Special session:

The multiple benefits of energy efficiency

Buildings

Buildings energy efficiency sessions in partnership with:

UCL ENERGY INSTITUTE

UCL

BEEP

INDO-SWISS BUILDING ENERGY EFFICIENCY PROJECT

IEA #energyefficientworld

Energy Efficiency Training Week: Buildings programme

1. **Where to start:** Energy use in buildings
2. **Where to start:** Energy efficiency potential in buildings
3. **Toolkit:** Energy efficient building design
4. **Toolkit:** Energy efficient building technologies

   Special session. Technology demonstration

   Where do I get help? IEA's Technology Collaboration Programmes
5. **Toolkit:** Energy efficiency policies and target setting
6. **What are the steps?** Enabling investment with energy efficiency policies
7. **What are the steps?** Implementing building energy codes and standards
8. **What are the steps?** Building operations and procurement

   Special session. The multiple benefits of energy efficiency
9. **Did it work?** Evaluation and energy efficiency indicators

   Where do I get help? International and regional energy efficiency initiatives
10. **Energy efficiency quiz:** Understanding energy efficiency in buildings

Energy Efficiency Training Week: Buildings

Special session: The multiple benefits of energy efficiency

Trainers: Brian Dean and Maxine Jordan

Purpose: To teach the fundamentals of how to evaluate both energy and non-energy benefits (the multiple benefits) of energy efficiency for buildings. This session will examine how to evaluate the monetised value of energy efficiency measures using numerous categories for multiple benefits.

Scenario: You understand that there are more benefits to energy efficiency beyond just the energy savings. *What benefits are most important to justifying the energy efficiency project or policy?*

