



BHUTAN

STAFF REPORT FOR THE 2016 ARTICLE IV CONSULTATION—DEBT SUSTAINABILITY ANALYSIS¹

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Approved By

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The assessment of Bhutan's external risk has not changed materially from the 2014 DSA. Since FY2010/11, Bhutan's rapid hydropower development has led to a substantial buildup of external debt. As a consequence, external debt ratios breach all indicative thresholds, and these breaches are projected to continue for several more years.² The extent and length of these breaches indicate a high risk of external debt distress. However, based on unique mitigating circumstances (as spelled out in the 2014 DSA), staff continue to assess Bhutan's external risk as moderate. These mitigating factors are as follows. A large share of external debt is linked to hydropower project loans from the Government of India (GoI). GoI covers both financial and construction risks of these projects and buys the surplus electricity output at a price reflecting cost plus a 15 percent net return. India's large unmet demand for power and the political commitment to increase its reliance on clean energy ensure a strong demand even in the current environment of low prices of alternative energy sources. As a result, Bhutan's debt situation is expected to improve in the medium and long term, reflecting significantly higher electricity exports when hydropower projects come on stream. This being said, stress tests to public sector debt dynamics reveal the need for fiscal consolidation and the importance of sustaining economic growth going forward.

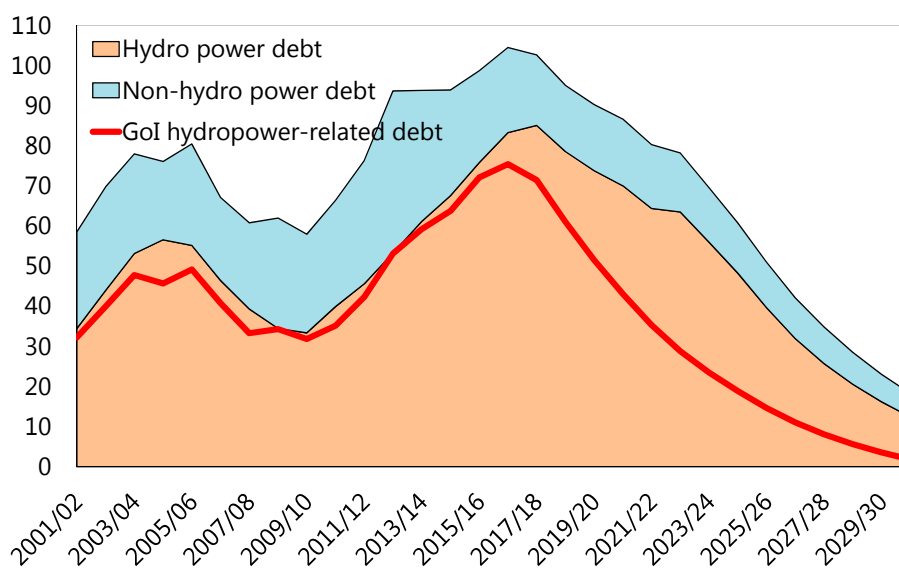
¹ This DSA was prepared by IMF and International Development Association staff in collaboration with the Asian Development Bank and Bhutanese authorities. The analysis updates the previous Joint DSA dated May 30, 2014 (IMF Country Report No. 14/178). The DSA follows the IMF and World Bank Staff Guidance Note on the Application of the Joint Fund-Bank Debt Sustainability Framework for Low-Income Countries (November 7, 2013). The data underlying the analysis are from the Bhutanese authorities, IMF, and World Bank staff estimates.

² The magnitude of the breach has increased due to the revision of the Country Policy and Institutional Ratings (CPIA) to medium, from a strong rating in the 2014 DSA. In 2013 and 2014, Bhutan's 3-year moving average CPIA ratings were 3.74 and 3.71, marginally below the "strong" rating threshold of 3.75.

BACKGROUND

1. **Bhutan's public and publicly guaranteed (PPG) external debt jumped to 94 percent of GDP in 2013, up from 75 percent of GDP in 2012, and has remained relatively stable in 2014 and 2015.**³ The earlier rise in public debt was driven mainly by hydropower sector-related external borrowing (see text chart below). Hydropower projects are primarily financed by India with a mix of loans (70 percent) and grants (30 percent).⁴ External debt continues to be dominated in Indian rupees (and related to hydropower sector debt), which accounts for about 70 percent of total external debt, with convertible currency debt accounting only 30 percent of GDP. Domestic debt remains a small fraction of public debt.

Hydro and Non-hydro Power Debt Outstanding
(In percent of GDP)



UNDERLYING DEBT SUSTAINABILITY ANALYSIS ASSUMPTIONS

2. **The baseline scenario assumes that additional expansion of Bhutan's power generation capacity will triple the generation capacity.** Presently, five hydropower plants are operating, with total capacity about 1,600 megawatts (MW). The hydropower development policy of Bhutan currently envisages eight new hydropower projects to be commissioned by 2026 (see table below), adding 5,200 MW to

³ The DSA uses fiscal years (FY). For example, 2013 means FY 2012/13.

⁴ The second generation of hydropower projects will be based on joint venture (JV) models (see text table below). In this model, 70 percent of the project will be financed by loans from India, while the remaining 30 percent will be financed by equity equally split between India and Bhutan's governments. India will provide a grant to Bhutan to finance its equity share.

Bhutan's power generation capacity.⁵ Total techno-economically feasible hydropower potential is estimated to be 24,000 MW. External financing for non-hydropower sector activities continues to remain predominantly from multilateral and bilateral donors at concessional terms.

Hydropower Projects in the Pipeline

	Capacity (MW)	Date of Commissioning	Development Model
Mangdechhu	720	2017-18	IG
Puna-II	1020	2017-18	IG
Puna-I	1200	2018-19	IG
Nikachhu	118	2018-19	JV
Kholungchhu	600	2022-23	JV
Bunakha	180	2023-24	JV
Chamkharchhu-I	770	2025-26	JV
Wangchhu	570	2025-26	JV
Total	5178		

3. The hydropower sector will continue to have a major impact on the rest of the economy as summarized by the following key baseline macroeconomic assumptions.

