Australian Bureau of Statistics

Water Accounts

Worked examples of the physical supply use tables for water

Presented by:
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Physical supply and use tables

Table III.1
Standard physical supply and use tables for water

A. Physical use table (*physical units*)		Industries (by ISIC category)							Households	Rest of the world	Total
		1-3	5-33, 41-43	35	36	37	38, 39, 45-99	Total			
From the environment	**1. Total abstraction (= 1.a + 1.b = 1.i + 1.ii)**										
	1.a. Abstraction for own use										
	1.b. Abstraction for distribution										
	1.i. From inland water resources:										
	1.i.1. Surface water										
	1.i.2. Groundwater										
	1.i.3. Soil water										
	1.ii. Collection of precipitation										
	1.iii. Abstraction from the sea										
Within the economy	**2. Use of water received from other economic units** *of which:*										
	2.a. Reused water										
	2.b. Wastewater to sewerage										
	3. Total use of water (= 1 + 2)										

Physical supply and use tables

B. Physical supply table (*physical units*)		Industries (by ISIC category)							Households	Rest of the world	Total
		1-3	5-33, 41-43	35	36	37	38, 39, 45-99	Total			
Within the economy	4. Supply of water to other economic units										
	of which:										
	4.a. Reused water										
	4.b. Wastewater to sewerage										
Into the environment	5. Total returns (= 5.a + 5.b)										
	5.a. To inland water resources										
	5.a.1. Surface water										
	5.a.2. Groundwater										
	5.a.3. Soil water										
	5.b. To other sources (e.g., sea water)										
	6. Total supply of water (= 4 + 5)										
	7. Consumption (= 3 - 6)										

Note: Dark grey cells indicate zero entries by definition.

Group Activity

Getting started

Let us look at the water supply in three cities inside the Republic of Blue:

- information is provided in the handout
- diagrams showing flows between industries and sectors is also provided in the handout

Group Activity

Getting started

- Water 'users' are institutional units that use water i.e. households, agriculture etc. (but the 'environment' is not a 'water user')

- ISIC = International Standard Industry Classification. However, in the workshop exercises a descriptive title is also provided for each industry…

Group Activity

Getting started

Water can be obtained through:

- 'abstraction' – i.e. extracted from the environment; or
- 'received water' i.e. from other economic units

Water may be abstracted for:

- 'own use'; or
- 'distribution' i.e. it is extracted for the purpose of supplying to another unit

Group Activity

Getting started

Water use is a gross concept referring to a flow between two industries or units.

Water consumption is a net concept referring to water that has been:

(a) resupplied to another industry like the Sewerage industry (ISIC 37)

(b) returned to the environment

(c) incorporated into products.

The water in question may have evaporated or transpired.

Group Activity

Getting started

- Water 'from the environment' = water from a river etc. rather than from an institutional unit

- Water 'within the economy' = water involving transactions between institutional units e.g. a water supplier sells water to an agricultural unit.

Group Activity

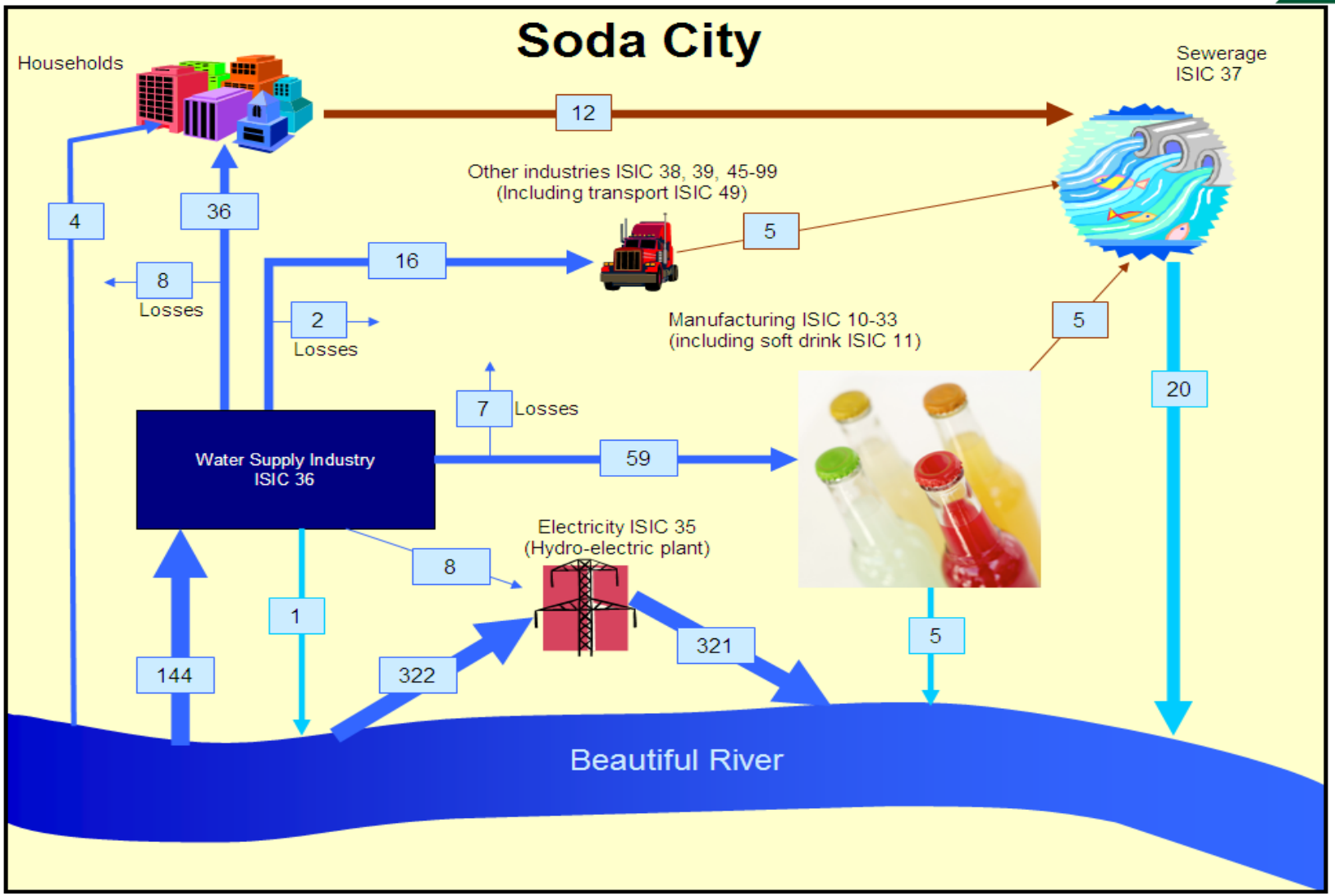
Getting started

- Water consumption defined:
  - 'the water that is evaporated, transpired or incorporated into products'

