The Abdus Salam
International Centre
for Theoretical Physics
50th Anniversary 1964–2014

2580-5

Joint ICTP-IAEA College on Identification and Assessment of Nationally Appropriate Mitigation Actions (NAMAs) in Energy System Development to Help Combat Climate Change

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Introduction to Methodologies for Economic Evaluation of Alternative Projects

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Economic Analysis of Alternative Projects

Economic analysis aims at identifying and comparing economic and social benefits accruing to the economy and society from alternative projects.

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Economic Comparison of Projects

- Project A:
  - Investment : $ 10,000 1st yr
  - Project life: 6 years,
  - Net Benefits: $5,000 2nd yr; $4,000 3rd yr; $3000 4th yr; $2,000 5th yr and $1,000 6th yr

- Project B:
  - Investment : $ 10,000 1st yr and $ 5,000 2nd yr
  - Project life: 6 years,
  - Net Benefits: $ 5,500 each year of operation

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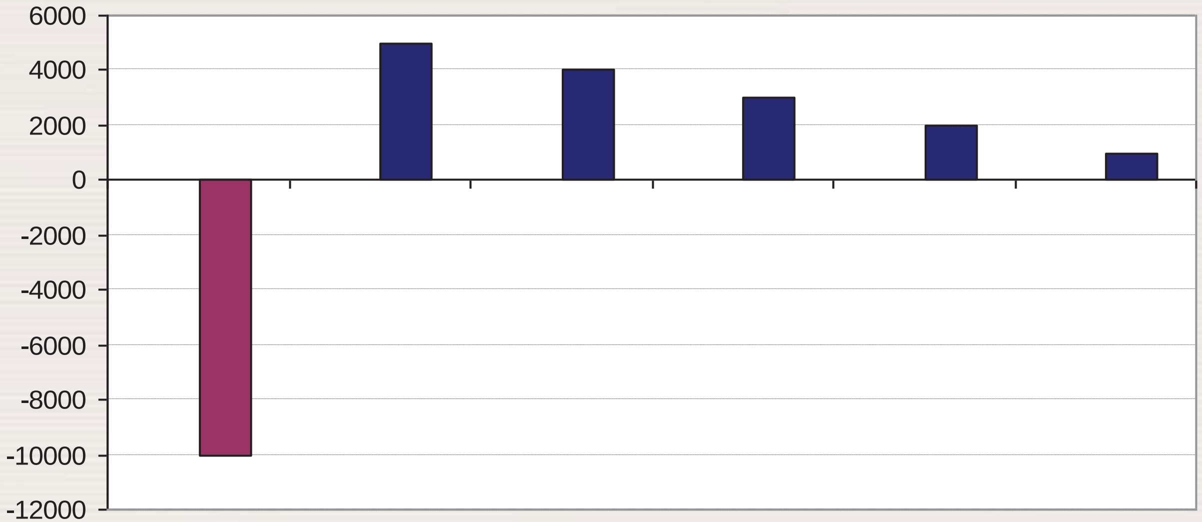
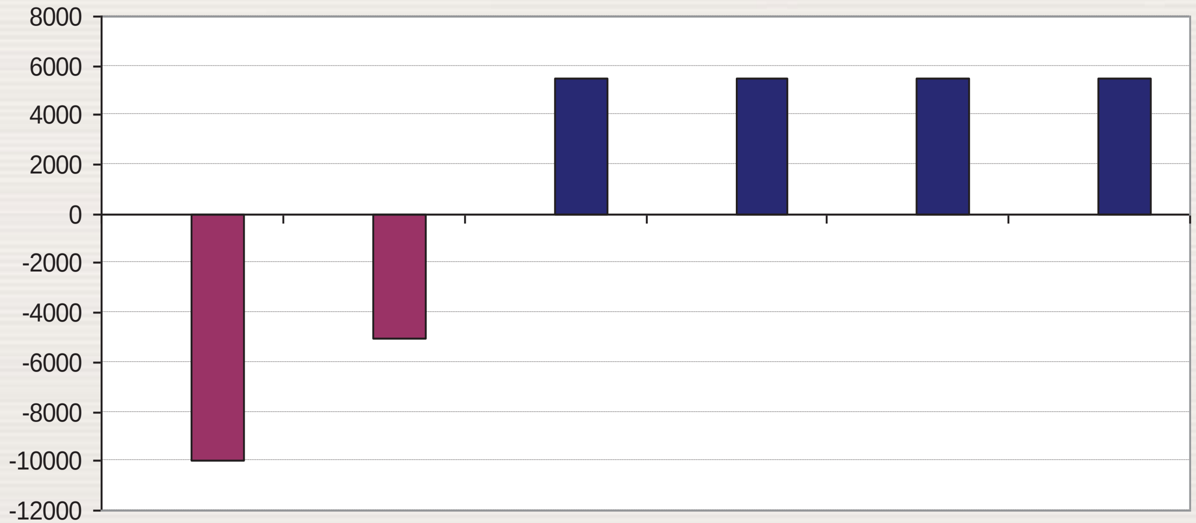
Cash flows of the two projects

