



Just
add
water

What we are seeking

The bottom line of this proposal:

\$130 million public contribution to five Tasmanian irrigation schemes

\$54 million private contribution

\$220 million on-farm private investment

\$282 million national economic benefit

310 direct and indirect employment growth

Funding of \$130 million under this proposal would enable \$54 million to be leveraged in private sector investment through the sale of water entitlements. This would give a total private investment in Tasmanian irrigation scheme infrastructure of \$180.8 million.

Further private sector investment will occur through on-farm development. This covers such items as pivots, farm machinery and dams.

This on-farm investment resulting from the five irrigation schemes in Tranche Two is conservatively estimated at \$220 million, or \$1.69 for every \$1 of public contribution.

Success will be measured by:

delivering the identified projects within agreed timeframes and budgets;

and the increase in output of Tasmania's agricultural sector;

and the flow-on effect to regional communities.

ON-FARM
INVESTMENT OF



FOR EVERY DOLLAR OF
PUBLIC CONTRIBUTION

Reliable irrigation is important for all the people in the region. It creates stable employment for the small towns and communities. It means that the schools, the hospitals, all those things are maintained.

*Tunbridge farmer
Richard Gardner*



Proposal summary

Initiative name

Just add water...

(An Innovation Strategy for Tasmania: Focus on Food Bowl Concept)

Location

Tasmania – statewide

Name of Proponent Entity

Tasmanian Irrigation Pty Ltd & Tasmanian Government

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Executive summary

Tasmanian Irrigation's goal is to develop a system of irrigation schemes that will add significant economic value to the state and nation's agricultural production.

Firstly, water will be delivered sustainably and economically to the most productive land and the most productive use. Secondly, sustainable agricultural production will be maximised for national economic benefit and in the interests of global food security. These aims are consistent with the Tasmanian Government's Economic Development Plan and Infrastructure Strategy.

Secure, high reliability water being available to Tasmanian farmers is critical to the success of the State's Economic Development Plan. The most efficient way to address this problem is through the establishment of true public private partnerships (PPP) to develop regionally significant irrigation schemes.

Tasmanian Irrigation is seeking \$130 million in public funding to develop another five irrigation schemes, Tranche Two, building on the irrigation schemes across Tasmania that are being developed under the National Partnership Agreement on Water for the Future between the Australian and Tasmanian Governments. A commitment of \$130 million in public funds would enable a further \$54 million to be leveraged in private sector investment through the sale of water entitlements.

In addition, on-farm private investment from the five schemes is conservatively estimated at \$220 million, or \$1.69 for every \$1 of public contribution. The total economic benefit from this public investment of \$130 million, on the basis of a combined economic NPV at farm gate of \$94 million, has been estimated by economic consultants Marsden Jacob Associates to have a flow-on economic effect of up to an additional \$188 million, that is, an economic multiplier of three.

Is this a new submission?

No, currently on Infrastructure Australia's 2012 Infrastructure priority list under the Early Stage Category.

Estimated cost of problems?

The Australian Bureau of Statistics estimated the gross value of Tasmanian agricultural production for 2010-11 was over \$1.15 billion. Professor Jonathan West, author of *An Innovation Strategy for Tasmania A New Vision for Economic Development, Conceptual Overview and Options Outline* (which informed the Tasmanian Government's Economic Development Plan) has identified agriculture as one of the key opportunities for growth in the state economy. Professor West has identified that agriculture could generate an additional \$5 billion per annum with additional irrigation water.

Estimated capital cost of initiative by proponent (\$m, nominal, undiscounted):

\$184 million

Commonwealth contribution sought by proponent (\$m, nominal, undiscounted):

\$130 million

Other funding (source/amount/cash flow) (\$m, nominal, undiscounted):

\$54 million – sale of water entitlements to the private sector

BCR by proponent excluding wider economic benefits:

1.4 excluding wider economic benefits

Estimated program

Full utilisation of new irrigation capacity could occur within three to five years. Tasmanian Irrigation has the capacity, if there is a smooth transition from Tranche One to Two, to commence the development of all five new projects simultaneously within the next year.



ECONOMIC MULTIPLIER OF THIS SCHEME

Marsden Jacob Associates



ADDITIONAL AGRICULTURE GENERATION POSSIBLE THROUGH ADDITIONAL IRRIGATION WATER

Professor Jonathan West



To create jobs,
just add water...



Background

There is a revolution under way in Tasmania that sets in cement the state's reputation as the most reliable source of food and fibre in a continent challenged by climate change.

Tasmania has only one per cent of the nation's land mass but, because of its unique maritime climate at the edge of the Southern Ocean, it has 13 per cent of Australia's total rainfall run-off. It is twice as much as the Murray Darling Basin.

The rain-bearing westerlies that unburden themselves after passing over the mountains of the Tasmanian west coast are on a constant circumnavigation in the latitudes called the Roaring Forties. The westerlies flow around the world, their path impeded only by South America. They arrive back in Tasmania, "their clouds pregnant with water after visiting the Amazon", as one irrigator describes it.

So in Tasmania there is always a potential deluge waiting to happen. The key for farmers is to capture that water, to harness that rainfall run-off for later use before it runs to the sea. It is a task beyond the scope of any individual farmer, but it is one in whose cost they have been more than willing to share in a successful public private partnership.

Large-scale, multi-user irrigation schemes developed under a true public private partnership (PPP) model are a more efficient use of capital than the sum total of individual storage schemes on farms. Under the PPP approach, the public sector assists farmers to establish the schemes and their associated delivery systems and the farmers meet part of that cost as well as the ongoing charges for using the water.

There are no expensive buy-backs like in the Murray-Darling Basin.

Tasmania already has:

- a temperate climate
- fertile soils
- the biosecurity benefit of isolation because it is an island
- an emerging class of skilled and increasingly innovative farmers
- established processors
- established domestic and international markets
- a sound research, development and extension foundation through the Tasmanian Institute of Agriculture, the University of Tasmania and local CRCs
- the Tasmanian Freight Equalisation Scheme for eligible freight across Bass Strait, and the credibility and strength, both nationally and internationally, of the Tasmanian brand.

Creating further water storages and irrigation for primary production unlocks the greater potential of Tasmania's food production and helps the transformation from traditional pursuits such as forestry into higher-value outcomes.

Each of the proposed schemes undertakes to provide 95 per cent reliability of water supply to farmers, possibly a level of security previously unachievable anywhere else in Australia.

The Tasmanian Government has charged state-owned company Tasmanian Irrigation Pty Ltd with delivering the schemes. The first tranche of 10 is already well under way, with four completed and two under construction. They have all been models of this partnership between public and private sector enterprise.

The precedent of the 10 nominated projects in Tranche One gives an insight into the likely economic impacts of those in Tranche Two. The \$140 million Australian government expenditure in Tranche One, when completed, will activate total direct capital expenditure of \$575 million: \$310 million on actual project construction and \$265 million on on-farm capital expenditure. This is expected to deliver a direct economic benefit at the farm gate of \$192 million. The additional economic value-add of Tranche One irrigation schemes is put at \$384 million.

Under this Tranche Two proposal, Tasmanian Irrigation is seeking \$130 million of public funding to develop another five additional and regionally significant irrigation schemes.

That commitment of \$130 million will leverage an additional \$54 million in private sector investment through the sale of water entitlements. Further on-farm investment from the five schemes is conservatively estimated at \$220 million, or \$1.69 for every \$1 of public contribution. On the experience of Tranche One, it is very conservative.