- Water 'use' is water received by an institutional unit, either:
  - from another unit; or
  - extracted/abstracted directly from the environment

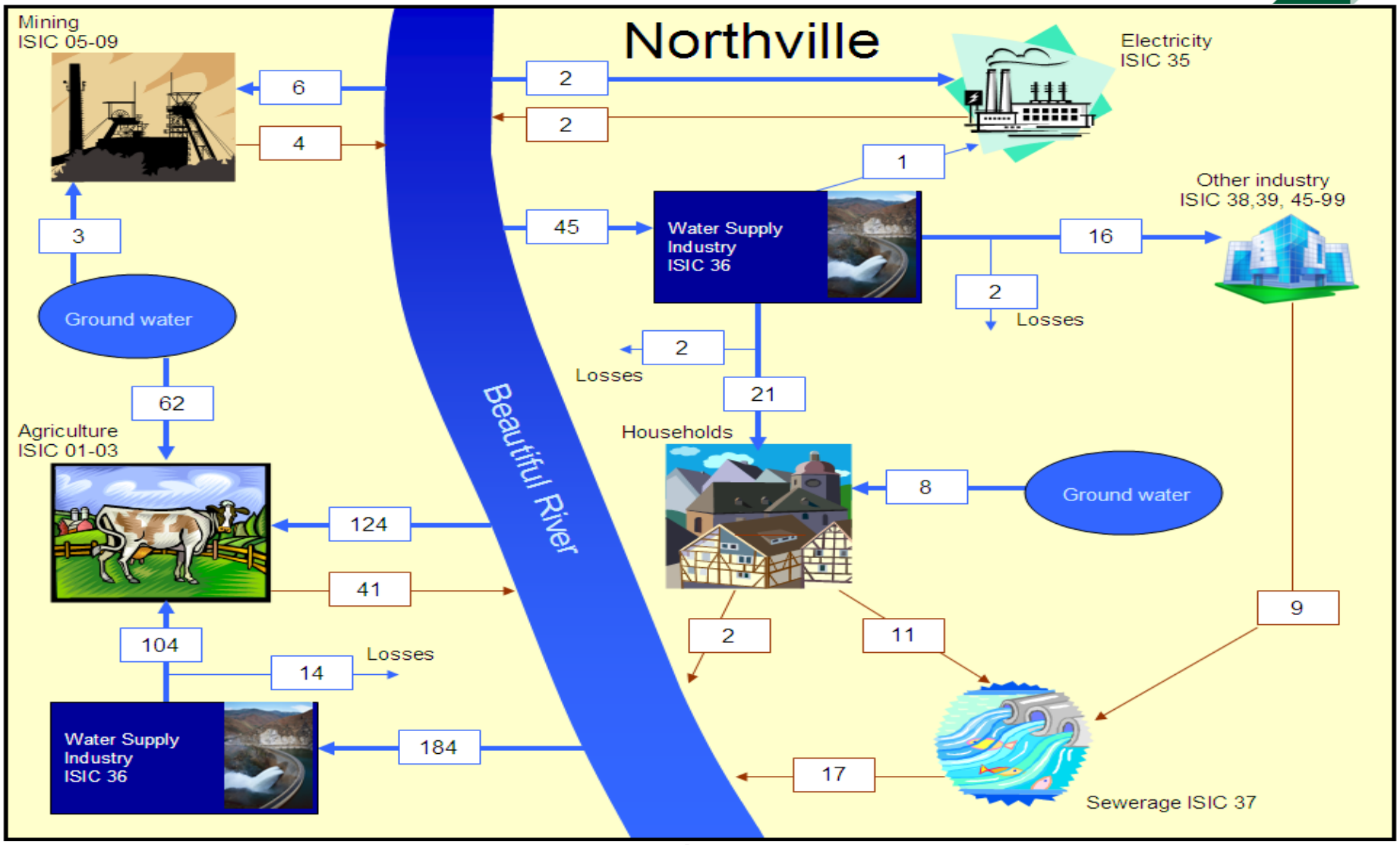
Group Activity

Republic of Blue – Soda City



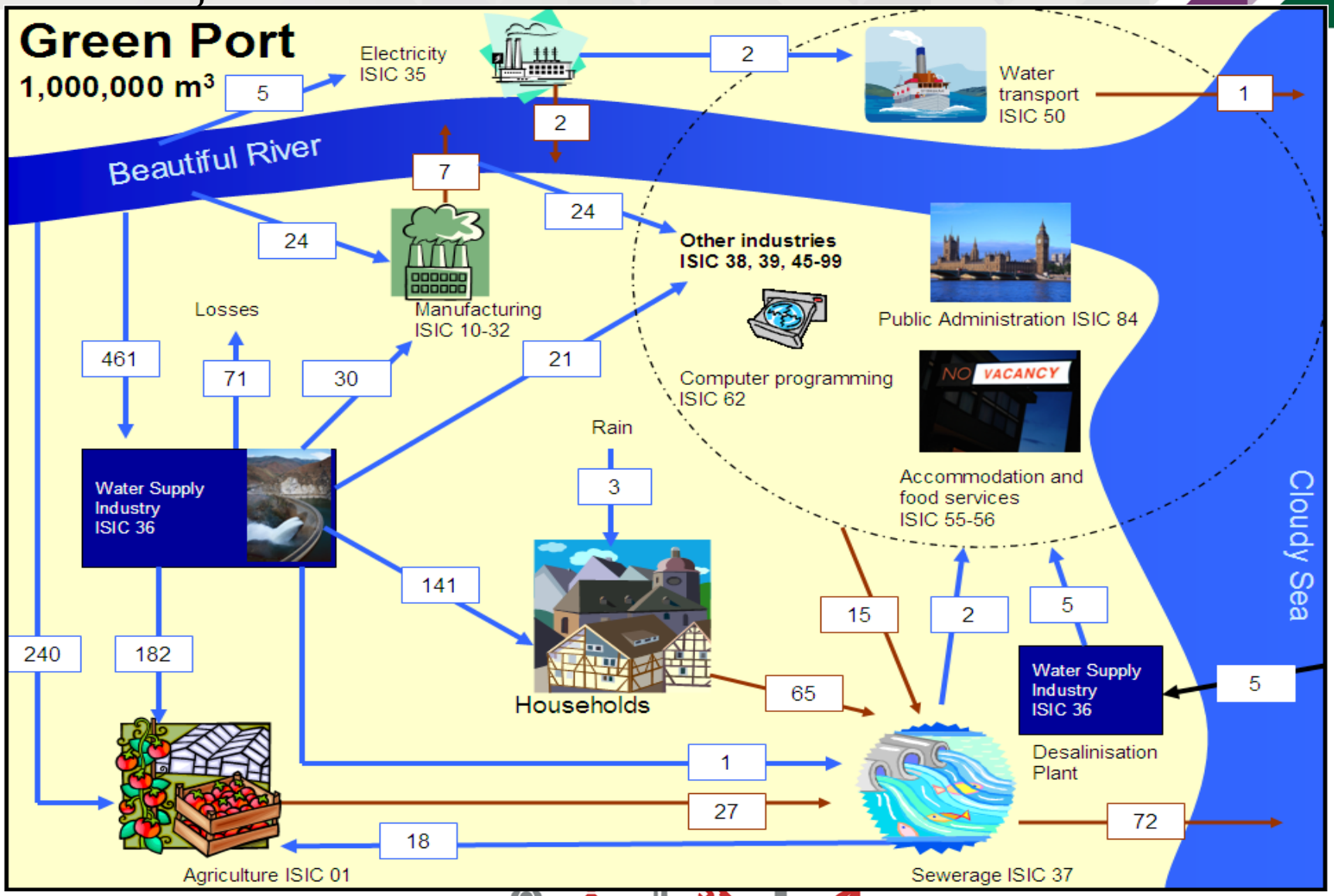
Group Activity

Republic of Blue – Northville



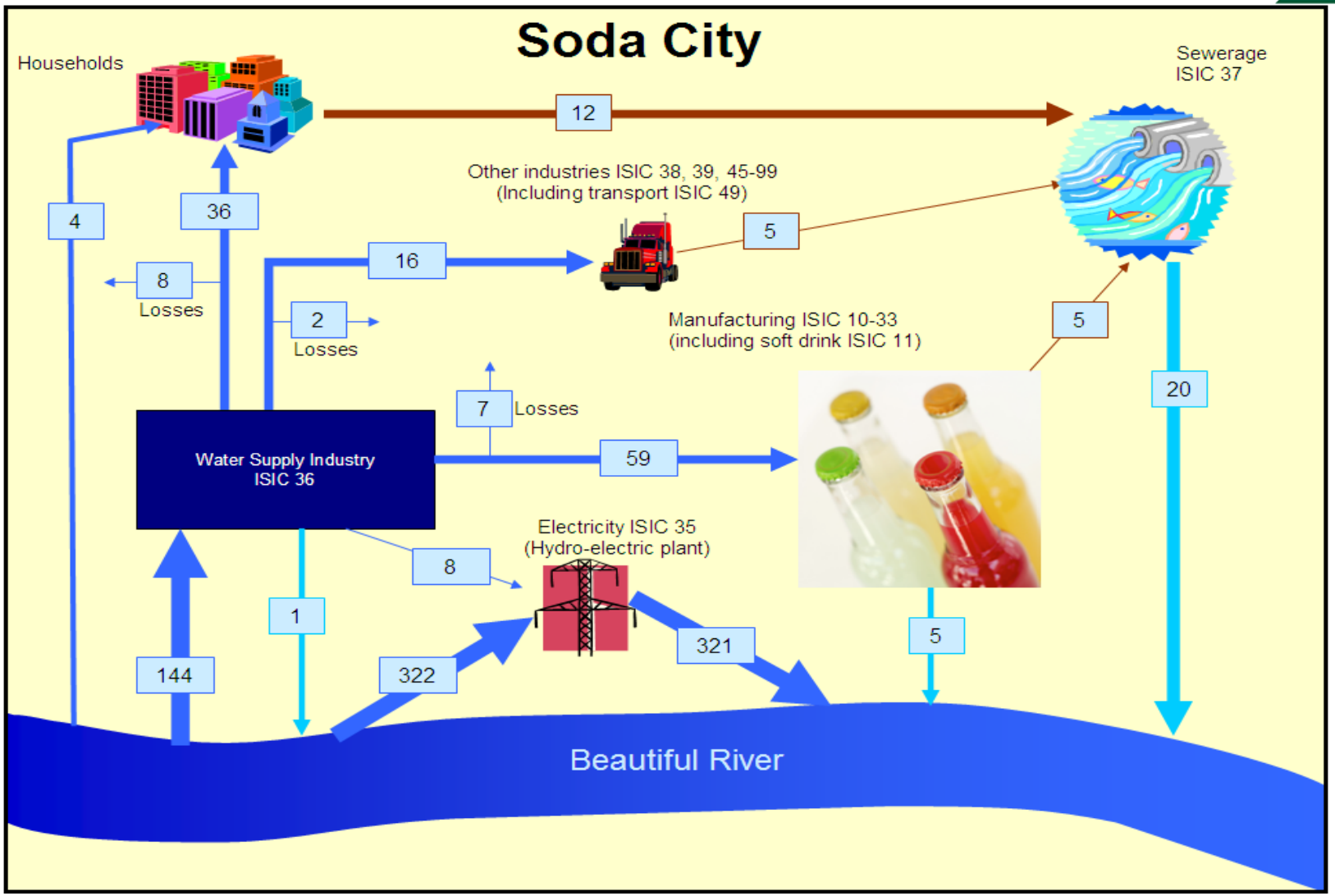
Group Activity

Republic of Blue – Green Port



Exercise 1

Republic of Blue – Soda City



Questions

Republic of Blue – Soda City

1. How much water does the electricity industry (ISIC 35) abstract from the environment?

2. How much water do households receive from other economic units?

