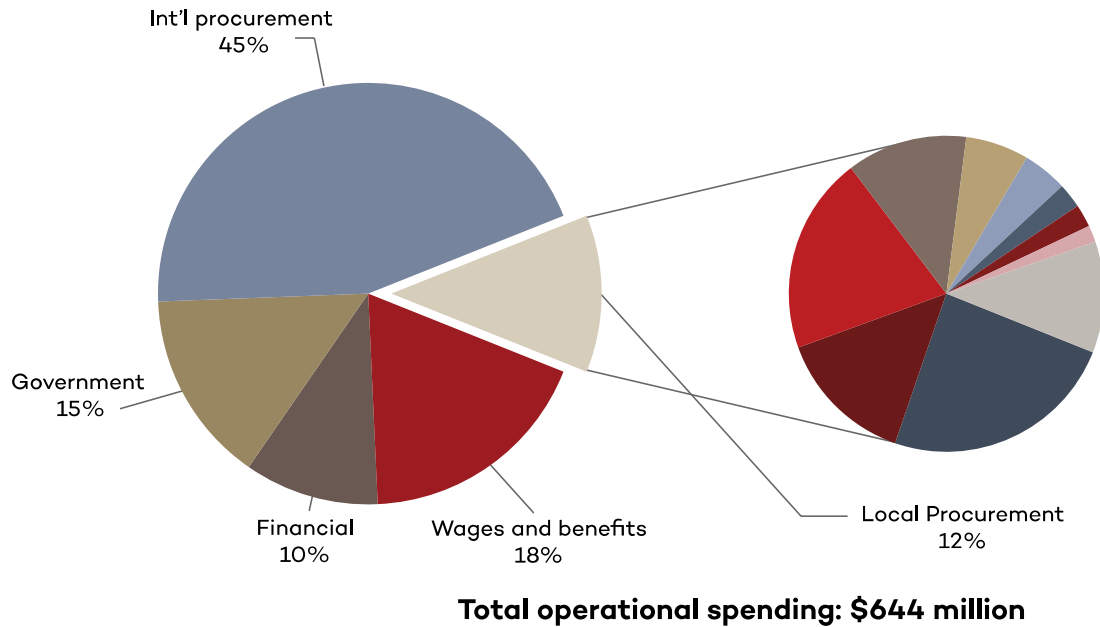


High-Income OECD Country



- Local Procurement**
- Contractor services
  - Energy
  - Equipment
  - Logistics, Transport
  - Construction
  - Worker-related goods
  - Consumables/Reagents
  - Fuel
  - Unknown
  - Minor supplies

Lower-middle-income Country



- Local Procurement**
- Fuel
  - Insurance
  - Contractor services
  - Camp
  - General supplies
  - Reagents, chemicals
  - Technical consultants
  - Rent
  - Corporate advertising
  - Other

**OECD co: 90% of total procurement is local ; LMI co.: 20% of total procurement is local – The field is striving to narrow this gap – Is this effort defeated by automation?**

# Impact of automation: direct, indirect, induced and total

	Direct Impact	Direct + Indirect	Direct, Indirect + Induced	Total impact as % of total multiplier effects of mine	Total impact as % of national GDP
<b>High-Income OECD Country Scenarios</b>					
30%	55,931,204	75,507,125	92,006,831	8.5%	<0.01%
50%	92,736,431	125,194,182	152,551,429	14.0%	<0.01%
70%	129,541,658	174,881,238	213,096,028	19.6%	>0.01%
<b>Low Middle-Income Country Scenarios</b>					
30%	39,843,100	103,592,059	124,310,471	6.2%	<2%
50%	65,474,572	170,233,887	204,280,664	10.2%	<3%
70%	91,106,044	236,875,715	284,250,858	14.1%	<4%