- Real sector:** Similar to the spike in real GDP when Tala was commissioned in 2006/07, Puna I, Mangdechhu and Puna II will continue to boost economic growth as they come on stream in 2017/18 and 2018/19.⁶ Real growth is projected to average around 9 percent in 2016–21, higher than the 10-year historical average of 7.4 percent. Growth will accelerate significantly in 2018-2019, with the commissioning of the above-mentioned plants, and then moderate to an average 5.5 percent in 2022–36.
- Fiscal sector:** Upon completion, the commissioning of hydropower projects will boost temporarily the domestic revenue-to-GDP ratio, mainly as a result of higher nontax revenues (transfer of profits and dividend payments). External budgetary aid is assumed to decline sharply during the 13th FYP (2024–2028) as Bhutan's per capita income rises. On average, the overall fiscal deficit remains broadly balanced over the long term.
- External sector:** The current account deficit is projected to remain close to the current levels till 2017, and then to start declining rapidly, as a result of significant increase in electricity exports upon the completion of hydropower projects. In the medium-term, electricity exports are estimated to more than quintuple from current levels, and the current account balance should move to a surplus by 2025, with external reserves increasing significantly.

⁵ There is uncertainty surrounding the exact timing of the projects, as well as the future of some additional projects under discussion that are not included in the projection.

⁶ Prior to commissioning, construction of these hydropower plants has been the second largest contributor after services to real growth during the 10th FYP. A more than doubling of electricity generation capacity with the commissioning of these plants will lead to a jump in electricity exports and fiscal revenue, providing a much larger boost to economic growth in comparison to the construction phase.

Key Macroeconomic Assumptions

	10 year Historical Average	Baseline Average	
		2016–2021	2022–2036
Current transfers, net total (in percent of GDP)	6.7	3.7	-0.4
Real GDP growth (percent)	7.4	8.6	5.5
Growth of exports of goods and services (US dollar terms)	13.8	16.3	5.7
Non-interest current account deficit (in percent of GDP)	14.3	13.9	-0.5
Primary deficit (in percent of GDP)	-2.3	-4.0	-0.6

EXTERNAL DEBT SUSTAINABILITY ANALYSIS

A. Baseline

4. Bhutan's external debt ratios remain above the LIC-DSA indicative thresholds during the first half of the projected period under the baseline, but the commissioning of the hydropower projects in 2017/18 and 2018/19 and the start of debt repayment put the debt ratio on a steady downward trajectory. Bhutan's external debt is driven mainly by hydropower developments. External PPG debt as a share of GDP is projected to peak at 113 percent in 2017, with disbursements for hydropower-sector projects, before declining slightly to 111 percent of GDP in 2018.⁷ As the first phase of hydro construction comes to an end (see table above) and debt repayment starts, the stock of PPG debt is projected to start falling briskly, to below the 50 percent of GDP by 2026, and to below 10 percent of GDP by 2036. As a result, the present value (PV) of PPG external debt-to-GDP gradually declines to only 5 percent over the long term, crossing the 40 percent indicative threshold in 2027. The PV of PPG debt-to-exports ratio remains above the threshold of 150 percent until 2024, but falls to 15 percent at the end of the projected period. Similarly, the PV of PPG external debt-to-revenues ratio peaks at close to 722 percent in 2018, but falls below the 250 percent threshold in 2025, and to 24 percent by 2036.

5. The PPG debt service-to-export ratio is projected to exceed the indicative thresholds in the medium term intermittently by a relatively small margin. The PPG debt service-to export ratio peaks at around 24 percent in 2017 and 2018. However, as exports pick up and debt repayment declines, the ratio falls below the 20 percent threshold by 2019, before rising above the threshold again marginally in 2020–22. In contrast, reflecting partly conservative revenue projection, the debt service-to-revenue ratio remains moderately above the 20 percent indicative threshold for most of the projected period, falling below only in 2032.

B. Sensitivity Analysis

6. The indicative thresholds for the PV of PPG external debt-to-GDP, debt-to-exports and debt-to-revenue ratios are breached under alternative scenarios and stress tests. All these indicators breach

⁷ In the 2014 DSA, public external debt was projected to peak at 120 percent of GDP. The main reason for the lower debt in the present DSA is the lower number of hydropower projects in the pipeline (three projects less).

their respective thresholds after the shocks in 2016, and most continue to breach the threshold for an extended period of time. The standard sensitivity analysis points to a high risk of debt distress (Figure 1 and Table 2). In particular, historical alternative scenario and bound test with exports in 2017–18 linked to historical average show very large breach. However, these scenarios fail to capture the projected jump in hydropower exports or fiscal revenues. Similarly, the worsening of external debt indicators under the bound test of 30 percent nominal depreciation in 2017 overestimates Bhutan's debt vulnerability as a large share of Bhutan's external income is in Indian rupees, which act as a natural hedge to the largely rupee-denominated external debt.

7. Debt service ratios indicative thresholds, too, are breached for large part of the projection period. As in the case of PPG external debt ratios, the historical scenario shows the largest breach for the debt service ratios as well. Debt service ratios remain above their respective thresholds under the historical scenario for the whole projection period. Under the bound tests, debt service ratios return eventually below their thresholds, but mostly late in the projection period.

PUBLIC DEBT SUSTAINABILITY ANALYSIS

A. Baseline

8. The baseline public debt dynamics follows closely that of the external debt. The PV of public debt exceeds the public debt benchmark by a significant amount. The public debt-to-GDP ratio is projected to peak at around 115 percent of GDP in 2017, less than the 129 percent of GDP peak in the 2014 DSA. After 2017, public debt is projected to decline steadily, falling to below 60 percent in 2027 and to 49 percent by 2036. Bhutan's public debt consists mainly of the external debt, and thus the same assessment of the unique mitigating circumstances as in the case of the PPG external debt above applies. With the gradually declining role of external financing, domestic financing is assumed to start playing a larger role in the financing of the development agenda, and the share of domestic debt in the public debt will increase.