In addition, the total economic benefit from this public investment of \$130 million (on the basis of a combined economic NPV at farm gate of \$94 million) has been estimated by economic consultants Marsden Jacob Associates to have a flow-on economic effect of up to an additional \$188 million. That is an economic multiplier of three which is a very sound return on capital for the nation.

Under the terms of the existing irrigation development arrangements, the Australian and Tasmanian governments and the private sector have shared the \$310 million capital cost of the schemes:

- the Australian Government provides \$140 million under its Water for the Future program;
- the Tasmanian Government provides \$80 million from its Water Infrastructure Fund; and
- private capital accounts for \$90 million through the purchase of tradeable water entitlements in each scheme.

This initial funding is producing 10 irrigation schemes, but there is more to be done, hence, this application for Tranche Two.



13%

**OF AUSTRALIA'S
TOTAL RAINFALL RUN-
OFF IS IN TASMANIA**



95%

SURETY OF SUPPLY

About Tasmanian Irrigation Pty Ltd

**A PROVEN
TRACK RECORD**

**\$46.2
million**

**IN PRIVATE
INVESTMENT SECURED**



**WINNER 2012 SMART
PROJECT AWARD:
INFRASTRUCTURE
PARTNERSHIPS
AUSTRALIA**

The peak national body, Infrastructure Partnerships Australia, conducts annual awards to recognise infrastructure excellence. Tasmanian Irrigation's development of a suite of regionally-significant irrigation schemes in Tasmania was selected by the national industry as the cleverest infrastructure project in Australia and received the accolade of the 2012 SMART Infrastructure Project of the Year Award. Tasmanian Irrigation also was a finalist in the Excellence in Government Partnerships category.

Tasmanian Irrigation is the state-owned entity that has the merged assets and roles of the Rivers and Water Supply Commission, the Tasmanian Irrigation Development Board Pty Ltd and Tasmanian Irrigation Schemes Pty Ltd.

The company provides the technical, financial and project management skills to take irrigation schemes from their concept through feasibility, detailed design and approval stages, construction and operation.

Its record to date is:

- four new irrigation schemes operating, providing 16,640 ML high surety, 95 per cent secure water to farmers (Sassafras Wesley Vale Irrigation Scheme, Winnaleah Irrigation Scheme), Augmentation, (Whitemore Irrigation Scheme, Headquarters Road Irrigation Scheme)
- two schemes under construction including the nationally significant Midlands Water Scheme and the Lower South Esk Irrigation Scheme
- a seventh scheme has obtained final approvals (Kindred North Motton Irrigation Scheme)
- detailed business cases completed for the eighth and ninth schemes (South East Irrigation Scheme and the Upper Ringarooma Irrigation Scheme)
- a preferred option study completed for a 10th scheme (Dial Blythe Irrigation Scheme)
- preferred option studies for an 11th and 12th scheme (Great Forester Brid and Southern Highlands irrigation schemes, both included in the Tranche Two submission).

In the seven schemes that have gone to the market so far, Tasmanian Irrigation has secured \$46.2 million in private investment by way of water entitlements. This is farmers and investors putting their money where their mouth is. The PPP model for infrastructure development has gained wide interest, including from New Zealand.

In April 2012, Tasmanian Irrigation was acknowledged at the Infrastructure Partnerships awards. Tasmanian Irrigation won the prestigious SMART project award and was a finalist in the government partnership category.



Broadening the agricultural canvas

The creation of water supplies in the most productive, arable regions of Tasmania maximises the retention and sustainable use of rainfall run-off that has traditionally been lost to primary production and assists in addressing climate change impacts.

Economically, this largely integrated system of schemes broadens the scope for traditional cropping and livestock production areas to allow for diversification. As importantly, and with climate change or global warming as an ally rather than a foe, irrigation broadens the canvas upon which our farmers exercise their creative minds.

The ongoing program advances the cause of water reform. The Tasmanian program demonstrates the value of the blending of public and private capital investment. It delivers tangible benefits that are visible in the landscape as well as in the financial bottom lines of the national economy and of individual agribusinesses.

It accords with Infrastructure Australia's theme of regional water reform. One of the schemes has the significant additional benefit of improving the reliability of drinking water supply for the town of Bothwell, which ran out of water during the most recent drought.

The program implements the National Water Initiative reforms through detailed planning and implementation and the creation of secure and fully tradeable water allocations.

The delivery model ensures that the schemes once constructed are self-funded through user charges. There is no public subsidy for operation or refurbishment. In 2004 COAG reaffirmed its commitment to water reform by drawing up a long-term action plan called the National Water Initiative (NWI).

The NWI strives to:

- maintain the momentum for change
 - further clarify water allocations and entitlements
- ensure the health of river and groundwater systems

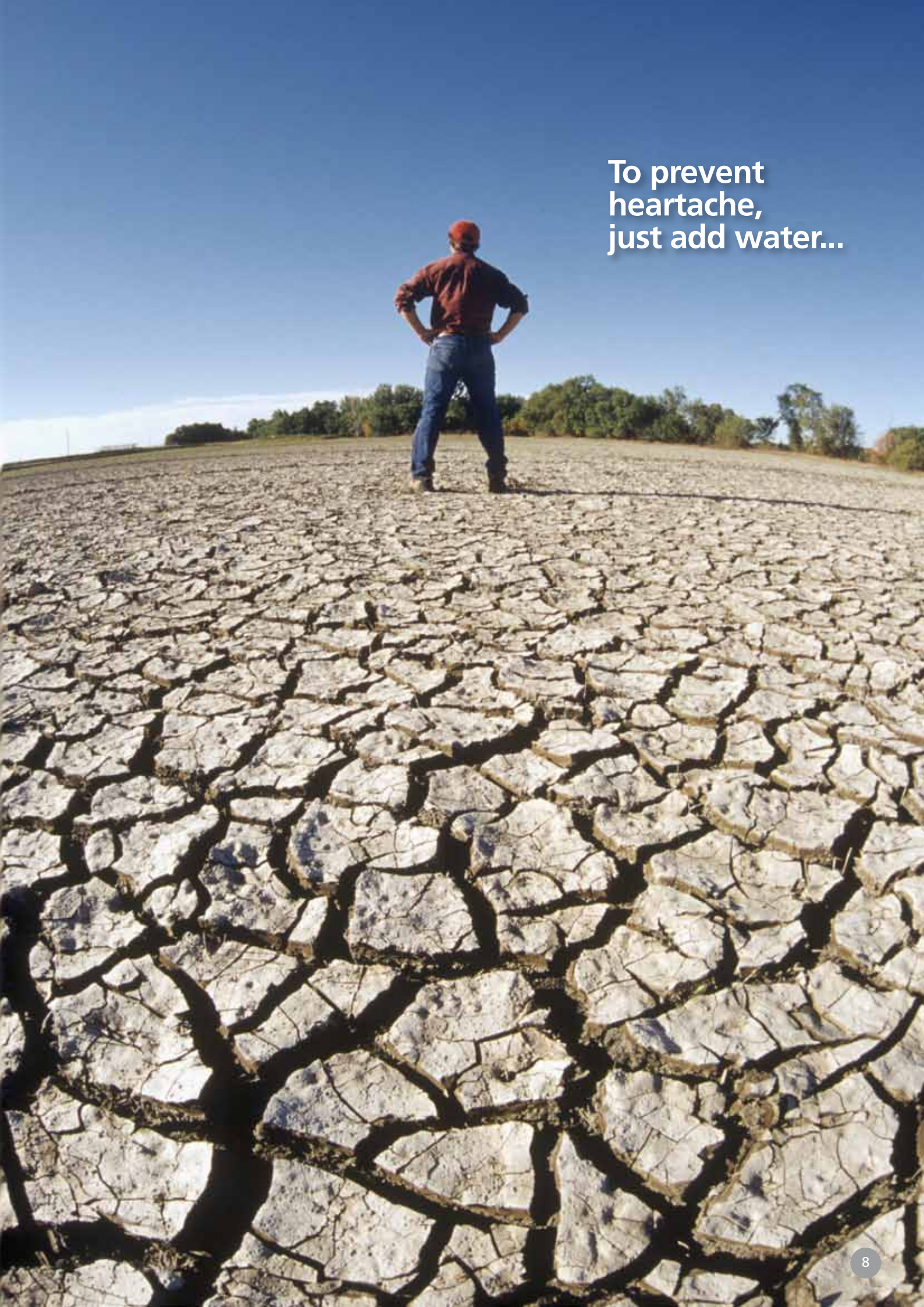
The Australian Government and all states and territories, with the exception of Western Australia, have signed on to the National Water Initiative. The objective of the NWI is to achieve a nationally compatible market, regulatory and planning based system of managing surface and groundwater resources for rural and urban use that optimises economic, social and environmental outcomes.

