



WORLD  
RESOURCES  
INSTITUTE

# LANDSCAPE OF ASSESSMENTS ON THE QUANTUM OF FINANCE NEEDED TO ADDRESS CLIMATE ACTION

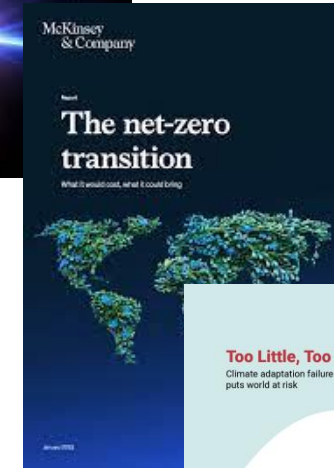
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# CONTEXT

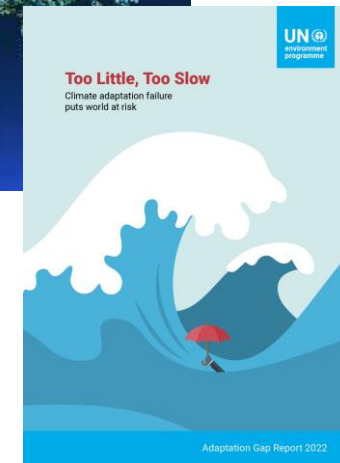
**\$5 trillion** per  
year Energy  
Transition by 2050