B. Sensitivity Analysis

9. The public debt ratios are projected to be on a declining path over the long term under alternative scenarios and various stress tests. However, the scenario with the primary balance unchanged from the 2016 level fails to capture additional revenues from the commissioned hydropower plants, and shows only a very gradual decline in the debt ratio. The sensitivity analysis also suggests that the debt and debt service ratios are sensitive to negative growth shocks. However, the size of the negative growth shock in 2017–20 is substantially magnified by the fact that growth is projected to peak during this period, with the commissioning of the new hydropower plants.

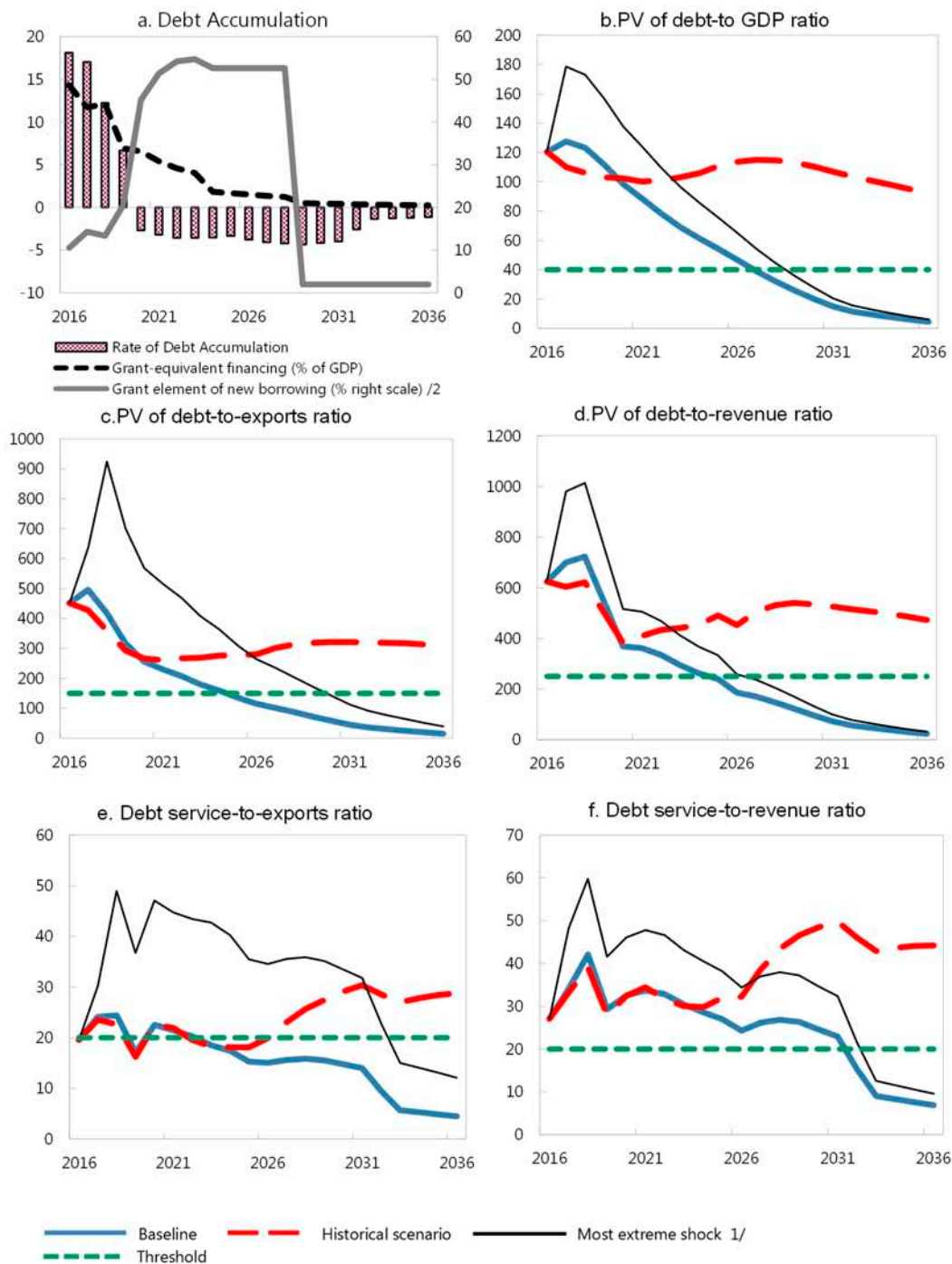
STAFF ASSESSMENT

10. The current assessment remains broadly the same as the assessment made in the 2014 IMF/World Bank Joint DSA, which found that Bhutan's debt dynamics are subject to a moderate risk of distress. Even though Bhutan's PPG external debt indicators continue to breach external debt thresholds

by large margins and for a long period, the unique and mitigating factors discussed in detail in the 2014 DSA remain valid and underpin staffs' unchanged assessment.