What this in fact means is that much needed reform in irrigation practices and water trading is now occurring on the back of the NWI and the resultant activities of Tasmanian Irrigation.

Tasmanian Irrigation has an excellent relationship with key stakeholders and, in particular, with the state Department of Primary Industries, Parks, Water and the Environment. There is strong commonality of purpose in pursuing genuine reform.



To prevent
heartache,
just add water...



A case study: Houston Farms



In 1957 Maitland and Bunty Houston migrated to Tasmania from Ireland with their six kids. They lived in shearing quarters at Ouse while Maitland and Bunty worked on a nearby dairy farm. It was not quite *Angela's Ashes*, but you get the picture.

Maitland eventually bought a small dryland farm near Hobart Airport, transferred his chooks from the Derwent Valley and sold their eggs. In 1989 the Coal River Irrigation Scheme pipeline was driven through their property. The farm, now in the hands of twins Anthony and Colin Houston, hooked into the pipe. A friend, a lettuce farmer, told the Houston boys that, with irrigation on tap, there was more money in lettuces than eggs. The Houstons started off with a patch six metres square. Today Houston's Farm sells 40,000 cases of salad leaves a week throughout Australia. They are sold through 1,200 supermarkets as well as independent grocers.

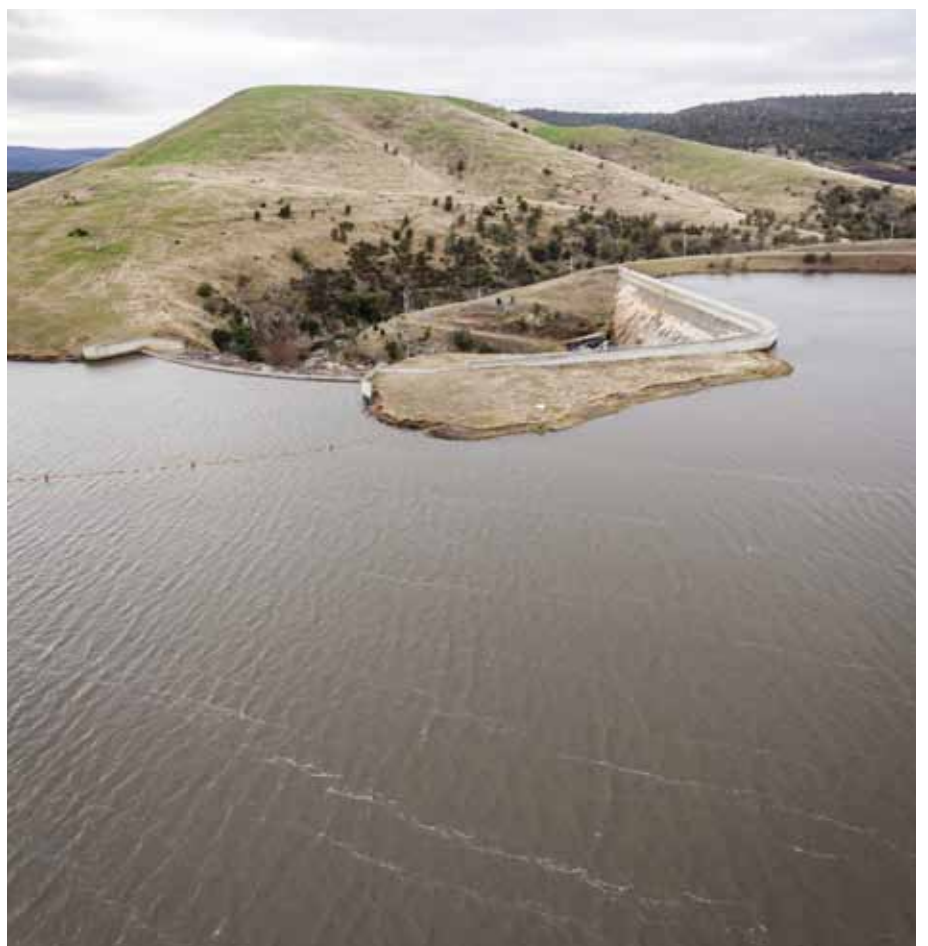
Their annual turnover is \$35 million with 175 employees. They are the major employer in their district.



THANKS TO WATER

Water on land has been the biggest advantage to the whole valley, not only this farm. It is now employing 175 people and producing around 20% of Australia's fresh baby-leafed salads.

Colin Houston



The Goal

What this is all about

Just add water... has two goals that support the State's Economic Development Plan and the Tasmanian Infrastructure Strategy:

- to deliver water efficiently, sustainably and economically to its most productive land and to its most productive use with 95 per cent surety of supply
- to maximise sustainable agricultural production for the national economic benefit and in the interests of global food security.

How it meshes with Tasmania's Economic Development Plan

In 2008 the Tasmanian Government set a new economic direction for the state. It involved innovation, skills and infrastructure strategies that included the accelerated development of rural water infrastructure and rural water reform. This food and agriculture initiative underpins the government's overarching Economic Development Plan for the state.

The essential elements of the water strategy are that water is delivered to its most productive use and it is managed commercially on real time information. The end game is to increase the productivity of arable land on the island with its associated economic benefits but with the higher objective of contributing to national and global food security in a sustainable way.

The by-products of that ethos are to focus research, encourage innovation and competition in primary production, promote skills development and to investigate fresh markets.

The story so far

The \$310 million committed in the first tranche of the irrigation program will provide more than 70,000 ML of water when those schemes are completed. That is equivalent to 28,000 Olympic-size swimming pools. Those schemes embrace the north-east and north-west of Tasmania, the midlands and the south-east, but there is more we can do.

The Second Tranche of projects covers another five regions where irrigation development is feasible and would return a positive economic benefit to Tasmania and to the nation. The Second Tranche requires a public contribution of \$130 million and private investment of \$54 million.

