Fair Trading Commission

Final Decision

LONG RUN INCREMENTAL COST (LRIC)

GUIDELINES FOR IMPLEMENTATION BY CABLE & WIRELESS (BARBADOS) LIMITED

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PART ONE – BACKGROUND

1. The Fair Trading Commission (Commission) in its decision on Cable & Wireless (Barbados) Limited's (C&W) Consolidated Reference Interconnection Offer (RIO) dated February 22, 2010, determined that C&W should undertake a Long Run Incremental Cost (LRIC) study to determine interconnection costs and tariffs. The Commission also indicated that it would design guidelines which C&W would be required to follow when developing the LRIC study.

2. This Decision sets out the LRIC guidelines which will be used by C&W to develop the LRIC Model. The Commission was assisted by external consultants who are experienced in similar regulatory processes.

3. The LRIC guidelines will cover the principles used within the model, the specific assumptions and processes required by the Commission.

4. The provision of interconnection facilities on fair and efficient terms is widely recognised as an essential requirement for the creation of a competitive telecommunications market. This is because operators in a competitive market need to terminate calls on other operators' networks and similarly to receive calls originated on other operators' networks.

5. Furthermore it makes sense economically, especially as competition develops, for competing operators to use each other's core networks for transit purposes and often this will be the most efficient way that a new entrant can provide some services. Interconnection charges can account for a substantial portion of an operator's costs. It is therefore important that interconnection rates be derived from appropriate costs which provide proper economic signals to operators to guide their investment decisions.

6. To determine interconnection charges from a LRIC study requires a modelling exercise that utilises an efficient operator's cost and demand

estimates. The objective of the model is to estimate the cost that C&W when operating efficiently would incur in providing interconnection services in a competitive market. The modelling exercise involves:-

- Estimating the direct costs of providing the interconnection service over the long run (this allows for inclusion of all associated capital investments which would not be incurred annually);

- Including a capital cost component that reimburses the operator for the cost of financing network equipment associated with interconnection services;

- Taking into consideration a reasonable attribution of costs that are not directly caused by interconnection services but are incurred by C&W in connection with its interconnection facilities and services, for example, salaries. These are referred to as joint and common costs.

7. There are various LRIC approaches and the Commission will be using the Total Service Long Run Incremental Cost (TSLRIC) approach. Such an approach measures the total costs of all services for the associated network elements and then attributes a proportion of these costs to the relevant interconnection services.

8. Some of the benefits of having interconnection rates based on LRIC are that they:

(a) encourage efficient competition in the wholesale market which leads to competition in the retail market;
(b) send economic signals that promote efficient forward-looking investment decisions;
(c) facilitate effective means of interconnection; and
(d) are non-discriminatory and non-preferential.

PART TWO – LEGISLATIVE FRAMEWORK

9. The Commission is a statutory body established by the Fair Trading Commission Act CAP. 326B of the Laws of Barbados with responsibility for, *inter alia*, regulating utility services, safeguarding the interests of consumers and promoting and maintaining effective competition in the Barbados economy. The Commission currently regulates the domestic and international telecommunications services of C&W and the country's sole provider of electricity the Barbados Light & Power Company Limited.

10. Section 4 (3) (a) of the Fair Trading Commission Act allows the Commission to:

> "*Establish principles for arriving at the rates to be charged by service providers*."

11. A similar provision exists under Section 3 (1) (a) of the Utilities Regulation Act, CAP. 282 of the Laws of Barbados while Section 6 (1) (d) of the Telecommunications Act CAP. 282B of the Laws of Barbados states that the Commission shall:-

> *"Establish and administer mechanisms for the regulation of prices in accordance with this act, the Fair Trading Commission Act and the Utilities Regulation Act;"*

12. Further, the provisions of the Telecommunications Act, CAP. 282B "TA" Section 27 (3) also state, *inter alia*, that the Commission shall:-

> "*(a) consult with the carrier providing the RIO and any other carriers likely to seek interconnection to that carrier's network."*

13. The Commission is of the view that this provision also supports the Commission's decision to consult on the development of the interconnection rates. Notwithstanding that the provision deals primarily with consulting on the RIO and that the Commission has already completed its consultation on the C&W Consolidated RIO, the Commission is of the view that interconnection rates form a critical part of the RIO and as such it is

appropriate that there should be consultations on Guidelines that will be used to develop interconnection rates**.**

14. In carrying out its duties as a regulator, the Commission must operate in a transparent, accountable and non-discriminatory manner. Consultative documents and the public consultation process are the main ways in which the Commission discharges its responsibilities relating to transparency and accountability.

15. Section 4 (4) of the Fair Trading Commission Act, CAP. 326B states:

> *"The Commission shall, in performing its functions under subsection (3) (a), (b), (d) and (f), consult with the service providers, representatives of consumer interest groups and other parties that have an interest in the matter before it."*

CONSULTATION PROCESS

16. The consultation related specifically to LRIC Guidelines for C&W, which are to be followed by C&W when developing the LRIC model.

17. Service providers, representatives of consumer groups and other interested parties were invited to comment on the consultation paper. The consultation period concluded on July 8, 2011 at 4:00p.m.

18. The Commission received responses to the LRIC Consultation document from C&W, Digicel (Barbados) Limited (Digicel) and CARITEL.

19. In addition, to responding to the ten (10) specific questions that were set out in the consultation document, stakeholders made more general comments on the overall process.

20. The Commission thanks C&W, Digicel and CARITEL for responding.

PART THREE – RESPONSE TO CONSULTATION

21. Having considered all responses, the Commission summarises below the general comments made by stakeholders in their submissions, followed by the Commission's position on the LRIC Guidelines.

MODEL SPECIFICATION

22. C&W sought clarification on when the Company would need to provide the Commission with the detailed model specifications. It also asked the Commission to clarify whether the model specifications to be supplied are the same as those required to be submitted as part of the model documentation once the LRIC model has been developed.