- The current and projected PPG external debt is now somewhat less than projected in the 2014 DSA, due to the fact that some hydropower projects have been put on hold. In 2015, PPG external debt stock reached 94.5 percent of GDP, 20 percentage points less than projected in the previous DSA. However, as mentioned above, Bhutan's CPIA rating has also worsened, from 'strong' to "medium"—even though the overall decline in CPIA score was relatively modest, to 3.74 and 3.71, marginally below the "strong" rating threshold of 3.75. Even with the lower CPIA rating and thus lower debt and debt service thresholds, these are mostly breached for similar or shorter period than in the previous DSA, reflecting the lower current and projected debt.
- India provides explicit guarantees that cover financial and construction risks for the intra-governmental hydropower projects. In addition, India buys all surplus power that is not consumed domestically, and the price is on a cost-plus basis which includes a net return of 15 percent. As a result, hydropower loans from India are more akin to foreign direct investment rather than debt-creating loans. Moreover, in power-hungry India, there is little risk of insufficient demand for future hydropower supply. This arrangement significantly reduced the risk of external debt distress.
- Bhutan's hydropower production, exports and thus the capacity to service its debt will increase only in the medium term. Therefore, staff continue to advise against any nonconcessional borrowing at this stage. As highlighted previously and confirmed again by the present DSA, Bhutan is vulnerable to adverse shocks. DSA's stress testing illustrates potential vulnerabilities in Bhutan's external debt situation to export and growth shocks, as well as to shortfalls in aid inflows and failure to reverse declining tax revenues.
- Assuming they are effectively executed and associated macroeconomic challenges properly managed, the additional hydropower projects should eventually bring solid economic dividends, supporting higher exports and income.
- The authorities agreed with staff's assessment of external risk. They emphasized that the projected increase in hydropower exports should help repay a big part of the external debt, and underscored the need to take this factor into account when assessing the external debt vulnerability.

Figure 1. Bhutan: Indicators of Public and Publicly Guaranteed External Debt Under Alternative Scenarios, 2016–2036 1/

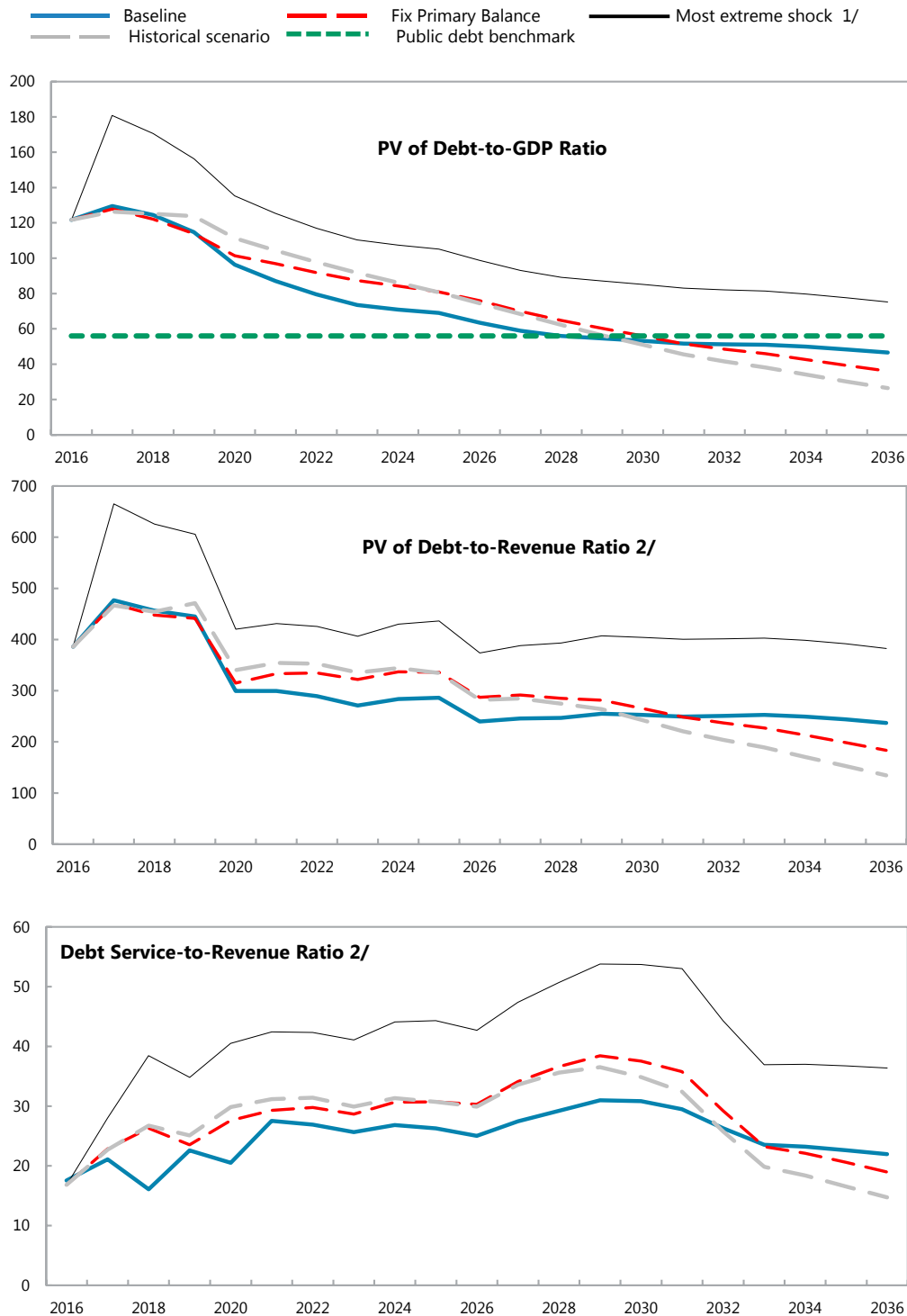


Sources: Country authorities; and staff estimates and projections.

1/ The most extreme stress test is the test that yields the highest ratio on or before 2026. In figure b. it corresponds to a One-time depreciation shock; in c. to a Exports shock; in d. to a One-time depreciation shock; in e. to a Exports shock and in figure f. to a One-time depreciation shock

2/ Sharp drop in grant element of new borrowing reflects a decline in the amount of new external borrowing, in part as a result of growing reliance on domestic financing.

Figure 2. Bhutan: Indicators of Public Debt Under Alternative Scenarios, 2016–2036 1/



Sources: Country authorities; and staff estimates and projections.
 1/ The most extreme stress test is the test that yields the highest ratio on or before 2026.
 2/ Revenues are defined inclusive of grants.

