

The WADE Economic Model

Quantifying the Cost and Carbon Savings of Decentralized Energy



The World Alliance for Decentralized Energy

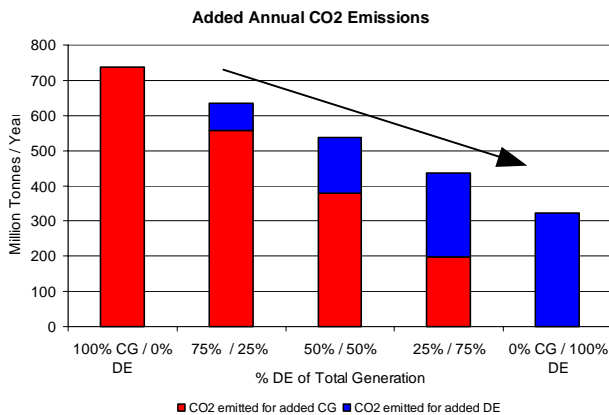
Work and Objectives

WADE is a non-profit organisation whose mission is to accelerate the worldwide deployment of high efficiency CHP systems and on-site renewable energies. WADE is backed by industrial companies, national governments, the UN and national/regional decentralized energy (DE) organisations.

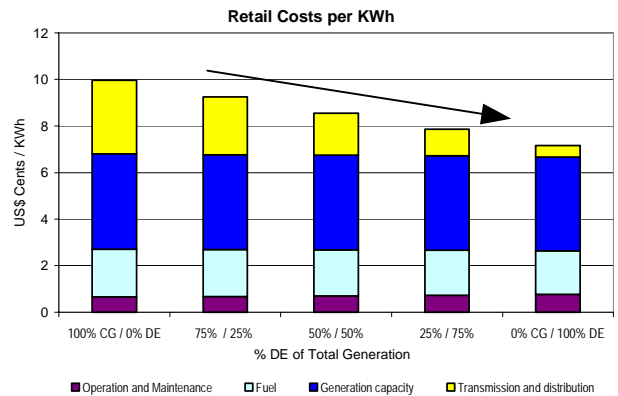
Concrete Results for Alternative Future Scenarios

The WADE Economic Model compares the performance of DE and central power in meeting future electricity demand growth. It gives concrete numerical and graphical results for capital costs, retail costs, emissions and fuel use. The model allows complete flexibility in terms of options for meeting future demand with different technologies and generation mixes.

Graphs: CO₂ Emissions



Graphs: Retail Costs



Tables: Overview of Results for China

Impact of Meeting Demand Growth to 2021 with CG or DE				
	100% CG	100% DE	DE Savings	% Change
Total Capital Cost Billions of US\$	1053	653	400	38%
Retail Cost (\$ / kWh)	9.97	7.16	2.81	28%
Emissions (000 t):				
NO _x	917	99	819	89%
SO ₂	910	97	813	89%
PM10	48	20	28	58%
CO₂ Emissions (Mt)	739	322	416	56%

The model summarises the overall results for each particular set of inputs in a table. It quantifies the emissions and costs savings of decentralised energy, both in absolute and relative terms. This enables easy comparison between centralised generation and decentralised generation.

In all simulations to date, the outputs from the WADE Economic Model have consistently shown that:

- DE can meet demand growth at lower cost than central generation
- DE provides a highly cost-effective solution for cutting CO₂ emissions

