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**Joint ICTP-IAEA Advancing Modelling of Climate, Land-use,
Energy and Water (CLEW) Interactions**

7 - 11 October 2013

**ENERGY-FOOD-WATER SECURITY: AN INSTITUTIONAL PERSPECTIVE
IN THE AUSTRALIAN CONTEXT**

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PURPOSE

Develop – in the Australian context – an institutional perspective on energy-food-water security

CONTENT

- **BACKDROP**
 - **Research Focus**
 - **Motivation**
 - **Research Framework**
- **PROGRESS**
 - **Policy nexus**
 - **Some early inferences**
- **NEXT STEPS**

Backdrop (contd.)

RESEARCH FOCUS

- **ENERGY-FOOD WATER SECURITY**
- **INSTITUTIONAL PERSPECTIVE**
- **AUSTRALIA**

Backdrop (contd.)

MOTIVATION

- **Criticality of the Energy-Food-Water Security Challenge**
- **Inappropriateness of the prevailing policy discourse**

RESEARCH FRAMEWORK

- **FRAME OF REFERENCE**
 - institutional underpinnings
- **TENOR**
 - multidisciplinary, empiric, policy-focused
- **APPROACHES**
 - institutional economics
 - political economy
- **METHODOLOGY**
 - establish 'security' context
 - analyse

ESTABLISHING THE SECURITY CONTEXT

- **INSTITUTIONAL PERSPECTIVE**
 - institutions
 - organizations
- **INSTITUTIONS**
 - formal
 - informal

Establishing the security context (contd.)

- **THE AUSTRALIAN CONTEXT**
 - **Polity**
 - **Economy**
 - **Energy, Food, Water**
- **POLITY**
 - **federalism**
 - **Westminster system**
 - **bicameral structure**

Establishing the security context (contd.)

- **ECONOMY**
 - micro-economic reform
 - primacy of markets
- **ENERGY-FOOD- WATER**
 - sectoral reforms
 - *leitmotiffs*: competition, choice, markets

RESEARCH PROGRESS

- **SECURITY NEXUS**
- **SOME EARLY INFERENCES**

GDP Australia: 2009-2010

Industry	Value Added ^(a) (\$m)	Share of GDP (%)	Energy Use (PJ)	Share of Total (%)	Water Use (GL)	Share of Total (%)
Agriculture	28416	2.2	96	1.6	7072	52.5
Mining	95185	7.4	509	8.6	489	3.6
Manufacturing	107782	8.3	1261	21.2	658	4.9
Electricity & Gas	18837	1.5	1793	30.2	297	2.2
Water Supply	7191	0.6			1893	14.0
Total	1201980	93.0	5945	100.0	13476	100.0

(a) Total GDP 2009-10: \$1292 billion (current prices)

Sources: ABS 2012, BREE 2012

Overview of Australian Energy Industries: 2009–2010

Industry	Value Added (\$b)	Gross fixed Capital Formation (\$b)	Employment ('000)
Coal Mining	22.5	5.3	34
Oil & Gas Extraction	22.6	16.2	14
Petroleum & Coal Product Manufacturing	1.6	0.5	6
Electricity Supply	20.5	11.3	50
Gas Supply	1.0	0.4	2
Total	68.2	33.7	106

Source: BREE 2012

Evolution of Organisational Structure, Ownership Arrangements and Regulations in the Australian Electricity Industry