Project A



Project B



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Comparison of cash flows of the two projects

	Cash Flow (US $)	
Yr	Project A	Project B
1	-10000	-10000
2	5000	-5000
3	4000	5500
4	3000	5500
5	2000	5500
6	1000	5500
Total	5000	7000

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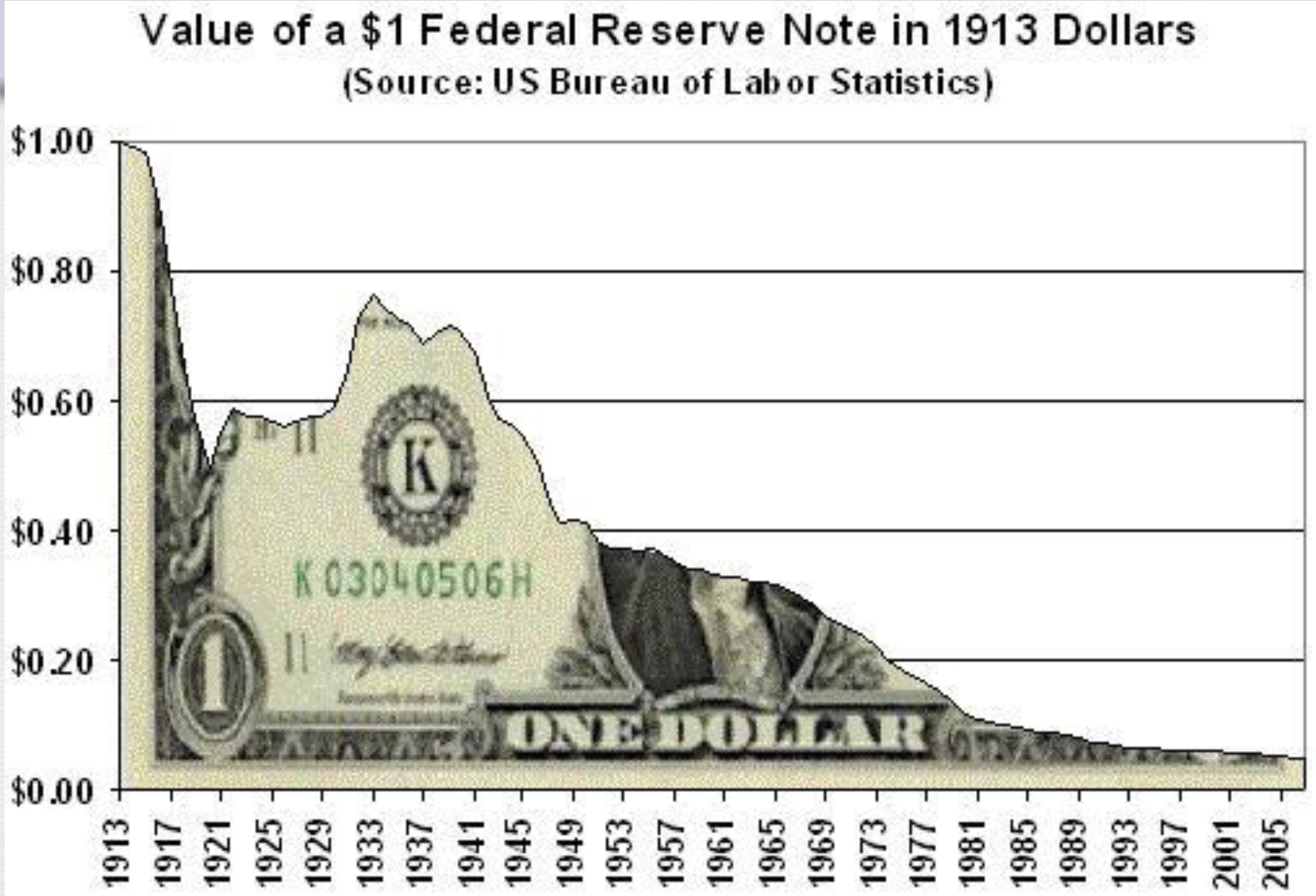
Value of a $1 Federal Reserve Note in 1913 Dollars
(Source: US Bureau of Labor Statistics)
$1.00
$0.80
$0.60
$0.40
$0.20
$0.00
1913
1917
1921
1925
1929
1933
1937
1941
1945
1949
1953
1957
1961
1965
1969
1973
1977
1981
1985
1989
1993
1997
2001
2005
K 03040506 H
ONE DOLLAR