Table 1:
Tasmanian Irrigation –
Irrigation Development
Projects Tranche Two

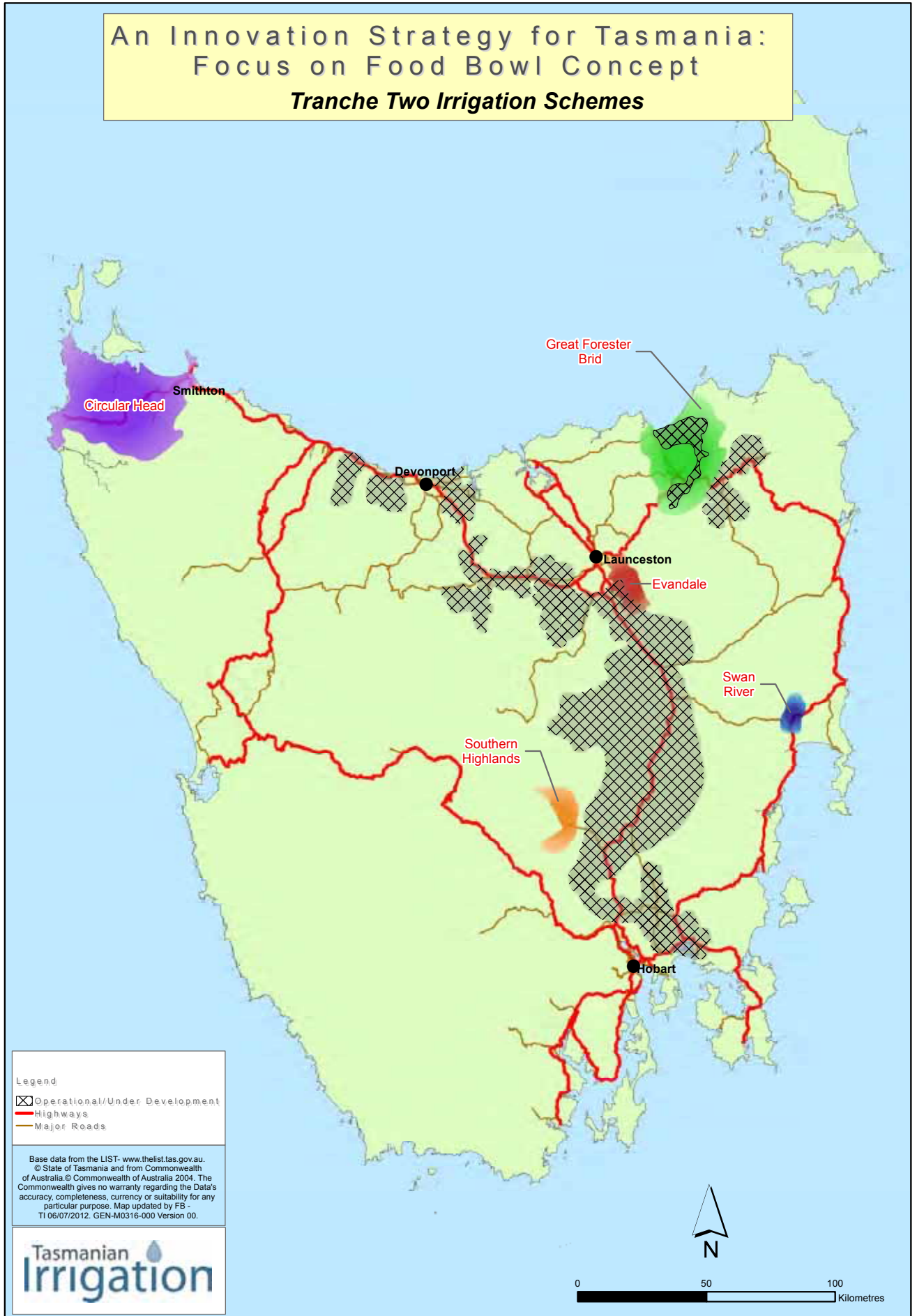
Scheme	Capital Expenditure	Public Contribution	Economic Benefit (NPV)	Benefit Cost Ratio
Great Forester–Brid Irrigation Scheme	\$46.2m	\$31.8m	\$9.4m	1.2
Southern Highlands Irrigation Scheme	\$22.5m	\$14.7m	\$14.6m	1.5
Circular Head Irrigation Scheme	\$60.7m	\$36.2m	\$50.5m	1.7
Evandale Irrigation Scheme	\$13.0m	\$9.4m	\$3.6m	1.3
Swan River Irrigation Scheme	\$12.0m	\$8.4m	\$15.5m	2.1
Project financing		\$15m		
Project management		\$14.5m		
Total	\$154.4m	\$130m		1.4

The net economic benefits (and hence the benefit cost ratio) in Table 1 are highly conservative and are based on a methodology that ensures that a base investment case is highly robust by not including "blue sky" factors. They reflect only the expansion of existing agricultural activities in a region, that is, the increased value of existing crop or livestock enterprises.



SURETY

An Innovation Strategy for Tasmania:
Focus on Food Bowl Concept
Tranche Two Irrigation Schemes



The Goal Cont.

No account or forecast has been made of new enterprises that one would expect to arise from an assured supply of water, such as the shift from low-value to high-value cropping and new enterprises. By adopting this approach, which may in fact well “undersell” the benefits of the schemes, Tasmanian Irrigation is assured that at a minimum, all schemes that reach development will have a proved and definable positive economic impact.

As well, Tasmanian Irrigation has assessed the economic benefit of each scheme on income generated at the farm gate. Each assessment does not consider the substantial economic linkages and multiplier effects post-farm gate such as manufacturing, retail and other commercial uses. The multipliers for agriculture vary significantly but are generally recognised to be in the order of two to three. That is, every dollar of agricultural output is worth \$2 or \$3 to the economy in total as a result of flow-on effects. However, this multiplier would increase with value-adding of agricultural product, notably processing. When such value-added processes are included the total value can be two to three times the initial multiplier.

Tasmanian Irrigation conservatively estimates the five proposed irrigation schemes would provide employment for more than 310 (200 on-farm and 110 indirect) full-time jobs. Most would be located in regional communities. This is particularly important at the current time where many regional communities across the state are transitioning from traditional industries such as forestry.

Table 2:
An Innovation Strategy for Tasmania:
Focus on Food Bowl Concept – Alignment
with state and national strategic plans

Strategic Plan	Initiatives
<input checked="" type="checkbox"/> National Water Initiative	<ul style="list-style-type: none"> - clear, nationally compatible characteristics for secure water access entitlements - transparent, statutory-based water planning - statutory provision for environmental and other public benefit outcomes - progressive removal of barriers to trade water - water accounting that covers planning, monitoring, trading, environmental management and on-farm management - recognises the link between surface and groundwater resources
<input checked="" type="checkbox"/> National Partnership on Water for the Future	<ul style="list-style-type: none"> - secure water supplies to adapt to climate change through efficient water use and management
<input checked="" type="checkbox"/> National Partnership Agreement on Water for the Future	<ul style="list-style-type: none"> - assist Tasmania to optimise its irrigation water use sustainably and efficiently
<input checked="" type="checkbox"/> Tasmania's Implementation Plan for the National Water Initiative	<ul style="list-style-type: none"> - expand water markets for greater permanent trade in water - promote flexible and profitable water use - increase confidence of water investors - improve water planning and accounting - improve water allocation, use and management from an environmental perspective



To ensure
food security,
just add water...

What's in this for Infrastructure Australia

Just add water... makes a positive contribution to Infrastructure Australia's strategic priorities.

By helping to provide highly reliable irrigation water in Tasmania, Infrastructure Australia is expanding the nation's agricultural capacity and productivity and creating employment opportunities in Tasmanian regional communities.