Table 1. Bhutan: External Debt Sustainability Framework, Baseline Scenario, 2013–2036 1/

(In percent of GDP, unless otherwise indicated)

	Actual			Historical Average	Standard Deviation	Projections									
	2013	2014	2015			2016	2017	2018	2019	2020	2021	2016-2021 Average		2026	2036	Average
External debt (nominal) 1/	94.1	93.6	94.5			105.8	113.0	110.7	101.0	89.6	81.3		44.8	6.7	
of which: public and publicly guaranteed (PPG)	94.1	93.6	94.5			105.8	113.0	110.7	101.0	89.6	81.3		44.8	6.7	
Change in external debt	19.0	-0.4	0.9			11.2	7.2	-2.3	-9.8	-11.3	-8.3		-6.6	-1.7	
Identified net debt-creating flows	21.7	27.1	18.4			20.8	23.7	8.0	-0.6	-4.8	-0.5		-5.4	2.2	
Non-interest current account deficit	22.6	24.0	26.8	14.3	12.4	26.6	29.7	16.8	10.5	-0.6	0.7		-4.2	3.9	-0.5
Deficit in balance of goods and services	20.4	21.5	20.8			26.4	28.0	18.6	8.5	0.9	0.3		-7.2	3.2	
Exports	29.5	29.2	28.7			26.7	25.7	29.5	35.2	38.4	38.4		40.5	29.8	
Imports	49.9	50.7	49.5			53.1	53.7	48.0	43.7	39.3	38.7		33.3	33.0	
Net current transfers (negative = inflow)	-6.9	-5.3	-4.0	-6.7	3.2	-6.7	-4.5	-5.4	-2.0	-2.2	-1.6		0.6	0.6	0.4
of which: official	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Other current account flows (negative = net inflow)	9.0	7.7	10.0			6.9	6.2	3.6	4.1	0.7	2.0		2.4	0.1	
Net FDI (negative = inflow)	-2.7	-0.5	-1.7	-3.0	4.2	-1.5	-1.5	-1.5	-1.5	-1.5	-1.5		-1.5	-1.5	-1.5
Endogenous debt dynamics 2/	1.8	3.7	-6.7			-4.2	-4.5	-7.4	-9.6	-2.7	0.3		0.3	-0.1	
Contribution from nominal interest rate	3.2	2.7	2.0			1.3	1.8	4.0	3.7	5.0	4.7		3.2	0.2	
Contribution from real GDP growth	-2.6	-3.6	-4.4			-5.5	-6.3	-11.3	-13.2	-7.7	-4.4		-2.9	-0.4	
Contribution from price and exchange rate changes	1.2	4.6	-4.3			...	...	...	...	...	...		...	...
Residual (3-4) 3/	-2.7	-27.6	-17.6			-9.6	-16.5	-10.2	-9.2	-6.5	-7.8		-1.1	-3.9	
of which: exceptional financing	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
PV of external debt 4/	...	...	107.5			120.4	127.6	123.3	111.7	98.3	88.4		46.6	4.6	
In percent of exports	...	...	374.9			451.5	496.3	418.4	317.3	255.7	230.1		114.9	15.3	
PV of PPG external debt	...	...	107.5			120.4	127.6	123.3	111.7	98.3	88.4		46.6	4.6	
In percent of exports	...	...	374.9			451.5	496.3	418.4	317.3	255.7	230.1		114.9	15.3	
In percent of government revenues	...	...	512.3			625.1	700.3	722.7	544.2	368.3	361.7		185.8	23.5	
Debt service-to-exports ratio (in percent)	19.5	33.6	22.9			19.6	24.1	24.4	17.1	22.6	21.4		15.0	4.5	
PPG debt service-to-exports ratio (in percent)	19.5	33.6	22.9			19.6	24.1	24.4	17.1	22.6	21.4		15.0	4.5	
PPG debt service-to-revenue ratio (in percent)	27.6	46.8	31.3			27.1	34.0	42.1	29.3	32.5	33.7		24.3	6.9	
Total gross financing need (Billions of U.S. dollars)	0.5	0.7	0.6			0.6	0.8	0.6	0.4	0.2	0.3		0.0	0.4	
Non-interest current account deficit that stabilizes debt ratio	3.6	24.4	26.0			15.3	22.4	19.1	20.3	10.7	9.0		2.3	5.5	
Key macroeconomic assumptions															
Real GDP growth (in percent)	3.6	3.8	5.2	7.4	3.0	6.0	6.4	11.3	13.9	8.5	5.2		8.6	6.1	5.0
GDP deflator in US dollar terms (change in percent)	-1.6	-4.7	4.8	2.9	7.6	-2.5	1.5	1.7	2.1	2.3	2.2		1.2	2.0	2.0
Effective interest rate (percent) 5/	4.3	2.8	2.3	3.5	1.6	1.4	1.8	4.0	3.8	5.5	5.6		3.7	6.7	3.1
Growth of exports of G&S (US dollar terms, in percent)	-11.5	-2.0	8.2	13.8	30.9	-3.9	4.0	29.8	39.0	21.2	7.6		16.3	9.7	5.2
Growth of imports of G&S (US dollar terms, in percent)	-8.8	0.5	7.5	9.6	19.9	10.9	9.2	1.3	5.8	-0.2	6.0		5.5	7.9	7.0
Grant element of new public sector borrowing (in percent)	...	...	...	...	...	10.5	14.3	13.3	20.4	45.2	51.4		25.9	52.6	2.0
Government revenues (excluding grants, in percent of GDP)	20.8	21.0	21.0			19.3	18.2	17.1	20.5	26.7	24.5		25.1	19.4	21.5
Aid flows (in Billions of US dollars) 7/	0.7	0.5	0.5			0.3	0.3	0.3	0.2	0.3	0.2		0.1	0.0	
of which: Grants	0.2	0.2	0.2			0.3	0.2	0.3	0.2	0.2	0.2		0.1	0.0	
of which: Concessional loans	0.5	0.3	0.4			0.0	0.1	0.1	0.1	0.1	0.1		0.0	0.0	
Grant-equivalent financing (in percent of GDP) 8/	...	...	...			14.3	11.7	12.1	6.9	6.6	5.4		1.5	0.3	1.3
Grant-equivalent financing (in percent of external financing) 8/	...	...	...			45.3	41.6	49.4	51.6	83.8	87.9		91.6	100.0	96.3
Memorandum items:															
Nominal GDP (Billions of US dollars)	1.8	1.8	2.0			2.1	2.3	2.5	3.0	3.3	3.5		5.1	10.5	
Nominal dollar GDP growth	1.9	-1.0	10.2			3.4	8.0	13.3	16.3	11.0	7.5		9.9	8.1	7.0
PV of PPG external debt (in Billions of US dollars)	...	...	2.1			2.5	2.8	3.1	3.3	3.2	3.1		2.4	0.5	
(PVt-PVt-1)/GDPt-1 (in percent)	...	...	...			18.1	17.0	12.2	6.7	-2.7	-3.2		8.0	-3.8	-1.1
Gross workers' remittances (Billions of US dollars)	...	...	...			...	...	...	...	...	...		...	...	...
PV of PPG external debt (in percent of GDP + remittances)	...	...	107.5			120.4	127.6	123.3	111.7	98.3	88.4		46.6	4.6	
PV of PPG external debt (in percent of exports + remittances)	...	...	374.9			451.5	496.3	418.4	317.3	255.7	230.1		114.9	15.3	
Debt service of PPG external debt (in percent of exports + remittances)	...	...	22.9			19.6	24.1	24.4	17.1	22.6	21.4		15.0	4.5	