	Early Developments 1920s - 1940s	Consolidation Era 1950s - 1980s	Internal Reforms 1980s – 1990s	Market Reforms 1990s - present
Organisational Structure	<ul style="list-style-type: none"> - Initial monopolization (private & public) - development of distribution and transmission networks - no unified national approach due to tyranny of distance 	<ul style="list-style-type: none"> - coherent vertically integrated structure across all States - horizontal functional integration - no national approach – except Snowy Mountains Scheme 	<ul style="list-style-type: none"> - no major change in structure - internal productivity improvements - establishment of the NEM 	<ul style="list-style-type: none"> - functional unbundling - competition/choice
Ownership Arrangement	<ul style="list-style-type: none"> - public, private mix - general move towards nationalisation - largely public: NSW, VIC, QLD, and TAS - private: SA and WA 	<ul style="list-style-type: none"> - increased nationalisation 	<ul style="list-style-type: none"> - dominantly publicly owned negligible privately owned plants 	<ul style="list-style-type: none"> - public, private mix - public: NSW, QLD, TAS and WA - private: VIC and SA
Rules and Regulations	<ul style="list-style-type: none"> - controlled market rules - less competition - mergers and acquisitions 	<ul style="list-style-type: none"> - merit-based dispatch (command & control) - no competition, state regulated - rate of return regulation 	<ul style="list-style-type: none"> - no major change - augmented command and control - commercialisation, corporatisation - incentive based regulation 	<ul style="list-style-type: none"> - wholesale& retail free market (AEMO) - enhanced competition/choice - privatisation

Overview of Australian Food Industry: 2009–2010

Food Industry	Value Added(\$b)	Share of Total (%)
Farm & Fish production	34.8	1.8 (of GDP)
Food, Beverage & Tobacco processing	24.0	19.0 (of Industry Value Added)
Retail Sales	125.7	52.7 (of retail)
Food Exports	24.5	12.2 (of trade)
Food Imports	10.1	

Source: DAFF 2012

Australian Water Consumption: 2009–2010

Industry	2009-10 Total (GL)	NSW	VIC	QLD	SA	WA	TAS	NT	ACT
Agriculture	6987	2127	1553	1928	720	324	286	49	1
Forestry and fishing	85	1	1	6	1	74	2	-	-
Mining	489	61	5	114	22	245	17	25	-
Manufacturing	658	141	138	186	76	62	37	18	-
Electricity & Gas	297	68	113	90	1	24	-	1	-
Water supply	1893	1001	512	190	52	103	17	10	8
Other Services	1199	363	250	210	97	207	35	27	11
Households	1868	565	327	364	126	348	72	38	28
Total	13476	4327	2899	3088	1095	1387	466	168	48