**\$9.2 trillion** per  
year Net-Zero by  
2050

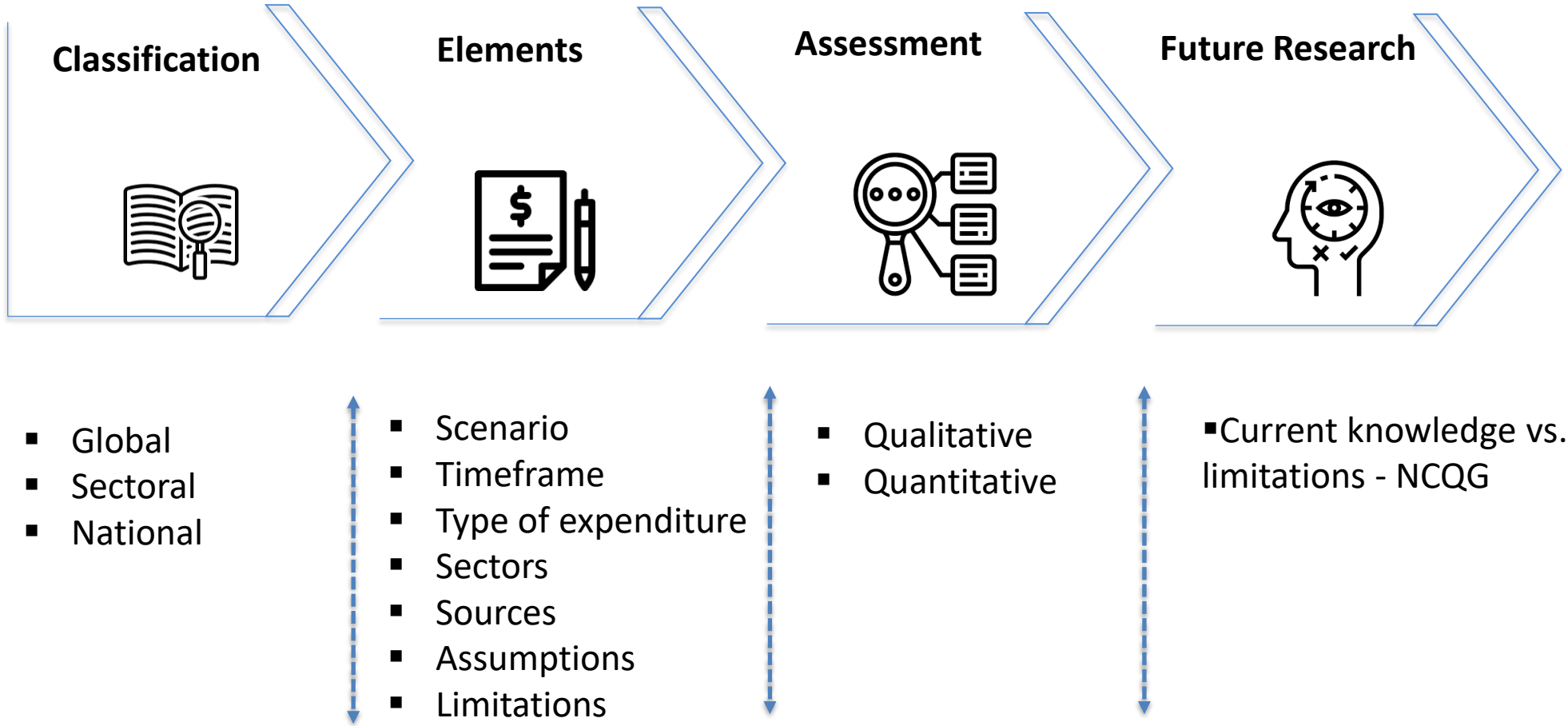


**\$0.3- 0.6 trillion** per  
year for Adaptation  
by 2050\*



\*Only developing countries

# ANALYSIS



**1**

**Mitigation  
Assessments**

**2**

**Adaptation  
Assessments**

**3**

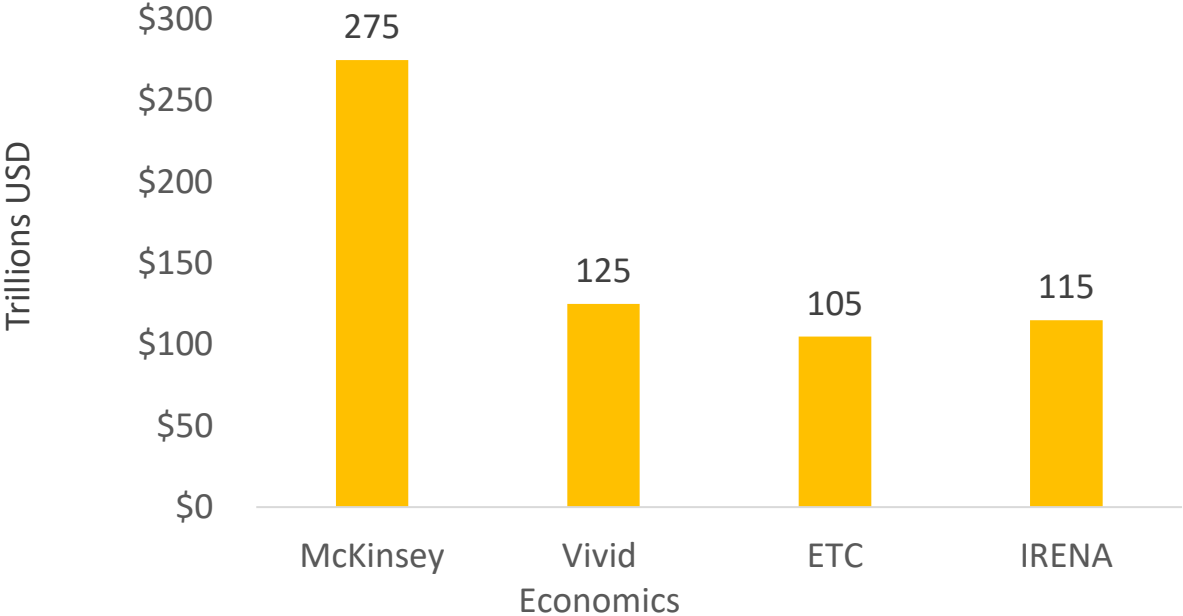
**Loss and  
Damage  
Assessments**

# MITIGATION ASSESSMENT REPORTS

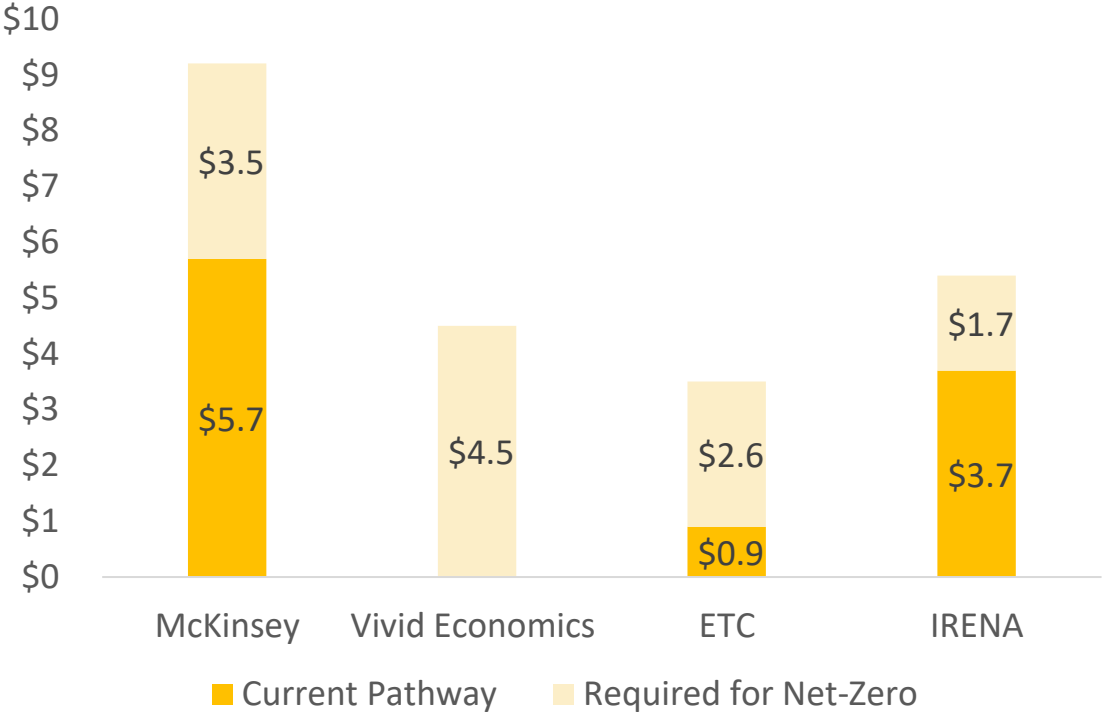
	McKinsey	Vivid Economics	Energy Transition Committee - 2023	IRENA - 2023
<b>Scenario</b>	Net-Zero by 2050	Net-Zero by 2050	Net-Zero by 2050	Net-Zero by 2050
<b>Timeframe</b>	2021- 2050	2021-2050	2021-2050	2030-2050
<b>Type of Expenditure</b>	Capital expenditure physical assets investment	Direct capital expenditure investment	Capital Investment (net incremental) Concessional/grant payments	N/A
<b>Sectors</b>	Energy: power, industry, mobility, buildings Land use systems: agriculture, forestry and waste.	Energy-related sectors (electricity, fossil fuels, low emission fuel supply, industry, transport, and buildings	Power, hydrogen, buildings, transport, industry, removals	Energy: Renewables, energy conservation and efficiency, electrification, hydrogen, CCS, bioenergy
<b>Sources of finance</b>	N/A	2021-2025 \$1.82 Private: (e.g., Households, Corporations, Commercial Fis, Infra.Fund) \$0.78 Public: Government, DFIs, SOEs, SOFIs)	N/A	2021-2030 \$0.8 public funding \$56.2 private funding
<b>US\$ Trillion</b>	\$9.2 per year (current + new) \$275 cumulative	\$4.5 per year (starting 2026) \$125 cumulative	\$0.9 per year (current low estimate) \$3 per year (new) \$101.5 cumulative	\$3.5 trillion per year (current + new) \$115 trillion cumulative