3. How much water does the water supply industry (ISIC 36) distribute to users?

Questions

Republic of Blue – Soda City

4. How much water do the 'other industries (ISIC 38, 39, 45-99) return to the environment?

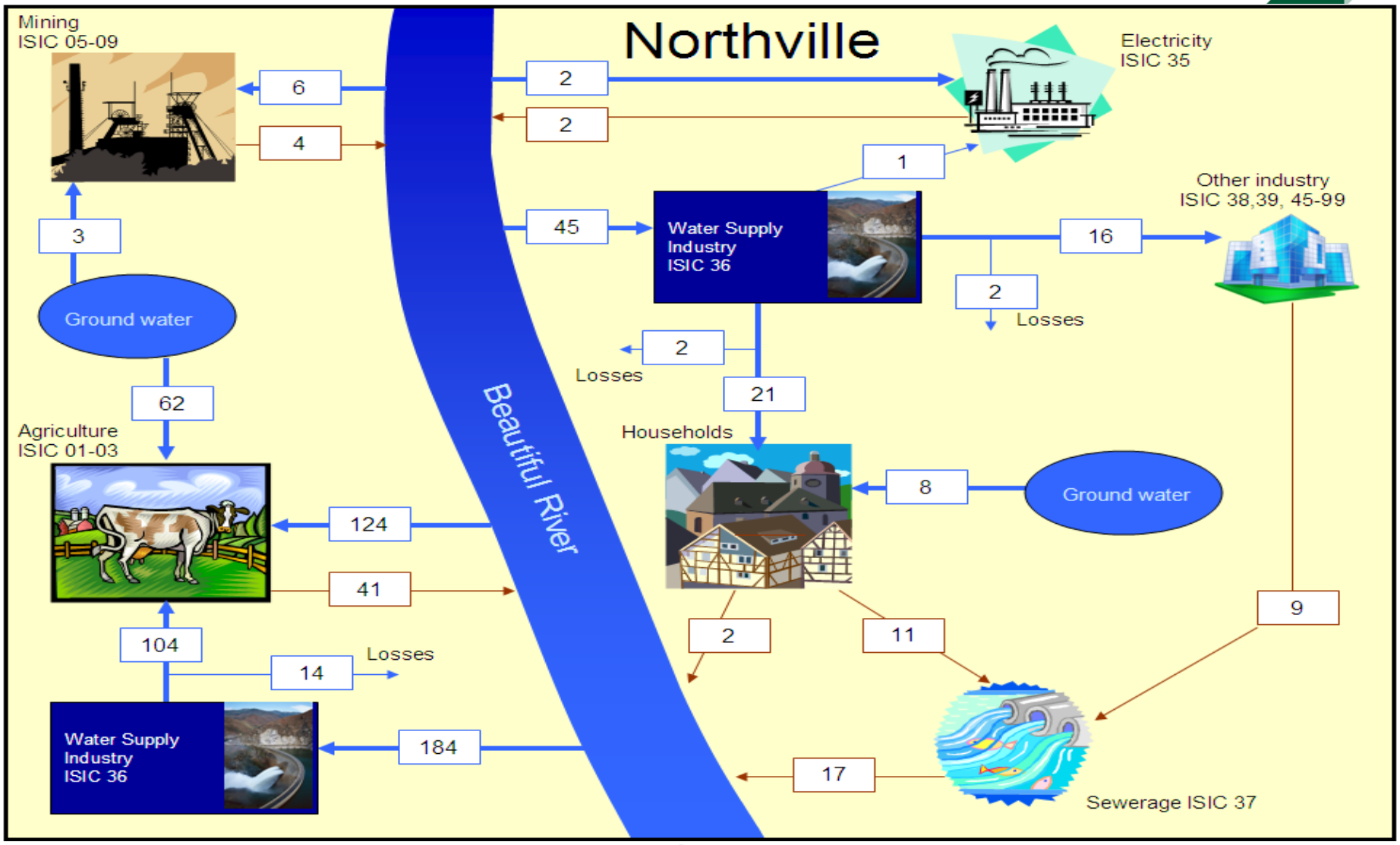
5. Which industry uses the 2nd greatest amount of water?

6. Which group of industries consumes the 2nd greatest amount of water?

7. In the manufacture of soft drink, the industry that consumes the most water, how do you think the water was consumed?

Exercise 2

Republic of Blue – Northville



Questions

Republic of Blue – Northville

Complete the Physical Supply Use Tables for the Republic of Blue – Northville

1. How much water does agriculture (ISIC 01) abstract from the environment?