Sources: Country authorities; and staff estimates and projections.

1/ Includes both public and private sector external debt.

2/ Derived as $[r - g - \rho(1+g)] / (1+g+\rho+g\rho)$ times previous period debt ratio, with r = nominal interest rate; g = real GDP growth rate, and ρ = growth rate of GDP deflator in U.S. dollar terms.

3/ Includes exceptional financing (i.e., changes in arrears and debt relief); changes in gross foreign assets; and valuation adjustments. For projections also includes contribution from price and exchange rate changes.

4/ Sizable capital grants are part of residuals.

5/ Assumes that PV of private sector debt is equivalent to its face value.

6/ Current-year interest payments divided by previous period debt stock.

7/ Historical averages and standard deviations are generally derived over the past 10 years, subject to data availability.

8/ Defined as grants, concessional loans, and debt relief.

9/ Grant-equivalent financing includes grants provided directly to the government and through new borrowing (difference between the face value and the PV of new debt).

Table 2. Bhutan: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2016–2036
(In percent)

	Projections							2036
	2016	2017	2018	2019	2020	2021	2026	
PV of debt-to-GDP ratio								
Baseline	120	128	123	112	98	88	47	5
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2016-2036 1/	120	110	106	103	102	100	114	92
A2. New public sector loans on less favorable terms in 2016-2036 2/	120	131	130	120	108	98	56	13
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2017-2018	120	128	133	120	105	95	50	5
B2. Export value growth at historical average minus one standard deviation in 2017-2018 3/	120	130	139	125	111	101	54	6
B3. US dollar GDP deflator at historical average minus one standard deviation in 2017-2018	120	134	138	126	110	99	52	5
B4. Net non-debt creating flows at historical average minus one standard deviation in 2017-2018 4/	120	129	129	117	103	93	49	5
B5. Combination of B1-B4 using one-half standard deviation shocks	120	131	146	132	117	106	57	6
B6. One-time 30 percent nominal depreciation relative to the baseline in 2017 5/	120	179	173	157	138	124	65	6
PV of debt-to-exports ratio								
Baseline	451	496	418	317	256	230	115	15
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2016-2036 1/	451	428	360	293	266	261	280	308
A2. New public sector loans on less favorable terms in 2016-2036 2/	451	510	441	342	280	256	139	43
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2017-2018	451	489	413	314	252	227	113	14
B2. Export value growth at historical average minus one standard deviation in 2017-2018 3/	451	636	924	701	569	516	264	40
B3. US dollar GDP deflator at historical average minus one standard deviation in 2017-2018	451	489	413	314	252	227	113	14
B4. Net non-debt creating flows at historical average minus one standard deviation in 2017-2018 4/	451	502	438	332	268	242	122	17
B5. Combination of B1-B4 using one-half standard deviation shocks	451	524	625	474	383	346	176	25
B6. One-time 30 percent nominal depreciation relative to the baseline in 2017 5/	451	489	413	314	252	227	113	14
PV of debt-to-revenue ratio								
Baseline	625	700	723	544	368	362	186	24
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2016-2036 1/	625	604	622	503	383	410	453	473
A2. New public sector loans on less favorable terms in 2016-2036 2/	625	720	762	587	403	402	225	66
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2017-2018	625	704	777	585	395	388	198	24
B2. Export value growth at historical average minus one standard deviation in 2017-2018 3/	625	715	812	611	417	413	217	31
B3. US dollar GDP deflator at historical average minus one standard deviation in 2017-2018	625	735	812	611	413	405	207	25
B4. Net non-debt creating flows at historical average minus one standard deviation in 2017-2018 4/	625	709	756	569	386	380	197	26
B5. Combination of B1-B4 using one-half standard deviation shocks	625	719	857	646	438	433	226	30
B6. One-time 30 percent nominal depreciation relative to the baseline in 2017 5/	625	981	1014	764	516	506	259	31

Table 2. Bhutan: Sensitivity Analysis for Key Indicators of Public and Publicly Guaranteed External Debt, 2016–2036 (concluded)

(In percent)

