

Biodiesel New Zealand



Andrew Simcock, General Manager

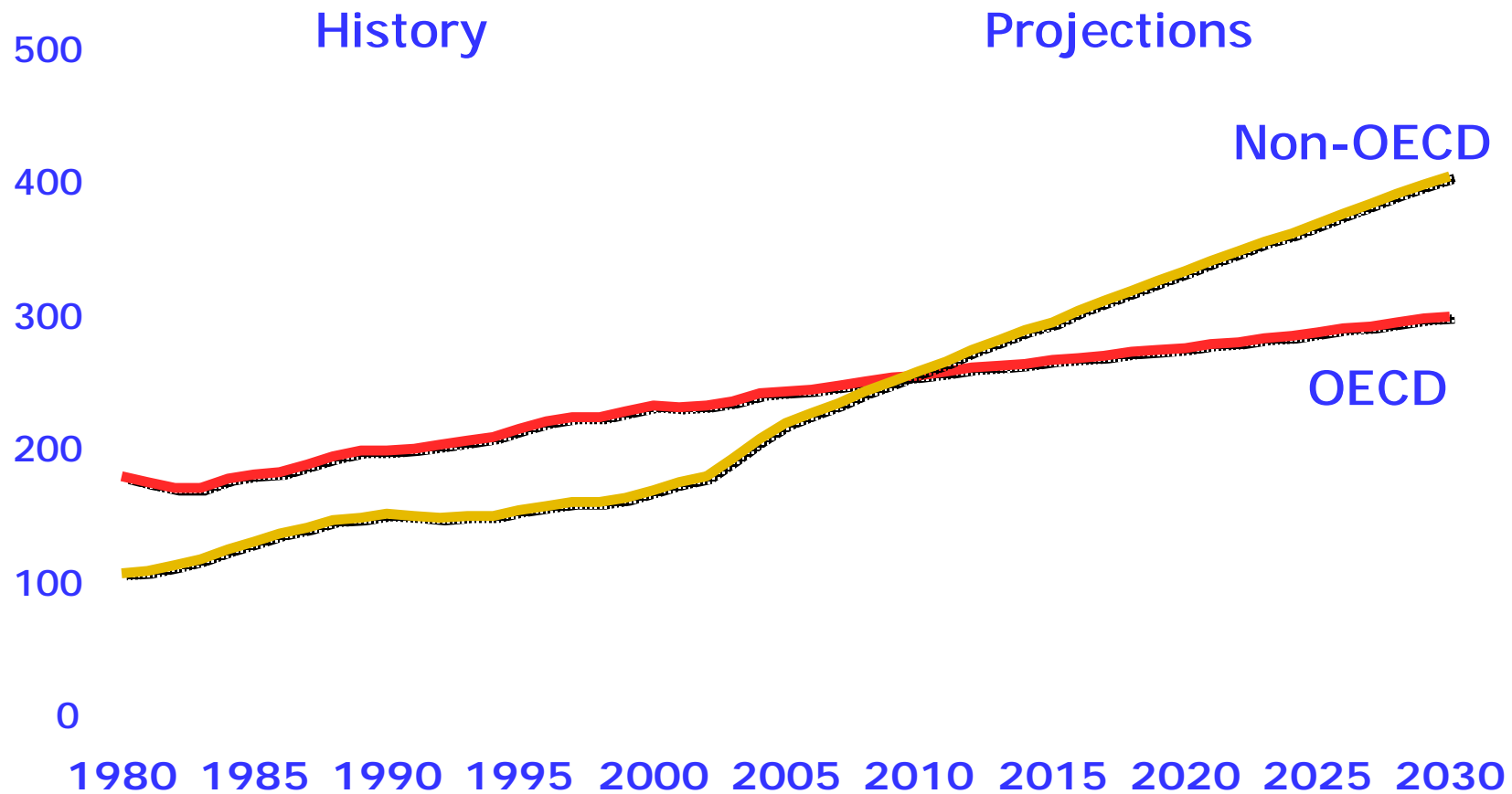
bi**diesel**
New Zealand
Renewable fuel from Solid Energy
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Quick Review: what are the current drivers for change in the energy sector?

- Affordability (customer), Viability (business)
- Fuel security
- “Sustainability”
(including carbon foot print, past & present land utilisation, management of waste & water)
- Meeting the needs of other societal drivers
(for example, clean air)

... Long term market pricing as energy demand is grows beyond supply, but when?