Multiple Benefits of Energy Efficiency

The publication

Energy Efficient Prosperity

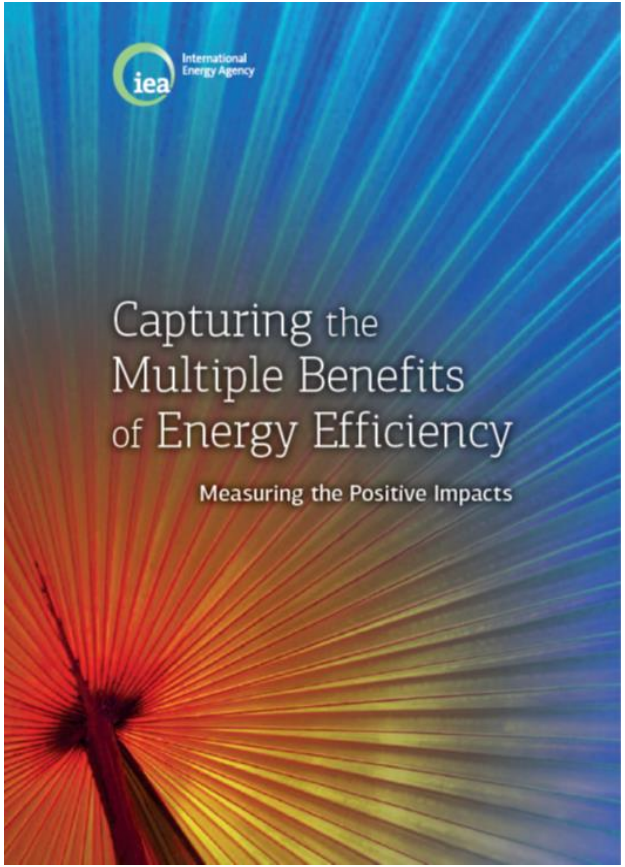
Multiple Benefits of Energy Efficiency

International
- Energy price reduction
- Greenhouse gas emissions reduction

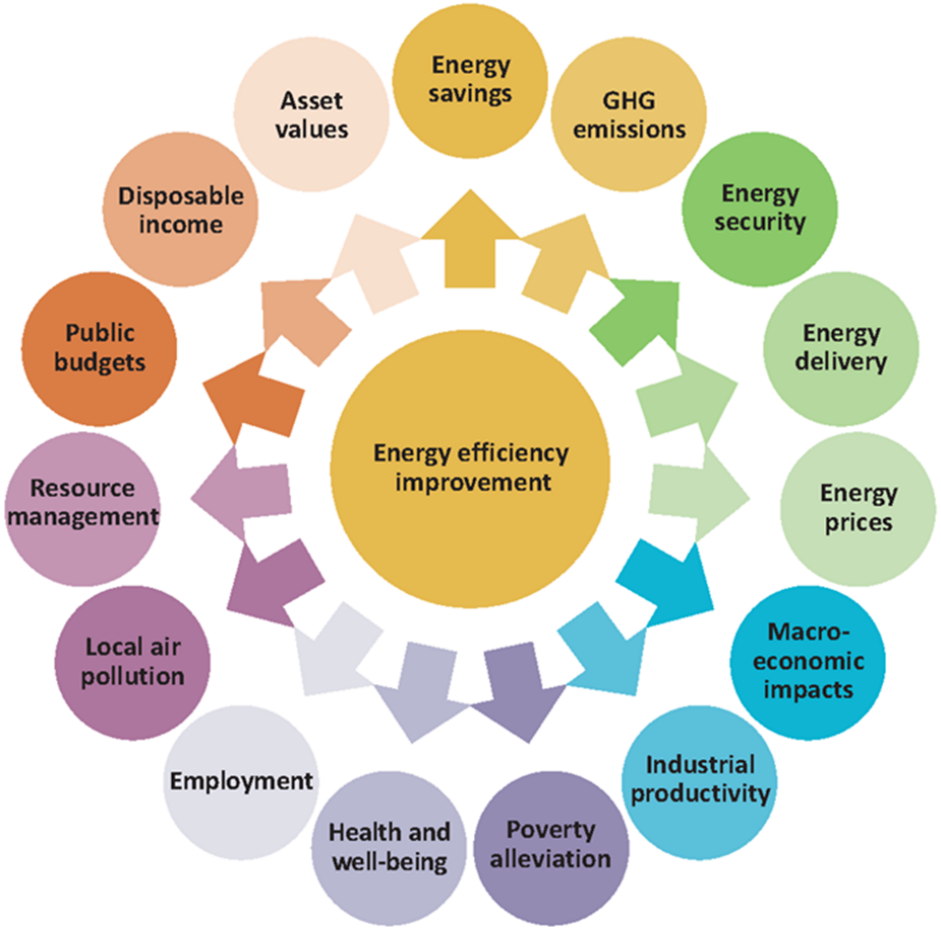
National
- Reduced energy demand and local price reduction
- Reduced public health spending
- Energy security
- Potential net increase in employment

Sectoral
- Increase in re-sale value of home
- Improved bill payments for energy providers
- Jobs in installation and production of insulation materials

Individual
- Lower energy bills (discretionary)
- Increased disposable income
- Warmer, drier, more comfortable home
- Improved health and well-being potential