In doing that, Tasmania is able to build on its climatic advantages to produce high quality food and fibre far beyond the needs of its own population and help feed the nation.

The assessments of the world's demand for food and agricultural production to the year 2050, when the population is expected to peak at nine billion, are relatively consistent in the future. We have to increase food and animal feed production substantially to meet this resultant demand. For instance, the International Water Management Institute cites a target of between 70 and 90 per cent.

Through its irrigation program, Tasmania is positioning itself to play an increasing role in the task of feeding the world. The key to this is the combination of climate, irrigation and the high skills of our farmers.

Funding Return on Investment

The proposal will utilise the successful private public partnership approach developed and refined for the Tranche One projects.

Under this framework, irrigators typically contribute around 30 per cent of the total capital cost of projects through the sale of water entitlements. Importantly, contractual agreements, including a 10 per cent deposit, are made with growers before construction starts. A pre-determined sales threshold, typically 60-70 per cent of total water entitlements is required.

Under current and future arrangements, 100 per cent of the on-going operation, maintenance and future refurbishment costs is borne by irrigators.

The agreements with the state and federal governments require no return to be made on the initial investment. However, should a return on investment be required in the future, Tasmanian Irrigation could examine pricing options that incorporate such a return.

Any return on investment component would be built into the fixed charge component of the annual charge for irrigation water.

The requirement for a return on investment would need to be undertaken as part of the preferred option phase held before water sales in order for potential irrigators to make appropriate investment decisions. Tasmanian Irrigation would also need to examine equity implications relating to schemes developed under Tranche One and the proposed Tranche Two funding arrangements.

Social Benefits

Tasmanian Irrigation's schemes provide important social benefits to the regions in which they are located. They derive from the improvements in the economic base attributable to the schemes and include greater community resilience and ability to adapt to change, maintenance of social cohesion through maintenance of community facilities and infrastructure. Importantly, the schemes, through the provision of reliable irrigation water, minimise or avoid income and employment losses that occur during extended periods of low rainfall.



100%

**OF ON-GOING
OPERATION AND
MAINTENANCE COSTS
BORNE BY IRRIGATORS**

The Problem

So what is the problem?

In a nutshell: too much rainfall run-off is being wasted and agricultural development is suffering accordingly. As a result, the significant economic benefit and growth identified by Professor Jonathon West, of up to an additional \$5 billion, is not being achieved and is unlikely to be without reliable irrigation.

Unlike any other state, Tasmania has enough rainfall to maximise its agricultural output but most of the run-off flows into rivers and out to sea. This small island has 13 per cent of Australia's rainfall run-off but much of it is wasted. Tasmanian farms could produce more food, animal feed, pharmaceuticals and fibre if they could harness this supply of water to ensure themselves of water year round, or close to it.

Tasmanian Irrigation can do that. For a relatively low public cost, but with an appropriately serious investment by the farmers themselves, irrigation water can be on tap with at least 95 per cent reliability in the state's prime farming areas.

As we have already outlined, Tasmania is a significant food producer, significant beyond its size. Not only does it produce the range of meat, fish, vegetables, and dairy products, fruit and wine that much of the world requires, all of it is of premium quality.

It can do better than \$1.1 billion a year at the farm-gate if our farmers can maximise their potential. The numbers speak for themselves. Of that \$1.1 billion, around 60% derives from land that is irrigated, and that constitutes only eight per cent of total farmland. In other words, we are only scratching the surface of Tasmania's farmland potential.

This is because we have only just embarked on this Just add water... program, stemming the flow of water to the sea and using it.

Nevertheless, taking the \$1.1 billion as a benchmark and applying the conventional industry multiplier factors, the farm-dependent economy contributes about \$5.4 billion to gross state product. That is 18 per cent, better than one dollar in every six. Similarly, that sector of the economy accounts for 17,000 jobs, one in every six in the state.

Understandably, Tasmania wants to capitalise further on the comparative advantage that it has with the scale of its water run-off enabling us to also contribute to the successful achievement of relevant State and National strategic interests.

Farmers can't do it by themselves

Large-scale, multi-user irrigation schemes are a more efficient use of capital than the sum total of individual storage schemes on farms, but they require a public private partnership in which the public sector assists farmers to establish the schemes and their associated delivery systems and the farmers meet part of that cost as well as ongoing charges for using the water.

What happens if Tranche Two does not proceed?

The impact of not progressing with further irrigation in the state will see comparable development, particularly in the case of the proposed Circular Head project referred to below, being developed offshore. The same could well happen to Tasmania's poppy industry.

From an employment perspective, loss of jobs in regions often equates to loss of services and ultimately the loss of local communities. With the dramatic downturn in the forest industry in Tasmania, this is a very real scenario that is currently being acted out.



Tasmania's water expansion is unique in Australia because elsewhere water has been free and it has been wasted. On the mainland Federal money is put into restoring the health of rivers and in order to do that they have been buying back water. Here we are harnessing our water more efficiently and selling it.

*Water Investor
David Williams*

The modus operandi of providing irrigation schemes in Tasmania

The three hurdles

Tasmanian Irrigation has three development criteria that each scheme must meet:

One

It must be **economically viable**

Based on the region's existing agricultural activities, each scheme must show that it will generate more wealth at the farm gate than the combined costs of construction and operation. Otherwise, it doesn't get to first base.

Two

It must be **environmentally sustainable**

The water resource and the irrigation infrastructure must harmonise with the landscape, Tasmania's greatest asset. Tasmanian Irrigation's demands exceed the requirements of local, state and national regulations. Scheme hydrology, for instance, is tested against the CSIRO's future climate models.

Water can only be applied to the land according to an approved farm water access plan that has water, soil and biodiversity modules.

Three

There has to be a **social licence**

That means the local community supports it. Tasmanian Irrigation sits on the same side of the table as the community it partners. If a community does not want a scheme, Tasmanian Irrigation does not seek to coerce.

Tasmanian Irrigation's development phases

There are five phases of development for any scheme:

- Prefeasibility
- Feasibility
- Detailed design and approvals
- Construction
- Operation

In the prefeasibility stage, Tasmanian Irrigation defines a preferred option for a scheme. The Tasmanian Government must approve the preferred option to allow a business case to be prepared. In many senses it is the critical phase because it requires:

- public meetings to establish local irrigator groups under the auspices of the Tasmanian Farmers and Graziers Association
- expressions of interest by irrigators for water entitlements
- preliminary assessments of land capability, pipeline alignments and dam sites
- a basic design
- engagement of the representative irrigator groups in the concept
- detailed feasibility studies that include environmental flows, stream geomorphology, hydrology (including sustainable yield impacts), flora and fauna, cultural heritage and geotechnical
- preliminary engineering design and cost estimates
- a socio-economic report.

In the feasibility stage, the business case is progressed to the point where the government may approve it with set conditions following a period of public consultation.

Once the detailed design is complete, state and local governments must approve its construction.

viable + sustainable + supported



To inspire
innovation,
just add water...

Crunching the numbers

Here we outline how Tasmanian Irrigation evaluates a scheme. In the next section we set out the separate evaluations for each of the five schemes in Tasmanian Irrigation's Tranche Two irrigation projects.

How we evaluate an irrigation scheme

Each scheme is subjected to a detailed economic assessment where the main economic outcomes expected from the completed scheme are analysed and the risks quantified. The benefits stream and full life-cycle costs are examined and if the difference between the two is positive, the project is deemed to deliver net benefits to Tasmania and Australia.