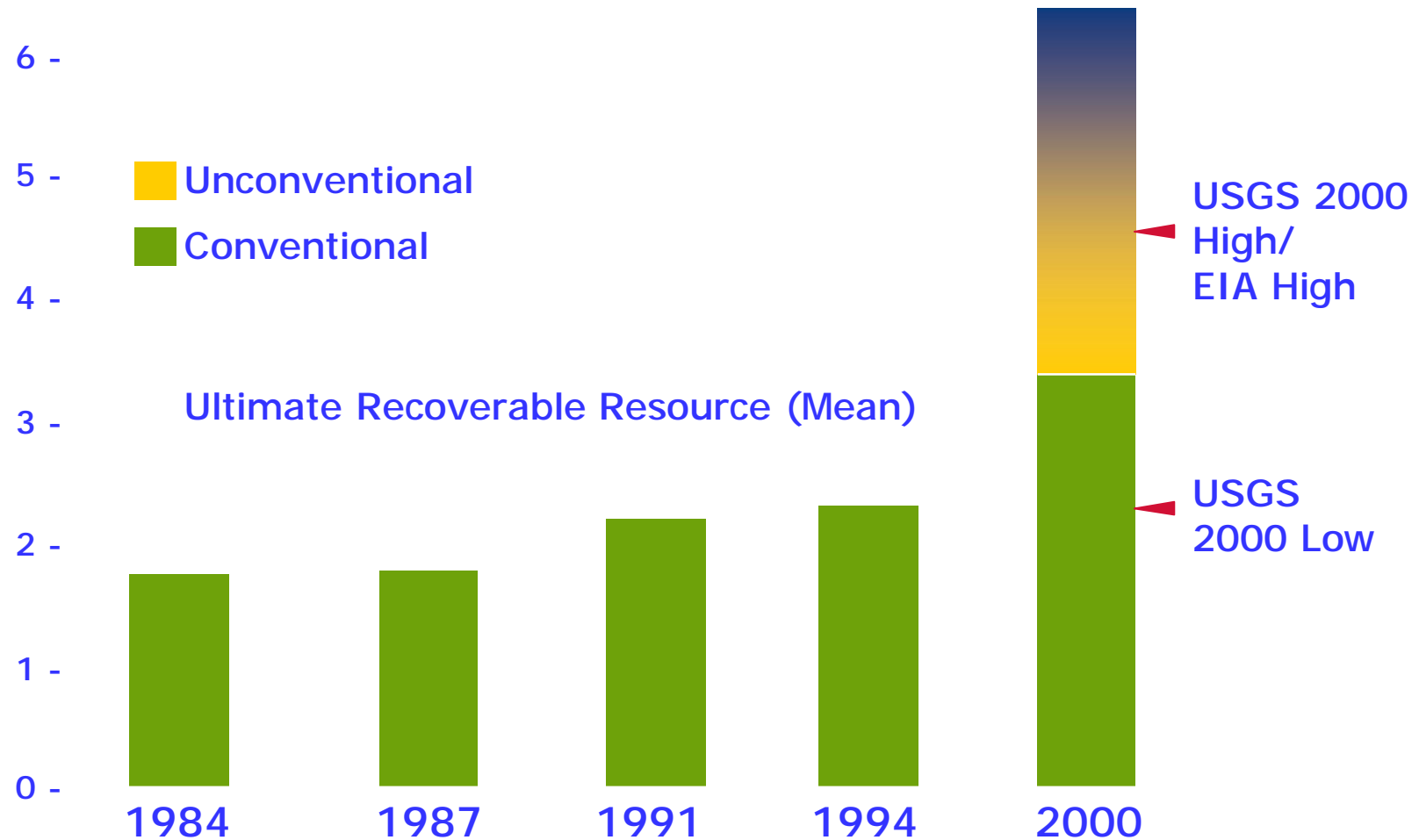
Quadrillion BTU Per Year



Source: EIA 2006

Large oil resources but limited cheap oil supply

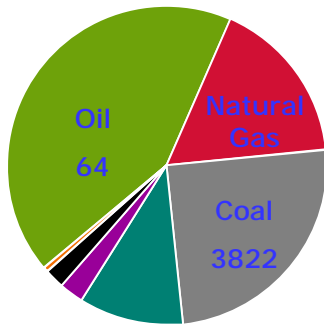
Trillion Barrels - Oil



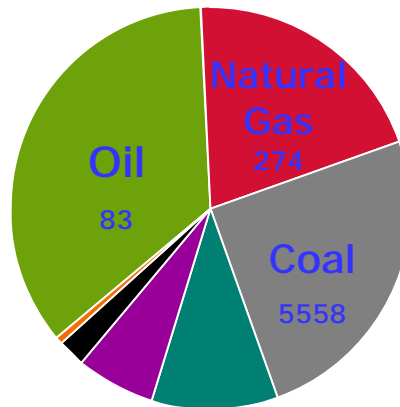
Source: United States Geological Survey

Coal, Oil and Natural Gas will remain indispensable but increasingly costly and there is simply not enough

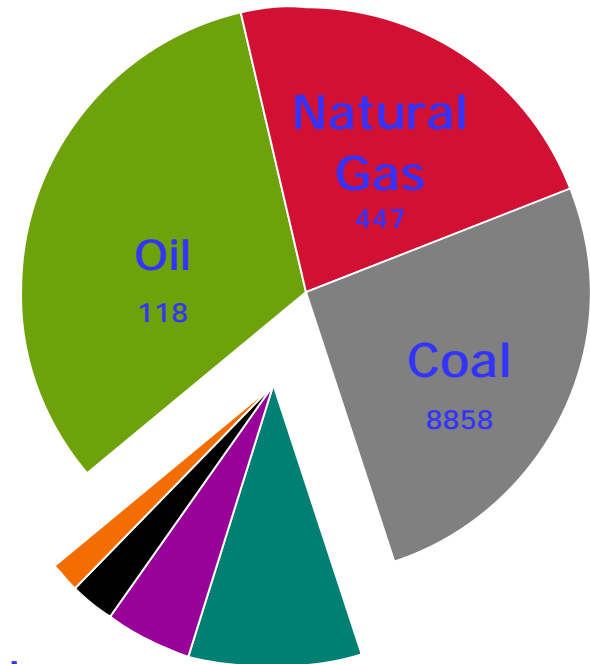
1980
288 Quadrillion
BTU



2004
445 Quadrillion
BTU



2030
678 Quadrillion
BTU



Wind/Solar/Geothermal

Hydro

Nuclear

Biomass

Oil in Million Barrels/ Day
Natural Gas in Billion CF/ Day
Coal in Metric Tonnes/ Year





Source: EIA and IEA Data for NPC Global Oil and Gas Study


Remember what energy solutions are likely to look like...

- A range of energy feedstock options
- A range of energy mediums
- Flexibility in how those options/mediums are used
- Smart, integrated solutions
- Combination of central and local solutions



Biofuels

Today

- **From a range of feedstocks:**
 - **Ethanol:**  whey, sugar and starch plants
 - **Biodiesel:**  used cooking oil (UCO),  oilseed rape (OSR),  tallow, jatropha and other nut-producing plants.