The Commission's Position

23. **The Commission is of the view that as a first step after the LRIC guidelines have been published, C&W must provide the Commission with proposed model specifications consistent with the guidelines. The Commission will then review the proposed model specifications and provide feedback to C&W on any required amendments. C&W will then need to develop the LRIC model based on these agreed model specifications.**

24. **During the model development process the model specifications may require modification with the agreement of the Commission. The final model specification, including any modifications, will then form part of the general reporting and documentation requirements for the LRIC model which is submitted to the Commission, along with the LRIC model itself.**

TRANSPARENCY

25. Digicel raised its concern about the overall level of transparency within the LRIC modelling process, as the model will be developed by C&W and then reviewed by the Commission. This concern particularly relates to the mobile network model, as this model could be used to also set interconnection rates

for Digicel. In this context, Digicel made the following comments and suggestions:-

- To prevent potential misallocation of costs between C&W's fixed and mobile networks, the development of separate LRIC models for each network.
- The co-existence of a Calling Party Pays (CPP) regime and a Receiving Party Pays (RPP) regime in Barbados needs to be considered in the LRIC modelling process.
- Any LRIC model template should contain 'real' information for key modelling parameters rather than 'dummy' numbers to allow interested parties to review the model.
- The LRIC model template should allow for a range of sensitivity analyses to allow stakeholders' to review the model.

The Commission's Position

26. **The Commission notes Digicel's concern on the degree of transparency within the overall LRIC modelling process. However, prior to addressing the specific issues raised by Digicel, it would like to clarify the overall process, in particular the treatment of confidential information and the review of the model.**

27. **As set out in the LRIC consultation document, C&W will be required to develop the LRIC models for the fixed and mobile networks. These models will need to be developed in line with the LRIC guidelines and the model specifications consistent with these guidelines. Once the LRIC models have been built and populated, C&W will submit the models, including detailed model documentation to the Commission. The Commission will review the submission (i.e. model templates, input data and supporting documentation) to ensure that the models are in line with the requirements set out in the guidelines. When the Commission is satisfied that this has been done the model results will be accepted and will then form the basis**

for any regulatory pricing decisions. For the avoidance of doubt, it should be noted that the Commission does not foresee publishing the LRIC modelling tool or any underlying data given that the information is commercially sensitive.

28. **The above approach is designed to ensure an efficient and timely process for developing LRIC estimates for interconnection services. The Commission further took into consideration confidentiality concerns with regard to input data and assumptions required for a LRIC model.**

29. **The Commission also recognises that the overall LRIC process needs to be transparent, subject to confidentiality and efficiency objectives, and should allow for active participation by all interested stakeholders, where possible. As such, the Commission will invite Digicel and other parties who responded to the consultation to also provide input data or benchmarks for the LRIC model (once the LRIC draft model has been developed). This information would be used by the Commission to verify the input data provided by C&W and the LRIC model results, whilst ensuring confidentiality of any data provided by each stakeholder. C&W response to any proposed revision will be taken into consideration.**

30. **After the development of the LRIC Model, the Commission will make a presentation on the LRIC results, proposed output rates and the underlying assumptions. Thereafter, interested parties will be permitted to submit further responses. These responses will be taken into account when making a final determination of interconnection rates.**

31. **Concerning the specific issues raised by Digicel, the Commission responds as follows:**

- **Separate LRIC models for fixed and mobile networks - C&W will be required to develop separate LRIC models for its fixed and mobile network businesses based on the guidelines. However, it is for C&W to decide whether it will present these calculations in a single**

workbook or in two separate workbooks Under the hybrid approach of using a bottom-up approach to derive network cost estimates separately for fixed and mobile and a top-down approach for operating and common costs, there is only limited potential to misallocate costs between the two networks. The required expense factors for these two cost types will be informed from C&W's Enhanced Allocation Model cost model (EAM), adjusted to take account of the factors that would allow costs of the modelled efficient operator to differ from the level of costs reported. The Commission undertook a review of the EAM and a report was received in May 2011. Any resulting inputs to the LRIC model will be further reviewed as part of the overall LRIC model review, which will take account of the potential incentive for C&W to misallocate costs.

- **CPP vs. RPP regimes in Barbados - The Commission considered the prevailing different charging regimes for fixed-to-mobile calls which use receiving party pays (RPP) and for mobile-to-mobile calls which use calling party pays (CPP). The Commission does not believe that this will have a significant impact on the cost modelling exercise.**
- **'Real' information - As mentioned above, the Commission will not publish the LRIC modelling tool or any underlying data for confidentiality reasons.**
- **Sensitivity analysis - The LRIC guidelines require C&W to construct the model to allow the Commission to perform sensitivity analysis in the following areas:-**
    - Demand forecasts;
    - Market share assumption of the hypothetical operator;
    - Equipment prices;
    - Network Quality of Service (or proxies such as utilisation levels);
    - WACC values;
    - Adjustments applied to operational expenditure;
    - Capital cost annualisation methodologies; and
    - Asset lives.

The Commission considers this list to be adequate to allow for a full review of the LRIC models.

WEIGHTED AVERAGE COST OF CAPITAL (WACC) ASSUMPTIONS

32. Digicel stressed the importance of the Weighted Average Cost of Capital (WACC) assumption in the overall LRIC modelling process and requested a separate consultation on the WACC values to be used for the fixed and mobile network LRIC models.

The Commission's Position

33. **The Commission determines that C&W must submit a WACC estimate but does not believe that consultation on the WACC will be required as the WACC estimate will be reviewed by the Commission. The Commission also invites respondents to submit their estimates of relevant industry WACC. The Commission would then consider all of the information provided.**

RESPONSES TO SPECIFIC CONSULTATION QUESTIONS

Consultation Question 1 - TSLRIC Definition

34. *Do you agree with the proposed definition of 'total service' increments for the TSLRIC model?*

35. All three respondents agreed in principle with the proposed TSLRIC definition. However, several additional comments were raised in this context. In particular:

C&W sought clarification that it was not necessary to calculate a detailed geographic costing of the fixed access network or to utilise component quantities that are different from those currently in use in Barbados.