# MITIGATION ANNUAL AND CUMULATIVE ASSESSMENTS

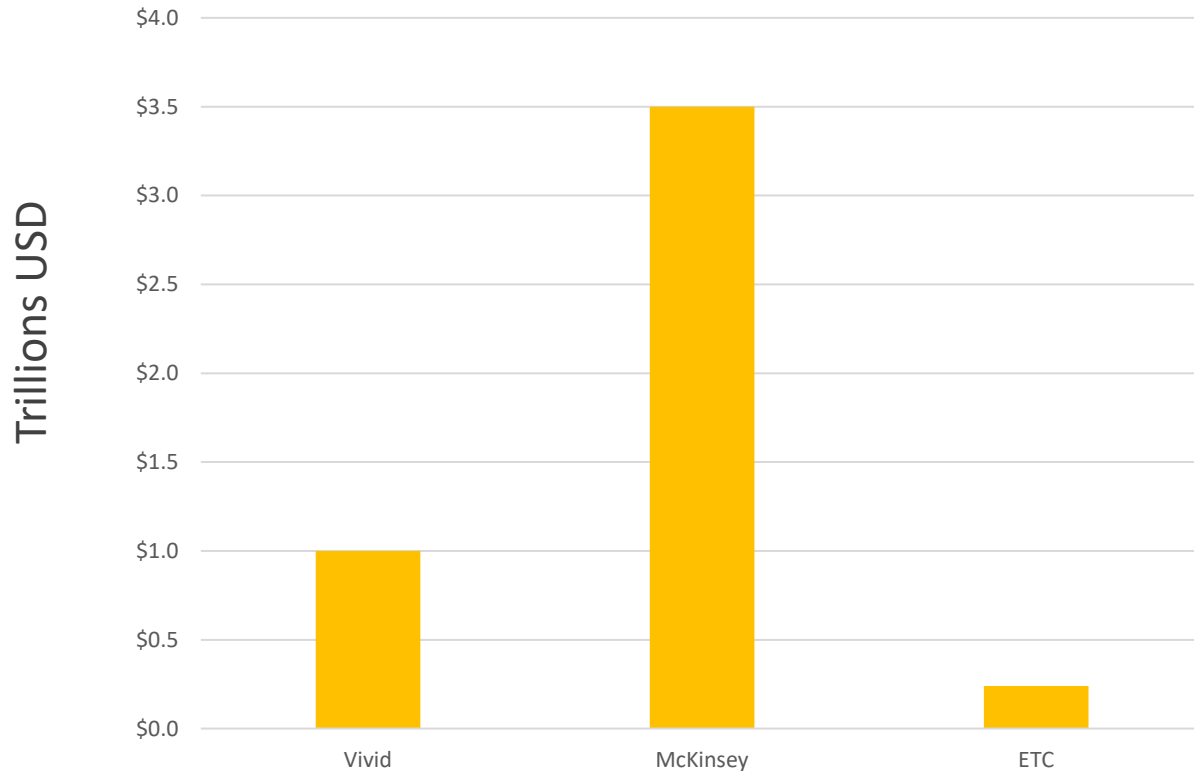
## Cumulative



## Annual



# ANNUAL SECTORAL ASSESSMENTS: MOBILITY & TRANSPORT



Report	Assumptions	Sub-sectors
Vivid Economics, 2021	Costs differ based on 5 or 10-year time frames and include up-front costs of electric vehicles.	Vehicles Road charging infrastructure
McKinsey, 2022	Up-front costs per vehicle and the cost of installing electric and hydrogen charging infrastructure, includes aviation and maritime transport infrastructure. Consumer spending included.	Vehicles Road charging infrastructure Aviation Shipping Rail
ETC, 2023	Investments in charging infrastructure for electric passenger cars and light commercial vehicles gross basis, Consumer expenditure not included	Road charging infrastructure (\$0.13) Aviation (\$0.07) Shipping (\$0.04)