- **1st generation production technologies**
- **Viable today vs R&D**
- **Governments generally promote the use of “sustainable” biofuel options**

 = New Zealand indigenous options

Tomorrow

- **From a wider range of feedstocks:**
 - **Ethanol:**  purpose-grown biomass, wastes
 - **Biodiesel:**  algae, biomass
- **2nd generation and other production advances including “green diesel” (direct use of bio fats and oil at refineries)**
- **Capacity to replace more traditional fuels → capacity of development in purpose-grown biomass industry.**

Evaluation of existing options & finding additional novel plant biodiesel feedstocks which:

1. do not necessarily need top agricultural land
2. are not foods or compromise food for fuel argument
3. do not need high inputs of ag-chemicals or water
4. possibly have new chemistries
5. increase oil yield through novel bio-innoculants
6. do not destroy ecosystem (nature's) services but actually support them

Why we picked canola and assessing other crop and feedstock options...

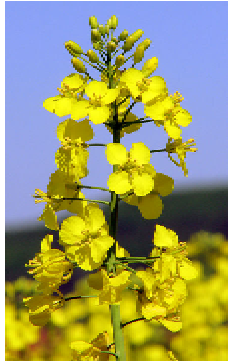
Canola, Oilseed Rape (OSR) Selected

Life cycle....



Improving canola performance as a biofuel...