Tasmanian Irrigation commissioned financial and economic consultants Marsden Jacobs Associates to review the methodology of assessing the socio-economic values of new irrigation schemes. Their report describes all stages of a comprehensive socio-economic assessment, from data collection to financial and economic modelling of the scheme's performance. It also offers a basis for a scheme's demographic profiling. A copy of the Marsden Jacobs Associates' socio-economic assessment methodology is in Appendix 6.

Estimates of economic cost

The economic cost of a project includes:

- capital costs of the project plus capital costs associated with the on-farm developments including irrigation layouts, plant and equipment, packing sheds, and other infrastructure
- its operating, maintenance, administration and refurbishment costs, regulatory, licensing and compliance costs
- increase in operating costs of irrigators and primary processors
- loss of income from "without case" (i.e., the situation without the project proceeding)
- environmental impacts (to the extent that a monetary value can be estimated).

Capital development costs

The capital development cost estimate derives from engineering cost data reported in the planning documents that are commissioned in the feasibility and pre-feasibility assessments.

Items assessed in the capital development cost estimate include pipelines, dams, mini-hydro scheme add-ons, pump stations, land purchases, compensation, fittings, planning and design and a level of contingency.

The level of contingency is consistent with recommendations in professional standards for engineers. The capital costs associated with the on-farm developments are incorporated within the estimates for the enterprise margins and are based on current commercial costs provided by leading agricultural advisors.

Operating costs

Operating costs consist of variable (pumping costs, water purchase) and fixed (scheme management, overheads and maintenance, asset refurbishment) costs.

Asset refurbishment and maintenance

These estimates are often presented as an annual equivalent amount and expressed as a percentage of the capital cost (e.g., one per cent of the purchase price of pumps, and 0.5 per cent for pipes). Alternatively, these costs can be directly included in the cost model by identifying the forecast timing and value of the cost. The former method, while less precise, is often preferred, given the uncertainty about the future maintenance and refurbishment schedule.

The Evaluation Cont.

Economic benefit estimates

An irrigation scheme may have a number of direct economic benefits attributable to it:

- the returns to irrigators represented by estimated margins per ML for the principal crop and livestock enterprises
- returns for mini-hydro stations.

There may also be economic benefits associated with recreational uses of water supplies and positive environmental impacts.

Enterprise margins

Margins, expressed as dollars per ML, represent the economic value of water to irrigators (or other consumptive uses), and are specific to the type of crop or consumptive use.

We calculate an enterprise margin using an economic model of a farm enterprise to produce an estimate of farm profits (net of all capital costs). This profit can be expressed as a profit per hectare (say, \$1,000 per ha for crop A) and, in turn, the margin per ML can be estimated. If crop A requires 5 ML per annum, then the margin for crop A is \$200 per ML.

The enterprise mix and farm margins for each supply zone are used to estimate the weighted average farm margin that is used to estimate the benefits from use of water in the economic model. Experienced agricultural advisors using current actual costs derived from client records develop these enterprise models.

Adjustments to margins include:

- the capital cost of developing irrigation and other infrastructure
- the cost of on-farm storages.

In addition, the dryland returns must be deducted, as the aim is to determine the benefit from using water that can only be realised if water is supplied.

Demand estimate

For each irrigation scheme, a standard demand assessment is undertaken reviewing land capability, existing water supplies, farm surveys and economic returns from irrigation enterprises suited to the region. The demand assessment will provide an estimate of:

- the total volumetric demand for a region
- the rate of up-take (water entitlements and usage) and
- the key risk factors that could lead to either the sale of water rights or the overall usage level being less than predicted.

The demand up-take rate impacts significantly on the present value estimate of each irrigation scheme's benefits and costs. A slow up-take rate in terms of the usage of water entitlements impacts the economic performance of the scheme as this determines the rate at which economic benefits (or margins) from water use are achieved.

It is predicted water usage up-take will be most rapid where irrigators already have irrigation skills, existing infrastructure and equipment. If there are high levels of latent demand and strong demand relative to the overall volume of new water, then it is reasonable to expect a rapid up-take rate. An element of judgement will be required about the up-take rate.

However, indications of high up-take rate include:

- high volumetric demand relative to scheme capacity
- high-value crops
- well-established irrigation areas/skills
- availability of capital (if farmers have low debt levels this may reduce inertia in the up-take rate).

Other issues to take into account in assessing the up-take rate include:

- attitudes to irrigation – some graziers may prefer not to switch to irrigation. This issue can be overcome by operators with irrigation skills leasing land from graziers. However, in some cases, the switch to irrigation may not occur until the property is sold. The higher returns from irrigation are factored into the purchase price and the new owner will generally need to move into irrigation to achieve a reasonable return on the investment
- indicative sale price for water entitlements (impacts up-take of water entitlements)
- indicative annual water charges (impacts usage up-take rate).

Assumptions and parameters

For the economic evaluation, a standard government discount rate for project evaluation is applied – typically six per cent.

Tasmanian Irrigation undertakes its economic assessment assuming a 40-year evaluation period.

Each assessment includes a range of sensitivity tests on key variables of the analysis.

Typically, these sensitivity tests include:

- capital development costs (+/-10%)
- operating costs (+/-10%)
- enterprise margins (+/-10%)
- discount rate (5%, 7%)
- demand sensitivities (slow up-take, rapid up-take).

For some projects, there may be other relevant sensitivity tests that should be undertaken. For example, if a mini hydro scheme is included, the economic costs and benefits of including the scheme should be assessed for a range of throughput volumes and electricity prices.

Threshold analysis may also be undertaken for an irrigation project. This involves calculating the amount by which economic model variables can change before the project is no longer economically viable or generates net economic losses. This is an important part of the analysis because it informs us about the economic risks of the project.

The established bottom line

The precedent of the 10 nominated projects in Tranche One gives an insight into the likely economic impacts of those in Tranche Two.

The \$140 million Australian government expenditure in Tranche One activated total direct capital expenditure of \$575 million: \$310 million on actual project construction and \$288 million on on-farm capital expenditure. This, in turn, is expected to induce a further economic stimulus of at least \$288 million, assuming a multiplier of 1.5, that is, economic activity created by the supply of construction materials, transport, and hospitality services during the construction phase.

On an annual basis, the federal funding is equivalent to \$8.4 million (\$140m at 6% over 40 years) and provides direct net economic benefits to Tasmania of about \$20 million annually. Indirect or flow-on benefits would contribute a further \$10 to \$20 million annually to the state's economy.

However, such estimates are considered conservative as they are largely based on an assumed expansion of existing enterprises.

Over time, the availability of reliable irrigation water across geographically different regions of Tasmania provides the foundation for Tasmanian agriculture to evolve from traditional agricultural enterprises such as dairying, livestock, poppies, processed vegetables, cereals into development of niche, high-value enterprises with targeted markets.

This evolution has commenced already, evidenced by the state's reputation for premium sparkling and cool climate wines, speciality cheeses, and salad vegetables, stone fruit and berry-fruit production.

The South East Irrigation Scheme (SEIS) and Dial Blythe Irrigation Scheme (DBIS) to be developed under the Tranche One funding will enable significant expansion of fresh salad vegetables production in the south-east and berry fruit production in the north-west. Such developments typically involve significant on-farm capital expenditure on irrigation infrastructure, plant and equipment, cool stores and packaging facilities of the order of \$50,000 to \$80,000/ha. A high proportion of this expenditure is spent in Tasmania, providing an important stimulus for the state's economy during the construction/development phase of the schemes.