Digicel stressed the importance of the costs relating to wholesale billing, fraud, bad debt and bypass be included in the LRIC model as these are directly related to the provision of interconnection services.

CARITEL agreed with the development of a LRIC model, but stressed the importance for the Commission to retain the option to apply benchmarking when setting interconnection charges.

The Commission's Position

36. **The Commission welcomes the agreement on its proposed TSLRIC definition. Concerning the additional issues raised, it responds as follows:**

- **Fixed access network increment - The Commission agrees that, given the current market and regulatory environment in Barbados, there is currently no need to model the fixed access network in detail. However, the fixed access network increment in the LRIC model is required to allow an appropriate attribution of any shared costs between the fixed core and fixed access increments.**

- **Cost items included in interconnection services - The Commission agrees with the need to include non-network costs relating to wholesale service provision in the final regulated wholesale charges. The Commission will require C&W to separately identify such costs.**

- **Benchmarking - The Commission and its consultants will take account of benchmarking information when reviewing the LRIC model in order to ensure that the model results reflect the best possible estimate of the costs of an efficient operator in Barbados.**

37. **In view of the above, the Commission has maintained its definition of "total service" increment.**

Consultation Question 2 – Overall Modelling Approach

38. *Do you agree with the proposed approach of using a bottom-up approach to derive network cost estimates and a top-down approach for operating and common costs?*

39. **Digicel** and **CARITEL** commented on this issue:-

- **Digicel** raised the concern that a 'pure' bottom up approach could commonly lead to underestimating the cost of providing interconnection services. Digicel advocates the application of a 'pure' top-down approach but if a bottom-up approach is implemented it should only be used to inform a top down approach.

- **CARITEL** objected to the proposed approach since it believed that only a 'pure' hybrid model could ensure that no inefficiencies are included in the LRIC model. CARITEL further objected to the proposal that the LRIC model will be based on legacy equipment (especially copper-based infrastructure) as this would set the wrong incentives for new entrants wishing to invest in new technologies (such as fibre-based infrastructure and 4G/LTE technologies).

The Commission's Position

40. **The Commission's proposed approach is a hybrid approach which incorporates a bottom-up approach to derive network cost estimates and a top-down approach for operating and common costs (rather than a 'pure' bottom-up approach). The Commission is of the view that this approach is likely to provide the most robust and accurate estimates of the cost of wholesale services. Adopting this modelling approach has the benefits of allowing the company to accurately forecast service costs over the medium term and to provide greater flexibility compared to a top-down approach.**

41. **The Commission disagrees with the suggestion to ignore legacy infrastructure and instead to base the LRIC model entirely on fibre and 4G technologies. An approach based on the current technology used to deliver voice services is likely to provide a more accurate view of the cost of an efficient operator than hypothetical models based on technologies such as 4G/LTE and Fibre-To-The-Premises which are in the process of deployment and in the case of 4G, cannot currently deliver traditional voice services.**

The inclusion of LTE (4G mobile technology) in a model, the primary purpose of which is to estimate the cost of voice termination in the next three years is not warranted. To date voice over LTE has not been standardised. This is in line with international practice.

42. **The Commission determines that the hybrid approach would be used.**

Consultation Question 3 – Modelling period

43. *Do you agree with the proposed four-year modelling period of the TSLRIC model with outputs produced for each of the four years?*

44. **C&W** and Digicel commented on this issue:-

- **C&W** had no objection to the Commission's proposal, but preferred a three year modelling period. However, C&W objected to the proposed incremental build-out assumption proposed by the Commission, as this would add unnecessary complexity to the LRIC model (relative to an instantaneous built-up assumption – i.e. a single year model).
- **Digicel** preferred a five year modelling period, as this would be closer in line with its planning horizon for interconnection agreements.

The Commission's Position

45. **The Commission determines that its original proposal of a four year modelling period represents an adequate balance between having a forward looking view of costs and forecast accuracy.**

46. **The Commission is still of the opinion that a model that produces results for multiple years is necessary. However, it understands C&W's concern that a model where the network dimensioned in each year is dependent on previous years' network dimensions could lead to an overly complex model. The Commission has decided that it would accept a multi-year model for a period where the network dimension in each year was solely a function of the demand in that year (an instantaneous build assumption).**

Consultation Question 4 – Market Share Assumptions

47. *What are your views on the proposed market share assumptions within the model?*

48. **Digicel** commented on this issue stating that although agreeing on the underlying principle, the Commission should apply a 33.3% market share assumption in the mobile LRIC model (i.e. assuming a hypothetical three player market).

The Commission's Position

49. **The Commission recognises that there are currently three mobile network licences available in Barbados. However, only two of these are currently used to provide services to end users. Given the current macro-economic environment, the size of the overall market, the limited success of market entrants in markets at a similar stage of development and the consolidation trends elsewhere, a continuation of the current two players market appears to be a more credible outcome than the proposed three players market for the period forecast in the model.**

50. **As such, the Commission determines that the 50% market share assumption of the mobile LRIC model is reasonable.**

Consultation Question 5 – Technology Assumptions

51. *What are your views on the technology assumptions proposed for the hypothetical fixed and mobile network operators?*

52. **Digicel** and **CARITEL** commented on the proposed technology assumption.

- **CARITEL** agreed with the proposal that the fixed LRIC model will be based on IP and NGN technology, but sought clarification on how the Commission would verify C&W's costing and technology assumptions, as this process was not set out in the consultation document. CARITEL further suggested that the mobile LRIC model should not solely be

based on the current 2.5G technology but also take into account 4G technology. This would ensure that the LRIC model is forward looking and hence provide the correct incentives for new entrants.