- agricultural land **widen acceptable land**
- food AND fuel **OSR cake as animal feed**
- productivity including ag-chem inputs
optimise cropping practice and management
- agro-ecosystems **extend benefits**
- life-cycle analysis of energy needs for
production **measure, improve, scale**



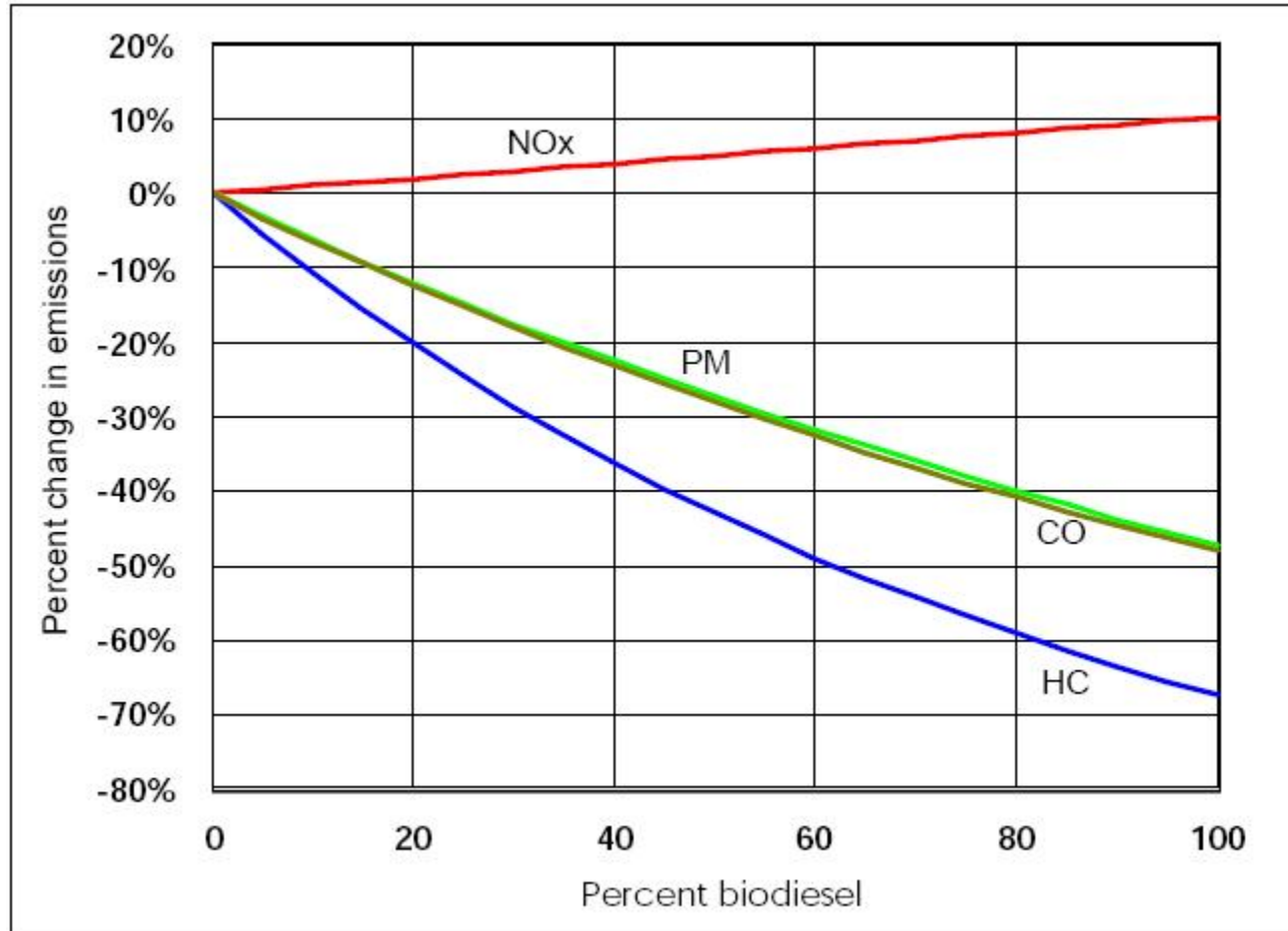
Canola model benefits



- **Recycling used cooking oil strategy promotes use of healthier cooking**
- **Growing OSR (a brassica) improves soil, subsequent cereal yields requiring less ground work and fertiliser**
- **Producing OSR oil also produces a high-protein, high-value seedcake for animal feed / conditioning**
- **Biodiesel is easy on the environment: any spills quickly biodegrade compared with mineral diesel**
- **Can be used in virtually any blend proportion with mineral diesel**
- **More favourable engine tailpipe emissions ...**