Multiple Benefits of Energy Efficiency



Energy Efficient Prosperity

Energy efficiency as a means to support economic and social development

The benefits by perspective

Owner and occupant

Societal / macroeconomic

City and national / public budgets

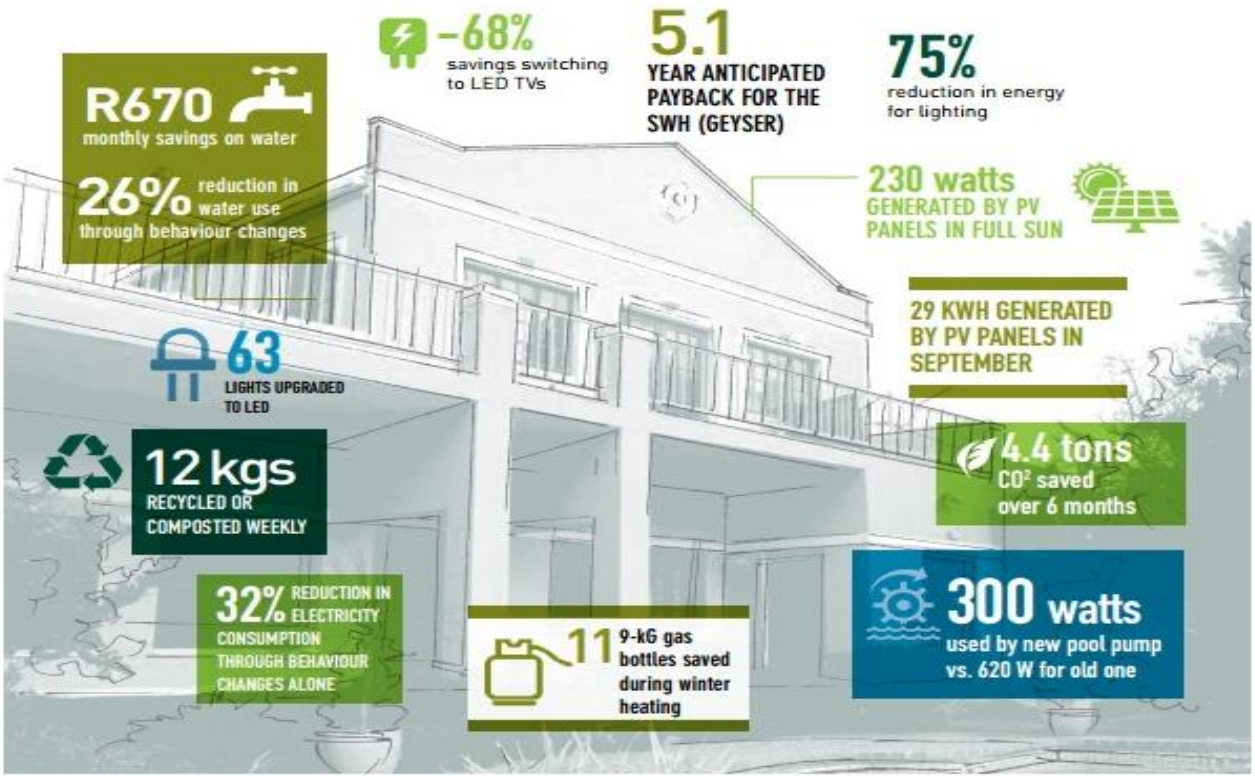
Industry / energy provider

Multiple Benefits of Energy Efficiency: owner and occupant perspective

Comfort	Improved lighting comfort, thermal comfort and noise comfort
Health	Improved physical and mental health from indoor air quality and comfort.
Operations and maintenance	Improved building and systems durability with reduced need for maintenance.
Safety	Improved safety through lighting, controls and reduced chance of fire from gas leaks.
Property Value	Increased rental income, reduced tenant turnover, increased habitable floor area.

Benefits for owners: increased quality & property value
Benefits for occupants: increased health, comfort, safety and affordability