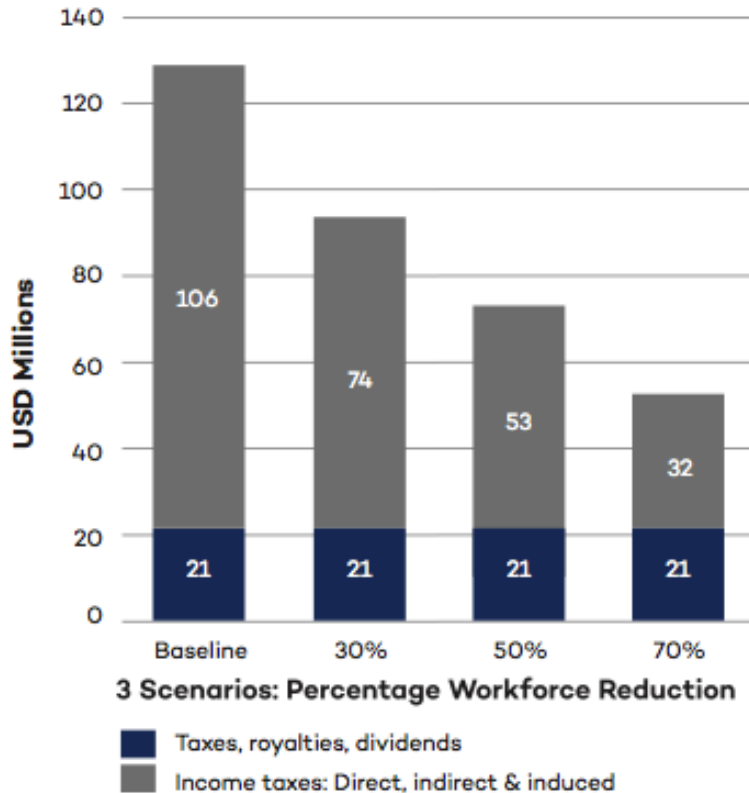
*Note: Multipliers used are from the national accounts of the respective host countries.*

**Impact: an absolute reduction in contributions to the national economies of the host countries ranging from USD 93 million to USD 284 million. In absolute terms, the OECD country is suffering more but in relative terms the LMI country is hit more.**

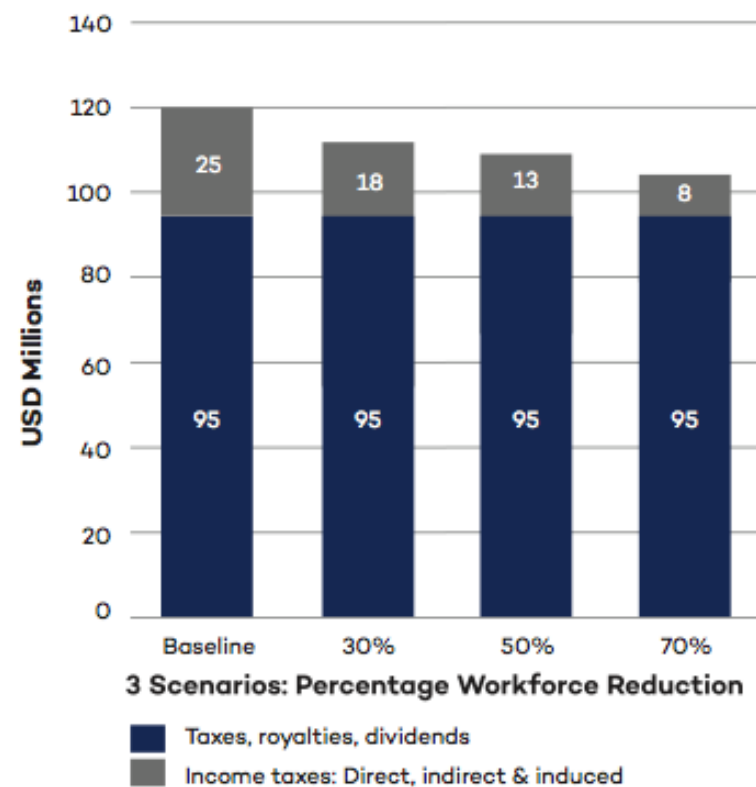


# Impacts of automation on revenues

## High-Income OECD Country



## Lower-Middle-Income Country



The OECD country is suffering more than the the LMI country because of its higher reliance on personal income taxes.



# Conclusions: Who will be affected more?

## Developing countries



Lower cost of labor

Less reliant on personal income tax

More reliant on extractive industries

More reliant on employment – related local procurement opportunities

Lower standards in Health, Safety and Environment

Little financial and technical capacity to adapt to technological changes through re-training

**TECH AND SKILL GAP WILL WIDEN**





# Conclusions: Is local content a mirage?

- **Opportunities for low to medium skill employment** (drilling, blasting, train and truck driving) reduced
- **New positions are high skills** : observation and servicing of remotely controlled autonomous equipment, data processing and process analysis – new skills rely on maths, science and new tech

Employment

Procurement

- **Related – employment opportunities reduced**
- **New goods:** high in tech content -> maintenance, spare parts become inaccessible

Support programs, Trainings, Technology transfer

- **Absorptive capacity** is reduced
- **Scope for LC** is considerably reduced

**Building on increasing local content might be a mirage and increasing the share of the pie that accrues to the government through procurement and employment is becoming impossible mission !**



# Thank You!

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