



IEA :Implementing Agreement for Hydropower Technologies & Programs
Hydro 2012 International Conference and Exhibition
29 to 31 October 2012 Bilbao, Spain



Session 17:IEA Hydropower Annex-XI
Renewal and Upgrading of Hydro Plants

Introduction to the work of Annex-XI

October 31, 2012

Annex-XI Operating Agent

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Outline of Annex-XI activities

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Theme: Renewal and Upgrading of Hydropower Plants

(Background)

- There are growing concerns not only in Japan but also in other industrialized nations about the **aging of hydropower facilities**.
- There is a growing expectation for hydropower as **a future key player in low-carbon society**, as it represents a domestic, affordable and CO2-free source of energy.
- In the western world, small- or medium-sized pumped-storage hydropower is gaining renewed recognition **as a load-balancing system** to complement the intermittent wind and solar power.

(Purpose)

- The taskforce is trying to **gather as many good practice examples as possible from around the world on the renewal and upgrading of existing hydropower plants**.
- The information will be used to identify and convey **effective policies, assistance measures and innovative technologies** to the rest of the world.

1. Member Countries:

Japan (OA), Norway and USA

2. ExCo Member Countries

Brazil, Finland, Canada

3. Other Countries

New Zealand (Meridian Energy, Genesis Energy, Mighty River Power)

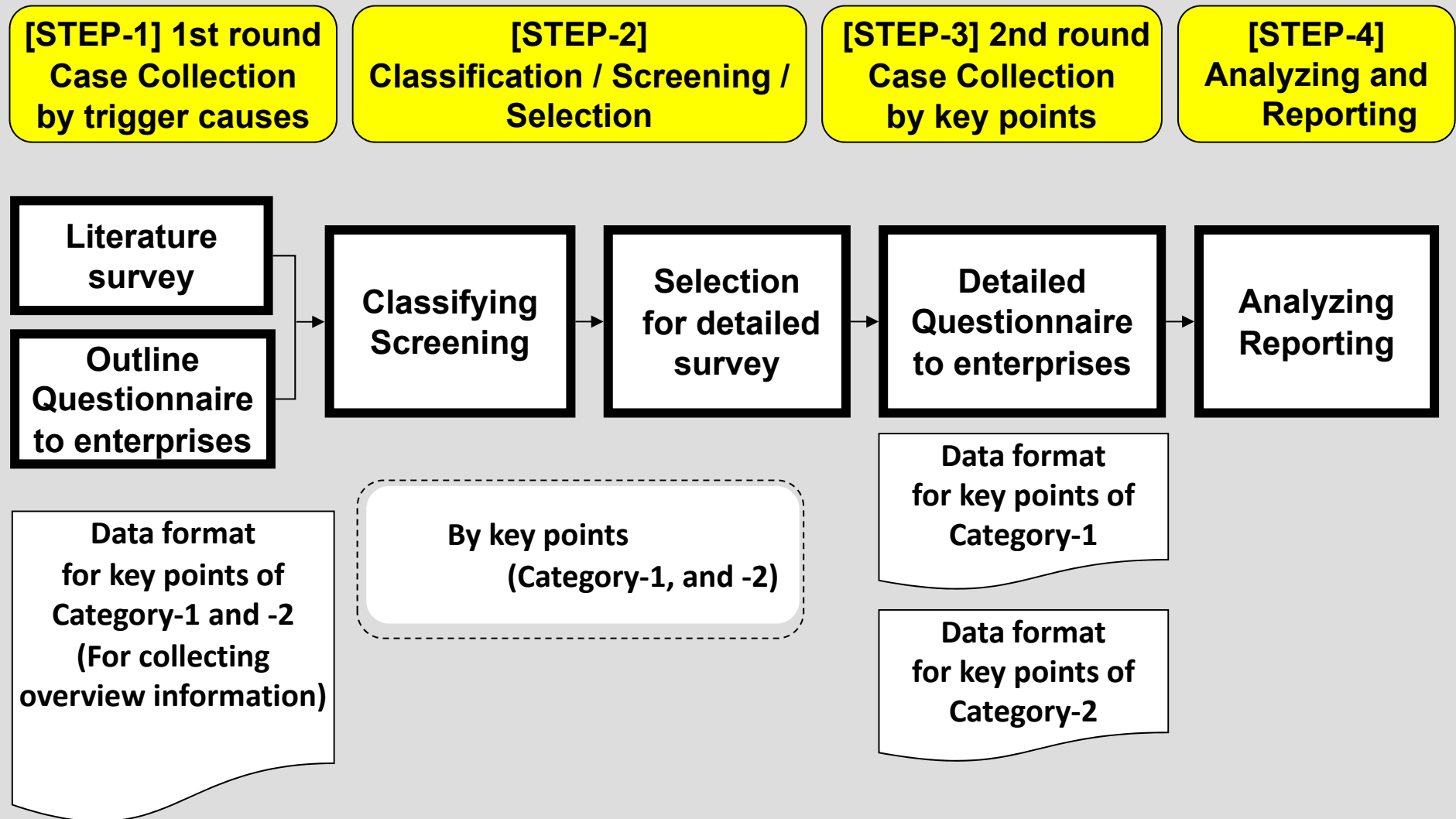
Australia (Hydro Tasmania)

