

## BACKGROUND PAPER FOR IDC

### PRICE ELASTICITY OF DEMAND FOR ELECTRICITY

This note provides additional information on the price elasticity of demand for electricity assumed in Treasury's Climate Change Mitigation Modelling.

The Monash Multi-Regional Forecasting (MMRF) model is currently being used by Treasury in modelling the economic costs of climate change mitigation. MMRF is an economy wide computable general equilibrium (CGE) model of Australia. The MMRF model incorporates the results from detailed modelling of the electricity sector. The detailed electricity generation modelling is being conducted by SKM – MMA and ROAM Consulting. The electricity generation modelling and MMRF are iteratively linked to ensure a consistent set of projections.

The MMRF model allows for substitution at both the firm and household levels.

- The firm's constant price elasticity of demand for intermediate input use of electricity is **-0.25**.
  - If the retail electricity price rises by 10 per cent relative to other inputs used in a firm's production, all else unchanged, the firm will use 2.5 per cent less electricity and supplement this with more capital, labour or other intermediate goods.
- In MMRF, three household consumption industries account for household consumption of energy sources and the underlying capital equipment for each service: private transport services; private heating services; and private electricity services.

**Table 1: Model assumptions of own price elasticity of demand and expenditure elasticity for each household consumption sector.**

| Sector                       | Expenditure elasticity | Implied own price elasticity |
|------------------------------|------------------------|------------------------------|
| Private Transport Services   | 0.4                    | -0.2                         |
| Private Electricity Services | 1.0                    | -0.5                         |
| Private Heating Services     | 0.5                    | -0.3                         |

Note: The constant own price and expenditure elasticities are based on the initial MMRF database for 2005-06.  
Source: MMRF

- The expenditure and implied own price elasticity, taking private electricity services as an example, are interpreted as follows.
  - A 10 per cent increase in the price of private electricity services faced by households, all else unchanged, decreases the demand of private electrical services by 5 per cent.
  - A 10 per cent increase in total household expenditure, all else unchanged, increases private electrical services expenditure by 10 per cent.
- The elasticities reported above are constant partial equilibrium elasticities and should be used as a guide only. As MMRF is a general equilibrium model, there are second order effects to electricity demand from an electricity price rise.
  - The modelled outcomes of an increase in electricity prices will change depending on the size of the price shift, the impacts of electricity prices on the economy and other prices in the economy.

- The aggregate response of electricity demand to carbon prices will also depend on the induced changes in industrial structure. This will reduce resources flowing to these sectors and reduce the overall demand for electricity in the economy.

## Section 22