Moreover, such developments are more labour intensive than traditional enterprises. For example, the SEIS is estimated to result in an additional direct employment of about 370 FTEs, equivalent to 1 FTE for every 14 ML of entitlement. For the DBIS, direct additional employment of about 70 FTEs is estimated as 1 FTE for every 40 ML of entitlement. Indirect employment in upstream and downstream activities is likely to add at least half to one FTE for each direct FTE employed.

While the direct economic benefits of these speciality, niche enterprises are high, e.g., net margins of \$1700/ML for fresh vegetables and \$2360/ML for berry fruit compared to \$400/ML for dairy to \$650/ML for poppies, the indirect or flow-on economic impacts are also much higher due to:

- the higher demand for downstream goods and services including packaging materials, specialised transportation services, marketing and point-of-sale material
- the higher demand for upstream goods and services including specialist technical (irrigation and agronomic) and financial services
- income effects as a consequence of the higher employment requirements with a high proportion of employee wages spent directly in the immediate local and regional economies, further stimulating the provision of goods and services in these regions.

A case study: Rob and Jo Bradley



Photo: Chris Crerar

Rob and Jo Bradley are farming 1200 ha on two properties, Woollen Park and Rosemount, the amalgam of several former sheep properties in the Longford–Cressy area. In 2009 Rob won a Nuffield scholarship that took him to the US and the UK to investigate how to integrate livestock and pasture into an irrigated cropping system that would improve soil quality and deliver a profitable and sustainable farming enterprise.

“What I found was that we are one of the only places in the world that does mixed cropping, in terms of mixing livestock and crops, and that our livestock operations provide enormous opportunity to improve and maintain our soils in good condition so as to be able to continue to crop them.”

Both the Bradley properties are on the Cressy–Longford Irrigation Scheme. Their pivot irrigators have revolutionised what they can do.

“They are a wonderful tool. It means that we can crop in the spring and summer when water is vital for germination.

“We will continue to develop our irrigation. There is a lot of development work still to do and we will continue to improve our cropping mix so that we have high-value crops and a pasture phase.”

We will continue to develop our irrigation. There is a lot of development work still to do and we will continue to improve our cropping mix so that we have high-value crops and a pasture phase.
Rob and Jo Bradley





To build healthy communities,
just add water...

Great Forester–Brid Irrigation Scheme

Project summary

The Great Forester–Brid Irrigation Scheme (GFBIS) is a 9,300 ML dam on Camden Rivulet, 18 km south of Scottsdale in north-east Tasmania.

The scheme would give a significant and enduring socio-economic boost to the region. It has lost primary product processing facilities in the past 10 years and suffered the virtual closure of its forest industry, including the loss of Scottsdale's two softwood sawmills.

The project would deliver 8,600 ML a year (before transmission losses) to be applied to dairying, cropping, vegetable production and some livestock finishing. The direct (on-farm) employment boost is estimated to be 42 full-time equivalents with a further 21 indirect jobs.

The dam will fill with winter flows from the Camden Rivulet, which are surplus to environmental and water licence requirements. A two-way pipeline from the dam to a pump station located on the St Patricks River will enable supplementary filling of the dam using surplus winter flows. This will meet Tasmanian Irrigation's objective of 95 per cent average reliability of supply.

During the summer irrigation season, water from the dam will be released via the two-way pipeline to the St Patricks River pump station. That will pump water over a 50-metre rise before descending 300 metres to a 2,000 KW mini-hydro power station located immediately above the existing Headquarters Road Dam.

Water will be discharged from the mini-hydro station into Headquarters Road Dam, which will act as a balancing storage and header tank. From Headquarters Road Dam water will be supplied to irrigators at Scottsdale, Springfield and Waterhouse.

Scheme details

scheme capacity (water entitlements)	8600
scheme delivery (ML)	8222
years of operation for full up-take (usage)	5

Scheme benefits and costs assessment

feasibility expenditure (business case)	\$1.1m
detailed design and approvals expenditure (ready to construct)	\$0.9m
construction expenditure	\$42.2m
total capital expenditure	\$46.2m
annual variable and fixed operating expenditure	\$0.8m
enterprise net margins (weighted average)	\$530/ML

Economic assessment and sensitivity analysis

	Economic benefit (NPV)	Benefit cost ratio
base case	\$9.4m	1.2
increase in capital expenditure (+10 per cent)	\$4.9m	1.1
decrease in capital expenditure (-10 per cent)	\$14.0m	1.3
increase in operating expenditure (+10 per cent)	\$9.1m	1.2
decrease in operating expenditure (-10 per cent)	\$9.8m	1.2
increase in enterprise margins (+10 per cent)	\$14.9m	1.3
decrease in enterprise margins (-10 per cent)	\$3.9m	1.1
discount rate – 5 per cent	\$17.2m	1.3
discount rate – 7 per cent	\$3.3m	1.1
slow demand – water usage	\$7.6m	1.1
fast demand – water usage	\$10.5m	1.2

Project status

A detailed preferred option of the GFBIS has been developed including detailed capital expenditure estimates, demand assessment and an economic analysis, but has not yet been submitted to the Tasmanian Government for consideration and endorsement. The preferred option is located in Appendix 1.2 of this submission.

To progress the GFBIS to a construction-ready position, a 12-month detailed design and approvals process is required, costing \$2 million.

Construction time is two years.

Southern Highlands Irrigation Scheme

Project summary

The Southern Highlands Irrigation Scheme (SHIS) is to deliver 6500 ML of high reliability, summer irrigation water to the greater Bothwell region in the southern central highlands.

This \$22.5 million project is designed to deliver summer water to a region held back by a lack of reliable water. It can serve 8000 ha of farm land that experiences highly variable water availability. The water will be used primarily for cropping, especially poppy opiates, and irrigated grazing with the potential to convert to dairying. At the time of writing, the Australian and Tasmanian governments were considering allowing the import of poppy straw to maintain local production of opiates.

The project is designed to capture winter flows from the Shannon River in a dam with 6500 ML storage. This water will be supplied during summer to irrigators through a 32.5 km pipeline network.

This scheme was previously named the Shannon Clyde Irrigation Scheme (SCIS). It began in 2009. A business case was submitted to the Tasmanian Irrigation Development Board (now Tasmanian Irrigation) in 2010. For a number of reasons, the project was parked. Following the resolution of the external factors, Tasmanian Irrigation revisited the project and undertook a desktop review that resulted in the latest concept.

The project has the significant additional benefit of improving the reliability of drinking water supply for the town of Bothwell, which ran out of water during the most recent drought.

Scheme details		Economic assessment and sensitivity analysis		Economic benefit (NPV)	Benefit cost ratio
scheme capacity (water entitlements)	6500	base case		\$14.6m	1.5
scheme delivery (ML)	6500	increase in capital expenditure (+10 per cent)		\$12.3m	1.4
years of operation for full up-take (usage)	3	decrease in capital expenditure (-10 per cent)		\$16.9m	1.6
		increase in operating expenditure (+10 per cent)		\$13.8m	1.5
		decrease in operating expenditure (-10 per cent)		\$15.5m	1.5
		increase in enterprise margins (+10 per cent)		\$19.0m	1.6
		decrease in enterprise margins (-10 per cent)		\$10.2m	1.3
		discount rate – 5 per cent		\$23.7m	1.8
		discount rate – 7 per cent		\$7.3m	1.3
		slow demand – water usage		\$13.9m	1.5
		fast demand – water usage		\$15.0m	1.5
		no supply from Great Lake		\$11.1m	1.4
Scheme benefits and costs assessment					
feasibility expenditure (business case)	\$1.0m				
detailed design and approvals expenditure (ready to construct)	\$0.6m				
construction expenditure	\$20.9m				
total capital expenditure	\$22.6m				
annual variable and fixed operating expenditure	\$0.5m				
enterprise net margins (weighted average)	\$392/ML				

Project status

There is a detailed preferred option of the SHIS, including detailed capital expenditure estimates, demand assessment and an economic analysis. At the time of writing, this is under consideration by the Tasmanian Government. The detail preferred option is located in Appendix 1.3 of this submission.