2. Of the water abstracted by agriculture (ISIC 01) how much is from ground water?

3. In Northville, who supplies the waste water to the sewerage industry?

Questions

Republic of Blue – Northville

4. How much water do households receive from other economic units?

5. How much water could potentially be supplied as reused water by the sewerage industry (ISIC 37) rather than be returned to the environment?

Questions

Republic of Blue – Northville

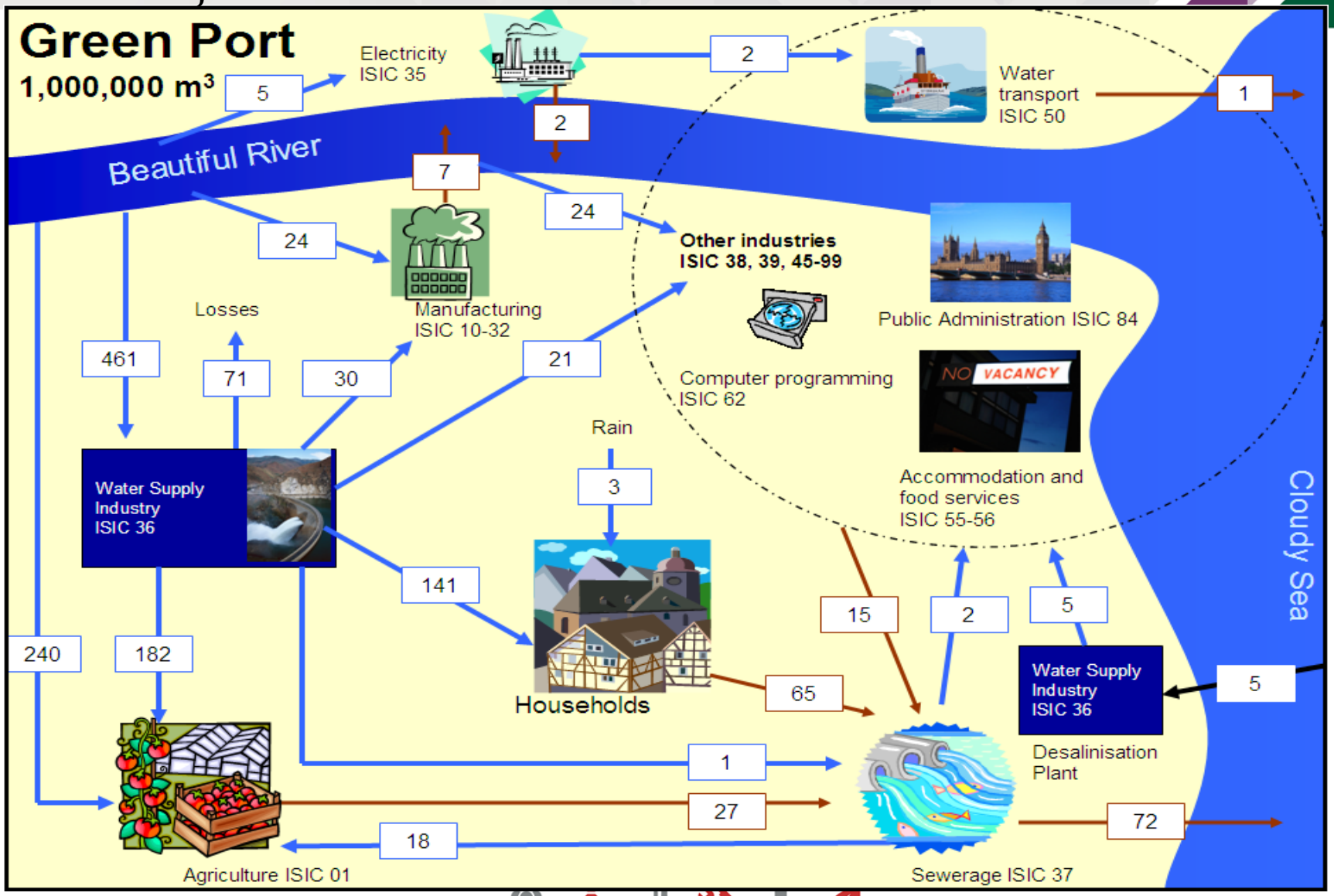
6. If the sewerage industry (ISIC37) was to supply reused water to other industries (ISIC 38,39, 45-99) with 5,000,000 m3 of reused water, in what column and line would the supply be recorded?