Debt service-to-exports ratio								
Baseline	20	24	24	17	23	21	15	4
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2016-2036 1/	20	24	23	16	23	22	20	29
A2. New public sector loans on less favorable terms in 2016-2036 2/	20	24	22	16	22	21	16	4
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2017-2018	20	24	24	17	23	21	15	4
B2. Export value growth at historical average minus one standard deviation in 2017-2018 3/	20	30	49	37	47	45	35	12
B3. US dollar GDP deflator at historical average minus one standard deviation in 2017-2018	20	24	24	17	23	21	15	4
B4. Net non-debt creating flows at historical average minus one standard deviation in 2017-2018 4/	20	24	25	18	23	22	16	5
B5. Combination of B1-B4 using one-half standard deviation shocks	20	25	34	25	33	31	23	8
B6. One-time 30 percent nominal depreciation relative to the baseline in 2017 5/	20	24	24	17	23	21	15	4
Debt service-to-revenue ratio								
Baseline	27	34	42	29	32	34	24	7
A. Alternative Scenarios								
A1. Key variables at their historical averages in 2016-2036 1/	27	33	39	28	32	34	32	44
A2. New public sector loans on less favorable terms in 2016-2036 2/	27	34	39	28	32	34	26	5
B. Bound Tests								
B1. Real GDP growth at historical average minus one standard deviation in 2017-2018	27	35	46	32	35	37	26	7
B2. Export value growth at historical average minus one standard deviation in 2017-2018 3/	27	34	43	32	34	36	28	9
B3. US dollar GDP deflator at historical average minus one standard deviation in 2017-2018	27	36	48	33	37	38	28	8
B4. Net non-debt creating flows at historical average minus one standard deviation in 2017-2018 4/	27	34	43	30	33	35	26	8
B5. Combination of B1-B4 using one-half standard deviation shocks	27	35	47	34	37	39	30	9
B6. One-time 30 percent nominal depreciation relative to the baseline in 2017 5/	27	48	60	42	46	48	34	10
<i>Memorandum item:</i>								
Grant element assumed on residual financing (i.e., financing required above baseline) 6/	13	13	13	13	13	13	13	13

Sources: Country authorities; and staff estimates and projections.

1/ Variables include real GDP growth, growth of GDP deflator (in U.S. dollar terms), non-interest current account in percent of GDP, and non-debt creating flows.

2/ Assumes that the interest rate on new borrowing is by 2 percentage points higher than in the baseline, while grace and maturity periods are the same as in the baseline.

3/ Exports values are assumed to remain permanently at the lower level, but the current account as a share of GDP is assumed to return to its baseline level after the shock (implicitly a an offsetting adjustment in import levels).

4/ Includes official and private transfers and FDI.

5/ Depreciation is defined as percentage decline in dollar/local currency rate, such that it never exceeds 100 percent.

6/ Applies to all stress scenarios except for A2 (less favorable financing) in which the terms on all new financing are as specified in footnote 2.

Table 3. Bhutan: Public Sector Debt Sustainability Framework, Baseline Scenario, 2013–2036
(In percent of GDP, unless otherwise indicated)

	Actual			Average ^{6/}	Standard Deviation ^{6/}	Estimate					Projections				
	2013	2014	2015			2016	2017	2018	2019	2020	2021	2016-21 Average	2026	2036	2022-36 Average
Public sector debt 1/	100.3	96.2	96.2			107.1	115.0	112.0	104.1	87.8	80.0		61.6	48.7	
<i>of which: foreign-currency denominated</i>	94.1	93.6	94.5			105.8	113.0	110.7	101.0	89.6	81.3		44.8	6.7	
Change in public sector debt	24.1	-4.1	0.0			10.9	7.9	-3.1	-7.9	-16.3	-7.8		-4.6	-2.0	
Identified debt-creating flows	1.2	-12.3	-5.7			-5.3	-6.2	-11.5	-15.5	-14.3	-9.1		-4.3	-1.9	
Primary deficit	1.6	-5.7	-3.1	-2.3	2.4	-2.2	-0.1	-1.8	-3.4	-9.2	-7.6	-4.0	-3.0	-0.2	
Revenue and grants	30.2	33.6	28.9			31.5	27.2	27.3	25.8	32.2	29.1		26.4	19.6	
<i>of which: grants</i>	9.4	12.7	8.0			12.3	9.0	10.2	5.3	5.5	4.6		1.4	0.3	
Primary (noninterest) expenditure	31.8	27.9	25.8			29.4	27.1	25.5	22.4	23.0	21.4		23.4	19.5	
Automatic debt dynamics	-0.3	-6.6	-2.6			-3.1	-6.1	-9.8	-12.1	-5.1	-1.5		-1.3	-1.7	
Contribution from interest rate/growth differential	-0.2	-1.5	-6.1			-12.1	-14.1	-15.8	-17.2	-10.1	-6.4		-4.2	-2.2	
<i>of which: contribution from average real interest rate</i>	2.4	2.2	-1.3			-6.6	-7.6	-4.0	-3.6	-2.0	-2.1		-0.4	0.2	
<i>of which: contribution from real GDP growth</i>	-2.6	-3.7	-4.8			-5.5	-6.5	-11.7	-13.6	-8.2	-4.4		-3.8	-2.4	
Contribution from real exchange rate depreciation	-0.1	-5.1	3.5			9.0	8.0	6.0	5.1	5.0	5.0		...	...
Other identified debt-creating flows	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Privatization receipts (negative)	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Recognition of implicit or contingent liabilities	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Debt relief (HIPC and other)	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Other (specify, e.g. bank recapitalization)	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Residual, including asset changes 2/	22.8	8.2	5.6			16.2	14.1	8.4	7.7	-2.0	1.3		-0.3	-0.1	
Other Sustainability Indicators															
PV of public sector debt	...	...	109.2			121.8	129.6	124.5	114.8	96.4	87.1		63.4	46.5
<i>of which: foreign-currency denominated</i>	...	...	107.5			120.4	127.6	123.3	111.7	98.3	88.4		46.6	4.6
<i>of which: external</i>	...	...	107.5			120.4	127.6	123.3	111.7	98.3	88.4		46.6	4.6
PV of contingent liabilities (not included in public sector debt)	...	...	...			...	...	...	...	...	...		...	...
Gross financing need 3/	7.3	8.7	3.0			3.4	5.7	2.6	2.4	-2.6	0.4		3.6	4.2	
PV of public sector debt-to-revenue and grants ratio (in percent)	...	...	377.3			386.0	476.7	456.5	445.3	299.4	299.5		240.0	236.9
PV of public sector debt-to-revenue ratio (in percent)	...	...	520.3			632.2	711.6	730.1	559.6	361.4	356.1		253.0	240.1
<i>of which: external 4/</i>	...	...	512.3			625.1	700.3	722.7	544.2	368.3	361.7		185.8	23.5
Debt service-to-revenue and grants ratio (in percent) 5/	18.8	27.9	21.3			17.6	21.1	16.1	22.6	20.5	27.5		25.0	22.0	
Debt service-to-revenue ratio (in percent) 5/	27.3	44.7	29.4			28.8	31.5	25.7	28.4	24.7	32.7		26.4	22.3	
Primary deficit that stabilizes the debt-to-GDP ratio	-22.5	-1.6	-3.1			-13.1	-8.0	1.3	4.5	7.1	0.2		1.5	1.9	
Key macroeconomic and fiscal assumptions															
Real GDP growth (in percent)	3.6	3.8	5.2	7.4	3.0	6.0	6.4	11.3	13.9	8.5	5.2	8.6	6.1	5.0	
Average nominal interest rate on forex debt (in percent)	4.3	3.0	2.3	3.6	1.6	1.4	1.8	4.0	3.8	5.5	5.6	3.7	6.7	3.1	
Average real interest rate on domestic debt (in percent)	9.0	-4.1	-4.0	-0.1	3.8	1.2	-2.2	-1.5	-0.4	0.5	1.4	-0.2	1.9	1.4	
Real exchange rate depreciation (in percent, + indicates depreciation)	-0.1	-5.5	4.0	1.7	8.1	...	...	...	...	...	...	...	...	...
Inflation rate (GDP deflator, in percent)	7.4	6.8	5.8	6.1	1.4	4.2	4.2	4.5	4.5	4.5	4.6	4.4	4.5	4.5	
Growth of real primary spending (deflated by GDP deflator, in percent)	-5.5	-8.8	-2.8	-1.7	3.1	20.7	-1.9	4.9	-0.2	11.5	-2.0	5.5	5.8	2.0	
Grant element of new external borrowing (in percent)	...	...	...	...	...	10.5	14.3	13.3	20.4	45.2	51.4	25.9	52.6	2.0