To progress the SHIS to a construction-ready position, a 12-month detailed design and approvals process is required, costing \$1.8 million.

Construction time is 18 months.

Circular Head Irrigation Scheme

Project summary

The Circular Head Irrigation Scheme (CHIS) will deliver 20,000 ML of high surety summer irrigation water to Tasmania's far north-west.

It integrates with two large-scale private investments worth \$250 million in downstream processing of dairy produce and also with State priority projects that are being funded by the Federal Government under the Tasmanian Forest Agreement.

Under the dairy initiatives, Tasmania's annual milk production will rise in the next five years from 730 million litres to more than one billion litres. Responding to the risk that demand and downstream processing capacity will outstrip supply, the Australian Government is providing \$1.5 million to upgrade power supplies in the far north-west to allow lower-value beef production farms to convert to high-value, labour-intensive dairy production.

The proposed irrigation scheme will take 20,000 ML from the Arthur River and deliver it to the upper reaches of the Duck, Montague and Welcome Rivers. Included in the project is a 15,000 ML off-river storage for harvesting winter flows for use in the summer.

The project will support between 30,000 and 40,000 additional cows at 30 new dairies with an average on-farm employment requirement of five full-time positions per dairy (150 direct full time positions in total). The flow-on benefits from new dairies are considerable. The average capital investment for a 1000-cow dairy is \$7 million.

Scheme details		Economic assessment and sensitivity analysis		Economic benefit (NPV)	Benefit cost ratio
scheme capacity (water entitlements)	20000	base case		\$50.5m	1.7
scheme delivery (ML)	19000	increase in capital expenditure (+10 per cent)		\$44.7m	1.6
years of operation for full up-take (usage)	5	decrease in capital expenditure (-10 per cent)		\$56.3m	1.9
		increase in operating expenditure (+10 per cent)		\$48.5m	1.7
		decrease in operating expenditure (-10 per cent)		\$52.2m	1.8
		increase in enterprise margins (+10 per cent)		\$62.4m	1.9
		decrease in enterprise margins (-10 per cent)		\$38.6m	1.6
		discount rate – 5 per cent		\$67.1m	1.9
		discount rate – 7 per cent		\$37.3m	1.6
		slow demand – water usage		\$44.0m	1.6
		fast demand – water usage		\$61.4m	1.9
Scheme benefits and costs assessment					
feasibility expenditure (business case)	\$0.7m				
detailed design and approvals expenditure (ready to construct)	\$2.3m				
construction expenditure	\$53.7m				
total capital expenditure	\$60.7m				
annual variable and fixed operating expenditure	\$1.3m				
enterprise net margins (weighted average)	\$530/ML				

Project status

The analysis of the potential irrigation development opportunities for the CHIS has been completed, including examining its water sources, infrastructure requirements and capital expenditure estimates, but has not yet been submitted to the Tasmanian Government for consideration and endorsement. This report is in Appendix 1.4 of this submission.

To progress the CHIS to a construction-ready position will require an 18-month detailed design and approvals process costing \$3 million.

Construction time is two years

Evandale Irrigation Scheme

Project summary

The proposed Evandale Irrigation Scheme is yet to be fully scoped.

The Evandale region is located to the east of Launceston, near the airport. It is a productive agricultural area with diverse enterprises including cereals, seed production, poppies and potatoes. Summer irrigation water would provide enhanced security for existing irrigated enterprises within the region. At the time of writing, the Australian and Tasmanian governments were considering allowing the import of poppy straw to maintain local production of opiates. The economic benefits listed in the table are estimates.

Scheme details		Economic assessment and sensitivity analysis		Economic benefit (NPV)	Benefit cost ratio
scheme capacity (water entitlements)	3000	base case		\$3.8m	1.3
scheme delivery (ML)	2850	increase in capital expenditure (+10 per cent)		\$2.4m	1.2
years of operation for full up-take (usage)	3	decrease in capital expenditure (-10 per cent)		\$4.8m	1.4
		increase in operating expenditure (+10 per cent)		\$3.5m	1.2
		decrease in operating expenditure (-10 per cent)		\$3.7m	1.3
		increase in enterprise margins (+10 per cent)		\$5.4m	1.4
		decrease in enterprise margins (-10 per cent)		\$1.8m	1.1
		discount rate – 5 per cent		\$5.8m	1.4
		discount rate – 7 per cent		\$1.8m	1.1
		slow demand – water usage		\$3.4m	1.2
		fast demand – water usage		\$4.0m	1.3
Scheme benefits and costs assessment					
feasibility expenditure (business case)	\$0.4m				
detailed design and approvals expenditure (ready to construct)	\$0.7m				
construction expenditure	\$11.9m				
total capital expenditure	\$13.0m				
annual variable and fixed operating expenditure	\$0.2m				
enterprise net margins (weighted average)	\$490/ML				

Project status

To progress the Evandale Irrigation Scheme to a construction-ready position, a two-year detailed design and approvals process is required, costing \$1.1 million. The scheme has strong community support.

Construction time is 12 months.

Swan River Irrigation Scheme

Project summary

The proposed irrigation scheme for the Swan River is yet to be fully scoped.

The Swan River is on Tasmania's east coast. It is a grazing, irrigated cropping, walnut farming and grape production area. There are outstanding prospects for the wine industry.

The region has had a history of ongoing droughts. They are of major concern to the local farming communities. Irrigation development here would provide long-term water surety. The economic benefits listed in the table are estimates.

Scheme details		Economic assessment and sensitivity analysis		Economic benefit (NPV)	Benefit cost ratio
scheme capacity (water entitlements)	3000	base case		\$15.5m	2.1
scheme delivery (ML)	2850	increase in capital expenditure (+10 per cent)		\$14.4m	2.0
years of operation for full up-take (usage)	3	decrease in capital expenditure (-10 per cent)		\$16.7m	2.3
		increase in operating expenditure (+10 per cent)		\$15.4m	2.1
		decrease in operating expenditure (-10 per cent)		\$15.7m	2.2
		increase in enterprise margins (+10 per cent)		\$18.5m	2.3
		decrease in enterprise margins (-10 per cent)		\$12.6m	1.9
		discount rate – 5 per cent		\$19.6m	2.4
		discount rate – 7 per cent		\$12.3m	1.9
		slow demand – water usage		\$14.3m	2.0
		fast demand – water usage		\$16.0m	2.2
Scheme benefits and costs assessment					
feasibility expenditure (business case)	\$0.4m				
detailed design and approvals expenditure (ready to construct)	\$0.6m				
construction expenditure	\$11.0m				
total capital expenditure	\$12.0m				
annual variable and fixed operating expenditure	\$0.2m				
enterprise net margins (weighted average)	\$800/ML				

Project status

To progress the Swan River Irrigation Scheme to a construction-ready position, a two-year detailed design and approvals process is required, costing \$1.0 million.

Construction would take 12 months.