- **Digicel** proposed the inclusion of 2G (or 3G) technology in the mobile LRIC model, plus an element of LTE used for the provision of data services only.

The Commission's Position

53. **The Commission believes that the timing and extent of the deployment of new technologies in a jurisdiction is difficult to accurately predict. In addition the cost and technical characteristics of equipment not yet widely deployed will be subject to a great degree of uncertainty. As such, the Commission is of the view that LRIC models reflecting the current technologies used to deliver voice services in Barbados would provide the most accurate and appropriate bases for setting regulated prices. This approach is consistent with a forward looking LRIC model, as the model will be based on future demand assumptions and the cost of the networks able to meet this demand. As such, the Commission remains of the view, that its current technology assumptions are appropriate.**

54. **The Commission advises that verification of the costing and technology assumptions proposed by C&W will form part of the general model review process, following submission of the LRIC models by C&W. The Commission will review any input data and assumptions based on international benchmarks, information contained in C&W's EAM model and information provided by other stakeholders. This is in line with approaches taken elsewhere and will allow for a rigorous review of the LRIC models.**

Consultation Question 6 – Scorched-Node Assumptions

55. *Do you agree that the TSLRIC model should be based on a scorched-node approach?*

56. All three respondents agreed, in principle, with the proposed scorched-node approach. However, **C&W** and **Digicel** proposed the definition of mobile network nodes should include current base station sites.

The Commission's Position

57. **The Commission notes the positive feedback on the scorched-node approach proposed for the LRIC models. The Commission believes that the comments on mobile network nodes are well founded and has included existing base station sites as nodes for the purpose of defining 'scorched nodes'.**

Consultation Question 7 – Tilted Annuity Assumptions

58. *Do you agree with the proposed use of a tilted annuity to estimate capital costs?*

Of the two responses received on this issue, **CARITEL** agreed with the proposed tilted annuity approach and **Digicel** stated a preference for a straight-line depreciation approach (without providing further justification for this preference).

The Commission's Position

59. **Within the consultation paper, the Commission had set down the three most common approaches for costing fixed assets, including the main advantages and disadvantages associated with each of them. As no further evidence in support of any alternative approach has been brought forward by the respondents, the Commission determines that the tilted annuity approach is the preferred option. This approach would be in line with the approach taken in several other jurisdictions, e.g. Australia, Sweden**

Consultation Question 8 – Treatment of Operating Costs

60. *Do you agree with the proposed approach to operating costs?*

61. **Digicel** and **CARITEL** responded to this question.

- **CARITEL** stated that it had no objection to the overall proposed approach, as long as the Commission (and its consultants) reviewed any input data carefully and, if need be, reverted to benchmarking data instead.
- **Digicel** reiterated its concern about the need for transparency within the overall process.

The Commission's Position

62. **As stated earlier, the Commission recognises the need for transparency throughout the LRIC modelling process. It further encourages Digicel and any other interested stakeholder to also submit relevant information on the level of costs to the Commission. The Commission will communicate information requirements with the respondents to the consultation when the detailed model specification has been finalised. This information would also be used by the Commission to verify the input data provided by C&W, whilst ensuring full confidentiality of any data provided by each stakeholder.**

63. **The data to be used in the LRIC model will be assessed in conjunction with information submitted by other stakeholders and available international benchmarking data.**

Consultation Question 9 – Treatment of Shared Costs

64. *What are your views on the proposed approach to shared costs between different networks?*

65. **Digicel** commented on this issue, stating that the LRIC model should not assume any network sharing. In particular, allowing for network sharing between countries in the LRIC model would place any new entrant (or operator which does not benefit from the same degree of international network sharing) at a disadvantage. Digicel further stated that intra-country

network sharing, such as tower sharing, would also not necessarily lead to any cost reductions due to existing capacity constraints on certain sites or unsuitable locations of some sites.

The Commission's Position

66. **Given that both mobile operators have similar footprints in the region, it is unclear how the assumption of international network sharing would discriminate against either operator. The potential disadvantage to a hypothetical new entrant does not in itself seem to be a valid reason to increase the estimated cost above an efficient level, based on the operations of the existing two mobile operators.**

67. **Concerning sharing of network assets within Barbados, the Commission remains of the view that any existing network sharing needs to be accounted for in the LRIC models.**

Consultation Question 10 – Reporting Requirements

68. *What are your views on the general reporting requirement for the TSLRIC model?*

69. Two responses were received on this issue.

- **CARITEL** requested further clarification on how the LRIC model will be audited (for example, whether the Commission would retain any consultants for this review). It further queried how the overall process would provide reliable cost estimates for services currently not provided by C&W, in particular Wireless Local Loop (WLL) services, fibre-based (FTTx) services, and calling card services.
- In addition to reiterating the need for the LRIC model to allow for a wide range of sensitivity analyses, **Digicel** set out a list of additional, specific reporting requirements to allow for a comprehensive review of the model by all interested parties.

The Commission's Position

70. **The Commission confirms that it has retained external consultants to support it during the entire LRIC model development process (including the preparation of the LRIC guidelines the review of the LRIC model and the model results).**

71. **The main aim of the LRIC models is to inform interconnection rates for the services contained in C&W's RIO. Other services will not form part of this costing exercise.**

72. **The Commission appreciates Digicel's proposed additional reporting requirements. However, it determines that the suggested additions are too specific to be included in the LRIC guidelines. The Commission will consider these requirements further when engaging with C&W on the exact model specifications. The Commission wishes to reiterate that the LRIC models will not be made public and review will be undertaken by the Commission.**

PART FOUR – LRIC GUIDELINES DECISION

73. Based on the foregoing discussion and consideration of the responses the Commission has determined the requirements for the guidelines to be used by C&W in the LRIC modelling process. The LRIC Guidelines as set by the Commission are presented in this section.

