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Suggested Scoring Criteria for BTOP Broadband Infrastructure Deployment Grants

Congress defined five specific considerations for NTIA to consider when awarding BTOP grants:

- Increase affordability and subscribership of broadband service to greatest population of users in the area.
- Provide greatest broadband speed possible to the greatest population of users in the area.
- Will enhance service for health care delivery, education or children to the greatest population of users in the area.
- Will not result in unjust enrichment.
- Applicants' status as a socially and economically disadvantaged small business.

There are other unique general purposes of BTOP outlined in the legislation:

- Provide broadband education, awareness, training, access, equipment and support to educational institutions, community support organizations, organizations targeting vulnerable populations, and job creating strategic facilities.
- Improve broadband access and use by public safety agencies.
- Stimulate demand for broadband, economic growth, and job creation.

Other unique considerations in the bill include:

- Project completion
- New investment only (BTOP)
- 20 percent match (BTOP); projects where all elements are fully funded (RUS)
- Adherence to openness, non-discrimination and interconnection conditions (BTOP)
- Current or former REA Title II borrowers (RUS)
- Projects that result in end users having the choice of more than one provider (RUS)

And finally, there were additional unique concerns raised by NTIA in its public notice:

- Long-term feasibility of investment
- Prior RUS funding
- Project relates to other parts of ARRA

To translate these various purposes, concerns and considerations into a mathematical system for scoring infrastructure deployment grant applications, we grouped the above items into five unique categories, and assigned importance weights to each (for a total sum of 100 percent):

1. Affordability and Adoption - 25%
2. Speed - 25%
3. Civics - 20%
4. Efficiency - 15%
5. Job Creation - 15%

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We do not propose here a system for applications for projects that are non-deployment based, but do suggest that those applications be considered separately from infrastructure deployment projects.

We suggest the following outcome measures for each of these five criteria categories:

- Affordability & Adoption (25 total possible points)
 - Monthly Cost (15 possible points): To encourage grantees to operate networks that are generally affordable, we suggest a mechanism that measures the monthly retail service cost as a percentage of an area’s median household income. If this is above the national average of 0.7 percent of an area’s median household’s annual income (calculated assuming an average broadband subscription cost of \$30 per month per household, and an average median household income of \$51,000), then no points are awarded. If this is below 0.7 percent, points are awarded as follows (note that the values in the third column are for reference purposes only, as the actual price figures will be entirely dependent on the area in question’s median household income):

Figure 1: Point Allocation based on Service Cost

Service Price to Area’s Median Household Income Ratio	Points Awarded (Out of a Possible 15)	Comparative Monthly Price (for national average)
Less than 0.35%	15	Less than \$15/mo.
Greater than or equal to 0.35% but Less than 0.6%	10	Between \$15 and \$25
Greater than or equal to 0.6% but Less than 0.7%	5	Between \$25 and \$30
Greater than or equal to 0.7%	0	Greater than \$30

- Competition (10 possible points): To promote and ensure that end-users are able to reap the benefits of efficient competition; and to quantify the priority given to projects that result in end-users having access to more than one provider (outlined by Congress for RUS awards), we establish a point award for networks that will be operated on a wholesale (non-open access) or wholesale (open-access) basis. If the project is completely wholesale, with more than one retail provider identified in the application, 5 points will be awarded. If such a project is also operated on a non-discriminatory open access basis (i.e. all wholesale terms and conditions are made publicly available), 5 additional points will be awarded. If the project is partially wholesale (i.e. the operator is both a retail and wholesale provider) and more than one retail provider is identified in the application, 3 points will be awarded. If such a project is also operated on a non-discriminatory open access basis (i.e. all wholesale terms and conditions are made publicly available), 5 additional points will be awarded.
- Speed (25 total possible points)
 - Downstream and Upstream Speed (20 possible points): To encourage the construction of networks that are reasonable comparable to those available in urban areas, we construct a point award system that awards higher levels of points for faster services. For example, if a service has a total speed (upstream plus downstream) of less than 1Mbps, no points are awarded, while a service with a total speed greater than 100Mbps receives the full 20 points (as an aside, we recommend that all services must have upstream speeds greater than 200kbps in order to be considered for BTOP awards).