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# ADAPTATION ASSESSMENTS

	IPCC 2022	Markandya and Gonzalez-Eguino 2019	Climate Analytics, Baarsch et 2015	Chapagain et a. 2020	UNEP 2022
<b>Timeframe</b>	2030, 2050	2030, 2050	2030, 2050	2030, 2050	2030, 2050
<b>Countries</b>	Global, includes studies of both	Global, disaggregation by regions included	Developing (have global estimates)	Developing	Developing
<b>Methodology</b>	Median and range from 5 studies in 2005 priced in US\$ bn	Breakdown by RCP 2.6, INDC 2.7 C, INDC 3C and CPP with the low being RCP 2.6 and the high being CPP for each scenario	AD-RICE Model (Adaptation Regional Integrated Model of Climate and Economy)	Meta-analysis of 20 rigorous bottom-up adaptation cost estimates (not national plans) to develop a model	Extrapolation, per capita

# ADAPTATION ASSESSMENTS

## 2030 Annual

## 2050 Annual



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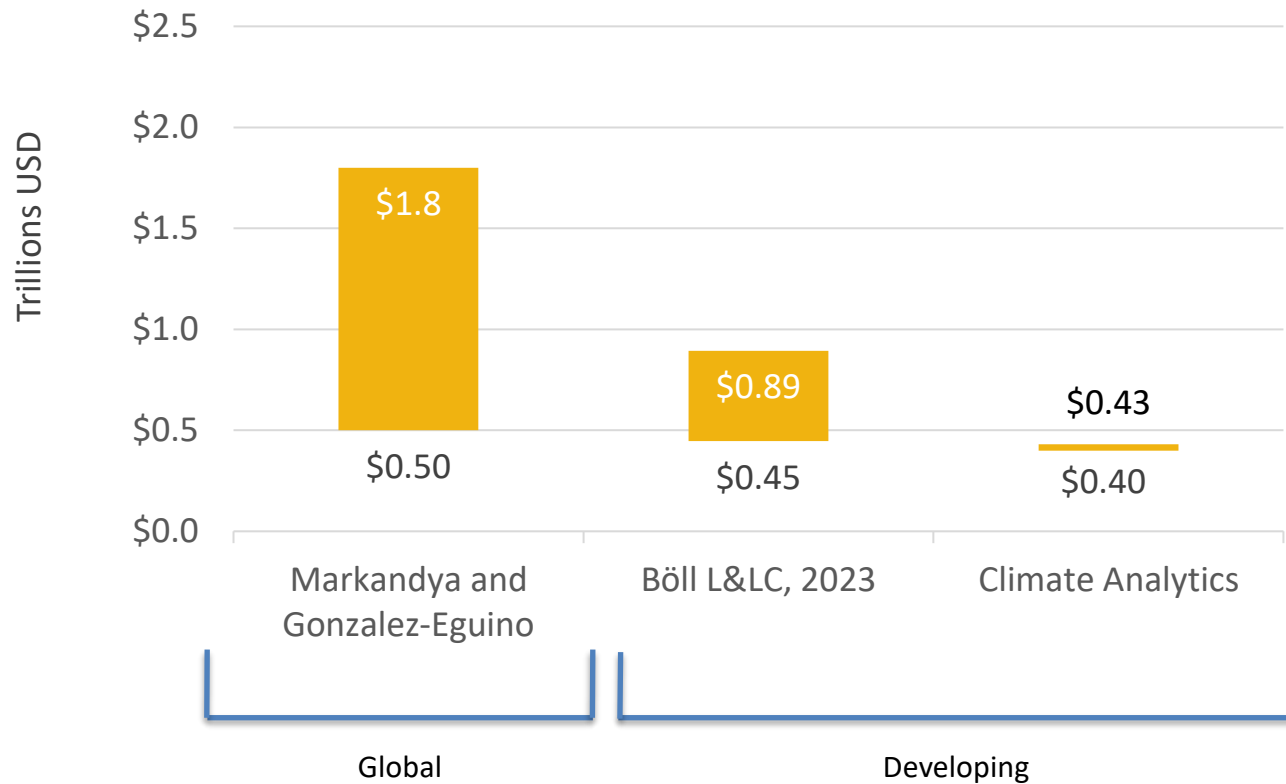
**Loss and  
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Assessments**