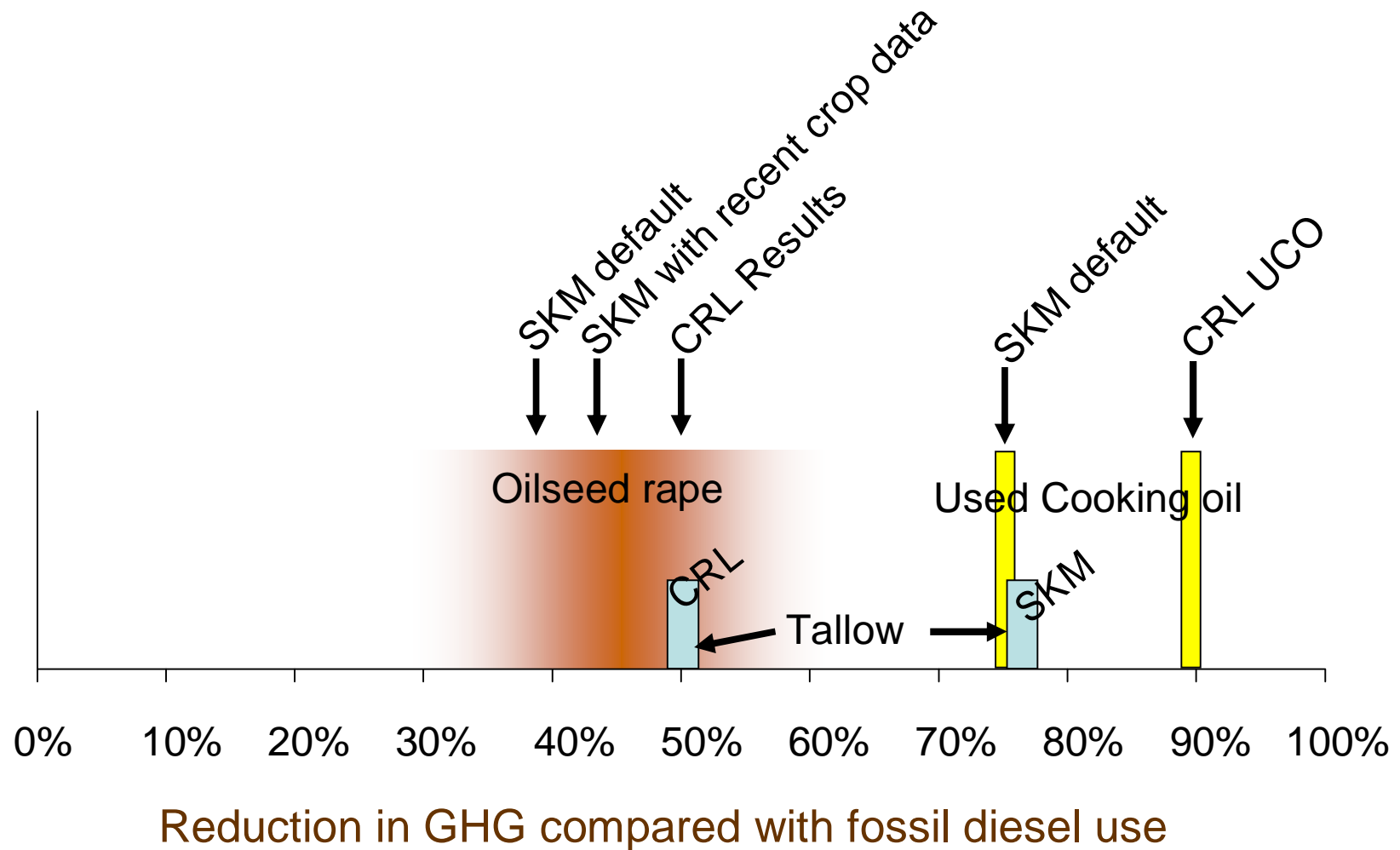


Biodiesel-conventional diesel emissions results



From: *A Comprehensive Analysis of Biodiesel Impacts on Exhaust Emissions, Draft Technical Report* US EPA, EPA420-P-02-001, October 2002

Biodiesel lifecycle GHG results



Taking Biogold to NZ energy market

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