Austria, Nepal, South Africa, Sweden, Switzerland, etc.
(Tentative)

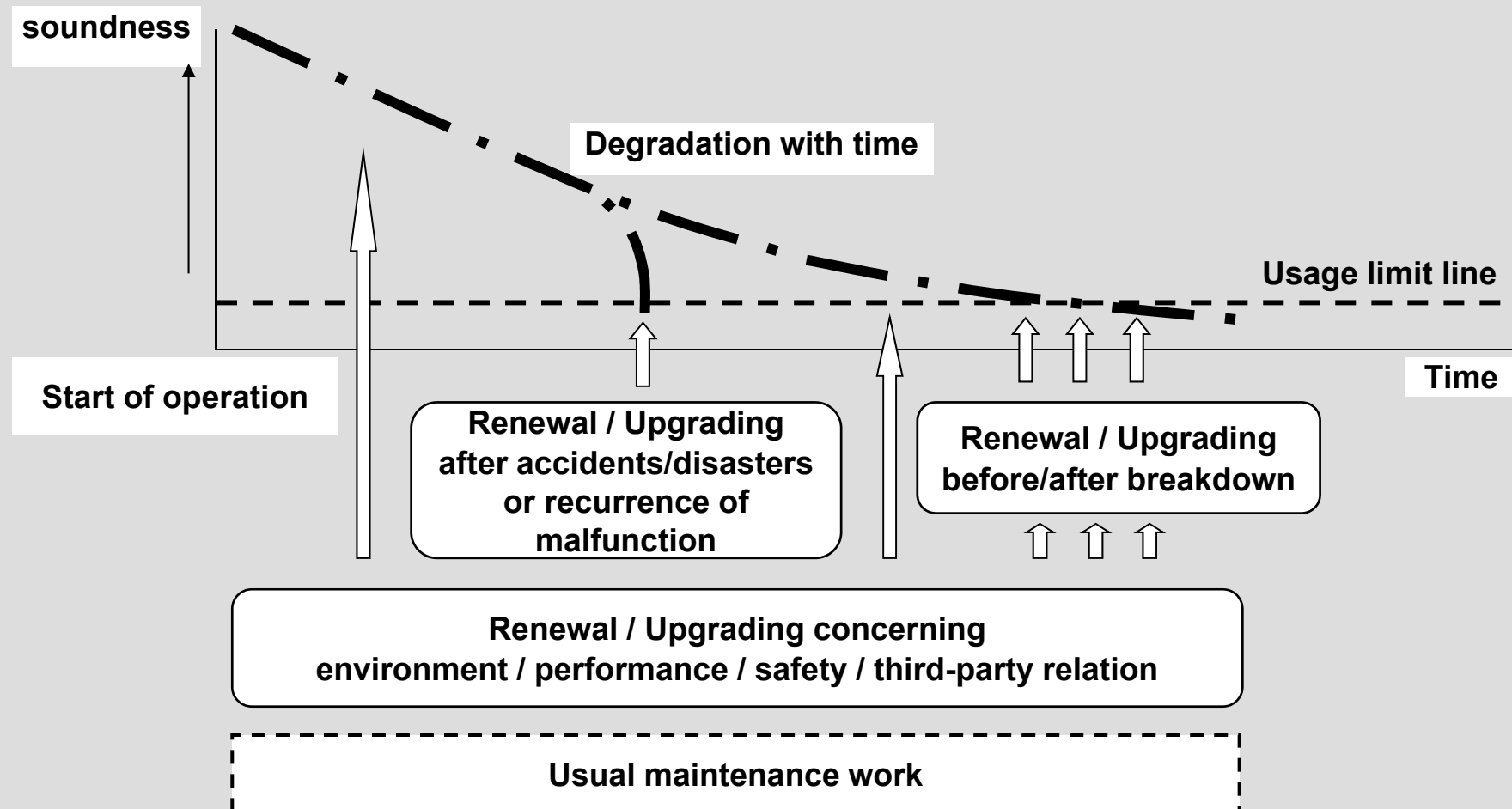
4. Other Organizations

IHA

Flow Chart of Case Collection



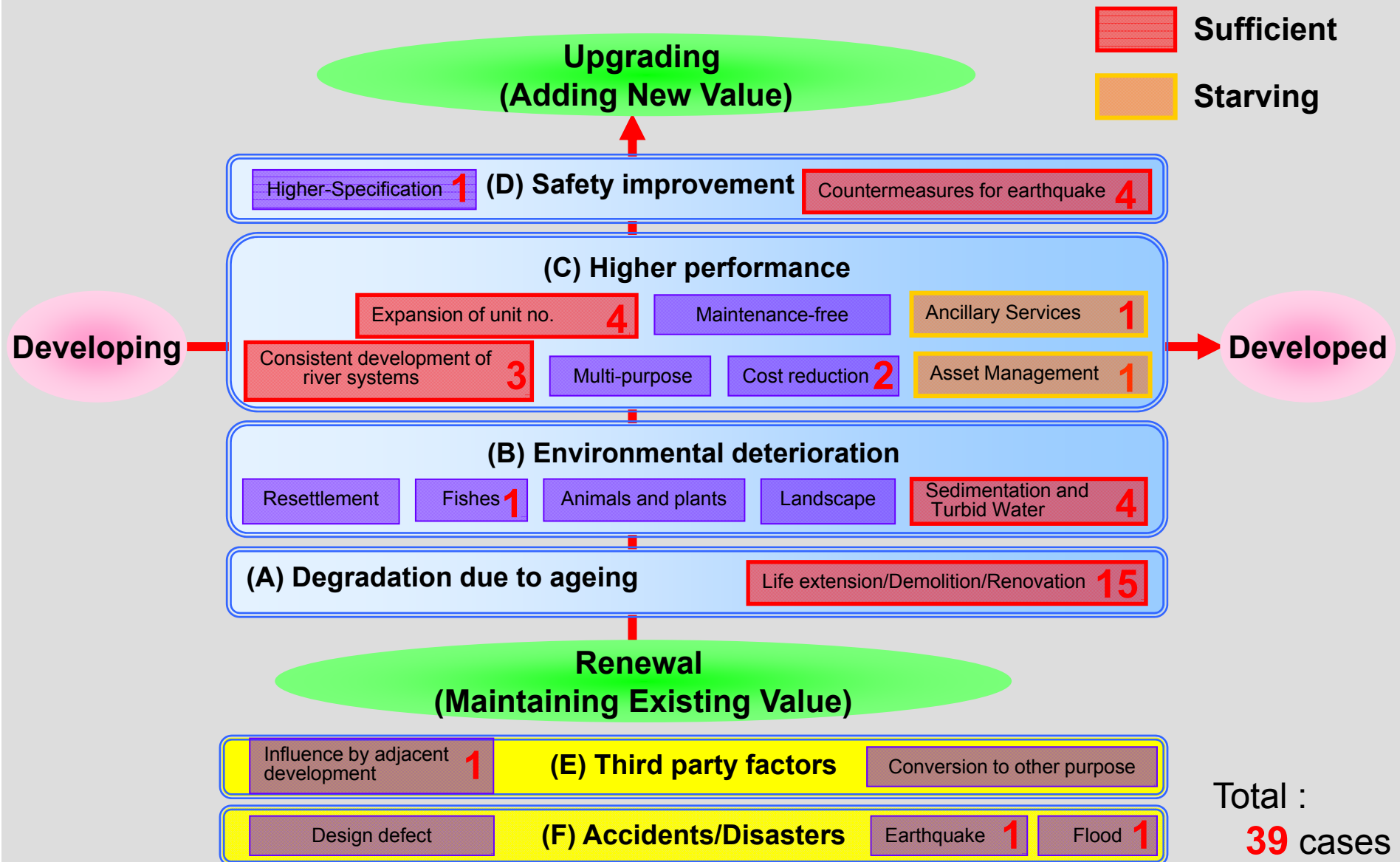
Conceptual Life Cycle



Trigger Causes of Renewal and Upgrading

Trigger Causes	Expected Performance
(A) Ageing and recurrence of malfunction	(a) Improvement of efficiency
	(b) Improvement of durability and safety
	(c) Cost reduction
	(d) Easy maintenance with less labor
(B) Environmental deterioration	(a) Sedimentation reduction
	(b) Improvement of river environment
(C) Needs for higher performance	(a) Addition of units, Expansion of power & energy
	(b) Role change of hydropower generation Addition of new functions
(D) Needs for safety improvement	(a) Improvement of safety
(E) Needs due to third party factors	(a) Sustainable operation (sometimes accompanied by power reduction)
(F) Accidents / Disasters	(a) Recovery

Coverage of Collected Cases in Japan



Key Points to be focused and analyzed (1-1)

Category-1. Public Policies, Facilitation Measures, etc.

a) **Energy policies of Countries & States**

⇒ In connection with the state of affairs in the country,
(**stored resources, development level, economic level**
and **environmental awareness level**)