# LOSS & DAMAGE ASSESSMENTS

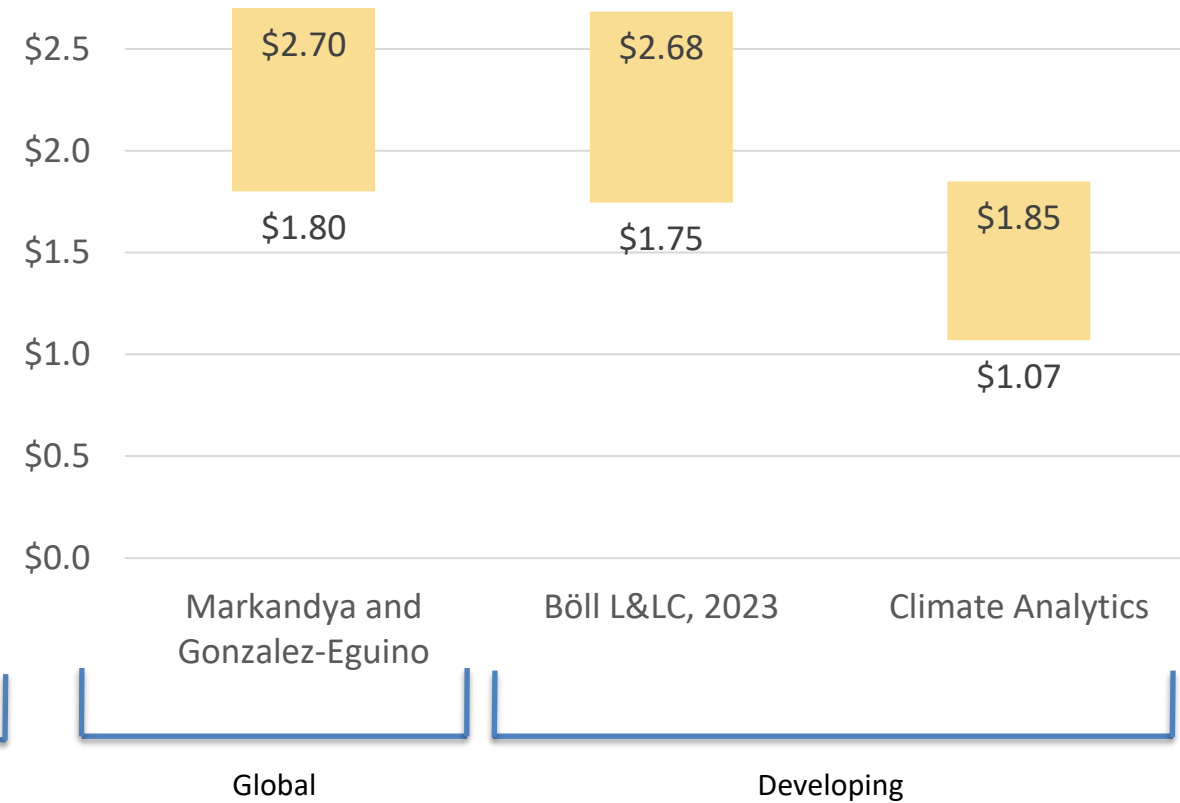
	Climate Analytics, Baarsch et. al, 2015	Markandya and Gonzalez-Eguino, 2019	Böll L&LC, 2023
<b>Timeframe</b>	2030 2050	2020 – 2100 (breakdown by decade)	2020-2050 (breakdown by decade)
<b>Methodology</b>	AD-RICE	IAM Low and high damages ranges using low and high discount rates 2005 US\$ values	a. Major extreme climate and weather events 2022 (AON+Updates Pakistan) b. Update Markandya and Gonzalez-Eguino 2023 US\$ values
<b>Finance Type</b>	Macroeconomic damages (US\$ 2012 bn)	Residual damage costs (L&D minus adapt. costs)	a. Costs of major extreme climate and weather events b. Residual damage costs
<b>Type of economic impact</b>	Health, agriculture, effects on leisure activities, water resources, energy, and sea level rise	Only economic losses	Only economic losses
<b>Countries</b>	Developing, includes global in report	All	Only developing
<b>Source</b>	N/A	N/A	Developed countries and key industries (e.g., international aviation and maritime through taxes/levies)