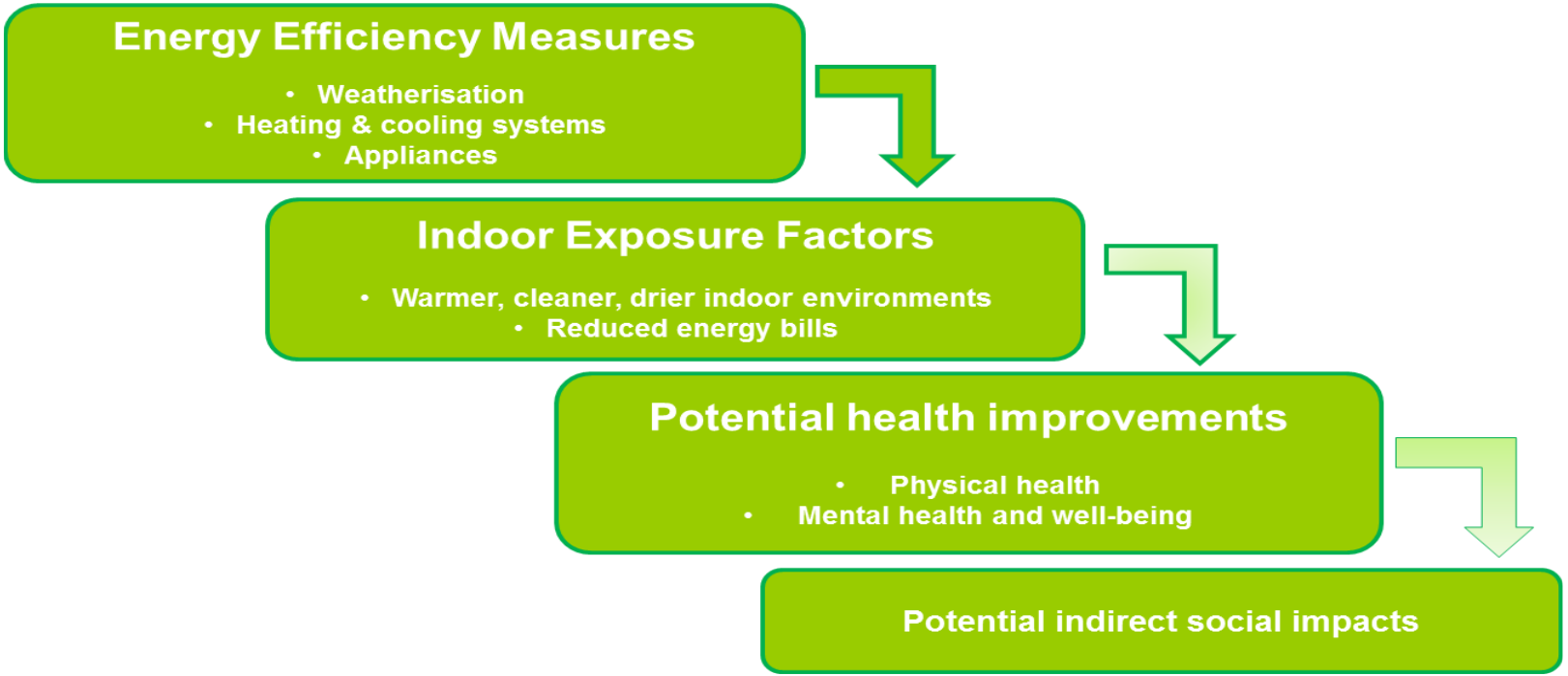
Multiple benefits: for individuals



Overall 50% reduction in electricity consumption and a more comfortable place to live.

Source: Green Building Council – South Africa

Multiple benefits: energy efficiency → warmth as medicine



Example: Carefully executed energy efficiency can deliver USD 99 billon in annual savings for Europe's public health sector by 2020

Multiple benefits: for students

Improved learning and test scores at schools

students' test scores: shows ~20–26% faster learning

Multiple benefits: safety and security

- At the building level, lighting and lighting controls can improve safety, increase security, improve the value of the building and reduce light pollution.
- Energy efficient equipment and system that comply with modern standards have reduced risk of fires and leaks.

Example: Villa 31 in Buenos Aires

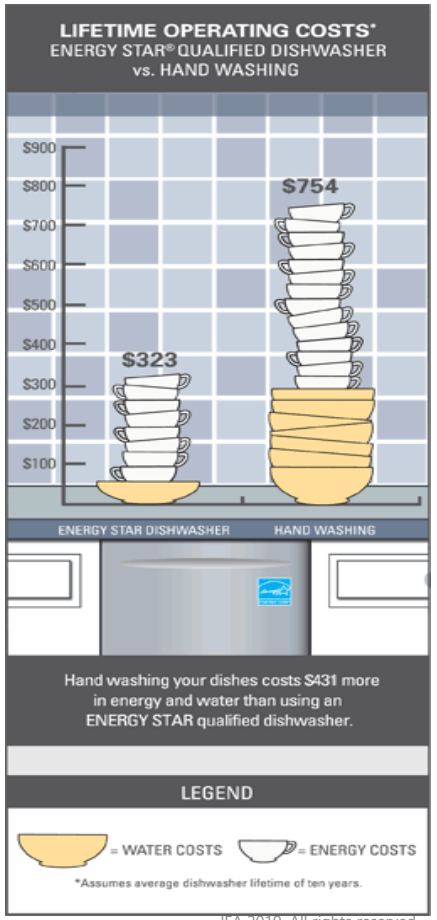
- **Increase the reliability of electrical systems**, reducing outages frequency and improving living conditions.
- **Existing electricity, water and gas connections will be set to standard**, reducing the possibility of accidents such as electrical fires or gas leakages;
- Substitution of older for more energy-efficient appliances (e.g. wood cooking stoves for electric ones).