Source: ABS 2012

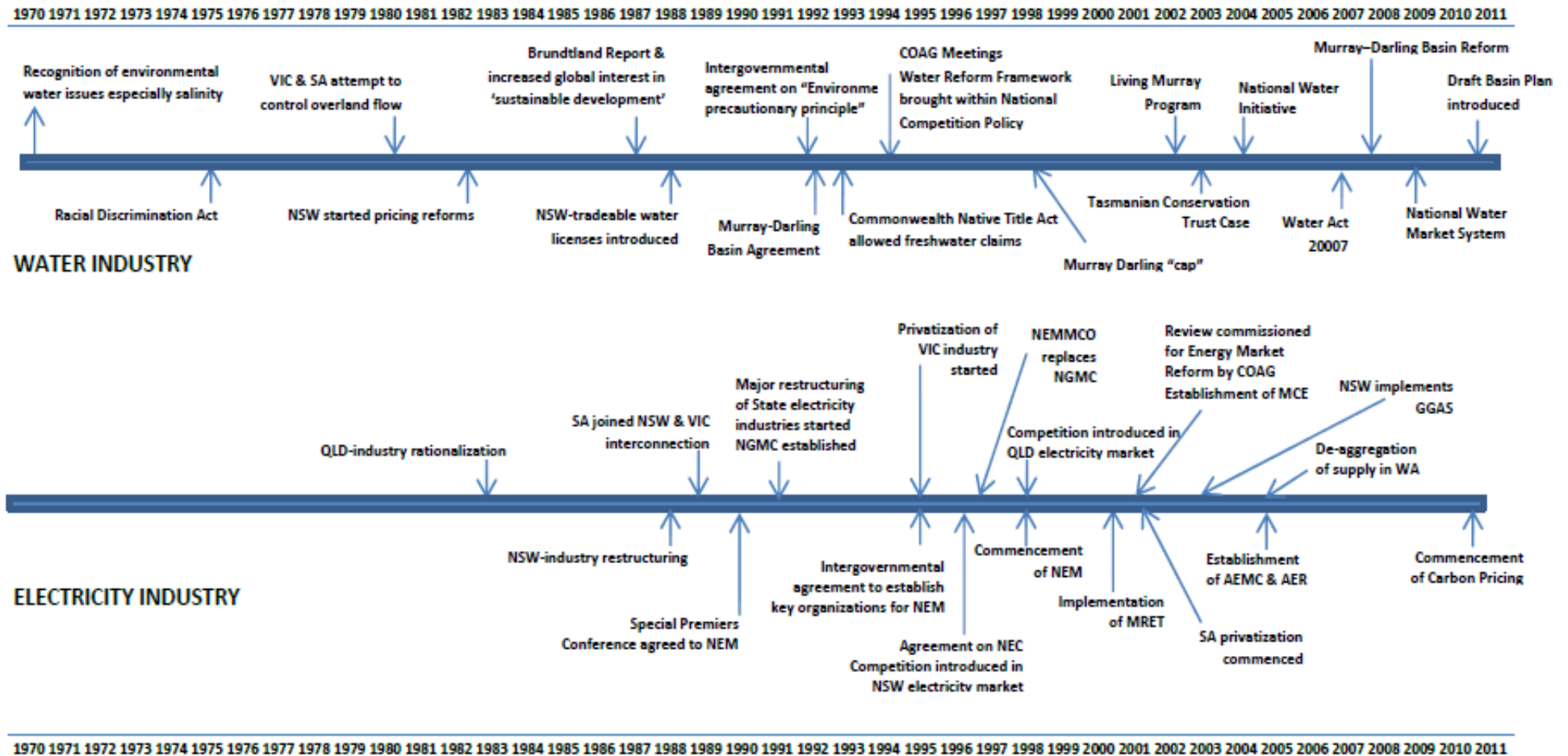
Australian Water Consumption: 2009–2010

Percentages

Industry	2009-10 Total	NSW	VIC	QLD	SA	WA	TAS	NT	ACT
Agriculture	52	49	54	62	66	23	61	29	2
Forestry and fishing	1	0	0	0	0	5	0	-	-
Mining	4	1	0	4	2	18	4	15	-
Manufacturing	5	3	5	6	7	4	8	11	-
Electricity & Gas	2	2	4	3	0	2	-	1	-
Water supply (a)	14	23	18	6	5	7	4	6	17
Other Services	9	8	9	7	9	15	8	16	23
Households	14	13	11	12	12	25	15	23	58

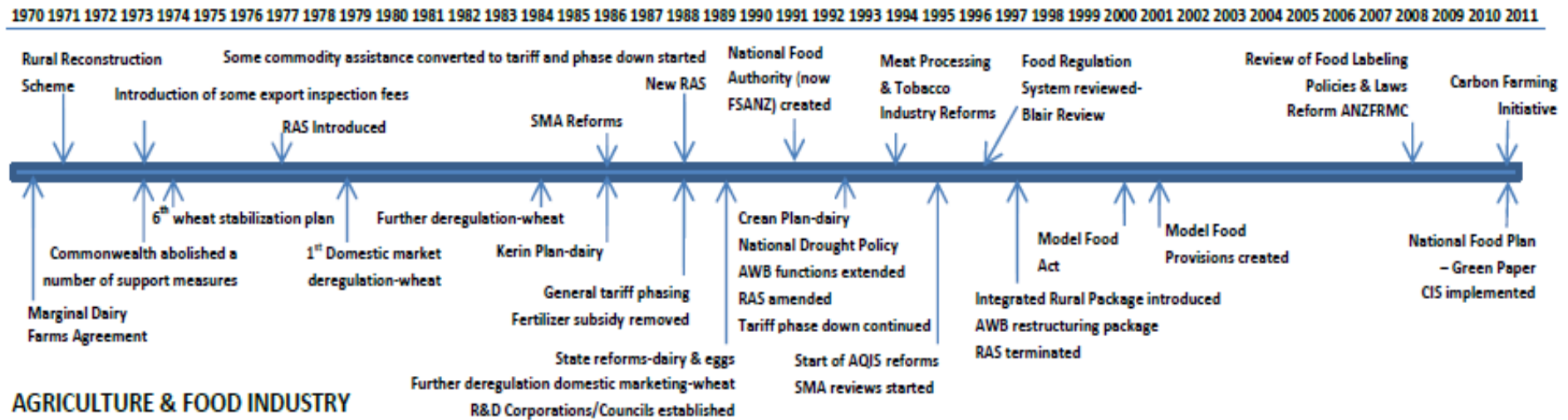
Source: Australian Water Consumption in 2009-2010