# LOSS & DAMAGE ASSESSMENTS

## 2030 Annual



## 2050 Annual



# FUTURE RESEARCH

## Current knowledge



**Timeframes:** Mostly 2030, 2050



**Thematic assessments:** Mitigation, Adaptation and L&D



**Sectoral assessments:** Energy, AFOLU



**Geography:** Global, regional, economy type, developing



**Source:** Actor, financial instrument

## Limitations

Not all thematic/sectoral assessments share same timeframes

Methodologies, assumptions, different risks or economic outcomes, not factored.

Different sectors, sub sectors and activities within each. Not NDCs

Thematic/sectoral not disaggregated equally

Not disaggregated, identified.

# REFERENCES

## Mitigation

1. McKinsey & Company (2022) The net-zero transition: What it would cost, what it could bring. McKinsey Global Institute.
2. Vivid Economics (2021) UNFCCC Race to Zero campaign and the Glasgow Financial Alliance for Net Zero. Net Zero Financing Roadmaps: Key Messages.
3. ETC (2023) Financing the Transition: How to Make the Money Flow for a Net-Zero Economy.
4. IRENA (2023) World Energy Transitions Outlook 1.5C Pathway.

## Adaptation

1. IPCC (2022) Climate Change 2022: Impacts, Adaptation, and Vulnerability. Contribution of Working Group II to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.
2. UNEP (2022) Adaptation Gap Report.
3. Chapagain D, Baarsch F, Schaeffer M, D'haen S (2020) Climate change adaptation costs in developing countries: insights from existing estimates. *Climate and Development* 12(10), 934–942. <https://doi.org/10.1080/17565529.2020.1711698>
4. Climate Analytics (2015) Impacts of Low Aggregate INDCs Ambition
5. Markandya A, González-Eguino M (2019) Integrated Assessment for Identifying Climate Finance Needs for Loss and Damage: A Critical Review. In: Mechler R, Bouwer L, Schinko T, Surminski S, Linnerooth-Bayer J (eds) *Loss and Damage from Climate Change. Climate Risk Management, Policy and Governance*. Springer, Cham. [https://doi.org/10.1007/978-3-319-72026-5\\_14](https://doi.org/10.1007/978-3-319-72026-5_14)

## Loss & Damage

1. Markandya A, González-Eguino M (2019) Integrated Assessment for Identifying Climate Finance Needs for Loss and Damage: A Critical Review. In: Mechler R, Bouwer L, Schinko T, Surminski S, Linnerooth-Bayer J (eds) *Loss and Damage from Climate Change. Climate Risk Management, Policy and Governance*. Springer, Cham. [https://doi.org/10.1007/978-3-319-72026-5\\_14](https://doi.org/10.1007/978-3-319-72026-5_14)
2. Chapagain D, Baarsch F, Schaeffer M, D'haen S (2020) Climate change adaptation costs in developing countries: insights from existing estimates. *Climate and Development* 12(10), 934–942. <https://doi.org/10.1080/17565529.2020.1711698>
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