Multiple benefits: improved operations

Energy efficient clothes and dishwashers can be better than hand washing…

Others benefits:

- Reduction in electricity and water consumption
- Reduction in energy and time required for drying
- Extending clothes lifetime
- Higher capacity = saves time



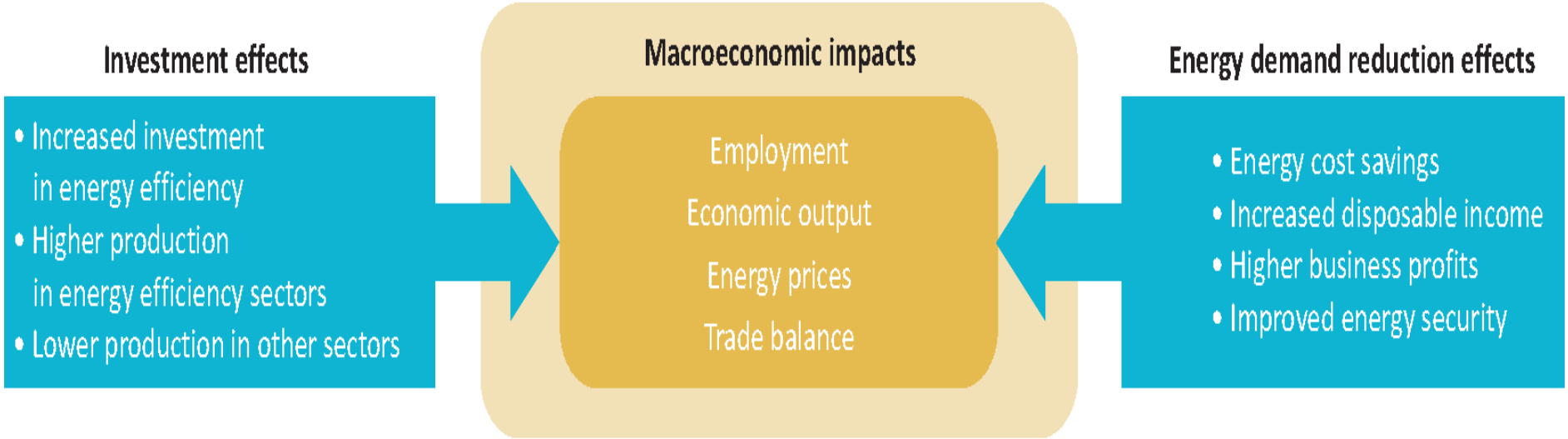
Source: US EPA ENERGY STAR www.energystar.gov

Multiple Benefits of Energy Efficiency: societal perspective

Jobs	Shifting from global to local jobs and from polluting to green jobs
Economic	Investment that provides economic benefit for many years.
Emissions	Reduced direct and indirect emissions from efficiency, refrigerants and reduced product size / quantity.
Energy	Energy use benefit from improved efficiency and reduced embodied energy from increased durability
Environmental	Air pollution, solid waste, wastewater, and reduced input materials

Benefits: broader benefits that last for many years.

Multiple benefits: macroeconomic impacts



Moving away from the traditional view that economic performance is always linked to increased energy consumption – the reverse can also be true!

Multiple Benefits of Energy Efficiency: cities and national perspective

Energy access	Expand access to supply power to more people through the existing energy infrastructure.
Economic development	Supporting economic growth including through industrial productivity and reducing fuel import bills.
Poverty alleviation	Increasing the affordability by reducing the per-unit cost of lighting, heating, refrigeration, etc.
Combatting local pollution	Reducing direct and indirect emissions through energy efficiency on supply side and demand side.
Climate change resilience	Reducing vulnerable energy infrastructure and improving the durability of buildings.