OVERALL PROCESS

74. This LRIC exercise will be conducted assuming an efficient operator and costs calculated using estimates of future forward looking demand. Other assumptions in the modelling process include consideration of the planning period to be used in the model, whether or not the network is designed using the actual C&W network, the market share of C&W fixed and mobile networks and the type of technology to be used for the fixed and the mobile networks. Costing issues such as the type of depreciation, the valuation of assets, estimation of operating costs and the sharing of costs between different networks also form part of this exercise and are discussed in these guidelines.

The Modelling Process

75. The TSLRIC model implementation process will consist of three main phases:

(a) **Publication of TSLRIC guidelines -** The Commission has finalised the guidelines taking due regard of any comments received during the public consultation period.

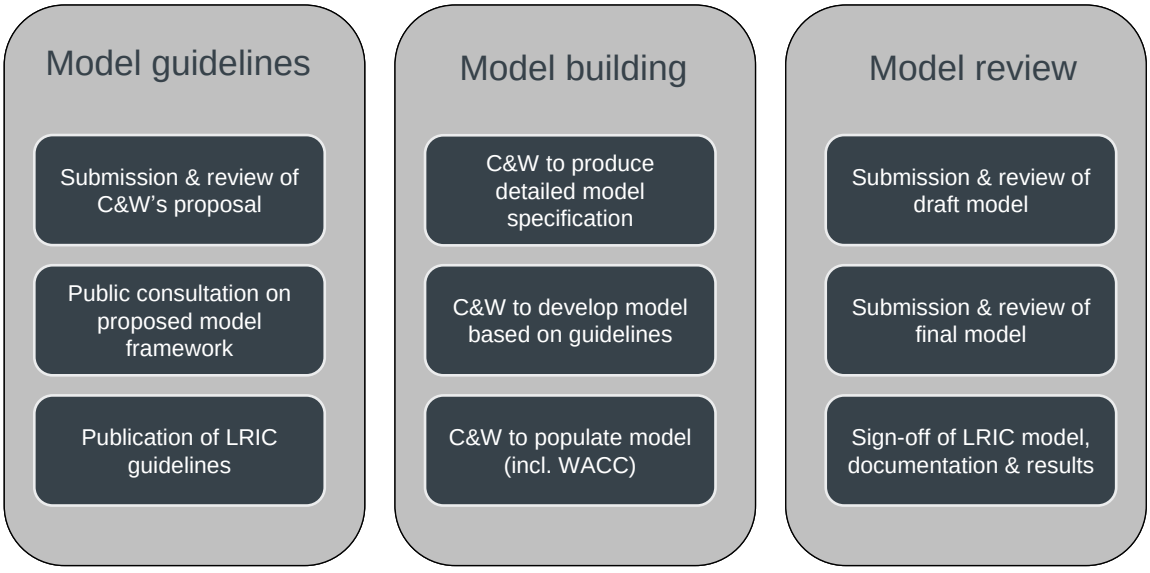
(b) **Model specification and building** - Following the publication of the guidelines, C&W will be required to set out the specifications of the TSLRIC model consistent with the guidelines and build the model based on these specifications. The specifications which will include the conceptual design together with input and output formats must be reviewed and approved by the Commission.

(c) **Review of C&W's TSLRIC model** - Upon C&W's submission of the draft TSLRIC model, the Commission will review the model to ensure

that the modelling approach is consistent with the guidelines. The Commission will seek to ensure that the model is accurate and free from errors and bias. The burden of proof will be on C&W to satisfy the Commission that the model and its inputs are accurate and consistent with the guidelines. In addition the respondents to the Consultation Paper will be invited to submit to the Commission any benchmarking and factual evidence on network costs and the cost of providing relevant interconnection services in Barbados. The Commission will then review and verify any submitted information to ensure that any relevant information is reflected in the TSLRIC model. Information provided to the Commission as part of this process will be treated in confidence. Where the Commission is not satisfied that the model is fit for purpose, C&W will be directed to produce evidence to justify assumptions and/or make modifications to the model calculations and input assumptions in order to resolve any issues identified. The review process will finish when the Commission is satisfied that the model is fit for purpose.

76. The model development process is summarised at Figure 1.

Figure 1 TSLRIC Model Development Process Stages



77. For the avoidance of doubt, C&W will be required to develop separate TSLRIC results for each of its fixed and mobile network businesses based on the guidelines. However, it is for C&W to decide whether it will present these calculations in a single workbook or in two separate workbooks.

78. The Commission will review the output of C&W's cost models and utilise any further information provided by the respondents to the presentation on the model, as well as available benchmarking data. The resulting TSLRIC estimates will be used to inform interconnection rates for the services contained in C&W's RIO. The Commission may direct C&W to submit new interconnection rates if warranted.

ISSUES IN NETWORK MODELLING

79. Implicit in the TSLRIC definition is that prices should reflect efficient forward looking costs, i.e. the costs of delivering services using the most efficient technology for meeting current and future demand.

80. The "*IC*" in TSLRIC refers to "incremental cost" which can be defined as the change in overall cost for the company as a whole if it were not to deliver a service or group of services (the "increment"), where a company produces a large number of different services. Incremental cost approaches are based on the theory that efficient prices for services in perfectly competitive markets should reflect the cost of delivering these services.

81. The "*LR*" means that the incremental costs are measured over the long run including both costs that may vary in the short run, such as operating expenditure, and also costs which vary in the long run such as the cost of fixed assets. The long run view takes into account the need for operators to recover the costs of assets in order to ensure continued investment in the network.

82. The *"TS"* refers to a "total service" approach, where the increment is defined as all relevant services provided by a network, with the costs of delivering individual services, for example interconnection services, estimated by distributing the cost of each element of the network over the services that use that element. A total service approach takes account of the large fixed and common costs within telecommunications networks which are not causally related to any single service, but which are required to deliver the totality of services. Under a total service approach, all services make a proportionate contribution to the recovery of these fixed and common costs.