Sources: Country authorities; and staff estimates and projections.

1/ Gross government debt including hydro-related liabilities.

2/ Positive residuals reflect off-budget hydropower sector transactions, debt financing of which is included in the stock of public debt, and the associated interest payments are financed through the budget.

3/ Gross financing need is defined as the primary deficit plus debt service plus the stock of short-term debt at the end of the last period.

4/ Revenues excluding grants.

5/ Debt service is defined as the sum of interest and amortization of medium and long-term debt.

6/ Historical averages and standard deviations are generally derived over the past 10 years, subject to data availability.

Table 4. Bhutan: Sensitivity Analysis for Key Indicators of Public Debt, 2016–2036

	Projections							
	2016	2017	2018	2019	2020	2021	2026	2036
PV of Debt-to-GDP Ratio								
Baseline	122	130	125	115	96	87	63	47
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	122	126	125	124	111	104	75	26
A2. Primary balance is unchanged from 2016	122	128	122	114	101	97	76	36
A3. Permanently lower GDP growth 1/	122	130	126	117	100	91	75	77
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2017-2018	122	132	137	128	109	101	84	77
B2. Primary balance is at historical average minus one standard deviations in 2017-2018	122	130	126	116	97	88	66	50
B3. Combination of B1-B2 using one half standard deviation shocks	122	129	131	122	104	95	76	66
B4. One-time 30 percent real depreciation in 2017	122	181	171	156	135	125	99	75
B5. 10 percent of GDP increase in other debt-creating flows in 2017	122	138	132	122	103	93	70	53
PV of Debt-to-Revenue Ratio 2/								
Baseline	386	477	457	445	299	300	240	237
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	386	466	454	471	340	354	282	135
A2. Primary balance is unchanged from 2016	386	470	448	442	315	333	287	183
A3. Permanently lower GDP growth 1/	386	479	459	453	308	313	283	389
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2017-2018	386	484	485	486	334	343	316	389
B2. Primary balance is at historical average minus one standard deviations in 2017-2018	386	477	461	450	303	304	248	252
B3. Combination of B1-B2 using one half standard deviation shocks	386	475	470	467	318	324	287	336
B4. One-time 30 percent real depreciation in 2017	386	665	626	606	420	431	374	382
B5. 10 percent of GDP increase in other debt-creating flows in 2017	386	508	484	472	319	322	264	267
Debt Service-to-Revenue Ratio 2/								
Baseline	18	21	16	23	20	28	25	22
A. Alternative scenarios								
A1. Real GDP growth and primary balance are at historical averages	17	23	27	25	30	31	30	15
A2. Primary balance is unchanged from 2016	17	23	26	24	28	29	30	19
A3. Permanently lower GDP growth 1/	17	23	27	24	28	29	30	30
B. Bound tests								
B1. Real GDP growth is at historical average minus one standard deviations in 2017-2018	17	23	28	26	30	31	33	32
B2. Primary balance is at historical average minus one standard deviations in 2017-2018	17	23	27	24	28	29	28	21
B3. Combination of B1-B2 using one half standard deviation shocks	17	23	27	25	29	30	31	27
B4. One-time 30 percent real depreciation in 2017	17	28	38	35	40	42	43	36
B5. 10 percent of GDP increase in other debt-creating flows in 2017	17	23	28	25	29	29	30	23

Sources: Country authorities; and staff estimates and projections.

1/ Assumes that real GDP growth is at baseline minus one standard deviation divided by the square root of the length of the projection period.

2/ Revenues are defined inclusive of grants.