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Time Value of Money

$$F_t = P \times (1+r)^t$$

$$P = \frac{F_t}{(1+r)^t}$$

P = present value; F = future value

t = time; r = rate

Comparison of cash flows of the two projects

Yr	Cash Flow (US $)			
	Project A		Project B	
	Nominal	Discounted	Nominal	Discounted
1	-10000	-10000	-10000	-10000
2	5000	4762	-5000	-4762
3	4000	3628	5500	4989
4	3000	2592	5500	4751
5	2000	1645	5500	4525
6	1000	784	5500	4309
Total	5000	3410	7000	3812

Discount Rate 5%

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Comparison of cash flows of the two projects

	Cash Flow (US $)			
Yr	Project A		Project B	
	Nominal	Discounted	Nominal	Discounted
1	-10000	-10000	-10000	-10000
2	5000	4545	-5000	-4545
3	4000	3306	5500	4545
4	3000	2254	5500	4132
5	2000	1366	5500	3757
6	1000	621	5500	3415
Total	5000	2092	7000	1304

Discount Rate 10%

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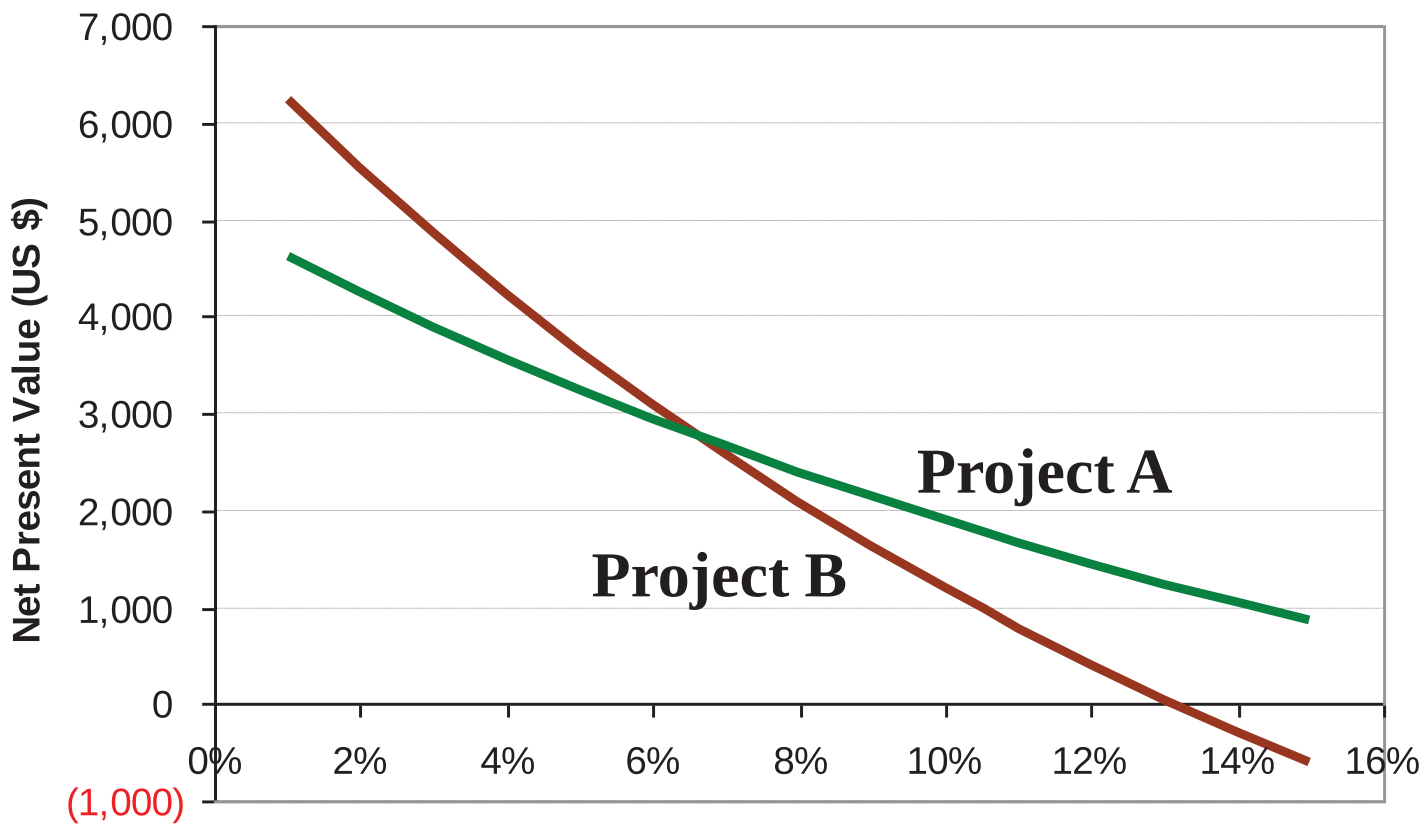
Net Present Value vs Discount Rate