"Total Service" Increment

83. For the purpose of calculating TSLRIC estimates, one must define the services to be included in the "increment" which will be used to determine costs. The increments defined must include the specific interconnection services for which costs are to be determined but will also include other services which make use of shared network components. This will ensure that interconnection services recover a proportion of any network fixed and common costs.

84. The Commission has defined two increments for which TSLRIC estimates will be calculated:

- A 'fixed core network' increment consisting of those elements of the fixed network that are sensitive to the level of traffic; and
- A 'mobile network' increment, consisting of the total mobile network.

85. Within its fixed network related TSLRIC model, C&W should further define a "fixed access network" increment consisting of those elements of the network which are sensitive to the number of subscribers, for the purpose of excluding the costs of these elements from the calculation of interconnection costs. However the costs of this increment do not need to be modelled in detail, but can be based on the costs reported in the EAM.

86. Within its mobile network related TSLRIC model, C&W should further define a subscriber increment consisting of those elements which are sensitive to the number of subscribers, for the purpose of excluding the costs of these elements from the calculation of interconnection costs.

87. These increments are detailed in Table 1 below.

Table 1. Increment Definitions

Increment	Services
Fixed core network	**Voice calling services** (domestic on-net, domestic off-net, domestic directory enquiry, emergency services, internet dial-up, voicemail, domestic payphone, domestic operator assistance, outgoing international & incoming international)
	Interconnection service (fixed termination, directory enquiry, emergency services, international fixed termination, national transit, international incoming transit & international outgoing transit)
	Other – transmission capacity based – services (IP direct connect, domestic leased lines transmission, international leased lines, other data)
Mobile network	**Voice calling services** (domestic on-net, domestic off-net, voicemail, outgoing international & incoming international)
	Interconnection service (domestic voice termination, international voice termination, SMS termination & inbound roaming)
	Subscriber services (the provision of a mobile subscription – to be excluded from interconnection services)
Fixed access network	**Access lines** (PSTN, ADSL, ISDN & leased lines local connections)

88. The "fixed traffic" increment is therefore defined as the entire group of services using the fixed core network, which is in line with definitions adopted internationally. The cost of providing this wider group of services will then be divided by the total volume of demand in the core network increment to produce the average incremental cost per unit of traffic.

Bottom-up versus Top-down TSLRIC Models

89. TSLRIC models can be developed on a "top-down" or a "bottom-up" basis. A top-down model is based on (and reconciles to) the operator's reported costs of the business from the financial statements. In contrast, a bottom-up model estimates the costs that a hypothetical network operator would face in order

to meet a given level of demand based on a series of engineering rules and input cost data. A third option is to combine a bottom-up cost model with top-down cost information from the operator. This third approach is commonly referred to as a "hybrid" model.

90. The Commission has decided to adopt a hybrid approach in the TSLRIC guidelines using a bottom-up approach to derive network capital cost estimates and a top-down approach for operating and common costs data, with a provision that any cost data drawn from C&W's financial accounts must be adjusted where appropriate to reflect the efficient operation of the modelled hypothetical network operator. This approach shall strike an appropriate balance between accuracy and reflecting efficient forward looking costs. In C&W's case the fixed network is in a period of transition from legacy Time Division Multiplex (TDM) technology to an IP based next generation network. As a result it is likely that a top-down approach would result in service costs that did not reflect true forward looking costs.

Timescale of model

91. Regulated prices should be set on a forward looking basis, to reflect the costs of delivering the services in the future rather than the costs of delivering those services in the past. In addition networks are designed to efficiently meet foreseeable demand over the medium term rather than to minimise costs and thus some forecast of future demand is necessary. A period of four years into the future is therefore reasonable as forecasts over any longer period would be subject to a high degree of uncertainty.

92. The Commission requires the model to be populated to produce outputs for each year from the latest year for which financial data is available to four years on.

Market Share Assumptions

93. In a multi-operator market, such as the mobile market, it may not be appropriate to set prices based on the costs of any given operator but instead to establish a hypothetical, "efficient" operator. Typically when there are multiple operators in the mobile market regulators have assumed that each operator has an equal share of the market. In the case of the fixed market, it may be appropriate to set prices based on actual market share. However, the model shall also be able to run a range of sensitivities including those based on C&W's market share.

94. The Commission requires C&W to construct the model such that it can produce results based on C&W's actual and forecasted demand of its fixed network operations and for a hypothetical mobile operator with a 50% share of the market.

Technology Assumptions

95. Two key decisions required when developing TSLRIC models are:

(i) the technology that should be included in the model and

(ii) the network architecture that should be modelled. The main fixed and mobile technology assumptions are set out below, followed by a discussion on the network design assumption.

Fixed Network

96. The Commission considers that modelling the fixed network services using IP-based NGN technology to be consistent with the TSLRIC methodology as it reflects the technology that would be used by a new operator entering the market today and it appears to be in line with the network evolution in Barbados. It is also in line with C&W's transition to NGN architecture.

Mobile Network

97. The timing and degree of new technologies being deployed in any jurisdiction is inherently difficult to accurately predict. As such, the Commission is of the view that the LRIC models shall reflect the current technologies in Barbados used to deliver voice services rather than any assumptions on future technology deployments. This approach is still consistent with a forward looking LRIC model, as the model will be based on future demand assumptions and networks being able to meet this demand.

Network Design Assumptions

98. A key element of any TSLRIC model specification is the network design assumptions. The proposed assumption for the key network design parameters are set out below.

99. Bottom-up TSLRIC models can involve varying degrees of optimisation in terms of how closely the modelled network matches the actual network deployed by the regulated operator. The degree of optimisation relates to both the choice of "nodes" to be modelled and to the choice of technologies.