7. If other industries (ISIC 38, 39, 45-99) were to use 5,000,000m3 of reused water, in what column and line would the supply be recorded?

8. Why do you think the water supply industry consumes 69,000,000m3 of water, the second most of all of the industries or households in Northville?

Exercise 3

Republic of Blue – Green Port



Questions

Republic of Blue – Green Port

Complete the Physical Supply Use Tables for the Republic of Blue – Green Port

1. In Green Port, which industries abstract water from the environment?

2. How much water does Agriculture (ISIC 01) receive from other economic units?

3. From which industries do the other industries (ISIC 38,39, 45-99) receive water?

Questions

Republic of Blue – Green Port

4. How much additional water (ie more than is currently supplied) could be supplied as reused water by the sewerage industry (ISIC 37)?

5. What two water sources (ie abstractions from the environment) are used in Green Port that are not in Soda City or Northville?

6. Which industry or household uses the most water?

7. Which industry or household consumes the most?

Questions

Republic of Blue – Green Port

8. Of the total water use, what percentage is accounted for by:

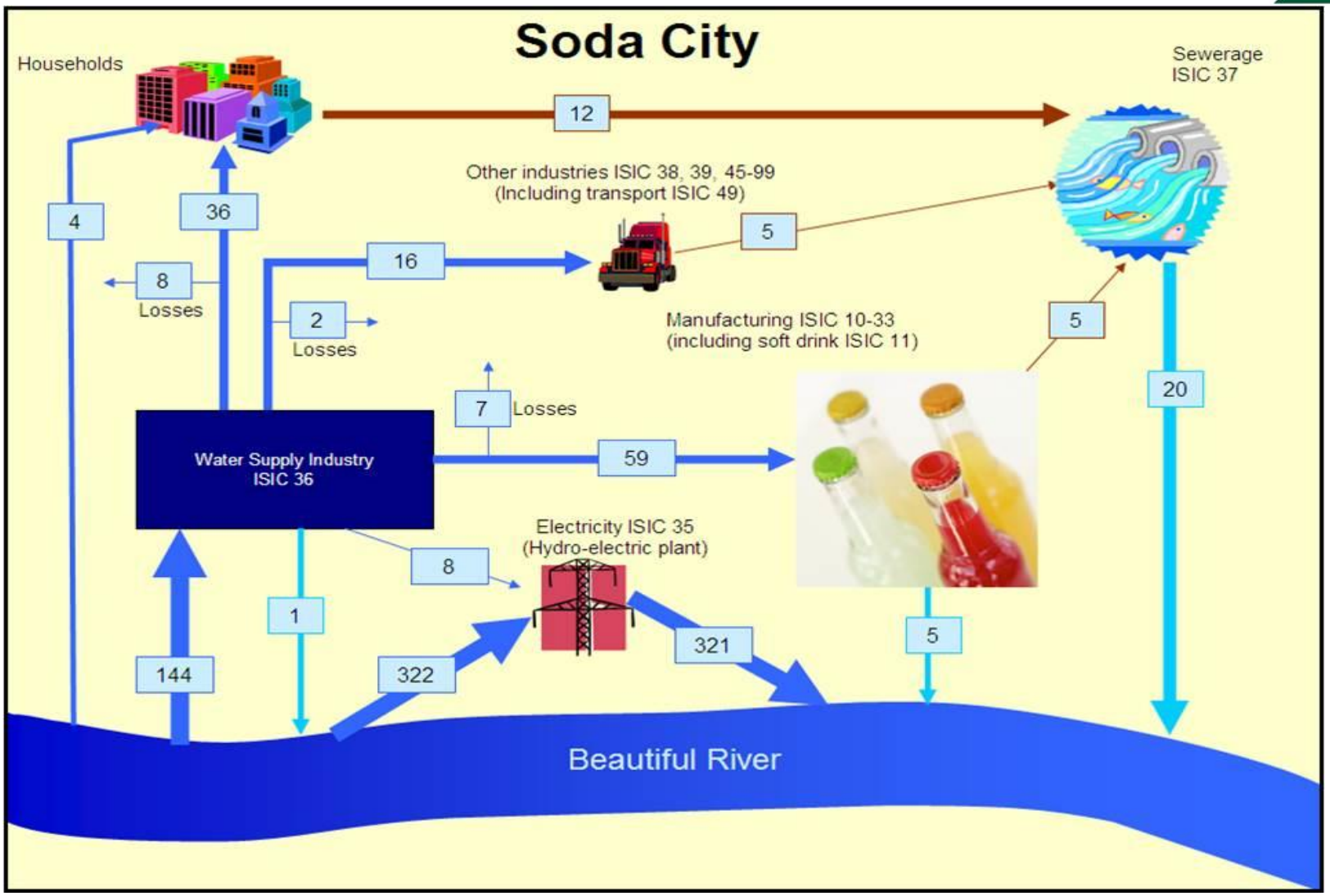
- Collection of precipitation by households
- Use of reused water (supplied by ISIC 37)
- Supply of water used first for cooling the electricity industry (ISIC 35)
- Losses by the water supply industry (ISIC 36)

GROUP ACTIVITY:

Answers

Exercise 1

Republic of Blue – Soda City



Exercise 1

Republic of Blue – Soda City

1. How much water does the Electricity industry (ISIC 35) abstract from the environment?

   322 million m^3 from Beautiful River to the hydro-electric plant

2. How much water do households receive from other economic units?

   36 million m^3 from the Water Supply industry (ISIC 36).