Economic Comparison

Two Widely used techniques

- **Present value Analysis**

  All cash flows are converted to the same point in time

- **Annual Equivalent Cost Analysis**

  All cash flows are converted to an equivalent annual amount (annuity)

Both techniques yield the same Decision Preference

Criteria for Evaluation of Projects

- Criteria based on present value
  - Maximum net present value
  - Minimum present value of costs
  - Minimum levelised cost of generation
  - Maximum Benefit-to-cost ratio

- Criteria based on yield

  Criterion of internal rate of return

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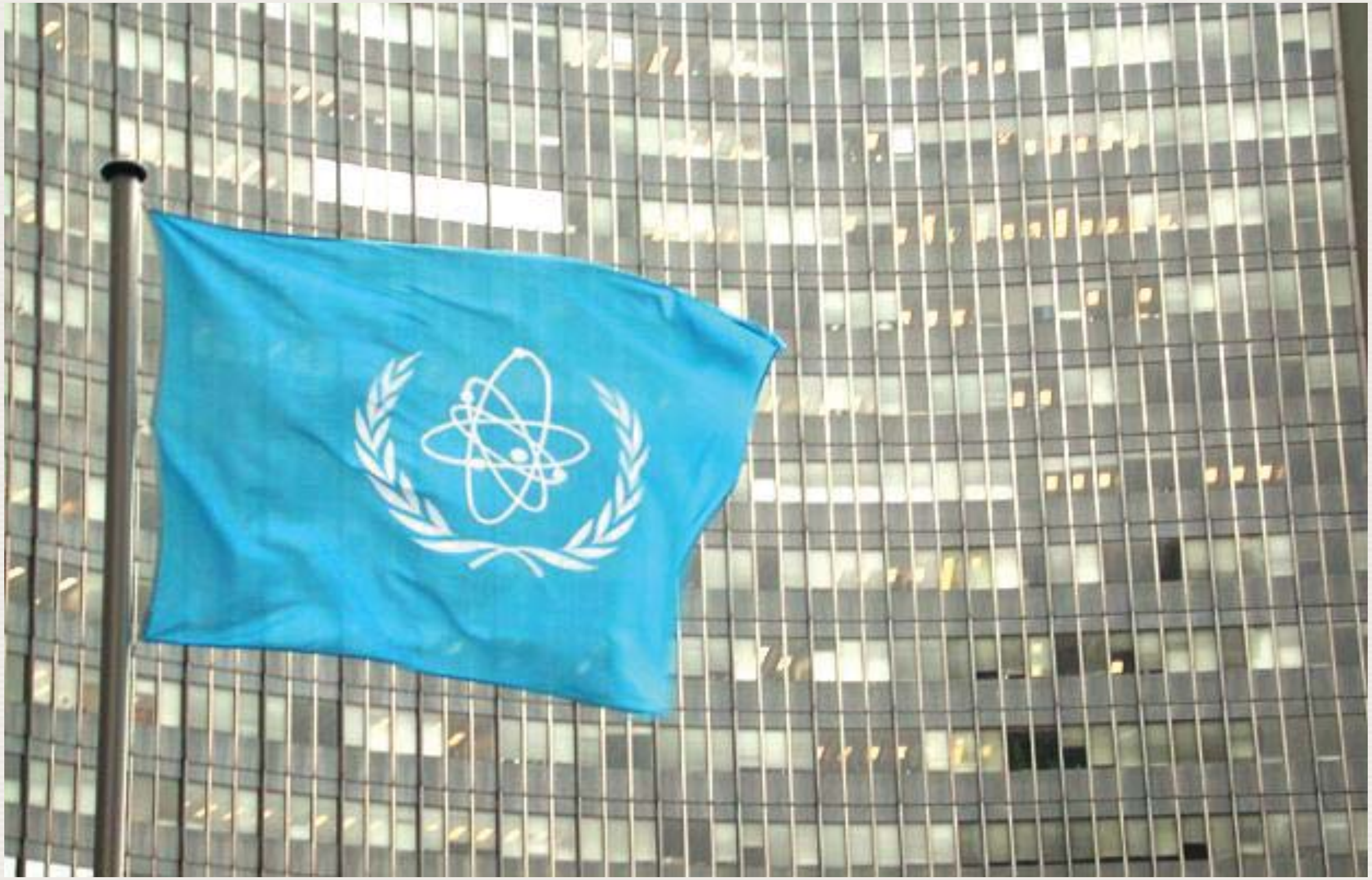

…atoms for peace.

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