100. Models can be developed either under the "scorched node" or "scorched earth" basis. A "scorched earth" approach means the model is independent of the existing network locations while a "scorched node" approach builds the model on the basis of the existing network locations, with varying levels of optimisation. A "scorched node" approach is generally used in LRIC models.

101. C&W shall adopt a "scorched node" approach as this approach attempts to balance the need to model an efficient network with the constraint of the existing network topology in Barbados. Under the "scorched node" assumption, the nodes are defined as existing network buildings and existing base station sites for the mobile network.

Service Quality levels

102. The network dimensioning rules will also need to take account of service quality. C&W needs to ensure that the modelled network would provide services at a level of quality and functionality, which at a minimum meets the level that C&W offers today to interconnecting operators based on the existing technology.

Demand Assumptions

103. Due to the forward-looking nature of the LRIC modelling the LRIC model shall reflect the cost of networks which are able to efficiently meet the expected demand in the foreseeable future.

104. The overall structure of the network shall reflect foreseeable demand, as it would not be efficient to change the structure of the network from year to year. However it may be reasonable to increase the capacity of certain network elements over time to reflect expected demand in the shorter term, for example increasing mobile base station capacity to reflect increases in demand in the next year. The networks assumed within the LRIC models should be designed to meet expected peak demand in the medium term (defined as four years from the date when the model is finalised) with capacity in each year of the model to meet the peak demand in the following year. For ease of modelling it would be acceptable to model network dimension in each year independently of previous years, and 'instantaneous build' approach.

105. As part of the LRIC model exercise, C&W shall develop demand forecasts for each of the services contained in the models. The demand forecasting may be undertaken within the LRIC model or it can form an input to the model. However, C&W will have to provide its analysis and supporting evidence on its assumptions to the Commission to allow a full review of the demand forecasts underlying the LRIC models.

106. Additional information about the modelling approach was provided in Annex 2 of the consultation paper.

NETWORK COSTING

107. The main methodological issues which arise in relation to the measurement of costs (i.e., operating costs, capital costs and fixed and joint costs) in the bottom-up TSLRIC model are discussed below.

Costing Assets

108. Capital costs used for purchasing fixed assets, such as network equipment, represent the bulk of a fixed or mobile operator's total cost base. As fixed assets by definition are used over a number of years, their costs should also be recovered over a number of years. There are a number of approaches to determining costs for fixed assets.

109. The Commission has determined that capital costs be estimated based on a tilted annuity approach. A *tilted annuity* calculates an annuity charge that changes between years at the same rate as the price of the asset is expected to change (i.e., the charge is constant in real terms). A tilted annuity also has the advantage of setting prices that reflect the current acquisition cost of assets, rather than the cost at which assets were acquired in the past. Such current cost accounting (CCA) approaches are generally preferred by regulators when setting interconnection rates.

110. The Commission has determined that capital costs be estimated based on a tilted annuity approach.

Asset cost inputs

111. The standard tilted annuity depreciation formula that C&W will need to use is set out below:

$$\frac{WACC - \Delta p}{1-\left(\frac{1+\Delta p}{1+WACC}\right)^{Asset\ life}} \times Asset\ Value$$

The inputs required are:

- WACC = the weighted average cost of capital;
- Δp = rate of price change ("tilt");
- The current replacement cost of the asset; and
- The determined useful asset life of the asset.

Cost of capital

112. The annual capital cost estimates will need to include an appropriate allowance for a reasonable return on investment. The cost of capital is typically measured using the WACC. The WACC estimates for the fixed and mobile network assets will form an input to the TSLRIC model. C&W shall provide a separate WACC study which will be reviewed by the Commission and its consultants before being applied to the TSLRIC model.

113. WACC estimates values for the fixed and mobile networks shall be obtained using the Capital Asset Pricing Model (CAPM) methodology, which is consistent with international best practice.

114. The Commission will review the resulting WACCs to ensure the cost of capital reflects the best estimate of that of an efficient operator.

Asset Costs and Price Changes

115. The Commission requires the underlying sources for all the unit costs input data to be clearly explained in C&W's TSLRIC documentation as part of the TSLRIC model assumptions.

116. Any equipment unit cost data shall include the following three elements:

- Direct capital costs;

- A mark-up for capitalised installation and commissioning cost; and
- A mark-up for equipment spares which are required and justifiable from a network operations perspective.

Assumptions on the rate of equipment price changes, which is one input to the tilted annuity calculation, shall be based on analyses of the trends to date.

Expected Asset Lives

117. In addition to the network design assumptions above, C&W shall define, as part of the network design and costing exercise, the average expected lifetime of each asset. The asset lives shown in C&W's statutory accounts provide a good starting point for this. However, there may be reasons for amending these asset lifetimes for the TSLRIC modelling exercise to take account of current engineering and economic realities.

118. The Commission will, as part of its general review of C&W's draft LRIC models, also assess C&W's asset lives assumptions to ensure that these are reasonable and in line with international practice.

Operating Costs

119. In addition to the costs of purchasing network equipment, the model shall include the operational expenditure directly or indirectly resulting from operating and maintaining the network. Indirect costs shall include a range of common corporate support activities.

120. Many bottom-up models estimate operating costs on the basis of operating cost to replacement cost mark-ups (or "expense factors"). These expense factors are then applied to the network capital costs (i.e. the gross replacement cost) estimated in the bottom-up LRIC model. A similar approach shall also be applied to common costs, for which separate expense factors would need to be derived. There are two common approaches to estimating expense factors namely: the operator's top-down data or benchmarking data.