Exercise 1

Republic of Blue – Soda City

3. How much water does the Water Supply industry (ISIC 36) distribute to users?

119 million m^3

- 8 million m^3 to the Electricity industry (ISIC 35)
- 16 million m^3 to Other industries (ISIC 38 to 99)
- 36 million m^3 to the household sector
- 59 million m^3 to Manufacturing industries (ISIC 10 to 33)

Exercise 1

Republic of Blue – Soda City

4. How much water do the Other industries (ISIC 38 to 99) return to environment?

0 m^3

- BUT 5 million m^3 to the Sewerage industry (ISIC 37)

5. Which industry uses the second greatest amount of water?

The Water Supply industry (ISIC 36) at 144 million m^3

- The Electricity industry (ISIC 35) uses the greatest amount of water at 322 million m^3

Exercise 1

Republic of Blue – Soda City

6. Which group of industries consumes (rather than uses) the second greatest amount of water?

Other industries (ISIC 38 to 99) at 11 million m^3

- 16 million m^3 from the Water Supply industry (ISIC 36)

  minus

- 5 million m^3 to the Sewerage industry (ISIC 37)

Exercise 1

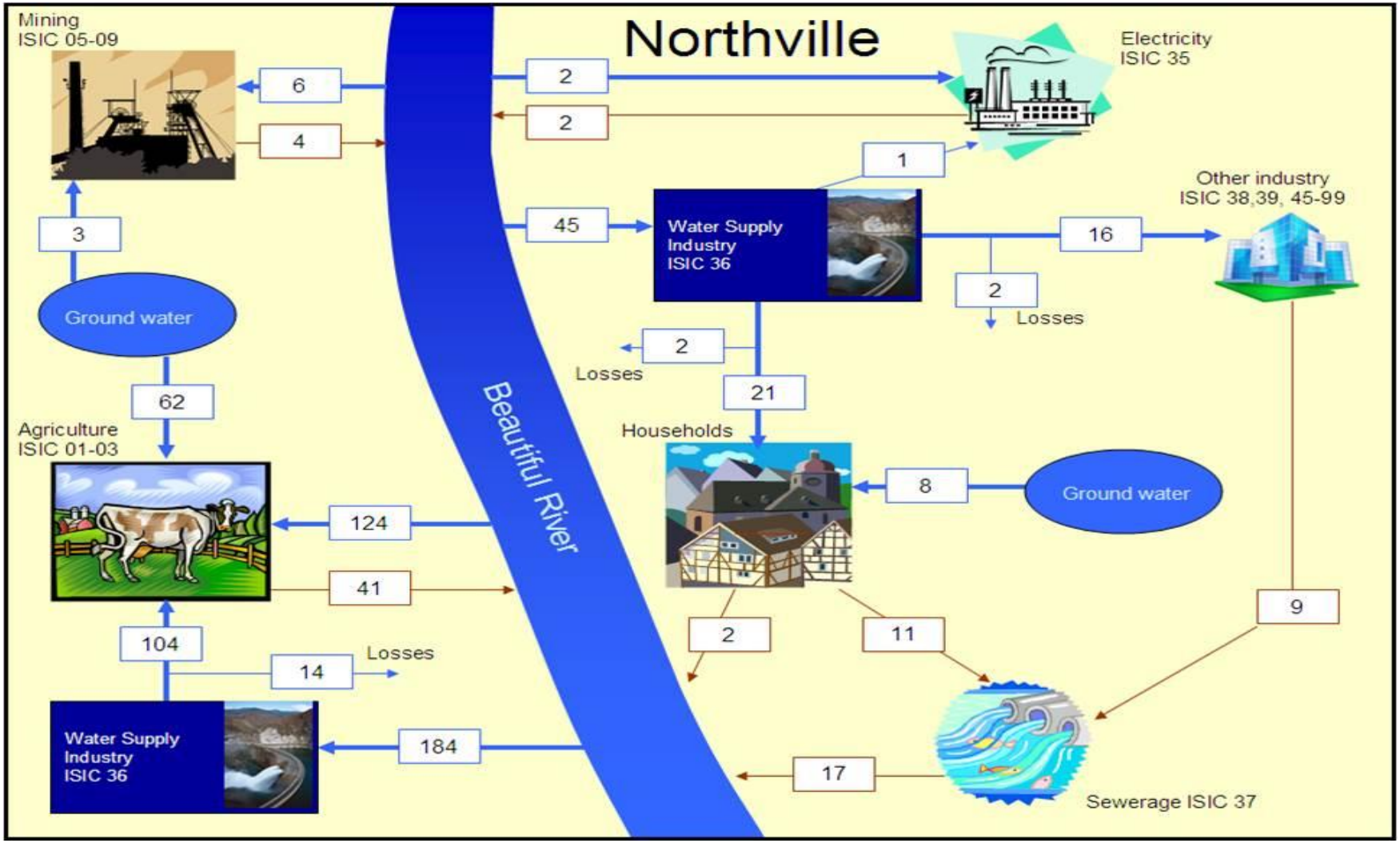
Republic of Blue – Soda City

7. The Soft Drink Manufacturing industry (ISIC 11) uses more water than any other industry. How do you think the water has been consumed?

The water is incorporated into bottles of soft drink — products (or output) of that industry. A small amount has been supplied to the Sewerage industry (ISIC 37).

Exercise 2

Republic of Blue – Northville



Exercise 2

Republic of Blue – Northville

Exercise 2: Northville

Physical use table

Gigalitres (=1,000,000 m3)

		Industries (by ISIC categories)							Households	Rest of the world	Total
		1-3	5-33, 41-43	35	36	37	38,39, 45-99	Industry total			
From the environment	**1 - Total abstraction (=1.a+1.b= 1.i+1.ii)**	**186**	**9**	**2**	**229**	**0**	**0**	**426**	**8**		**434**
	1.a Abstraction for own use	186	9	2	0	0	0	197	8		205
	1.b Abstraction for distribution	0	0	0	229	0	0	229	0		229
	1.i From inland water resources:	186	9	2	229	0	0	426	8		434
	1.i.1 Surface water	124	6	2	229	0	0	361	0		361
	1.i.2 Groundwater	62	3	0	0	0	0	66	8		73
	1.i.3 Soil water	0	0	0	0	0	0	0	0		0
	1.ii Collection of precipitation	0	0	0	0	0	0	0	0		0
	1.iii Abstraction from the sea	0	0	0	0	0	0	0	0		0
Within the economy	**2. Use of water received from other economic units**	**104**	**0**	**1**	**0**	**20**	**16**	**141**	**21**	**0**	**162**
	of which:							0			
	2.a Reused water	0	0	0	0	0	0	0	0	0	0
	2.b Wastewater to sewerage	0	0	0	0	20	0	20	0	0	20
	2.c Distributed water	104	0	1	0	0	16	121	21	0	142
3. Total use of water (=1+2)		**290**	**9**	**3**	**229**	**20**	**16**	**567**	**29**	**0**	**596**

Note: grey cells indicate zero entries by definition.