Benefits for cities and nations: supporting key government goals

Multiple benefits: impacts on public budgets

Sales tax revenue from sales of energy efficient products and services	Income	
Sales tax revenue from other goods when crowded out by energy efficiency	Income	
Initial costs of public investment in energy efficiency products and services	Expense	
Expenditures on health, social welfare and unemployment benefits	Expense	
Revenues from real estate transactions if properties become more valuable	Income	

Energy efficiency can be both a expense and income for public budgets

Multiple benefits: impacts on public budgets

Expenditures on public sector energy consumption	Expense	
Energy subsidies to final consumers	Expense	
Energy excise duty, emissions trading, and carbon tax revenues	Income	
Sales and income tax revenues from sales of goods and services	Income	
Public investment in energy supply infrastructure and subsidies	Expense	

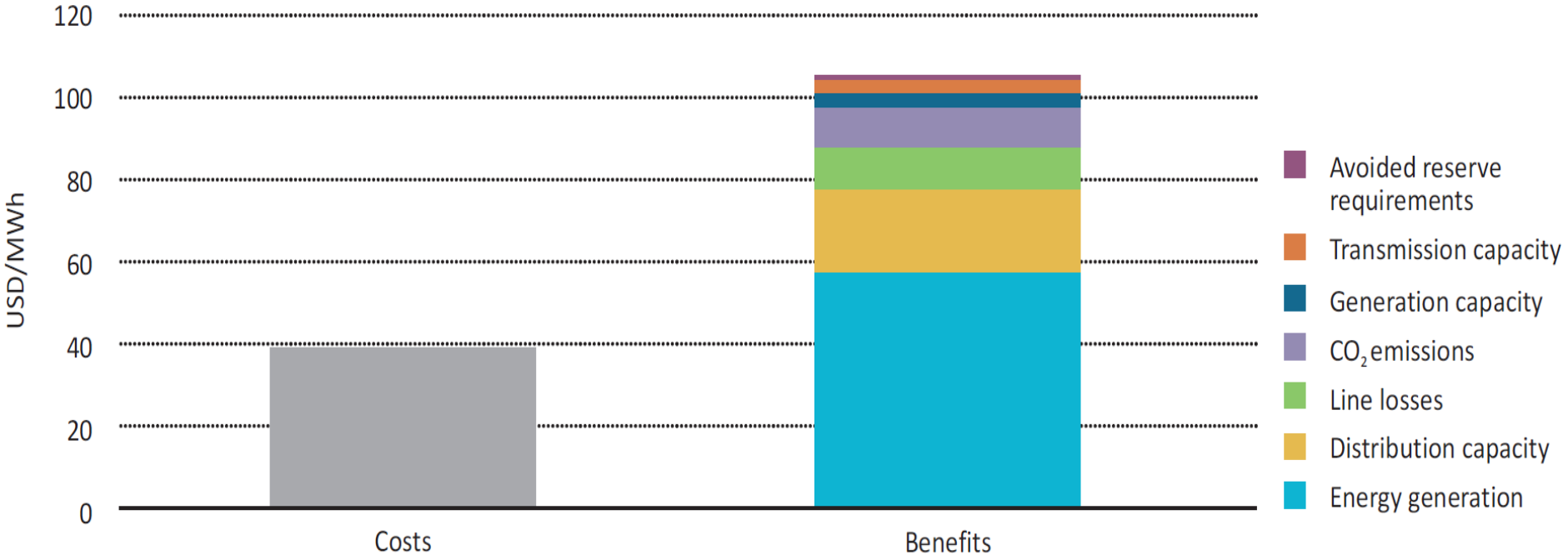
Energy efficiency can be both a expense and income for public budgets

Multiple Benefits of Energy Efficiency: industry perspective

Competitiveness	Ability to enter new markets, reduced production costs, etc.
Production	Capacity utilisation, improved product quality, etc.
Operations and maintenance	Improved industrial and commercial operation; reduced need for maintenance, etc.
Working environment	Site environmental quality, worker health and safety, etc.
Environment	Air pollution, solid waste, wastewater, reduced input materials, etc.

Benefits for industry: increased productivity & value creation
Benefits for consumers/indirect benefits for industry: increased affordability and access to products and services

Multiple benefits: energy provider perspective



Benefits for utilities: cost and operational benefits in a resource constrained operating context
Benefits for consumers/indirect benefits for utilities: increased affordability reduces customer default

Group discussion

Scenario:

You understand that there are more benefits to energy efficiency beyond just the energy savings.

What benefits are most important to justifying the energy efficiency project or policy?

www.iea.org

IEA #energyefficientworld