- Symmetry of Speeds (possible deduction of points): To encourage the deployment of two-way broadband *communications* networks, we propose a deduction of points for networks that are highly asymmetric. For example, a network that is 50Mbps in both the downstream and upstream direction will receive 20 points, and no asymmetry deduction. But a network that is 7Mbps in the downstream and 0.896Mbps in the upstream will receive 8 points, then a 1.44-point deduction (an 18% deduction from the 8 points; see Figure 2 below).
- Contention Ratios (5 possible points): To encourage the deployment of networks that can reasonably deliver advertised speeds, we propose a point award for networks that are not oversubscribed, as measured by last-mile contention ratios (from the first point of aggregation to the end user). So for example, a network that offers 16Mbps service to 125 users over a single 38.8Mbps DOCSIS channel will have a contention ratio of 51.5 ($16 \times 125 = 2000 / 38.8 = 51.5$). This network would receive zero out of a total of 5 contention ratio points. In contrast, a network that offers 50Mbps service over a 2.5Gbps GPON fiber network to 32 homes would have a contention ratio less than 1, and thus receive the full 5 contention points.

Figure 2: Point Allocation based on Speed

Speed (sum of downstream and upstream)	Points	Downstream: Upstream Ratio	Deduction (from gross)	Contention Ratio	Contention Points
Less than 1Mbps	0	1:1	0%	1:1	5
Greater than or equal to 1Mbps but Less than 3Mbps	2	2:1	3%	20:1	4
Greater than or equal to 3Mbps but Less than 6Mbps	5	3:1	6%	30:1	3
Greater than or equal to 6Mbps but Less than 10Mbps	8	4:1	9%	40:1	2
Greater than or equal to 10Mbps but Less than 15Mbps	10	5:1	12%	50:1	1
Greater than or equal to 15Mbps but Less than 20Mbps	12	6:1	15%	>50:1	0
Greater than or equal to 20Mbps but Less than 30Mbps	14	7:1	18%		
Greater than or equal to 30Mbps but Less than 50Mbps	16	8:1	21%		
Greater than or equal to 50Mbps but Less than 100Mbps	18	9:1	24%		
Greater than or equal to 100Mbps	20	10:1	27%		
		>10:1	30%		

To illustrate how this would work in practice, we provide 11 hypothetical networks below with varying speeds and contention ratios. Figure 3 below shows these, sorted in descending order by networks receiving higher total speed points. Here we see that a 50/50Mbps symmetrical GPON network would receive the total 25 points, while a standard residential DSL network providing 3Mbps downstream / 256kbps upstream with a 50:1 contention ratio would receive 5.2 out of the total 25 points.

Figure 3: Hypothetical Examples of Point Allocation based on Speed

Downstream Speed	Upstream Speed	Down:Up Ratio	Contention Ratio	gross points	Assymetry Deduction	net points	Contention Points	Final Points
50	50	1.0	1:1	20	0.00	20	5	25
50	20	2.5	1:1	18	0.54	17.46	5	22.46
10	10	1.0	20:1	14	0.00	14	4	18
20	5	4.0	1:1	14	1.26	12.74	5	17.74
10	2	5.0	100:1	12	1.44	10.56	0	10.56
16	2	8.0	80:1	12	2.52	9.48	0	9.48
18	0.896	20.1	50:1	12	3.60	8.4	1	9.4
7	0.896	7.8	50:1	8	1.44	6.56	1	7.56
8	1	8.0	80:1	8	1.68	6.32	0	6.32
3	0.256	11.7	50:1	6	1.80	4.2	1	5.2
1	0.256	3.9	100:1	4	0.24	3.76	0	3.76

- Civics (20 possible points)

- Public Safety Improvements (5 possible points): To encourage network providers to also incorporate public safety concerns, we suggest a subjective award of up to 5 points for projects that increase the use of interoperable broadband by public safety agencies.
- Socially and Economically Disadvantaged Small Business Concern (5 possible points): To take into consideration the goal articulated in the ARRA, we propose that businesses that meet the definition of a Socially and Economically Disadvantaged Small Business receive 5 points.
- Broadband education, awareness, training, access, equipment and support (10 possible points): To encourage applicants to go beyond mere infrastructure deployment, we suggest a subjective award of up to 10 points for projects that provide broadband education, awareness, training, access, equipment and support to educational institutions, community support organizations, organizations targeting vulnerable populations, and job creating strategic facilities. Points could also be awarded for projects that coordinate with other aspects and goals of ARRA, such as smart-grid or tele-health projects. So for example, a project that in addition to deploying residential retail broadband also provides free broadband access to a local community college or public library could receive up to 10 additional points under this criterion. Also, a project that identified business end-users of the new network who agreed to construct free public WiFi access points could also receive up to 10 additional points.