Exercise 2

Republic of Blue – Northville

Physical supply table

Gigalitres (=1,000,000 m3)

		Industries (by ISIC categories)							Households	Rest of the world	Total
		1-3	5-33, 41-43	35	36	37	38,39, 45-99	Industry total			
Within the economy	4. Supply of water to other economic units	0	0	0	142	0	9	151	11	0	162
	of which:										
	4.a Reused water	0	0	0	0	0	0	0	0	0	0
	4.b Wastewater to sewerage	0	0	0	0	0	9	9	11	0	20
	4.c Distributed water	0	0	0	142	0	0	142	0	0	142
To the environment	5. Total returns (= 5.a+5.b)	41	4	2	18	17	0	82	2		84
	5.a To inland water resources	41	4	2	18	17	0	82	2		84
	5.a.1 Surface water	41	4	2	0	17	0	64	2		66
	5.a.2 Groundwater	0	0	0	18	0	0	18	0		18
	5.a.3 Soil water	0	0	0	0	0	0	0	0		0
	5.b To other sources (e.g. sea water)	0	0	0	0	0	0	0	0		0
6. Total supply of water (= 4+5)		41	4	2	160	17	9	233	13	0	246
7. Consumption (3-6)		249	5	1	69	3	7	334	16	0	350

Note: grey cells indicate zero entries by definition.

Exercise 2

Republic of Blue – Northville

1. How much water does agriculture (ISIC 01) abstract from the environment?
   186 million meters cubed (186,000,000m^3)

2. Of the water abstracted by agriculture (ISIC 01) how much is from ground water?
   62 million meters cubed (62,000,000m^3)

3. In Northville, who supplies the waste water to the sewerage industry?
   Households and other industries (ISIC 38, 39, 45-99)

Exercise 2

Republic of Blue – Northville

4. How much water do households receive from other economic units?
   21 million meters cubed (21,000,000m^3)

5. How much water could potentially be supplied as reused water by the sewerage industry (ISIC 37) rather than be returned to the environment?
   17 million meters cubed (17,000,000m^3)

Exercise 2

Republic of Blue – Northville

6. If the sewerage industry (ISIC37) was to supply reused water to other industries (ISIC 38,39, 45-99) with 5,000,000 m3 of reused water, in what column and line would the supply be recorded?

   Line 4.1 (supply of reused water), column for sewerage industry (ISIC 37). Line and column totals and subtotals would also have to be adjusted

7. If other industries (ISIC 38, 39, 45-99) were to use 5,000,000m3 of reused water, in what column and line would the supply be recorded?

   Line 2.1 (use of reused water), column for other industries (ISIC 38, 39, 46-99). Line and column totals and subtotals would also have to be adjusted

Exercise 2

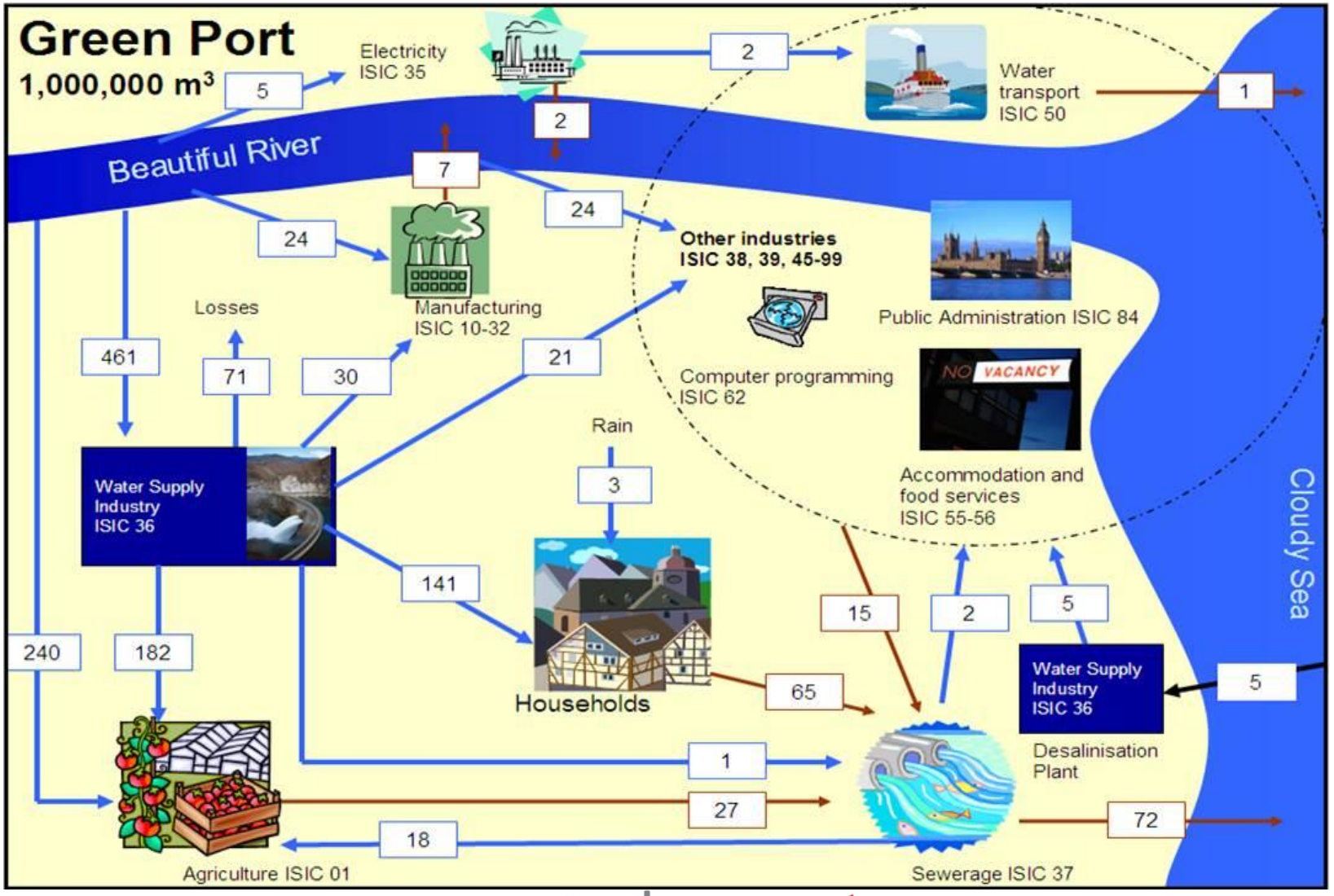
Republic of Blue – Northville

8. Why do you think the water supply industry consumes 69,000,000m3 of water, the second most of all of the industries or households in Northville?