121. The operating costs shall be drawn from C&W's Enhanced Allocation Model (EAM). While the Commission believes that C&W's reported costs are likely to reflect the costs of operating in the Barbados environment, it believes the costs must be adjusted to take account of the network as modelled, compared to C&W's current network. Such adjustment shall take account of a range of factors including:

- Differences in the dimension of the network, reflecting different levels of demand;
- Changes in unit costs over the period of the model; and
- Increased efficiency resulting from the use of more modern technology and productivity increases over time.

122. Therefore C&W shall adopt a Top-down data approach and base estimates of operating costs on its reported costs, adjusted to take account of the factors that would lead to the costs of the modelled efficient operator to differ from the level of costs reported.

Other Costing Issues

Working Capital

123. Working capital is required because companies typically face a delay between paying out cash for inputs and receiving cash for outputs and models may contain an allowance for this. As part of its modelling submission, C&W must provide evidence in support of the working capital requirements included in its TSLRIC models.

Shared Cost between Different Networks

124. The TSLRIC model would take account of the sharing of certain assets by reducing the costs recognised by an individual operator. Shared costs could include:

- Cross-border assets (i.e., network assets and operations shared with operations in other jurisdictions);
- Assets shared between fixed and mobile networks; and

- Assets shared between mobile networks within Barbados (i.e. such as masts shared between Digicel and C&W).

125. Taking into consideration comments received during the consultation period, the Commission has decided that such costs should be reduced by applying an appropriate coefficient to the specific network costs that is subject to sharing thereby reflecting the proportion of cost relevant to the modelled network.

REPORTING REQUIREMENTS

126. The Commission's role as the regulator is to critically review the output of the models. In order to conduct the review, C&W must submit both the model itself and supporting documentation to the Commission. Below the Commission sets out the reporting requirements for C&W in the context of the LRIC modelling submissions.

General Model Requirements

127. LRIC models tend to be extensive and complex. When building a TSLRIC model, C&W needs to ensure that the model is logically structured and sufficiently detailed in order to allow the Commission to easily review the model. Unless standard-software such as MS Excel is used, the model needs to be submitted along with the software that allows the Commission to verify and run the models.

Sensitivity Analysis

128. The TSLRIC model needs to be fully articulated and flexible thus allowing the Commission to examine the impact of changes, within a reasonable range in:

- Demand forecasts;
- Market share assumption of the hypothetical operator;
- Equipment prices;
- Network Quality of Service (or proxies such as utilisation levels);

- The WACC values;
- The adjustments applied to operational expenditure;
- The applied annualisation methodologies; and
- Asset lives.

Required Documentation

129. To ensure that C&W has developed the TSLRIC models in line with its guidelines, the Commission will review the models upon completion. To facilitate this review process, C&W shall submit to the Commission, as part of its TSLRIC model submission, detailed documentation of its modelling approach and modelling tool.

130. As part of its TSLRIC submission C&W needs to, at a minimum, provide the following documentation:

(1) TSLRIC *model documentation* which will contain, at a minimum:

- The specifications used when developing the model setting out an overview of the modelling approach taken (including a compliance table for all requirements set out in the upcoming TSLRIC guidelines). These model specifications would have been agreed with the Commission at the beginning of the LRIC model development process.
- A description of and source for each input data used within the models;
- A detailed explanation on each modelling assumption applied;
- A comprehensive description of the network dimension analysis and subsequent network costing (including key design parameters, assumed network algorithms and an explanation of the main equipment types);
- A detailed description of the approach applied to derive the operational cost estimates (including, for example, an overview

of the source data, assumptions applied and a list of the resulting adjustments); and

- The route factor matrix applied in each model as well as a detailed explanation of how these route factors were derived.

(2) A *user guide* to the TSLRIC model setting out a step-by-step guide to these files (including, for example, an overview of the main model flows, where to locate any input data and modelling results, and how to undertake the sensitivity analyses).

Dated this 12th day of December, 2011

Original Signed by

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Neville V. Nicholls

Chairman

Original Signed by

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Andrew S. Downes

Deputy Chairman

Original Signed by

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Gregory F.M. Hazzard

Commissioner

Original Signed by

……

Trevor T. Welch

Commissioner

FAIR TRADING COMMISSION

BARBADOS **NO. 0001/11**

FAIR TRADING COMMISSION

IN THE MATTER of the Utilities Regulation Act, CAP 282 of the Laws of Barbados;

IN THE MATTER of the Utilities Regulation (Procedural) Rules, 2003;

IN THE MATTER of Utilities Regulation (Procedural) (Amendment) Rules (2009);

AND IN THE MATTER of the Long Run Incremental Cost (LRIC) Guidelines for Cable & Wireless (Barbados) Limited

BEFORE:

Sir Neville Nicholls	Chairman
Professor Andrew Downes	Deputy Chairman
Mr. Gregory Hazzard	Commissioner
Mr. Trevor Welch	Commissioner

ORDER

In recognition of the issues that have been considered and determined by the Commission during the consultation process on the Long Run Incremental Cost (LRIC) Guidelines to be followed by Cable & Wireless (Barbados) Limited (C&W).

UPON CONSIDERATION of the Fair Trading Commission's decision on the C&W Consolidated Reference Interconnection Offer (RIO) dated February 22, 2010 which determined that C&W should undertake a LRIC study to determine interconnection costs and tariffs;

AND UPON READING the responses to the LRIC Consultation document including the responses by C&W, Digicel and CARITEL to the ten (10) specific questions submitted by the Commission;

IT IS HEREBY ORDERED AS FOLLOWS:-

C&W shall follow the LRIC Guidelines as determined by the Fair Trading Commission in its decision of December 12, 2011 when developing the LRIC Model. The Guidelines cover the principles used within the model, the specific assumptions and the processes required by the Commission.

Dated this 12th day of December, 2011

Original Signed by

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Neville V. Nicholls

Chairman

Original Signed by

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Andrew S. Downes

Deputy Chairman

Original Signed by

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Gregory F.M. Hazzard

Commissioner

Original Signed by

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Trevor T. Welch

Commissioner