Chronology of Microeconomic Reforms in Water & Electricity Industry



Sources: IC 1998, NWC 2011, EFA 2009

Chronology of Microeconomic Reforms in Agriculture & Food Industry

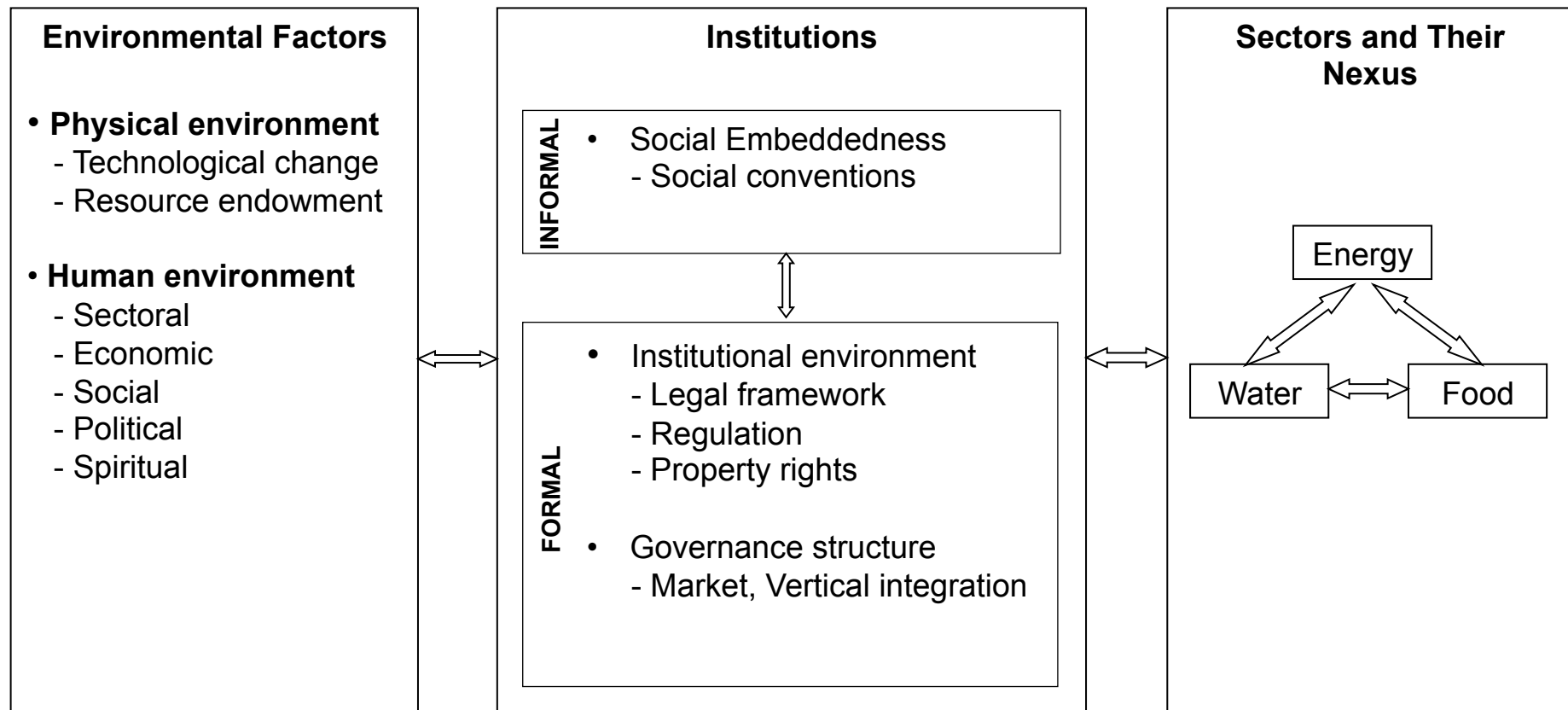


Sources: IC 1998, DAFF 2012

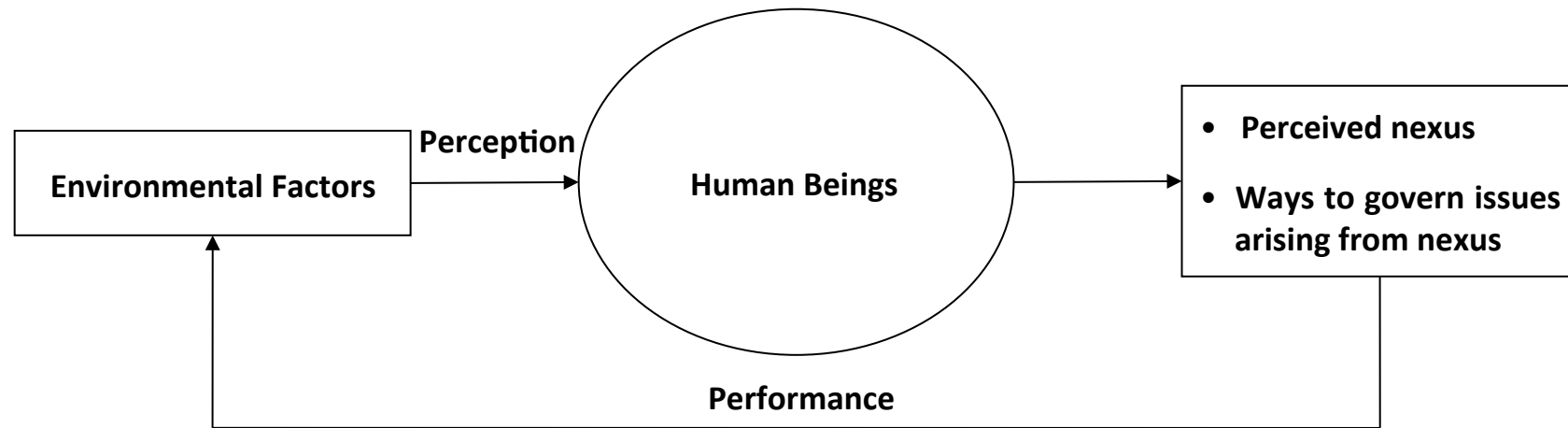
ANALYTICAL FRAMEWORK: SELECT FEATURES

- **FOCUS**
 - economic institutions
- **FRAMEWORK FOR ANALYSING INSTITUTIONAL CHANGE**
 - intentionally-created
 - global, national, sectoral
- **FRAMEWORK FOR ANALYSING POLITICAL POWER**
 - domain, scope
- **INSTITUTIONAL ARRANGEMENTS**
 - structure, ownership, regulation

ANALYTICAL FRAMEWORK: AN OVERVIEW



Analytical Framework: An Overview (contd.)



SOME EARLY INFERENCES

- **SECURITY CHALLENGE**
 - real, substantive
- **INSTITUTIONAL DIMENSIONS**
 - multiplicity, complexity
 - insularity of discourse
 - polity, history, culture matter

NEXT STEPS

- **CONTEXTUALIZE SECURITY CHALLENGE**
- **DEVELOP POLICY CONNECTS**
- **IDENTIFY SOCIO-CULTURAL LINKAGES**
- **DEMONSTRATE INSTITUTIONAL SIGNIFICANCE**