In Northville, the use of open channels to supply water to agriculture, mentioned in the introduction to water supply and use in Northville, leads to the evaporation of water. These losses are not shown directly in the supply use tables but are included in the consumption by the water supply industry (ISIC 36). Water consumption is the amount of water evaporated, transpired or incorporated into products.

Exercise 3

Republic of Blue – Green Port



Exercise 3

Republic of Blue – Green Port

Exercise 3: Green Port

Physical use table

Gigalitres (=1,000,000 m^3)

		Industries (by ISIC categories)							Households	Rest of the world	Total
		1-3	5-33, 41-43	35	36	37	38,39, 45-99	Industry total			
From the environment	1 - Total abstraction (=1.a+1.b= 1.i+1.ii)	240	24	5	466	0	24	759	3		762
	1.a Abstraction for own use	240	24	3	0	0	24	291	3		294
	1.b Abstraction for distribution	0	0	2	466	0	0	468	0		468
	1.i From inland water resources:	240	24	5	461	0	24	754	0		754
	1.i.1 Surface water	240	24	5	461	0	24	754	0		754
	1.i.2 Groundwater	0	0	0	0	0	0	0	0		0
	1.i.3 Soil water	0	0	0	0	0	0	0	0		0
	1.ii Collection of precipitation	0	0	0	0	0	0	0	3		3
	1.iii Abstraction from the sea	0	0	0	5	0	0	5	0		5
Within the economy	2. Use of water received from other economic units	200	30	0	0	108	30	368	141	0	509
	of which:							0			
	2.a Reused water	18	0	0	0	0	2	20	0	0	20
	2.b Wastewater to sewerage	0	0	0	0	107	0	107	0	0	107
	2.c Distributed water	182	30	0	0	1	28	241	141	0	382
3. Total use of water (=1+2)		440	54	5	466	108	54	1127	144	0	1271

Note: grey cells indicate zero entries by definition.

Exercise 3

Republic of Blue – Green Port

Physical supply table

Gigalitres (=1,000,000 m^3)

		Industries (by ISIC categories)							Households	Rest of the world	Total
		1-3	5-33, 41-43	35	36	37	38,39, 45-99	Industry total			
Within the economy	**4. Supply of water to other economic units**	**27**	**0**	**2**	**380**	**20**	**15**	**444**	**65**	**0**	**509**
	of which:										
	4.a Reused water	0	0	0	0	20	0	20	0	0	20
	4.b Wastewater to sewerage	27	0	0	0	0	15	42	65	0	107
	4.c Distributed water	0	0	2	380	0	0	382	0	0	382
To the environment	**5. Total returns (= 5.a+5.b)**	**0**	**7**	**2**	**71**	**72**	**1**	**153**	**0**		**153**
	5.a To inland water resources	0	7	2	71	0	0	80	0		80
	5.a.1 Surface water	0	7	2	0	0	0	9	0		9
	5.a.2 Groundwater	0	0	0	71	0	0	71	0		71
	5.a.3 Soil water	0	0	0	0	0	0	0	0		0
	5.b To other sources (e.g. sea water)	0	0	0	0	72	1	73	0		73
6. Total supply of water (= 4+5)		**27**	**7**	**4**	**451**	**92**	**16**	**597**	**65**	**0**	**662**
7. Consumption (3-6)		**413**	**47**	**1**	**15**	**16**	**38**	**530**	**79**	**0**	**609**

Note: grey cells indicate zero entries by definition.

Exercise 3

Republic of Blue – Green Port

1. In Green Port, which industries abstract water from the environment?

   Agriculture (ISIC 01), Manufacturing (10-33), Electricity (35), Water supply (36), And other industries (38,39,99)

   Households, while not an industry, also abstract water.

2. How much water does Agriculture (ISIC 01) receive from other economic units?

   200 million meters cubed (200,000,000m3). Of this 18 million is reused water from the sewerage industry (ISIC 37) and 182 million is from the water supply industry (ISIC 36)

Exercise 3

Republic of Blue – Green Port

3. From which industries do the other industries (ISIC 38,39, 45-99) receive water?

   The water supply (ISIC 36), sewerage (37) and electricity (35) industries all supply water to other industries (ISIC 38,39, 45-99)

4. How much additional water (ie more than is currently supplied) could be supplied as reused water by the sewerage industry (ISIC 37)?

   72 million meters cubed (72,000,000m3), the amount currently discharged to sea

Exercise 3

Republic of Blue – Green Port

5. What two water sources (ie abstractions from the environment) are used in Green Port that are not in Soda City or Northville?

   Collection of precipitation by households and the abstraction of sea water for desalination by the water supply industry (ISIC 36).

Exercise 3

Republic of Blue – Green Port

6. Which industry or household uses the most water?

   The water supply industry (ISIC 36), which uses 466 million meters cubed (466,000,000m3) of water. Consumption is only 15 million meters cubed (15,000,000m3) because most water is supplied to other users (380,000,000m3) and another portion (71,000,000m3) is lost in distribution through leaky pipes to groundwater.

7. Which industry or household consumes the most?

   The agriculture industry (ISIC 01) consumes 413,000,000m3

Exercise 3

Republic of Blue – Green Port

8. Of the total water use, what percentage is accounted for by:

Total water use is 1271 million meters cubed (1,271,000,000m3) so:

- Collection of precipitation by households of 3,000,000m3 is 0.24%
- Use of reused water (supplied by ISIC 37) is 20,000,000m3 or 1.57% of total water use
- Supply of water used first for cooling the electricity industry (ISIC 35) of 2,000,000m3 is 0.16%
- Losses by the water supply industry (ISIC 36) of 71,000,000m3 is 5.59%

Water Accounts

Worked examples of the physical supply use tables for water

THANKYOU!