- Efficiency (15 possible points)

- Protection against unjust enrichment: USF (5 possible points): To recognize the fact that broadband brings increased “triple-play” revenue opportunities that result in less need for ongoing cost support in high-cost areas, we propose an award of 5 points for projects that affirm the end-user locations served by the ARRA-funded network will not have any need for, and will not request any ongoing Universal Service Fund High Cost program support.
- Long-term feasibility of business (5 possible points): To encourage the construction of networks that are self-sustaining, we suggest that all applicants provide a detailed business plan that

discusses the long-term prospects of the network, including expected take-rates, expected ongoing costs, and “shovel ready” nature of the projects (such as public rights-of-way agreements or tower site permits already obtained). NTIA can subjectively award up to 5 points depending on their assessment of the soundness and feasibility of each business plan.

- Long-term feasibility of network infrastructure: scalability (5 possible points): To encourage the construction of networks that will be able to meet the future needs of Internet consumers, we propose a point award system that rewards network designs that are efficiently scalable. So for example, a grant application that includes the construction of middle mile network infrastructure of sufficiently high capacity (e.g. OC-12) would be considered (in part) more scalable than a network whose only middle mile access was on a legacy DS-3 circuit.
- Jobs (15 possible points)

This criterion is to quantify the overarching goal of the ARRA -- job creation. We suggest a point award system that awards greater levels of points relative to the expected BEA RIMS-II (U.S. Bureau of Economic Analysis Regional Input-Output Modeling System) multiplier for telecommunications projects (approximately 15 jobs created per million in increased demand, or approximately \$67,000 per job). So for example, a project that has a total projected cost of \$1 million (and receives \$800,000 in BTOP funds, matched with \$200,000 of the grantee’s own funds) and creates or maintains 23 jobs will receive the full 15 points. In contrast, a project that has a projected total cost of \$1 million that creates or maintains just 9 jobs will receive only 4 of the possible 15 points. It is important to note that an applicant needs to show the direct benefit on jobs, not any future indirect benefit resulting from so-called “network effects.” Thus, the applicant should show jobs created industry wide from the project, and not just jobs created in the applicants own company. In other words, a fiber-to-the-home project will increase employment at both the network operators business, and at businesses that manufacture the fiber optic cables.

Figure 4: Point Allocation based on Job Creation

Multiplier (Jobs created per million expended in total project cost including 20% match)	Points Awarded (Out of a Possible 15)
Less than 5	0
Greater than 5 but Less than 10	4
Greater than 10 but Less than 15	8
Greater than 15 but Less than 20	12
Greater than 20	15

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- Required Criteria

We should note that the ARRA contains a number of criteria that are simply requirements, and thus do not need to fit into a weighting selection criteria. So for example, an applicant must demonstrate that the project would not have taken place absent the grant, and the applicant must agree to adhere to the non-discrimination contractual conditions. These are not flexible.

- Possible Criteria Not Included in Our System

We have consciously chosen to omit certain criteria that may appear in other models.

For example we do not have a criteria based on a cost-per-customer-served figure. We chose to avoid this metric because it could run counter to the goal to fund projects that would not have occurred without governmental investment. If the per customer cost is too low, that is a strong indication that the grant is an inframarginal investment that would have, or could have occurred efficiently without the grant.

We also chose to not give weight for projects that serve greater numbers of customers. We feel that there are a wide variety of projects both big and small that deserves funding. To ensure a wide range of projects are funded, and to reduce the administrative burden for NTIA and RUS, we suggest that a strata of project sizes, based on award amounts, are funded. So for example, there should be X dollars devoted to projects that have a total cost of less than \$100,000, and Y dollars devoted to projects that have total costs of more than \$100 million dollars. In this manner, a project that under our point system that receives 80 points and serves 1,000 customers need not directly compete with another project receiving 80 points but serves 100,000 customers.

Finally, we do not distinguish between un- and under-served areas for the purpose of awarding infrastructure deployment grants. We feel that once the criteria for these are set, and once an area is certified as meeting either definition, then they should have equal status to compete for grants under the point award system we've described above.