b) **Investment incentives;**

Feed-in-Tariff (FIT),

Renewable Portfolio Standard (RPS),

Subsidies, Financial assistance, Tax deductions, etc.

⇒ **The extent to which** these incentives are **utilized and effective** will be analyzed

Key Points to be focused and analyzed (1-2)

Category-1. Public Policies, Facilitation Measures, etc.

c) **Integrated management of water resources and river systems**

⇒ The **integrated development** of **water resources** and **river systems** (domestic or international) will be collected and analyzed including **sediment management**.

d) **Asset management, strategic asset management and Life cycle cost analysis**

⇒ Collected and analyzed to determine the **method**, **scale**, and **timing**.

Key Points to be focused and analyzed (1-3)

Category-1. Public Policies, Facilitation Measures, etc.


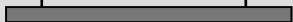




- e) Projects justified by the Non-monetary valuation of stabilizing unstable power system in the up-coming low-carbon society
⇒ Cases of **adjustment functions**, **the use of non-power dams** and **increased output** will be collected to analyze **new values of hydropower**
- f) Environmental conservation and improvement
⇒ Cases of measures for **sedimentation**, **protection of fish and birds**, **GHG emission** and mitigation are collected. **Safety improvement** and **aseismic reinforcement** are also collected.

Category-2. Modern Technologies, Systems, material, etc.

- a) Technological innovation & deployment expansion of electro-mechanical (E/M) equipment
- b) System and Reliability Improvement in Protection & Control (P&C)
- c) Technological innovation, deployment expansion and new materials used for civil and building works
- d) Integration of other renewable energies into hydropower systems

Activity Schedule of Annex-XI

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Work Item	2010	2011	2012	2013	2014	2015
1. Agreeing on and starting the new ANNEX	✦ 24th					
2. Formulating a detailed activity plan						
3. Annex-11 expert meetings	✧ ✧	✧ ✧	✧ ✧	✧	✧	
	July Sep	July Oct	Jun Oct			
4. Collecting cases						
1st round Case Collection						
Screening						
2nd round Case Collection						
5. Analyzing and evaluating cases						
6. Creating and releasing reports						
7. Workshops, etc.		*-1 ★	*-2 *-3 *-4 ★ ★ ★	★	★	
8. ExCo meeting	✦ 24th ✦ 25th	✦ 26th	27th ✦	✦	✦	✦

*-1: Sacramento, USA, July 19th.

*-2: Tokyo, Japan, February 2012.

*-3: Washington, D.C., USA, May 30th

*-4 Bilbao, Spain, October 2012

The End