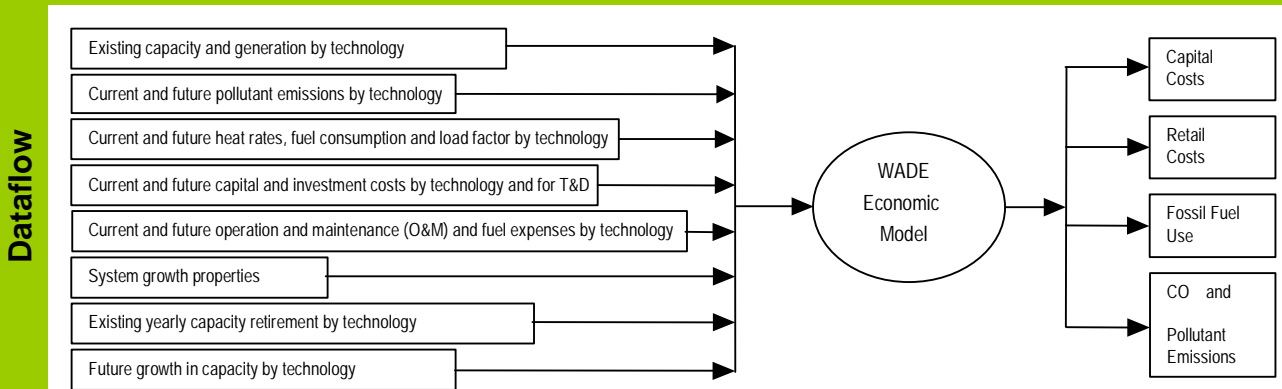
The WADE Economic Model

Data Input

Starting with generating capacity for the base year, the WADE Economic Model builds capacity to meet demand from projected future growth and existing plant retirement over a 20 year period. Users can specify the shares of different technologies of new capacity in five-year blocks. The WADE Economic Model input sheet can be adapted to support almost any mix of generating technology.

DE	Existing % of DE Generation	New Capacity Generation %;		New Capacity Generation %;		New Capacity Generation %;	
		year 1		year 6		year 11	
Gas CHP	74.84%	78.00%	78.0%	70.89%	70.9%	63.79%	63.8%
Gas micro-CHP	0.00%	0.00%	0.0%	3.95%	3.9%	7.89%	7.9%
Other FF CHP	22.79%	6.00%	6.0%	4.95%	4.9%	3.89%	3.9%
Renewable CHP	1.89%	5.00%	5.0%	7.63%	7.6%	10.26%	10.3%
Hydro (Local)	0.47%	3.00%	3.0%	2.74%	2.7%	2.47%	2.5%
Wind (Local)	0.00%	6.00%	6.0%	7.05%	7.1%	8.11%	8.1%
Solar (Local)	0.01%	2.00%	2.0%	2.79%	2.8%	3.58%	3.6%
	100.00%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%

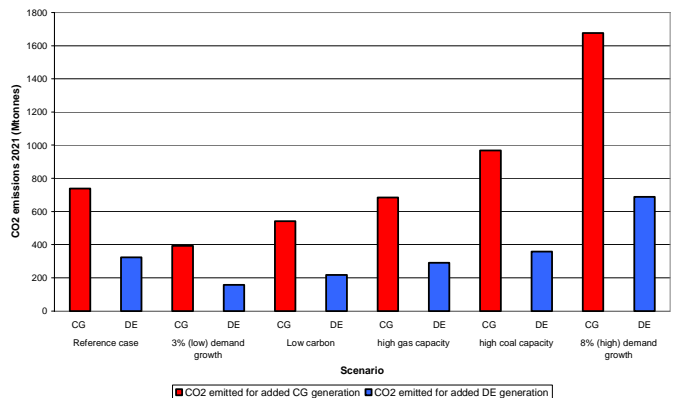
The WADE Economic Model: How Does It Work?



Special Applications: Multi-Scenario Analysis

Example: CO₂ Emission Scenarios for China

The WADE Model can be used to run scenarios to inform policy-makers as to the best solutions to particular problems. For example, future CO₂ emission scenarios can be analyzed and compared. These are then displayed graphically, facilitating analysis and providing high-impact visual outputs for use in presentations and reports.



Applying the WADE Economic Model to Your Country

Previous Applications of the WADE model



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WITH CHANGED INPUT ASSUMPTIONS, THE WADE ECONOMIC MODEL CAN BE ADAPTED TO ANY COUNTRY, CITY OR REGION IN THE WORLD.

For more information please visit www.localpower.org or email info@localpower.org.